



# COMMUNICATIONS INFRASTRUCTURE STANDARDS & SPECIFICATIONS

Version 3.0 May 1<sup>st</sup>, 2025

**PUBLIC** 





Document Number: STANDARD-NETEDGE-001

## **Document Ownership**

**Executive Owner:** 

Name: Gordon Gilmour

Title: Director, Communications

Technologies, PHSA

**Primary Contacts:** 

Name: Sunny Chan, MSc, MBA, PEng

Title: Provincial Manager, Network Edge

Name: Edmund Goh, RCDD, NTS, OSP, RTPM, ASCT

Title: ICT Consultant, Network Edge

Prepared By:

Name: Network Infrastructure Team (NIT)

Completion Date: April 1st, 2025

**Reviewed By:** 

Name: Edmund Goh Name: Infrastructure Standards Group

Title: ICT Consultant Date: April 23<sup>rd</sup>, 2025

Dept: Network Edge
Date: April 1st, 2025

**Approved By:** 

Name: Gordon Gilmour

Title: Acting Director, Communications

Technologies, PHSA Date: April 23<sup>rd</sup>, 2025

Revision History				
Status	Version	Date	Author	Details of Change
Final	2	May 1st 2024	Edmund Goh	Approved
Draft	1	April 1st 2025	Edmund Goh	Revised Section 27 00 00
Draft	1	April 1st 2025	Edmund Goh	Revised Section 27 01 00
Draft	1	April 1st 2025	Edmund Goh	Revised Section 27 05 26
Draft	1	April 1st 2025	Edmund Goh	Revised Section 27 05 28
Draft	1	April 1st 2025	Edmund Goh	Revised Section 27 05 53





# Document Number: STANDARD-NETEDGE-001

Draft	1	April 1st 2025	Edmund Goh	Revised Section 27 11 00
Draft	1	April 1st 2025	Edmund Goh	Revised Section 27 13 13
Draft	1	April 1st 2025	Edmund Goh	Revised Section 27 15 00
Draft	1	April 1st 2025	Edmund Goh	Revised Section 27 00 00.01
Draft	1	April 1st 2025	Edmund Goh	Revised Appendix C
Draft	1	April 1st 2025	Edmund Goh	Revised Appendix E.1
Draft	1	April 1st 2025	Edmund Goh	Revised Appendix E.3
Draft	1	April 1st 2025	Edmund Goh	Revised Appendix E.4
Draft	1	April 1st 2025	Edmund Goh	Revised Appendix G.1
Draft	1	April 1st 2025	Edmund Goh	Revised Appendix K
Draft	1	April 1st 2025	Edmund Goh	Revised Appendix L
Final	3.0	April 23 <sup>rd</sup> 2025	Edmund Goh	Approved





28

		Page 1 of 154
27 00 00 INTI	RODUCTION	12
1.1	Goals	12
1.2	Scope	12
1.3	Application and Intent	13
27 01 00 COM	MMUNICATIONS SYSTEMS OVERVIEW	15
Part 1	General	15
1.1	Summary	15
1.2	Related Sections	15
1.3	List of Abbreviations	15
1.4	Introduction	16
1.5	Overview	16
1.6	Referenced Codes and Standards	17
1.7	Application Standards	18
1.8	Approved Manufacturers	18
1.9	Manufacturers	19
1.10	Contractor Qualifications	19
1.11	Approved Communications Contractors	19
1.12	Warranty	19
1.13	Manufacturer's Cabling System Application Warranty	19
1.14	Acceptance Conditions	20
1.15	Communications Consultant	21
27 01 10 BAS	SIC REQUIREMENTS	25
Part 1	General	25
1.1	Summary	25
1.2	Related Sections	25
1.3	Contractor Responsibilities	25
1.4	Communications Rooms - Dust Containment and Access	26
1.5	Materials	28
1.6	Drawings	28
1.7	Acceptance Conditions	28

PHSA April 1<sup>st</sup>, 2025

Pre-Installation Site Survey

1.8





		Page 2 of 154
27 05 00 CON	MMON WORKS	29
Part 1	General	29
1.1	Summary	29
1.2	Related sections	29
1.3	Contract Drawings and Specifications	29
1.4	Shop Drawings, Submittals and Construction Documents	30
1.5	Review and Approval	31
1.6	Contractor's Foreman	31
1.7	Project Meetings	31
1.8	Coordination on Site	32
1.9	Sequence and Scheduling	32
1.10	Pricing	33
1.11	Permits, Fees, Taxes and Inspections	33
1.12	Coordination, Clarifications and Addenda	33
1.13	Inspections	34
1.14	Substantial Performance	34
1.15	Certification of a Communications System	35
27 05 26 GRO	DUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS	37
Part 1	General	37
1.1	Summary	37
1.2	Related sections	37
1.3	References	37
1.4	Statutory Authority – Electrical Safety	37
1.5	Definitions	37
1.6	System Description	38
Part 2	Products	38
2.1	Grounding & Bonding Conductors	38
2.2	Grounding Busbars	38
2.3	Connectors	39
Part 3	Execution	39
3.1	General	39
3.2	Identification	39





		Page 3 of 154
3.3	Grounding & Bonding Conductors	39
3.4	Grounding Busbars	41
3.5	Connectors	41
3.6	Outside Plant Electrical Protection Connectors	42
27 05 28 PAT	HWAYS FOR COMMUNICATIONS SYSTEMS	43
Part 1	General	43
1.1	Summary	43
1.2	Related Sections	43
1.3	References	43
1.4	System Description	43
1.5	Submittals	44
Part 2	Products	44
2.1	Cable Tray	44
2.2	Cable Hangers	45
2.3	Electrical Metallic Tubing (EMT) and Fittings	45
2.4	Pull Boxes	45
2.5	Liquidtight FLexible Metallic Conduit (LFMC)	45
2.6	Duct Plugs	45
2.7	Underground Cable Racks	46
2.8	Communications System Outlet Boxes	46
2.9	Communications System Outlet Plates	46
2.10	Surface Raceways Products	46
2.11	Maxcell Innerduct	47
Part 3	Execution	47
3.1	General	48
3.2	Entrance Ducts	50
3.3	Campus Perimeter Pathway System	50
3.4	Duct Plugs	51
3.5	Underground Cable Racks/ Supports	51
3.6	Backbone Conduits and Sleeves	51
3.7	Pathways through Fire-rated Barriers	51
3.8	Cable Tray System	52





		Page 4 of 154
3.9	Cable Hangers	54
3.10	Conduit	54
3.11	Outlet Boxes	58
3.12	Pull Boxes	59
3.13	Surface Raceways Installation	59
3.14	Maxcell Innerduct	59
27 05 29 FIRE	STOP SYSTEMS	60
Part 1	General	60
1.1	Summary	60
1.2	Related Sections	60
1.3	Requirements	60
1.4	Documents	60
1.5	References	60
1.6	Quality Assurance	61
1.7	Training	61
Part 2	Products	61
2.1	General	61
2.2	Specific Requirement	63
2.3	Acceptable Manufacturers	63
2.4	Materials	63
Part 3	EXecution	65
3.1	Coordination	65
3.2	Installation	65
3.3	Existing Penetrations	66
3.4	Masonry Pointing Pattern	66
3.5	Inspecting Authorities	66
27 05 53 IDEN	ITIFICATION FOR COMMUNICATIONS SYSTEMS	67
Part 1	General	67
1.1	Summary	67
1.2	Related Sections	67
1.3	General	67





		Page 5 of 154
Part 2	Products	67
2.1	Labels	67
Part 3	Execution	68
3.1	Installation	68
27 08 11.01 TES	STING FOR COMMUNICATIONS FIBER	76
Part 1	General	76
1.1	Summary	76
1.2	Related Sections	76
1.3	Overview	76
1.4	Testing	76
1.5	Test Results Documentation	76
1.6	Work Included	77
1.7	Fiber Quality Assurance	77
Part 2	Products	78
2.1	Optical Fiber Cable Testers	78
2.2	Optical Time Domain Reflectometer (OTDR)	79
Part 3	Execution	79
3.1	Fiber Testing	79
3.2	Acceptance of Fiber Test Results	81
27 08 11.02	TESTING FOR COMMUNICATIONS CATEGORY 3	83
Part 1	General	83
1.1	Summary	83
1.2	Related Sections	83
1.3	Description	83
1.4	Quality Assurance	83
1.5	Codes, Standards and Guidelines	83
1.6	Submittals	83
1.7	Identification	84
1.8	Definitions	84
1.9	Warranty	84
Part 2	Products	84





		Page 6 of 154
2.1	Category 3 Cable Testers	84
Part 3	Execution	84
3.1	General	84
3.2	Quantities	85
3.3	Installation	85
3.4	Grounding and Bonding	85
3.5	Testing	85
3.6	Acceptance	85
27 08 11.03 T	ESTING FOR HORIZONTAL CATEGORY 6 AND 6A	87
Part 1	General	87
1.1	Summary	87
1.2	Related Sections	87
1.3	Work Included	87
1.4	Scope	87
1.5	Quality Assurance	88
1.6	Submittals	88
1.7	Acceptance of Test Results	88
Part 2	Products	89
2.1	Products	89
Part 3	Execution	91
3.1	General	91
3.2	Balanced Twisted Pair Cable Testing	91
3.3	Administration	96
27 11 00 COM	MUNICATIONS ROOM FITTINGS	98
Part 1	General	98
1.1	Summary	98
1.2	Related Sections	98
1.3	Commmunications Rooms Overview	98
1.4	Communications Room Design	99
Part 2	Products	103
2.1	Equipment Racks / Cabinets	103





		Page 7 of 154
2.2	Cable Management Systems (CMS)	104
2.3	UTP Patch Panels	105
2.4	Optical Fiber Patch Panels	105
2.5	IDC Termination Blocks	105
2.6	Uninterruptable Power Supply (Refer to Appendix B & Con UPS)	) 105
2.7	Metered Power Bars (ePDU)	106
Part 3	Execution	106
3.1	Communications Room Finishes	106
3.2	Doors	106
3.3	Security	107
3.4	Finishes	107
3.5	Flooring	107
3.6	Floor Loading	108
3.7	Signage	108
3.8	Smoke Detector, Heat Detector, Sprinkler System	108
3.9	Fire Extinguisher	108
3.10	Lighting	108
3.11	HVAC	109
3.12	Equipment Racks / Cabinets (Refer to Drawings for Sizing)	110
3.13	Back-up Power and Power Outlets	110
27 13 13 COM	IMUNICATIONS COPPER BACKBONE CABLING	118
Part 1	General	118
1.1	Summary	118
1.2	Related Sections	118
1.3	List of terms as used in this Specification	118
1.4	Communications Multipair Copper Backbone Cabling	118
Part 2	Products	119
2.1	Multipair Inside Unshielded Twisted Pair Cable	119





		Page 8 of 154
2.2	Sealpic-F Core Multipair Backbone Cable	119
2.3	Termination Equipment	120
2.4	Cross-connect Wire	120
Part 3	Execution	120
3.1	Installation	120
27 13 23 COI	MMUNICATIONS FIBER BACKBONE CABLING	125
Network Core	e Requirement	125
Part 1	General	125
1.1	Summary	125
1.2	Related Sections	125
1.3	List of Terms as used in this Specification	125
1.4	Application Drive Distance	125
Part 2	Products	126
2.1	Fiber Backbone Cabling	126
2.2	Fiber Optic Cable Construction	127
2.3	Termination Equipment	128
2.4	Connectors	129
2.5	Fiber Management Components	129
Part 3	Execution	129
3.1	Installation	129
27 15 00 HO	RIZONTAL CABLING	131
Part 1	General	131
1.1	Summary	131
1.2	Related Sections	131
Part 2	Products	131
2.1	Category 6 Horizontal Cable	131
2.2	Category 6A Horizontal Cable	131
2.3	Communications Connectors	132
Part 3	Execution	132
3.1	Overview	132





		Page 9 of 154
3.2	Horizontal Cable Installation	133
3.3	Accessibility	135
3.4	Miscellaneous Cables	135
3.5	Lightning Protection	136
27 15 00.01 M	ODULAR FURNITURE	137
Part 1	General	137
1.1	Summary	137
1.2	Related Sections	137
1.3	Overview	137
Part 2	Products	137
2.1	Furniture Product	137
Part 3	Execution	138
3.1	Installation	138
27 16 00 CONNECTING CORDS, DEVICES AND ADAPTORS		139
Part 1	General	139
1.1	Summary	139
1.2	Related Sections	139
1.3	Copper and Fiber Patch Cords	139
Part 2	Products	139
2.1	Communications Room Copper Patch Cords	140
2.2	Work Area Copper Connecting Cords	140
2.3	Copper Connecting Cords for Wireless Access Points	140
2.4	Communications Room Fiber Patch Cords	140
2.5	Cross-connect Wire	140
Part 3	Execution	141
3.1	Duplex Fiber Polarity Guidelines for SC/LC Connectors	141
3.2	PHSA Patching Methodology	141
27 21 33 DATA	COMMUNICATIONS WIRELESS ACCESS POINTS	143
Part 1	General	143
1.1	Summary	143



		Page 10 of 154
1.2	Cabling for Wireless	143
1.3	Design Guideline for a Wireless Grid	144
Part 2	Product	145
2.1	See Horizontal Cabling Section 27 15 00	145
Part 3	Execution	145
3.1	Wireless Installation	145
3.2	Installation (indoor)	147
27 00 00.01 0	Communications Standard – Drawings	151
Table 1	Drawing Index	151
Appendix A -	PHSA Communications Standard Sample Database	154
.1	HorizontaL Cable Information	154
.2	Intra-building UTP Riser Cable Information	154
.3	Inter-building UTP Riser Cable Information	154
.4	Intra-building Fiber Riser Cable Information	154
.5	Inter-building Fiber Riser Cable Information	154
.6	Fiber Riser Cable Information - Propel & DCX Fiber Panels	154

Appendix B - PHSA Communications Standard - Power Distribution for all Communications Spaces

Appendix C - PHSA Communications Standard - UPS & ePDU

Appendix D - PHSA Communications Standard - CAD Standards for Consultants

Appendix E.1 - Belden 2400 CAT6, GXS CAT6A, and DCX Structured Cabling Systems Part Numbers

Appendix E.2 - Commscope Uniprise CAT6 CS37 Structured Cabling System Part Numbers Acute Site Renovation Project with Existing CAT6 MER/TR, and Community Site New Construction and Renovation Projects

Appendix E.3 - Commscope Systimax CAT6A Structured Cabling System Part Numbers
Acute Site New Construction Project and Renovation Project with New MER/TR

Appendix E.4 - Commscope Systimax Propel Fiber Structured Cabling System Part Numbers
Acute Site New Construction Project and Renovation Project; and Community Site New
Construction and Renovation Projects

Appendix E.5 - Hammond 4-POST Seismic Rack and Wall-mount Cabinet Assembly Part Numbers

Appendix F - PHSA Communications standard - Hilti Firestop System Details

Appendix G.1 - Identification for Biomedical Patched Cables



Page 11 of 154

Appendix G.2 – Identification for Copper and Fiber Patched Cables

Appendix G.3 - Identification for Wireless Access Points and Network Switches

Appendix H - PHSA Power Standards - UPS/ePDU Drawings

Appendix I - Category 6A Data Cabling Patching Layout

Appendix J - WIFI Standardized Deployment Process in Existing FHA CAT6 GigaBIX Cabling Environments

Appendix K – Manhole Labelling Standards - Drawing Examples

Appendix L – Powered Fiber Cable System

#### 27 00 00 INTRODUCTION

#### 1.1 GOALS

- .1 The goals of the Communications Infrastructure Standards and Specifications are to ensure:
  - .1 Provide a communications infrastructure that is capable of meeting current and future operational and clinical needs of the Health Authorities.
  - .2 Functionality, reliability and serviceability of facilities, systems and components.
  - .3 Minimum lifecycle cost of ownership including design, construction, operating and maintenance costs.
  - .4 Flexibility for growth and change.
  - .5 Resource efficiency (energy, materials).
  - .6 Safety and security.
  - .7 Value in facilities and infrastructure investment.
- .2 In the design and installation of a robust healthcare solution, the Communications Infrastructure Standards and Specifications emphasize the importance of:
  - .1 Utilizing best practices for design and deployment of cabling infrastructures.
  - .2 Considering the impacts of multiple technologies, networks and cabling systems.
  - .3 Addressing how MACs and future cabling upgrades shall be achieved.
  - .4 Considering the type of area and zone density needs (Acute Environments Low, Medium and High per ANSI/TIA-1179-A / Community Environment Commercial Building ANSI/TIA 568-C) in conjunction with end user functional requirements.
  - .5 Anticipating and accommodating future needs in complex healthcare environments.

#### 1.2 SCOPE

- .1 This document serves as the standard of quality and performance for the design and installation of communications infrastructure within healthcare facilities. The document covers the materials, physical components and systems that comprise of all types of Healthcare facilities. The level of quality deemed by any one standard or specification is determined on the basis of achievement of the above noted goals regarding facility functionality, reliability, sustainability, accessibility, safety, security, serviceability and lifecycle cost.
- .2 The document covers:
  - .1 Mandatory minimum standards and specifications.
  - .2 Acceptable practices.
  - .3 Common systems and components.
  - .4 Performance and Acceptance criteria.
  - .5 Procedural standards.
- .3 There are two categories of healthcare sites identified in the Communications Infrastructure Standards and Specifications Acute (Hospital) and Community (Assisted Living / Residential Care) Sites

Page 13 of 154

- .1 In some areas, the application of the standards and specifications will be different depending on whether the site is deemed to be an Acute (Hospital buildings) or Community (Assisted Living, Public Health) site.
- .2 However, determining whether a site's communications infrastructure should be built to an Acute or Community standard is not always clear cut.
- .3 There are a number of sites that fit between the bookends of "Acute" and "Community". Furthermore, the distinction between different kinds of facilities continues to diminish as healthcare sites of all kinds increasingly require robust and redundant IT infrastructures and technologies to improve care and patient outcomes and enable new operating models.
- .4 In these instances, determining how the standard will be applied will always be based on a collaboration between PHSA and key stakeholders in the Health Authorities. Communications Consultants, Professional Engineers, the Builder (Design-Builder or Project Co) or the Communications Contractor will always obtain direction on whether to treat a facility as either an Acute or Community site.
- .5 Examples of Acute or Community sites:
  - The Communications infrastructure within hospital buildings, including backbone pathways from the entrance room to the Communications room, must be designed to endure the entire lifespan of the building, regardless of the services it currently supports. Any changes in services should not necessitate upsizing the Communications room and pathways. This approach not only leads to long-term cost savings but also minimizes disruptions to patient care.
  - .2 All hospital buildings and Health Authorities' owned Outpatient buildings e.g. Jim Pattison Outpatient and Surgical Centre are classified as Acute sites.
  - .3 Community sites are leased spaces located outside the hospitals. Examples of Community sites include but are not limited to the following: Regional Computer Training Space, Primary Care Centre, Hospice, Kidney Dialysis, Assisted Living, Public Health, Home Health, Addiction Treatment Centre, Youth Clinic, Corporate Finance and HR, Health Informatics, Youth Health Centre, Community Outpatient Ambulatory Clinic, Community Outpatient Services, Health Protection Office, MRI Clinic, Friendship Centre Clinic, Sexual Health Clinic, etc.

#### 1.3 APPLICATION AND INTENT

- .1 The standards and specifications apply to all projects involving communications infrastructure.
- .2 Applicable projects include new construction (regardless of delivery method P3, Design-Build, Design-Bid-Build, Construction Management, etc.), renovations, upgrades and cyclical maintenance / renewal work.
- .3 Compliance with these standards and specifications shall be part of all consultant agreements. Specific applicability of the standards and specifications shall be directed to the consultant before fees are submitted. All proposed variances from these standards and specifications must be approved by PHSA Network Edge (NE) Representative throughout all stages of the design and construction.
- .4 The standards and specifications are intended to be used by:
  - .1 Consultants and Professional Engineers.
  - .2 Facilities Management, Maintenance and Operations

.3 Suppliers and contractors

Page 14 of 154

- .5 Consultants and Professional Engineers are expected to use these standards and specifications to develop their own Project specific specifications and drawings.
- .6 Project Registered Communications Distribution Designer (RCDD)
  - .1 The Lead Project Consultant shall be responsible for providing a BICSI certified RCDD local to the project's location to work with the Health Authorities' representatives as directed.
  - .2 The RCDD shall be an expert in all current and applicable codes and standards including but not limited to the current BICSI Telecommunications Distribution Methods Manual (TDMM), and the current PHSA Communications Infrastructure Standards & Specifications. The PHSA Standards shall be the highest authority at all times unless communicated otherwise in specific instances. The RCDD will communicate with the PHSA lead Information and Communications Technology resource on the project for clarification and guidance for all Communications infrastructure items not covered by the PHSA Standards.
  - .3 The RCDD shall abide by the duties and responsibilities noted in the PHSA Standards and provide services accordingly. Refer to 27 01 00 COMMUNICATIONS SYSTEMS OVERVIEW; Part 1; 1.10 and 1.15 for more information.
  - .4 Unless otherwise communicated, all approved drawings issued must bear an official stamp, a signature and the date from the RCDD indicating compliance. The RCDD shall attend milestone meetings with LMFM as determined by the LMFM PM in charge and the supervising Health Authority IT PM and the PHSA Technical Project Manager.
- .7 Contractors that are engaged directly by PHSA shall refer to these standards and specifications for all their installations. Contractors that are engaged directly by Facilities Maintenance and Operations shall refer to these standards and specifications as they relate to connection to the Health Authority's data network for all their installations e.g. BMS, lighting control, access control, CCTV, metering, generator control, elevator, fire alarm, master clock system, nurse call, public address system, and/or any other applications not specifically noted.

**END OF SECTION 27 00 00** 

Page 15 of 154

## 27 01 00 COMMUNICATIONS SYSTEMS OVERVIEW

P	ΑF	<b>?T</b>	1	GENERAL
---	----	-----------	---	---------

## 1.1 SUMMARY

1	Summarv
	Carring

- .2 Related Sections
- .3 List of abbreviations
- .4 Introduction
- .5 Overview
- .6 Reference codes and standards
- .7 Application standards
- .8 Approved manufacturers
- .9 Manufacturers
- .10 Contractor qualifications
- .11 Approved Communications contractors
- .12 Warranty
- .13 Manufacturer's cabling system application warranty
- .14 Acceptance conditions
- .15 Communications Consultant

#### 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 01 10 Basic Requirements
  - .2 Section 27 05 00 Common Works for Communications Systems
  - .3 Section 27 08 11.01 Fiber Optic Testing
  - .4 Section 27 08 11.02 Copper Testing
  - .5 Section 27 08 11.03 Horizontal Caté & Cat6ATesting
  - .6 Section 27 11 00 Communications Room Fittings
  - .7 Section 27 13 13 Copper Backbone Systems

#### 1.3 LIST OF ABBREVIATIONS

- .1 The following abbreviations may be used within this specification document and in the drawings.
  - .1 AHJ: Authority Having Jurisdiction
  - .2 ANSI: American National Standards Institute.
  - .3 ASTM: American Society for Testing and Materials
  - .4 BICSI: Building Industry Consulting Service International
  - .5 CATV: Cable TV
  - .6 CP: Consolidation Point
  - .7 CSA: Canadian Standards Association equipment safety approvals and testing for Canada
  - .8 EF: Entrance Facility
  - .9 EGB: Electrical Ground Breaker
  - .10 ETL: ETL Testing Laboratories product testing laboratory for U.S. and Canada
  - .11 FDC: Fiber Distribution Centre (Fiber splice tray or termination tray)
  - .12 IDF: Intermediate Distribution Frame
  - .13 IEEE: Institute of Electrical and Electronic Engineers

Page 16 of 154

- .14 ISO: International Standards Organization
- .15 MEGB: Main Electrical Ground Busbar
- .16 NEMA: National Electrical Manufacturer's Association
- .17 SBB: Telecommunications Ground Busbar
- .18 MER: Main Equipment Room (Typical location of Network Core Switches)
- .19 EF: Entrance Facility
- .20 TR: Local Telecommunications Room
- .21 PBB: Telecommunications Main Ground Busbar
- .22 TO: Telecommunications Outlet
- .23 ULC: Underwriters Laboratories of Canada testing laboratory for Canada (see C-UL and UL)
- .24 UTP: Unshielded Twisted Pair
- .25 WA: Work Area
- .26 NE: Network Edge
- .27 PHSA: BC Clinical Support Society

#### 1.4 INTRODUCTION

- .1 PHSA with few exceptions administers all cabling within healthcare facilities. Network Edge (NE), a department within PHSA's Technology Service's Group, operates, maintains and supports Communications systems and infrastructure.
- The intent of this document is to provide standards and specifications for the implementation and maintenance of the cabling infrastructure systems in new and existing acute and community buildings. Examples of acute sites include hospitals, mental health and outpatient facilities. Examples of non-acute sites include offices, hospices, assisted living, rehabilitation centres and labs. Prior to commencing design, the design team is to engage the PHSA NE Representative to determine the appropriate cabling standard (TIA-1179-A vs. TIA-568D) to apply to the project.
- Any new building shall be opened up for competitive pricing between Commscope and Belden systems for fiber and copper cabling systems. For existing building in a hospital or community site, it shall be opened up for competitive pricing between Commscope and Belden systems for fiber cabling system. For copper cabling system, if the building has standardized on Commscope, then that system shall be implemented. If it has standardized on a Belden system, then that system shall be implemented.
- .4 This document is the property of PHSA NE Department.

#### 1.5 OVERVIEW

- .1 This document must be read, interpreted and coordinated with all other related PHSA technical standards and specifications to deliver a complete Communications infrastructure system.
- .2 These standards and specifications prescribe minimum mandatory requirements for communications infrastructure systems within all buildings, up to and including the Communications outlet, and between buildings to the extent of a region and province wide environment
- .3 A structured approach is specified which shall ensure a flexible distribution system that shall minimize the future costs of moves, additions and changes.
- .4 The Contractor shall supply, furnish, and install: all material, labour, apparatus, tools, equipment and services required for construction and put into regular operation the complete Communications system, as shown on the Communications Drawings, described in the specifications and any attached appendices.
- .5 Renovations in existing buildings shall always reflect the intent of these standards and specifications.

Page 17 of 154

Any and all proposed changes to standards and specifications shall be subject to approval in writing to the PHSA NE Representative prior to implementation.

#### 1.6 REFERENCED CODES AND STANDARDS

- .1 Comply with the latest British Columbia Building Code, and Canadian Electrical Code, including all provincial and other amendments, any local by-laws or rules and regulations requirements of Lower Mainland Facilities Management regulating the installation of Communications facilities.
- .2 Provide underground systems in accordance with CSA C22.1-15 edition, except where specified otherwise.
- .3 Equipment and materials shall bear the approval of the Canadian Standards Association and where applicable, the Underwriters Laboratories of Canada or alternately shall bear local approval from the Electrical Inspection Department having jurisdiction. Include in the contract all costs associated with obtaining local approvals.
- .4 If there is a conflict between the Drawings and Specifications and the above noted codes, by-laws, rule and orders, the codes, by-laws, rules and orders shall govern. In no instance, however, shall the standards established by the Contract Documents be reduced by any of these codes or regulations.
- .5 Install and test telecommunications cabling networks as per the latest manufacturer's requirements and in accordance with the following standards: Note: the current ANSI/TIA Standards shall apply:
  - .1 ANSI/TIA Standards.
    - .1 ANSI/TIA-568.0-E-2020 Generic Telecommunications Cabling for Customer Premises standard
    - .2 ANSI/TIA-568.1-E-2020 Commercial Building Telecommunications Infrastructure Standard
    - .3 ANSI/TIA-568.2-D-2018 Balanced Twisted Pair Telecommunications Cabling and Components Standard
    - .4 ANSI/TIA-568.3-E-2016 Optical Fiber Cabling and Components Standard
    - .5 ANSI/TIA-569-E-2019 Commercial Building Standard for Telecommunications Pathways and Spaces
    - ANSI/TIA-606-D-2021 Administration Standard for Commercial Telecommunications Infrastructure
    - .7 ANSI/TIA -607-E-2019 Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
    - .8 ANSI/TIA-570-E-2018 Residential Telecommunications Infrastructure Standard
    - .9 ANSI/TIA-758-B-2012 Customer Owned Outside Plant Telecommunications Cabling Standard
    - .10 ANSI/TIA-1179-B-2017 Healthcare Telecommunications Cabling Standard
    - .11 ANSI/TIA-942-C-2024 Telecommunications Infrastructure Standard for Data Centers
    - .12 ANSI/TIA-TSB-162-B-2021 Telecommunications Cabling Guidelines for wireless Access Points
    - .13 ANSI/TIA-862-C-2022, Structured Cabling Infrastructure Standard for Intelligent Building Systems
  - .2 The Canadian Electrical Code Part 1, C22.1-15 edition.
  - .3 BC Amendments to the CEC and associated bulletins.
  - .4 IEEE 802.3 series of Ethernet Standards.
  - .5 IEEE 802.11 series of Wireless Standards.
  - .6 ISO 8802-3 series of Standards.
  - .7 BICSI latest technical manuals:

Page 18 of 154

- ANSI/BICSI 001-2017 R22, Information and Communication Technology Systems Design and Implementation Best Practices for Educational Institutions and Facilities
- .2 ANSI/BICSI 002-2024, Data Centers Design and Implementation Best Practices
- .3 ANSI/BICSI 003-2024 Building Information Modeling (BIM) Practices for Information Technology Systems
- .4 ANSI/BICSI 004-2018, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities
- .5 ANSI/BICSI-006-2020 Distributed Antenna System (DAS) Implementation Best Practices
- .6 ANSI/BICSI 007-2024, Information Communication Technology Design and Implementation Practices for Intelligent Buildings and Premises
- .7 ANSI/BICSI 008-2024, Wireless Local Area Network (WLAN) Systems Design and Implementation Best Practices
- .8 ANSI/BICSI N1-2019, Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure
- .9 ANSI/BICSI N2-17, Practices for the Installation of Telecommunications and ICT Cabling Intended to Support Remote Power Applications
- .10 ANSI/BICSI N3-20, Planning and Installation Methods for the Bonding and Grounding of Telecommunication and ICT Systems and Infrastructure
- .11 ANSI/BICSI G1-17, ICT Outside Plant Construction and Installation: General Practices
- .12 Information Technology Systems Installation Methods Manual (ITSIMM) 8<sup>th</sup> Edition
- .13 Network Systems and Commissioning (NSC) reference
- .14 Outside Plant Design Reference Manual 6th Édition
- .15 Telecommunications Distribution Methods Manual 15<sup>th</sup> Edition
- .16 ICT Terminology Handbook, Version 3.0
- .6 If the Contractor notes items in the Division 27 drawings or the specifications that are code violations, promptly bring them to the attention of the Communications Consultant and or the PHSA NE Representative in writing. Where the requirements of other sections of the specifications are more stringent than applicable codes, rules, regulations, and ordinances, the specifications shall apply.
- .7 Conform to current safety and security standards, codes, and practices in effect at Health Authorities including, but not limited to:
  - .1 Workers Compensation Act Part 3 Occupational Health & Safety.
  - .2 BC Electrical Safety Act.
  - .3 The British Columbia Building Code with Amendments.
- .8 Any other reference material must be approved by PHSA before work commences.
- .9 For installations in an acute hospital setting, if there is conflict between any of the ANSI/TIA or BISCI referenced standards, ANSI/TIA-1179-A takes precedence.

## 1.7 APPLICATION STANDARDS

.1 The Certified Structured Cabling System shall be guaranteed to operate the applications which the System was originally designed to support, as well as any new applications. New applications are defined as any application introduced in the future by recognized standards organizations or user forums that use the TIA-568-C or ISO/IEC IS 11801 component and link/channel specifications for cabling.

## 1.8 APPROVED MANUFACTURERS

Page 19 of 154

- .1 All signal carrying components (connectors, cabling, panels, etc.) of the structured cabling systems for telecommunications system provision shall be from a single manufacturer.
- .2 Approved Structured Cabling Products Manufacturer: Refer to 27 01 00 1.4 Introduction.

#### 1.9 MANUFACTURERS

- .1 All horizontal cable and associated jacks, connectors, patch panels and faceplates shall be manufactured by Commscope or Belden.
- .2 All voice backbone (Riser) cables shall be Category 3; however, termination hardware located in Communications Rooms shall be Category 6.
- .3 All fiber cable shall be manufactured by Commscope or Belden.
- .4 All fiber termination hardware including SM/MM Pigtails shall be manufactured Commscope or Belden.
- .5 All fiber connectors shall be manufactured by Commscope or Belden.

#### 1.10 CONTRACTOR QUALIFICATIONS

- .1 All structured cabling installations must be performed by PHSA prequalified cable contractors.
- .2 Certified Personnel
  - 1 The Contractor shall be an authorized Commscope Partner and/or Belden CSV cabling system Installer.
  - .2 All Technicians performing cable system installation work shall be current Commscope ACT 1 & 2 and/or IBDN-700 certified. All Technician certification cards shall be checked prior to work start up. Technicians must be current employees of the Communications Contractor. No sub-contracting shall be allowed.
  - .3 The Communications Contractor shall assign a Supervisor with current RCDD certification to provide Quality Control based on the "Communications Infrastructure Standards and Specifications," and to provide weekly report to the Communications Consultant and or PHSA NE Representative.
  - .4 The Contractor shall have worked satisfactorily for a minimum of five (5) years on Commscope Partner and/or Belden CSV cabling system.
  - .5 Upon request of the Communications Consultant and or PHSA NE Representative, supply a list of references with specific information regarding type of project and involvement in supplying and installing equipment and systems.

#### 1.11 APPROVED COMMUNICATIONS CONTRACTORS

.1 Refer to PHSA Procurement for the pre-approved list of cabling contractors.

#### 1.12 WARRANTY

- .1 Contractor shall process all warranty requests from the Owner or its agents during the warranty period.
- .2 Warranties shall have certification numbers registering the installation and shall be in the effect starting from the date of Final Acceptance.

## 1.13 MANUFACTURER'S CABLING SYSTEM APPLICATION WARRANTY

Page 20 of 154

- .1 Warranty of performance for the certified system i.e. the system shall meet or exceed the channel transmission requirements specified by applicable standards (copper and optical fiber).
- .2 Warranty against defects in passive component material and workmanship for a period of twenty-five (25) years from the date of installation. The repair / replacement shall include costs of labor.
- .3 Warranty of the certified systems shall support all industry-standard applications i.e. all Category 6, Category 6A, and singlemode and multimode applications identified in current at time of installation; any Category 6, Category 6A, and singlemode and multimode applications introduced at a future date by recognized standards bodies and user forums.
- .4 In the event that the certified system is unable to support an existing or future industry standard application as defined above, and such failure can be attributed to a deficiency in the certified system, the Manufacturer shall provide, at its expense, reasonable expertise, the system materials and labor as required to remedy the problem and/or resolve the claim.
- .5 All cabling products and workmanship must include coverage as follows:
  - .1 System Application Warranty must be provided by the Subject Warranty Manufacturer.
  - .2 System Performance (Component) Warranty Certificate must be provided by the Subject Warranty Manufacturer.
  - .3 The System Application Warranty term must be a minimum of 25 years provided by the Warranty Underwriting Manufacturer, from the date of final acceptance of the project.
  - .4 The name and address of the building/facility and location of site must appear on the warranty document.
  - .5 The contractor must be fully approved and certified by the proposed Warranty Underwriting Manufacturer prior to responding to the bid as a pre-qualification.
  - Testing shall be performed by Telecommunications Technicians who are qualified to perform related tests as required by the manufacturer in accordance with the manufacturer's methods.
  - .7 The original 25 Year Warranty Certificate from the Manufacturer's shall be submitted to the Owner.

#### 1.14 ACCEPTANCE CONDITIONS

- An applications Warranty shall be issued to guarantee to operate the applications which the System was originally designed to support, as well as any new applications. New applications are defined as any application introduced in the future by recognized standards organizations or user forums that use the TIA-568-C or ISO/IEC IS 11801 component and link/channel specifications for cabling.
- .2 Description of System
  - All horizontal cabling shall be either Category 6 or Category 6A as per the requirements identified in the remainder of this document.
  - .2 Voice backbone cabling shall consist of multiples of 25, 50, or 100 pair Category 3 unshielded twisted pair cables and shall be installed from the Main Equipment Room (MER) to each TR Communications Room. The voice riser shall be sized by allocating 50 pairs per 1,000 m² (10,000 ft²). The pair count shall be rounded to the next 25 pair multiple, for Communications Room Zones serving an area greater than 1,000 m² (10,000 ft²).
  - .3 Fiber Data backbone cabling shall consist of OM5 multi-mode and or OS2 singlemode or the latest accepted standard of multimode and single mode optical cables, connectors and patch cables. The Communications Consultant shall be

Page 21 of 154

- responsible to engage the PHSA NE Representative for instruction on the latest accepted standard of multimode and single mode optical cables, connectors and patch cables to use in the Facility prior to the completion of the project's design phase.
- OM5 and OS2 single mode optical cable shall be installed from the MER to each zone TR. Strand count and termination type as specified. Minimum strand count per cable shall be 24 strands.
- .5 Horizontal cable length shall not exceed 80 meters. Horizontal cables for data and/or voice connections to BMS, Lighting control, Access Control, Nurse Call, CCTV, Metering, Generator, Elevator, Fire alarm, Master clock system and/or any other application, systems or devices not specifically noted shall conform to the standards and specifications within this document. Refer to C-STD drawings in 27 00 00.01.).
- The Contractor shall provide equipment rack(s), cabinets, cable management, PDU's and other equipment identified in other areas of this document.
- .7 The Contractor shall finalize equipment layouts of Communications rooms with Communications Consultant and or PHSA NE Representative after award of Contract.
- .8 Communications Pathways c/w Firestop of all penetrations of fire rated barriers (floors and walls).
- .9 Communications Grounding and Bonding
- .10 Installation of wired and wireless hardware and accessories supplied by PHSA. Refer to other sections of this document for exact scope of work.

## 1.15 COMMUNICATIONS CONSULTANT

- .1 Mandatory minimum qualifying requirements:
  - BICSI Registered Communications Distribution Designer (RCDD) in good standing who has performed minimum 5 years of Communications infrastructure consulting services in Healthcare Industry. If the architectural or engineering firm does not have an RCDD on staff, PHSA shall provide a list of consultants who can contract for the project.
  - .2 Internationally recognized Manufacturer certification programs i.e. Belden and Commscope.
  - .3 Outside Plant / in-premise Backbone Pathway design, 5 years of experience.
  - .4 Wireless design & engineering, 5 years of experience.
  - .5 Low voltage systems' design, 5 years of experience CCTV, CATV, Security, Access Control, Intrusion, DAS Cellular, Satellite Distribution, Nurse Call system,
  - .6 General knowledge of HVAC, Generator and UPS power, Fire Protection, Server Cabinets c/w Seismic Bracing - relating to impact on telecommunications issues & designs.
  - .7 Data Centre design and implementation, 5 years of experience.
  - .8 Knowledge of standards, codes, best design practices including electrical grounding and bonding for telecommunications infrastructure (TIA standard based).
- .2 Communications Consultant Responsibilities:
  - .1 Liaison between Construction Design Team and PHSA NE Representative and the Health Authorities' IMIT Department during the planning, design and construction phases of the project through final construction close-out.
  - .2 Detail information & procedures needed for the uninterrupted service cutover of existing services from old to new cabling systems.
  - .3 Coordinate with other design disciplines. The main areas of coordination are:

Page 22 of 154

- .1 Architectural Coordinate with the Architect on location, size and critical dimensions of communications rooms and on their construction and finishes.
- .2 Structural Coordinate with the Structural Engineer on floor loading and seismic bracing of equipment racks and cabinets in Communications rooms, and in boring holes or cutting slots in floors of existing buildings.
- .3 Mechanical Coordinate with the Mechanical Engineer on environmental control and preferred cooling solutions for communications rooms. Provide the Mechanical Engineer with the BTU loads for each communications room considering network and vendor equipment as well as UPS. It is the Communications Consultnat responsibility to work and coordinate with the Mechanical Engineer to identify the location of plenuim spaces. The Mechanical Engineer shall identify the location of the plenum spaces that fall within the scope of the project in the context of existing hospital buildings. These plenum spaces require cabling running through them in open pathways to be FT6 rated. They shall be identified on IT drawings prepared by the project RCDD. Outside of these spaces, FT4 rated cabling is acceptable by code, subject to the AHJ.
- .4 Electrical Coordinate with the Electrical Engineer on electrical services for communications rooms (convenience outlets and rack/cabinet bay power, UPS and lighting)
- .5 Fire Detection and Suppression Coordinate with the Fire Protection Consultant or Engineer on fire detection and suppression system for communications rooms.
- .6 Security Coordinating with the Security Consultant on access control and CCTV coverage for communications rooms as well as the placement of security low voltage equipment within communications rooms.,
- .7 Intelligent Building Systems (IBS) Coordinate with all applicable disciplines and with the PHSA NE Representative on the connectivity and integration requirements between the telecommunications or IT systems and the various IBS systems (BMS, Lighting Control, Access Control, CCTV, etc.)
- .4 Design and provide a series of construction specifications based on Construction Specification Institute (CSI) guidelines and detail T-drawings (plans, elevations, sections, risers) based on the latest PHSA Communications Infrastructure Standards and Specifications for review meetings with the PHSA NE Representative at various design stages preliminary, 50%, 95% and final. A typical construction drawing package must include:
  - .1 Floorplans showing the locations of all communications rooms, wiring zones, telecom outlets (identifying the types of outlets and number of cable drops per outlet) and all backbone pathway systems (risers and horizontal pathways) and cabling routes including the routes of the telecommunications grounding backbone.
  - .2 Schematic diagram of the backbone pathway system consisting of riser conduits and sleeves and horizontal conduits, sleeves and cable tray.
  - .3 Schematic diagram of the Telecommunications Grounding System.
  - .4 Schematic diagram of the backbone fiber and copper cabling systems depicting the interconnection between Communications rooms, system components, sub-systems and equipment rack and cabinets.
  - .5 Detail elevation drawings of equipment layout in floor or wall mounted racks and cabinets in communications rooms.
  - .6 Detail plan view communications room layout illustrating the layout of all communications components and equipment and referencing information supplied by other engineering disciplines and consultants such as electrical distribution (panels and receptacles) and lighting fixtures, pathways (sleeves,

Page 23 of 154

- conduits, entrance ducts, cable tray), grounding, mechanical ducting and equipment, fire detection and suppression systems, security equipment, etc.
- .7 Elevation drawings of all walls of each Communications room, clearly showing the layout of all termination hardware, grounding & bonding components, horizontal pathway penetrations, and wall mounted equipment cabinets.
- .8 General and project specific details where necessary (ex. Access floor)
   .5 For new hospital buildings, the Communications Consultant shall provide design based on ANSI/TIA 1179-A Healthcare Facility telecommunications cabling standard:
  - .1 Low cable density functional area 6 cables;
  - .2 Medium cable density functional area 14 cables;
  - .3 High cable density functional area 15 cables or more as determined in consultation with the Authority; and
  - .4 Any additional cables necessary to support all of the networks, systems and equipment to be installed or used in the Facility.
  - .5 They shall also be based on Communications port requirements signed off by end user and provided by IMIT Project Manager.
- .6 For buildings dedicated to office use, the Communications Consultant shall provide design based on ANSI/TIA 568-C Commercial Building Telecommunications Cabling Standard, and shall be based on two cables per 10 square meters of usable floor area assuming it is 80% of the total gross floor area.
- .7 In administration and clinical areas, for each work area Communications outlet install a minimum of two (2) four-pair Horizontal cables plus IMIT Project Manager functional requirements or as specified. For Wireless Access Point (A/P) locations install two (2) four-pair Horizontal cable from the outlet location to the zone Communications Room (TR). Reception Desk shall be provided with two standard outlets with two cables each.
- .8 Stamp all accepted design prints, material data sheets and shop drawings including but not limited to all outside plant duct banks and cabling, entrance facilities, Communications rooms, equipment rack layout, wall layout, riser diagrams and work area outlets. The stamp shall reference the name of the RCDD, designator number and expiration date. An additional Professional Engineer's stamp may be needed if required by the Authority Having Jurisdiction (AHJ).
- .9 Attend and participate in project meetings.
- .10 Perform installation oversight of telecommunications and low voltage systems including technical analyses and resolution of engineering problems.
- .11 Provide acceptance commissioning of project cabling systems, pathways and spaces.
- .12 Random site inspections, testing of copper and fiber shall be done at the discretion of the Communications Consultant and or the PHSA NE Representative and the Manufacturer Representative to ensure standards are being met. Contractor shall provide all necessary support and any/all requested testing documents. Note: This shall not remove the responsibility of the RCDD to ensure these standards and all Contractors' Quality Control and Quality Assurance processes are met. The Communications Consultant and or the PHSA NE Representative may also request to be present during active testing by the Contractor.
- .13 Ensure all requirements of Communications documents, drawings, addenda, site instructions, change orders and change directives issued are completed in compliance to their instructions.
- .14 Review as-built documentation of communications cabling infrastructure submitted by the cabling contractor and ensure all documentation deficiencies are resolved

Page 24 of 154

prior to final submission to the PHSA NE Representative. Refer to Section 27 05 00 for further details on what is typically included within a standard as-built package.

All AutoCAD infrastructure drawing submissions created by Communications Consultants shall comply with LMFM (Lower Mainland Facilities Management) CAD and CAFM (Computer Aided facilities Management) AutoCAD drawing format and symbol standards. Refer to Appendix D for link to the current LMFM standards.

**END OF SECTION 27 01 00** 

Page 25 of 154

#### 27 01 10 BASIC REQUIREMENTS

#### PART 1 GENERAL

#### 1.1 SUMMARY

- .1 Summary
- .2 Related Sections
- .3 Contractor Responsibilities
- .4 Communications Rooms Dust Containment and Access
- .5 Materials
- .6 Drawings
- .7 Acceptance Conditions
- .8 Pre-installation Site Survey

#### **1.2** Related Sections

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 05 00 Common Works for Communications Systems
  - .2 Section 27 08 11.01 Fiber Optic Testing
  - .3 Section 27 08 11.02 Copper Testing
  - .4 Section 27 08 11.03 Horizontal Cat6 & Cat6ATesting
  - .5 Section 27 11 00 Communications Room Fittings
  - .6 Section 27 13 13 Copper Backbone Systems
  - .7 Section 27 13 23 Fiber Backbone Systems
  - .8 Section 27 15 00 Horizontal Cabling
  - .9 Section 27 16 00 Connecting Cords, Devices and Adaptors
  - .10 Section 27 21 33 Data Communications Wireless Access Points

#### 1.3 CONTRACTOR RESPONSIBILITIES

- .1 In the event that the certified system ceases to support the certified application(s), whether at the time of cutover, during normal use or when upgrading, the manufacturer and vendor shall commit to promptly implement corrective action.
- .2 The Contractor shall use qualified service personnel to conduct all maintenance/service work and at any time shall show manufacturer's certification and/or submit references upon request of the Communications Consultant and or PHSA NE Representative.
- .3 The maintenance on site of one complete set of white prints to be used exclusively for purposes of recording changes, deviations and revisions from the original contract. Care shall be taken by directing particular attention to the location of pipes, conduits etc.
- .4 Obtain the cost for as-built CAD fees from the Communications Consultant of Record for the project, and include in the tender price. Contractor shall not provide CAD services.
- .5 Scheduling the Work in a manner acceptable to the Communications Consultant and or the PHSA NE Representative.
- The Contractor has the responsibility to ensure that all provisions of these Standards are met and to specifically advise the Communications Consultant and or the PHSA NE Representative in writing of any contemplated exceptions and obtain approval in writing for these changes.
- .7 The Contractor shall obtain and pay all required permit fees in accordance to all local regulatory bodies.

Page 26 of 154

- .8 The Communications guideline specifications generally describe the work of the Sub-Contractors, but do not intend to define the responsibility between the General Contractor and its Sub-Contractors.
- .9 The complete scope of all work is fully described in Division 27 drawings and technical specifications described herein.
- .10 The words "provide, "supply", "furnish", and "install" shall imply that the applicable Contractor shall provide all necessary labour, materials, and equipment to complete the installation and where applicable, test same to the approval of the Communications Consultant and or the PHSA NE Representative.
- .11 Unless otherwise noted or specified, the Contractor shall provide all equipment and / or materials shown on the drawings and defined in the specifications.
- Any apparatus, appliances, materials, or work not shown on the drawings, but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered, and installed by the Contractor, without additional expense to the Owner.
- .13 Establishment and verification of dimensions, elevations, grades, boundaries shown on drawings and, reporting of any errors or inconsistencies to the Communications Consultant and or the PHSA NE Representative before starting Work. Starting Work shall imply that the Contractor has verified all items and found them to be correct. Additional costs arising out of any subsequent rectifications shall be borne by the Contractor.
- .14 The maintenance of discipline and general orderliness of work areas throughout the duration of the Project.
- .15 Take steps to prevent dust from escaping the immediate work zone and from settling on or contaminating communications equipment and terminal hardware, as well as furniture and equipment.
- Contractor shall be responsible to adhere to current Infection Control & Risk Assessment policies as it is related to the installation and construction of the Hospital and include all costs associated with the contractor's installation. Ensure that a minimum of one Foreman has completed CSA approved training on infection control.

#### 1.4 COMMUNICATIONS ROOMS – DUST CONTAINMENT AND ACCESS

- .1 Dust Containment
  - .1 ANSI/TIA-569-C Commercial Building Standard for Telecommunications Pathways and Spaces:
    - .1 To mitigate dust containment, Communications rooms (e.g. main and local telecommunications rooms, exclude data centres which have more stringent requirements) shall not be used as storage areas to store cardboard boxes, ladders and other materials as they tend to accumulate dust particles. This ensures Communications rooms are kept generally clean.
    - .2 Communications rooms shall be protected from contaminants and pollutants that affect the operation and material integrity of the installed equipment and connecting hardware.
    - .3 The Contractor shall effectively protect the Communications rooms, equipment, connecting hardware and materials from dust, dirt and damage during construction.
    - .4 Dust containment measures such as vapour barrier, positive room pressure and absolute filters shall be provided.
    - .5 Precautionary measures shall be taken to ensure dust containment measures taken to protect equipment shall not cause the equipment to overheat.

Page 27 of 154

- .6 Any dust or particulates that may have resulted from the work shall be mitigated from spreading by placing the nozzle of a vacuum close to the point of drilling, cutting, grinding, sanding and the like that create dust.
- .7 The work area shall be cleaned up and vacuumed on a daily basis. Communications rooms, the outside of equipment racks, cabinets and panels, the inside of power panels, connecting hardware, Communications outlets and the like shall be vacuumed.
- .2 Requirements for Communications Room cleanliness for new construction upon substantial completion
  - .1 Prior to installing any active equipment and components in a Communications Room, the Design-Builder will:
    - .1 Complete a post-construction cleaning of the Communications Room at the sub-micron level, cleaned to ISO 14644-1 Class 8 standard or better, removing all Construction related dust and debris from all surfaces including floors, walls, ceilings, electrical and mechanical equipment, cable trays and equipment racks and all components installed within them.
    - .2 The post construction cleaning will be done professionally by a company that is specialized in cleaning critical environments. The Design-Builder must submit for the Authority's approval information related to the company's experience, references, techniques, tools and the proposed contracted scope of work detailing what will be included in the post-construction clean. If the information does not satisfy the Authority's acceptance criteria, then the Design-Builder must re-submit information until the Authority grants its approval.
  - .2 Conduct air quality testing and provide the Authority with a report and analysis of particle counts before and after the post-construction cleaning of a Communications Room; and
  - .3 The Design-Builder will supply and install clean room sticky mats, booties, curtains and plastic strip doors and air scrubbers as long as required to maintain the required air quality and keep the room clean until substantial completion of the facility is achieved.
- .3 Access and other Conditions
  - .1 For access to Communications rooms, contact Facilities Maintenance and Operations (FMO) or a PHSA NE Representative.
  - .2 Communications room door shall be kept closed at all times for cooling, infection control and security reasons.
  - .3 No Food or beverages of any type.
  - .4 No Cardboard of any type.
  - .5 No Styrofoam or packing material.
  - .6 No wood pallets.
  - .7 Shoes must be clean before entering the room.
  - .8 All un-authorized people must have prior approval from Building Owner (Health Authority, FMOor Landlord), notify PHSA NE, and begranted access by FMO before entering Communications rooms.
  - .9 All people entering the Communications rooms must sign in and out with FMO.
  - .10 Vendors/Contractors must display ID at all times.
  - .11 Equipment cannot be added or removed from the Heath Authority's network racks unless specifically stated within the project's scope of work or authorized by a PHSA NE Representative. This includes power cables, network cables and fiber cables. This requirement excludes 3<sup>rd</sup> party vendor shared rack.

Page 28 of 154

.12 Failure to comply with these rules shall result in the removal of access to the Communications rooms.

#### 1.5 MATERIALS

- .1 Materials not approved or not conforming to the Contract Documents shall be rejected
- .2 The Contractor shall identify materials with long delivery times immediately upon submittal of shop drawings and shall order such materials as soon the shop drawings are approved by the Communications Consultant and or the PHSA NE Representative
- .3 Materials shall be delivered on site in original containers and packages with labels and seals intact. Use in strict accordance with manufacturer's latest printed directions and instructions unless otherwise specified.
- Material deliveries to the site shall be the responsibility of the Contractor. After delivery, the Contractor shall take responsibility to protect material during storage and handling to prevent damage and theft. Do not store equipment or materials where conditions fall outside manufacturer's recommendations for environmental conditions. Do not install damaged material or equipment. Material or equipment damaged during installation shall be replaced.

#### 1.6 DRAWINGS

- .1 The location of various items indicated in T drawings, are approximate except where specifically mentioned.
- .2 Drawings are generally diagrammatic and are intended to indicate the scope and general arrangement of work.
- .3 The Contractor is responsible to take field measurements where equipment and material dimensions are dependent upon building dimensions.
- .4 The Contractor shall coordinate with General, Mechanical and Electrical trades as well as Furniture Layout Designer for final user outlet locations.
- .5 If any discrepancies or omissions are found in the drawings, or if the intent is not clear, the Contractor shall obtain clarification from the Communications Consultant and or the PHSA NE Representative.

## 1.7 ACCEPTANCE CONDITIONS

.1 The installed system shall be deemed acceptable when the Contractor meets the conditions specified in Section 27 05 00 of this document.

#### 1.8 PRE-INSTALLATION SITE SURVEY

- .1 Prior to start of systems installation, the Contractor shall meet at the project site with the Communications Consultant and or the PHSA NE Representative and Representatives of trades performing related work to co-ordinate efforts.
- .2 The Contractor shall review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with other trades shall be necessary to meet critical deadlines for completion of Communications Rooms and Closets.
- .3 Examine areas and conditions under which the system is to be installed. Do not proceed with the work until satisfactory conditions have been achieved.

#### **END OF SECTION 27 01 10**

Page 29 of 154

#### **27 05 00 COMMON WORKS**

Ρ	ART '	I GENERAI	
	~! \		_

#### 1.1 SUMMARY

. 1	Summary

- .2 Related Sections
- .3 Contract Drawings and Specifications
- .4 Shop Drawings, Submittals and Construction Documents
- .5 Review and Approval
- .6 Contractor's Foreman
- .7 Project Meetings
- .8 Coordination on Site
- .9 Sequence and Scheduling
- .10 Pricing
- .11 Permits, Fees, Taxes and Inspections
- .12 Coordination, Clarifications and Addenda
- .13 Inspections
- .14 Substantial Performance
- .15 Certification of a Communications System

#### 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 01 10 Basic Requirements
  - .2 Section 27 08 11.01 Fiber Optic Testing
  - .3 Section 27 08 11.02 Copper Testing
  - .4 Section 27 08 11.03 Horizontal Cate & CateATesting
  - .5 Section 27 11 00 Communications Room Fittings
  - .6 Section 27 13 13 Copper Backbone Systems
  - .7 Section 27 13 23 Fiber Backbone Systems
  - .8 Section 27 15 00 Horizontal Cabling
  - .9 Section 27 16 00 Connecting Cords, Devices and Adaptors
  - .10 Section 27 21 33 Data Communications Wireless Access Points

## 1.3 CONTRACT DRAWINGS AND SPECIFICATIONS

- .1 The Contract drawings and specifications form an integral part of the contract documents. Neither the drawings nor the specifications shall be used alone. Work omitted from the drawings but mentioned or reasonably implied in the specifications, or vice versa, shall be considered as properly and sufficiently specified and shall be provided.
- .2 Misinterpretation of any requirements on drawings, or specifications shall not relieve the Contractor of his or her responsibility of properly completing the Contract.
- .3 Where conflict exists between drawings and specifications, the Contractor shall make allowance for provision of the component, system, or installation process in a manner which shall provide PHSA with the highest monetary cost components, systems, or installation process.
- .4 Drawings are generally diagrammatic and are intended to indicate the scope and general arrangement of the Work. The Contractor shall not scale the drawings, but rather take

Page 30 of 154

- field measurements particularly where equipment and material dimensions are dependent on building dimensions.
- .5 The Contractor shall obtain information from the Communications Consultant and or the NE Representative where exact communications outlet locations are not indicated, but are specified on the plans and or specifications.
- .6 The Communications Consultant and or the PHSA NE Representative has the option of changing the location of Communications outlets to within 3 meters of designed location prior to rough-in stage at no extra cost to the Owner.

## 1.4 SHOP DRAWINGS, SUBMITTALS AND CONSTRUCTION DOCUMENTS

- .1 The Contractor shall submit to the Communications Consultant and or the PHSA NE Representative for approval all product data (including cut sheets and catalogue information) and shop drawings on the complete bill of materials for the project noting long lead-time items and providing samples and mock-ups if required by the Contract Documents.
- .2 An indexed master parts list for all items included in the shop drawings shall be provided, and showing the page number relating to all the part numbers before the Communications Consultant and/or the PHSA NE Representative can review the shop drawings. Example:

  Table of Contents

Description	Manufacturer	Part Number	Page Number
Belden Seismic 4 Post Rack 84"X19"	Belden	XDRS8419-610S02	Page 3
Rack Bottom Shelf, Solid 19"EIA X 19"Deep	Belden	9010-1919-S01	Page 3
Vertical Cable Management Kit, 10in X 84in,	CommScope	760072801	Page 3
Double Sided with Doors, Silver		VCM-DS-84-10	

- .3 The Contractor shall submit a sample binder and contents of the Manual of Operations for approval at time of shop drawings submission. Refer to Substantial Performance for further details.
- .4 The Contractor shall also present the following submittals to the Communications Consultant and or the PHSA NE Representative for review and approval:
  - .1 Manufacturer's catalogue sheets and specifications for fiber optic field-test instruments including optical loss test sets (OLTS; power meter and source), optical time domain reflectometer (OTDR) and inspection scope.
  - .2 Sample test reports.
  - .3 Field-directed changes to cross connect and patching schedule.
  - .4 Backbone cable routing or location changes.
  - .5 Fire-stop design, identifying all locations to be fire-stopped, complete with documentation, a list of all fire-stopping materials to be used, and fire-stop systems to be installed.
- .5 All above submittals must be forwarded promptly and in such sequence as to cause no delay in the work or in the activities of the other trades.
- .6 The Communications Consultant and or the PHSA NE Representative shall indicate approval of shop drawings, product data, and samples submitted by stamping such submittals with the word: "APPROVED".
- .7 Submitted shop drawings shall be signed by the Contractor, imprinted with the date submitted, and shall bear the Contractor's legitimate Company name.
- .8 By submitting shop drawings, product data, and samples, the Contractor signifies that he, or she has carefully reviewed and verified materials, quantities, field measurements, and related field construction criteria. It also signifies the Contractor has checked, coordinated, and verified that all information contained in shop drawings, product data, and samples conforms to the requirements of the Work and of the Contract Documents.

Page 31 of 154

- .9 The Contractor shall perform no portion of the Work requiring submittal and review of shop drawings, product data, or samples until the Communications Consultant and or the PHSA NE Representative has approved the respective submittal.
- .10 The Contractor shall submit shop drawings, product data, and samples to the Communications Consultant and or the PHSA NE Representative as a complete set within fifteen (15) working days subsequent to Award of Contract and prior to start of Work.
  - .1 For initial and re-submission for approval, the Contractor shall submit a soft copy of the proposal that is electronically stamped to the Communications Consultant and or the PHSA NE Representative.
  - .2 The Communications Consultant and or the PHSA NE Representative shall only return one copy of each submission.
  - .3 The Contractor shall make reproductions as required for his or her own use and distribution to subcontractors.
  - .4 The Contractor shall highlight relevant products on the shop drawings.
  - .5 The Communications Consultant and or the PHSA NE Representative shall not accept illegible submittals.
- .11 The Communications Consultant shall provide one copy of each submittal to PHSA NE Representative for review and approval.

#### 1.5 REVIEW AND APPROVAL

- .1 The Communications Consultant's and or the PHSA NE Representative's approval of the Contractor's shop drawings, product data, and samples submitted shall not relieve the Contractor of responsibility for errors, omissions, or deviations from requirements of the Contract Documents, unless the Contractor has specifically informed the Communications Consultant and or the PHSA NE Representative in writing of such deviation at time of submittal. The Contractor shall also receive written approval of the specific deviation from the Communications Consultant and or the PHSA NE Representative.
- .2 The Communications Consultant's and or the PHSA NE Representative's review and approval of shop drawings, product data, and samples, is for the limited purpose of checking for conformance with information given and design concept expressed in the Contract Documents.
- .3 The Communications Consultant's and or the PHSA NE Representative's review of Contractor's submittals is not conducted for the purpose of determining accuracy and completeness of details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor.
- .4 The Communications Consultant's and or the PHSA NE Representative's review shall not constitute approval of safety precautions or of construction means, methods, techniques, sequences or procedures.
- .5 The Communications Consultant's and or the PHSA NE Representative's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

#### 1.6 CONTRACTOR'S FOREMAN

- .1 The Contractor shall designate a Foreman to remain on the job site from the time construction commences until final completion and acceptance of the Work
- .2 The Foreman shall not be changed unless satisfactory reasons are given in writing to the Communications Consultant and or the PHSA NE Representative.

#### 1.7 PROJECT MEETINGS

.1 The Cabling Contractor's Project Manager and Foreman shall attend all meetings with the General, Mechanical, and Electrical Contractors as requested, as well as meetings that may be requested by the Communications Consultant and or the PHSA NE Representative.

#### 1.8 COORDINATION ON SITE

- .1 The Cabling Contractor shall coordinate his work with the General, Mechanical, and Electrical Contractors to ensure that all required supporting structures, such as wall plywood, conduits, trays and cable dropouts, are in place prior to commencing work.
- .2 Any conduit, outlet boxes, J-hooks, cable trays or cable dropouts that are installed at locations that contradict instructions on the drawings or in the specifications shall be immediately identified and reported to the Communications Consultant and or the PHSA NE Representative.
- .3 The Contractor shall promptly advise the Communications Consultant and or the PHSA NE Representative of any specific equipment, materials or installation that are non-conforming with or in violation of laws, by-laws or regulations of authorities having jurisdiction.

#### 1.9 SEQUENCE AND SCHEDULING

- .1 The Contractor shall submit a complete Construction Schedule for the installation of equipment (if specified), and cabling within fifteen (15) working days of Awarding of Contract.
- .2 The Construction Schedule shall indicate delivery, installation, and testing dates for each component of the project. A typical project schedule submitted by the Contractor shall provide the following key milestone dates:
  - .1 Contract Award.
  - .2 Submittal and Approval of Shop Drawings
  - .3 Key Material Procurement Dates
  - .4 Horizontal Cabling
    - .1 Cable Rough-in
    - .2 Firestopping
    - .3 Cable Termination
    - .4 Testing
    - .5 Labelling
  - .5 Backbone Cabling
    - .1 Cable Rough-in
    - .2 Firestopping
    - .3 Cable Termination
    - .4 Testing
    - .5 Labelling
  - .6 Telecommunication Grounding Backbone
    - .1 Bonding Conductor Rough-in
    - .2 Busbar Installation
    - .3 Bonding Conductor Termination
    - .4 Labelling
  - .7 Communications Room Make Ready
    - .1 Racks/Cabinets/Cable Management Installed
    - .2 Grounding and Bonding Complete
    - .3 Cable Termination Equipment Installed

.4 Labelling

Page 33 of 154

- .5 Final (Equipment Ready) Clean
- .8 Equipment Installation Dates
- .9 Submission of As-Built Documentation Package
- .10 Substantial Performance.
- .11 Communications Consultant and or the PHSA NE Representative Acceptance.
- .3 The Contractor shall ensure their schedule aligns to and is coordinated with the General Contractor's overall construction schedule as well as the schedules of other sub-trades (electrical, mechanical, etc.), PHSA and other third parties whose tasks impact either the start and/or completion of the Contractor's tasks.
- .4 The Contractor shall submit a separate demolition time schedule with applicable cut-over in areas that have existing users. This applies to any areas where systems shall need to be taken off-line.

#### 1.10 PRICING

.1 The Contractor shall provide all separate, alternate and unit pricing as specified in this or any other documents relevant to this project.

#### 1.11 PERMITS, FEES, TAXES AND INSPECTIONS

- .1 Contractor is fully responsible for compliance with Federal, Provincial and Municipal laws and regulations.
- .2 Prior to the start of the project, the Contractor shall obtain a low voltage permit. As well, at the end of the project the Contractor shall submit a request for final inspection to the Authority Having Jurisdiction (AHJ).
- .3 The AHJ is responsible for issuing electrical permits.
- .4 The Contractor shall pay all associated inspection fees.
- .5 The Contractor shall be responsible and pay for any additional time and expense occurred if re-inspections are required for deficiencies, which have not been corrected to the Owner's satisfaction.
- .6 The Contractor shall pay for all associated taxes.
- .7 Contractor shall obtain and pay for all necessary key deposits, permits and licenses.
- .8 Prior to commencement of work, the Contractor shall provide a copy of all permits to the Communications Consultant and or the PHSA NE Representative.
- .9 The Communications Consultant shall provide drawings and specifications if required by the AHJ. All costs associated with this requirement shall be included in the Communications Consultant's fee proposal.
- .10 The Communications Consultant shall be required to notify the PHSA NE Representative of changes required by the AHJ prior to making changes.
- .11 Upon substantial performance and before final payment, the Contractor shall submit a confirmation copy of acceptance for all work, issued by the AHJ, to the Communications Consultant and or the PHSA NE Representative.

## 1.12 COORDINATION, CLARIFICATIONS AND ADDENDA

- .1 Questions about the meaning and intent of this document that may require clarification shall be submitted to the Communications Consultant and or the PHSA NE Representative.
- .2 Replies to tender questions shall be issued in writing in the form of Addendum. Replies or modifications made in any other manner shall not be binding and have no legal effect.
- .3 Addenda issued by the Communications Consultant during the tender period shall be incorporated into Contractor's response, shall become part of the contract documents, and shall be reflected in the Contractor's price.

.4 Site Instructions and Change Orders shall be incorporated into the installation drawings.

#### 1.13 INSPECTIONS

- .1 The Contractor shall request and coordinate representation from the Communications Consultant and or the PHSA NE Representative for inspection of cabling system during, but not limited to the following stages of construction:
  - .1 Communications room construction
    - .1 Wall layout of various low voltage systems, entrance copper cables, grounding system, system panels, connecting hardware and GigaBIX wall.
    - .2 Floor layout of equipment racks and double-sided finger-type vertical cable managers on both sides of each rack (double-sided means 152mm -305mm wide x 254mm deep front channel for patch cables and 152mm -305mm wide x 254mm deep rear channel for horizontal cables).
    - .3 Ceiling layout of cable tray, and cable dropouts over side of tray (clip-on Cablofil 115mm deep) into vertical cable managers and GigaBIX wall. This is to provide unrestricted access of cables from the tray into the vertical managers. Cutting of tray at the bottom is prohibited.
    - .4 Proper positioning of lighting and mechanical ducting layout in relation to ceiling tray, racks and sprinkler head.
    - .5 Layout of equipment on racks horizontal cable manager, fiber patch panels, analog voice patch panels, horizontal cable patch panels in relation to switches, etc.
  - .2 Cable rough-in, dressing and termination (workmanship).
  - .3 Labelling.
  - .4 Testing and documentation.
  - .5 Old cable removal and clean up.
  - .6 Completion and acceptance.

# 1.14 SUBSTANTIAL PERFORMANCE

- .1 The Contractor shall advise the Communications Consultant and or the PHSA NE Representative in writing when Substantial Performance has been achieved. At the same time, the Contractor shall request a Deficiencies Inspection to be made.
- .2 The Contractor shall not issue Substantial Performance and a Deficiencies Inspection request until the following work has been completed and specified documentation forwarded to Communications Consultant and or the PHSA NE Representative:
  - .1 As-built record (soft copy) documentation has been provided.
  - .2 All systems have been tested and are ready for operation.
  - .3 Record of completed verification of Communications system has been provided.
  - .4 Fire-stop installation is performed as per Fire-stop Section 27 05 29.
  - .5 The clean-up is finished in all respects.
  - .6 All inspection certificates have been furnished including final low voltage and or Electrical inspection certificate.
- .3 At Substantial Performance, the Contractor shall submit drafts in soft copy soft of the following to the Communications Consultant:
  - .1 As-Built drawings.
  - .2 Maintenance Manual
- .4 As-built drawing package shall confirm location and identification of all:
  - .1 Communications Outlets and jack numbers with serving Communications Room ID.

.2 Communications Rooms.

Page 35 of 154

- .3 Communications Room boundary lines
- .4 Backbone Cable Runs.
- .5 Communications Room floor and ceiling layouts (rack, GigaBIX wall, wall-mount system panels, vertical & horizontal conduit sleeves, ceiling tray, etc.).
- .6 Fiber, Copper and Grounding schematics.
- .5 The Maintenance Manual shall typically contain the following:
  - .1 Set of final reviewed Shop Drawings.
  - .2 A copy of all as-built drawings
  - .3 Digital photos of all Communications rooms showing each wall and rack elevations
  - .4 Circuit Spreadsheets for horizontal cabling and fiber backbone (refer to Appendix A)
  - .5 Manufacturer Warranty documents for equipment and workmanship.
  - .6 Copper Warranty Certification test result printouts.
  - .7 Optical fiber power meter/light source test result printouts.
  - .8 Fire-stop design and records documentation as per section 27 05 29.
  - .9 Names, addresses, phone numbers and facsimile numbers of Contractor, Communications Consultant, sub-contractors and suppliers used on the Work together with a specification reference of the portion of the Work they undertook.
- Upon completion of the project to the Owner's satisfaction, the Contractor shall submit final documentation consisting of:
  - .1 Full size set of As-Built drawings
  - .2 (3) USB Memory Keys of As-Built drawings. As-Built Drawings are to be provided in:
    - .1 AutoCad 2015 (bind all x-Refs files)
    - .2 PDF (all files combined into a single document)
  - .3 Maintenance Manual in a hard back D-ring commercial binder.
    - Maintenance Manual shall be in a suitably labelled, hard back, D-Ring type commercial binders, each complete with an index and tabbed title sheets for each section. All binder pages shall have self-adhesive reinforcing rings at each binder ring.
    - All maintenance manual data shall be printed on 8 1/2" x 11" heavy bond, indexed, tabbed, punched and bound in the binders. Drawings shall be printed on 11" x 17". Each manual shall have a title sheet which is labelled "Operation & Maintenance Manual", and shall list the Project name, Contractor's & Communications Consultant's names, date submitted, and a Table of Contents for each volume. If a manual exceeds 75 mm in thickness, provide additional manuals as required.
  - .4 Soft copy of the Maintenance Manual in PDF format on a separate USB Memory Key
- .7 The Communications Consultant shall distribute the final project documents to the following departments:
  - .1 Full size set of As-Built drawings to the site Facilities, Maintenance and Operations (FMO) team.
  - .2 USB Memory Key of As-Built drawings to FM Support.
  - .3 USB Memory Key of As-Built drawings to the site FMO team.
  - .4 USB Memory Key of As-Built drawings to the PHSA Network Edge Department.
  - .5 Maintenance Manual in a hard back D-ring commercial binder to the site FMO team.
  - .6 Soft copy of the Maintenance Manual in PDF format on a separate USB Memory Key to the PHSA Network Edge Department.

## 1.15 CERTIFICATION OF A COMMUNICATIONS SYSTEM

Page 36 of 154

- .1 The Contractor shall ensure that the installed cabling system and the Contractor's Employees working on this project are Certified and Warrantied by the Cable Manufacturer.
- .2 The Contractor shall only use Certified Personnel who are trained and equipped to properly install a structured cabling system, including but not limited to supporting pathways, cable, termination hardware, bonding and grounding system, equipment cabinets or equivalent, and associated Communications equipment, in order to obtain system acceptance.

**END OF SECTION 27 05 00** 

Page 37 of 154

## 27 05 26 GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PARII GENERAL	P	ART 1	GENER/	۸L
---------------	---	-------	--------	----

## 1.1 SUMMARY

- .1 Summary
- .2 Related Sections
- .3 References
- .4 Statutory Authority Electrical Safety
- .5 Definitions
- .6 System Description

## 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 08 11.01 Fiber Optic Testing
  - .2 Section 27 08 11.02 Copper Testing
  - .3 Section 27 08 11.03 Horizontal Cat6 & Cat6ATesting
  - .4 Section 27 11 00 Communications Room Fittings
  - .5 Section 27 13 13 Copper Backbone Systems
  - .6 Section 27 13 23 Fiber Backbone Systems
  - .7 Section 27 15 00 Horizontal Cabling
  - .8 Section 27 16 00 Connecting Cords, Devices and Adaptors
  - .9 Section 27 21 33 Data Communications Wireless Access Points

## 1.3 REFERENCES

- .1 CEC, CSA C22.1-15 "Canadian Electrical Code" Part 1
- .2 ANSI/TIA J-STD-607-C-2015 standard

# 1.4 STATUTORY AUTHORITY – ELECTRICAL SAFETY

- .1 Canadian Electrical Code, Part 1, Twenty-third Edition.
- .2 Safety Standard for Electrical Installations.
- .3 Canadian Standards Association Standard C22.1-15 is adopted in whole, including any errata and with the changes set out in schedule, as the B.C. Electrical Code Regulation, is in force.

#### 1.5 DEFINITIONS

- .1 Define the following list of terms, as used in this specifications as follows:
  - .1 "CM": Circular Mil.
  - .2 "MBRGB": Main Building Reference Grounding Busbar.
  - .3 "TBB": Telecommunications Bonding Backbone.
  - .4 "TBC": Telecommunications Bonding Conductor.
  - .5 "TGB": Telecommunications Grounding Busbar (Old Term).
  - .6 "SBB": Secondary Bonding Busbar (New Term).
  - .7 "TMGB": Telecommunications Main Grounding Busbar (Old Term).

.8 "PBB": Primary Bonding Busbar (New Term).

Page 38 of 154

## 1.6 SYSTEM DESCRIPTION

- .1 Telecommunications Grounding as described C-STD drawings in 27 00 00.01 are to be referred to as a minimum requirement using a dedicated ground, this applies to all new and any existing communications spaces.
- .2 The types of components connected to the Telecommunications Grounding and Bonding System include but are not limited to cable tray, interlocking armoured backbone cable, equipment racks, server cabinets, active network equipment, electrical panels, cable protectors, conduit and any exposed metal inside a Communications room.
- The Telecommunications Grounding Backbone system contains grounding bus bars, ground bar conductors, and connecting devices (including but not limited to compression lugs, taps, ground bushings, clamps, or exothermic welds). These components provide a low impedance path to ground for stray voltages or spurious signals present on telecommunications media and equipment.
- .4 Grounding and bonding practices shall comply with all applicable codes.

#### PART 2 PRODUCTS

## 2.1 GROUNDING & BONDING CONDUCTORS

- .1 TBB
  - .1 Conductor: Class I stranded copper.
  - .2 Insulation: Flex EPR/Hypalon LS, green in colour.
  - .3 The cable shall have the insulation grade, the conductor gauge, and applicable UL jacket listings printed on the insulation.
  - .4 Where conductors with green insulation are not commercially available, provide a minimum of 100 mm long colour band with green, non-aging, plastic tape in accordance with CEC. This band shall occur at both ends of the conductor, and at all connections between.
  - .5 <mark>Minimum</mark> gauge: #4/0.
- .2 TBC:
  - .1 Conductor: Class I stranded copper.
  - .2 Insulation: Flex EPR/Hypalon LS, green in colour. The cable shall have the insulation grade, the conductor gauge, and applicable UL jacket listings printed on the insulation.
  - .3 Gauge: #6 AWG for racks and cabinets, armoured fiber optic cable, metallic jacket of inter-building cables, and entrance cable surge protector. As there are different TBC sizes for different connections, the TBC sizes for the following items shall be based on the AHJ: electrical panels inside Communications spaces (minimum #1 AWG), exposed structural steel (minimum #2/0), entrance conduits, metallic backbone riser conduits, cable tray, Wiremold raceway (typically #12 AWG), etc. Project specification needs to ensure it is comprehensive about the connector types relative to the scope of work.
- .3 Bonding conductor shall be green jacketed, stranded copper, soft conductor, unless otherwise noted (bare #6 AWG. for cable tray). Unless installed in conduit system, bonding conductor jacket shall be CMR/P rated as required by the AHJ.
- .4 All bonding conductors and connectors shall be approved as defined in CSA C22.1-15.

## 2.2 GROUNDING BUSBARS

.1 PBB

Page 39 of 154

- .1 Material: Copper and tin-plated
- .2 Minimum dimension of 100 mm wide X 305 mm long X 6 mm thick.
- .3 Holes: Predrilled, with standard NEMA bolt hole sizing & spacing for this type of connectors used.
- .4 Mounting: Utilize insulated standoffs.
- .5 Manufacturer: Panduit or Erico. Panduit GB4B0612TPI-1 (minor construction or renovation project). Panduit GB4B0624TPI-1 (major construction or renovation project).

## 2 SBB

- .1 Material: Copper and tin-plated
- .2 Minimum dimension of 50 mm wide X 305 mm long X 6 mm thick. 100 mm wide X 610 mm long X 6 mm thick (major construction e.g. Acute Tower, or major renovation project e.g. Acute redevelopment).
- .3 Holes: Predrilled, with standard NEMA bolt hole sizing & spacing for the type of connectors used.
- .4 Mounting: Utilize insulated standoffs.
- .5 Manufacturer: Panduit or Erico. Panduit GB2B0306TPI-1.

## 2.3 CONNECTORS

- .1 General: All connectors shall be UL listed.
- .2 Connectors shall be intended for the application.
- Typical connectors: H-tap (for TBB), C-tap, Two-hole compression lug (for PBB and SBB), split-bolt Burndy, post Burndy, and ground bushings.

## PART 3 EXECUTION

#### 3.1 GENERAL

.1 Install a complete, permanent, and continuous bonding and grounding system for Communications infrastructure and, equipment including all necessary conductors, connectors and accessories, as indicated on drawings and this document, in order to conform to requirements of Electrical Inspection Department and Canadian Electrical Code.

#### 3.2 IDENTIFICATION

.1 Refer to Section 27 05 53 Identification for Communications Systems for labelling requirements.

## 3.3 GROUNDING & BONDING CONDUCTORS

- .1 Bonding conductors placed in metallic conduits longer than one metre must be bonded at each end of the conduit with the appropriate bonding bushing.
- .2 Where the Communications rooms are stacked, the bonding conductor shall be a common riser bonding conductor for connection to the stacked Communications rooms.
- Where practicable, all bonding conductors shall be installed without a splice. Where a splice is necessary, it shall be accessible and located within a Communications room. Conductors shall be spliced using irreversible compression-type connectors, exothermic welding, or equivalent. All joints shall be adequately supported and protected.

Page 40 of 154

- .4 Bonding conductors shall be as short as possible and routed with a minimum of bends. All bends made on the conductor shall be sweeping bends. Minimum bending radius is 200 mm (8") bonding conductors shall be fixed to the walls and neatly formed around the perimeter of the room.
- .5 Install a bare #6 AWG copper stranded conductor, in the entire length of surface raceway or cable tray and bond to the telecommunications grounding system.
- The cable tray bonding conductor shall be bonded to cable tray by a bonding clamp at each straight length of tray regardless of length and each elbow and T-fittings.
- .7 All splices of bonding conductors shall be outside of the cable trays.
- .8 Conduits for individual outlets shall be bonded using a #12 AWG stranded insulated copper conductor from the conduit bonding bushing to the cable tray bonding conductor.
- .9 Communications EMT outlet conduits that are run to cable tray must be grounded to the cable tray.
  - .1 Basket tray
    - .1 Basket tray installed along corridors (outside the Communications room) shall have a #6 AWG bare ground wire run along the tray for the entire length and grounded to the electrical ground system, and each section of tray shall be bonded/attached to the ground wire, all as per Canadian Electrical Code.
    - .2 Attach the end of the 1" EMT conduit to the top rung of the basket tray with a conduit P-clamp or install the 1" EMT conduit near the tray (above on the side), and include an EMT connector c/w ground bushing, and run a #12 AWG ground wire from the ground bushing to the #6 AWG ground wire located inside the cable tray.
    - .3 Basket tray installed inside the Communications room shall be grounded and bonded/attached directly to the PBB and SBB with a #6 AWG bare ground wire that runs along the tray for the entire length, and each section of tray shall be bonded/attached to the ground wire as per Canadian Electrical Code.
  - .2 Solid trav
    - .1 Solid tray installed along corridors (outside the Communications room) shall have a #6 AWG bare ground wire run along the tray for the entire length and grounded to the electrical ground system, and each section of tray shall be bonded/attached to the ground wire, all as per Canadian Electrical Code.
    - .2 Attach the end of the 1" EMT conduit into the side of the solid tray. Note: the EMT connector and locknut installed on the tray is an acceptable electrical ground.
- .10 The metallic jacket of all inter-building cables shall be bonded with a #6 AWG green PVC jacketed stranded copper conductor at the jacket opening at both ends of the cable, using a bonding clamp designed for the cable used.
- .11 The metallic jacket of metallic shielded & interlocking armoured backbone cables shall be bonded with a #6 AWG green jacketed stranded copper conductor at the jacket opening at both ends of the cable, using a Grounding Bushing on an armoured cable connector designed for the cable being used.
- .12 Metallic cable protectors shall be bonded with a #6 AWG green jacketed stranded copper bonding conductor.
- .13 Equipment racks and Communications equipment shall be bonded with a #6 AWG green. Each rack shall be bonded with a #6 AWG green directly to the PBB and SBB (starwired).
- .14 Metal parts in the Communications rooms shall be bonded to the appropriate ground busbar.
- .15 Power panels in Communications rooms shall be bonded to the PBB and SBB with ground cable sized as per the requirements of the CEC.
- .16 All Communications EMT conduit and tray leaving the Communications room shall be bonded.

Page 41 of 154

- .17 Bond the metal frame of the building to the PBB/SBB; cable sized as per the CEC.
- .18 All Communications outlet boxes shall be bonded.
- .19 Install #12 AWG insulated stranded copper bonding conductor to metal Wiremold surface raceway, and bond to the building and telecommunications grounding systems for joint-use power and Communications applications. Bond to telecommunications grounding system if the raceway is dedicated only for Communications use.
- .20 Protect exposed bonding conductors from mechanical damage.

## 3.4 GROUNDING BUSBARS

- .1 The PBB shall be connected to the building main Electrical ground busbar with a #4/0 AWG green jacketed stranded copper conductor.
- .2 The size of the TBB is a minimum size of 4/0 AWG.
- .3 All SBB's shall be connected to the PBB with a minimum #4/0 AWG green jacketed copper conductor FT rated as per the AHJ or installed in conduit.
- .4 A grounding busbar shall be placed below the ceiling cable tray at 2300 mm AFF near the corner of the wall that adjoins another wall where the conduit sleeves are located. It shall be mounted to the wall with insulating stand-offs.

#### 3.5 CONNECTORS

- .1 All connections to the TBB shall be accessible and located in a Communications room.
- .2 Bonding connections shall be made with paint-piercing washers, dual bolts, triple crimp connectors, clamps, or lugs specifically designed for the purpose.
- .3 A lug shall be crimped to each end of the bonding conductor. Bonding conductors shall be bolted on the appropriate ground busbar with a 6 mm copper alloy bolts and nuts.
- .4 Leave 6 spare connectors in the MER Communications Room and 4 spare connectors in each TR Communications Room.
- .5 Prior to attaching a lug to a painted or galvanized surface, the paint shall be scraped off to bare metal, to provide maximum contact. Paint-piercing washers and lock washers shall be used with the bolts.
- .6 Install two-hole connectors in accordance with manufacturer's instructions
- .7 Compression Taps:
  - .1 TBB shall bond the PBB with each SBB (star configuration individual TBBs) or
  - .2 TBB shall bond the PBB to the farthest SBB (riser configuration one main TBB where SBBs between PBB and farthest SBB are tapped off).
- .8 General: Compression taps shall be used as a connection device from TBCs (from the SBB) to the TBB.
  - "H" compression tap for #6 AWG bonding conductor to a 4/0 TBB, or approved equivalent.
- .9 Compression Connectors (Lugs)
  - .1 General: Compression connectors shall be used as a connection device from TBCs to SBBs.
  - .2 Copper lug for #6 AWG conductor, with two 6 mm bolt holes, or approved equivalent.
  - .3 Copper lug for 4/0 AWG conductor, with two 8 mm bolt holes, or approved equivalent.
- .10 Connections to Conduits
  - 1 Entrance Conduits: For connecting bonding conductor to all 103 mm rigid steel entrance conduits, use threaded insulated throat grounding bushings.

    Manufacturers:
- .11 Connections to Busbar

Page 42 of 154

- .1 General: Compression connectors shall be used as a connection device for TBC to SBBs.
  - .1 Standard barrel copper lug for #6 AWG conductor, with two 6 mm bolt hole.
  - .2 Standard barrel copper lug for 4/0 AWG conductor, with two 8 mm bolt holes.
  - .3 Two 8 mm lugholes, for all conductors between #4 AWG to 4/0 AWG conductors.
  - .4 Two 6 mm lugholes, for #6 AWG conductors.
- .12 Connections to Communications Racks and Cabinets.
  - .1 General: Connectors shall be used as a connection device for TBC's to equipment racks. Paint shall be removed from the rack location where the connector is attached to ensure metal to metal contact. Star washers shall be used.
  - .2 Each rack shall have a dedicated #6AWG bonding conductor homerun to the busbar. The racks shall not be daisy-chained with a single bonding conductor back to the busbar.
- .13 Connections to Structural Steel
  - Where shown on the Drawings, connect grounding conductors to structural steel using exothermic welds. Each particular type of weld shall use a kit unique to that type of weld.
- .14 Connections to Interlocking Armoured Fiber Optic Cable
  - 1 Bond the armour of the cable at both ends of the cable with armoured flex connector c/w grounding bushing sized to suit the cable.
    - .1 Provide a #6 AWG green insulated ground cable and bond the connector to the SBB or PBB.

## 3.6 OUTSIDE PLANT ELECTRICAL PROTECTION CONNECTORS

- .1 All the metallic components of exposed telecommunications cables must be grounded as close as possible to the entrance of the buildings. The distance shall not exceed 3 m (10 ft). This includes:
  - .1 Bonding and grounding of cable metallic sheath components.
  - .2 Installation of protectors to metallic pairs, along with their fuse links.
- .2 Ground the metallic sheath of the bonded cables with a green jacketed #6 AWG bonding conductor to the entrance facilities ground bus bar.
- .3 Ground the cable protector using a green jacketed #6 AWG bonding conductor to the entrance facilities ground bus bar.
- .4 Ground the entrance facilities ground bus bar to the PBB with a green jacketed #4/0 AWG bonding conductor.

**END OF SECTION 27 05 26** 

## 27 05 28 PATHWAYS FOR COMMUNICATIONS SYSTEMS

#### PART 1 **GENERAL**

#### 1.1 **SUMMARY**

- .1 Summary
- .2 Related Sections
- .3 References
- System Description .4
- .5 Submittals

#### 1.2 **RELATED SECTIONS**

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - Section 27 01 10 Basic Requirements .1
  - Section 27 08 11.01 Fiber Optic Testing Section 27 08 11.02 Copper Testing .2
  - .3
  - Section 27 08 11.03 Horizontal Cat6 & Cat6ATesting .4
  - Section 27 11 00 Communications Room Fittings .5
  - .6 Section 27 13 13 – Copper Backbone Systems
  - .7 Section 27 13 23 – Fiber Backbone Systems
  - .8 Section 27 15 00 - Horizontal Cabling
  - Section 27 16 00 Connecting Cords, Devices and Adaptors .9
  - Section 27 21 33 Data Communications Wireless Access Points .10

#### 1.3 **REFERENCES**

Refer to section 27 01 00 for Codes and Standards .1

#### 1.4 SYSTEM DESCRIPTION

- .1 The Communications pathway system shall be designed and installed to support, protect, organize and, where necessary, segregate IT and low voltage systems wiring. Quantity, size and bend radius requirements of the cable as well as room for growth (fill ratio) will be considered when determining the size of communications pathways. All Communications pathways installed must have adequate separation from sources of electromagnetic energy and heat as prescribed by industry standards and be easily accessible with minimal or no impact to clinical operations. It shall consist of the following
  - Cable Tray System overhead (within the ceiling space) from the building entrance .1 rooms, equipment rooms, and TRs throughout the building space.
  - .2 Electrical metallic tubing and fittings.
  - .3 Miscellaneous conduit fittings and products.
  - Conduit sleeves, Fire Stop sleeves, Conduits and Underground Ducts .4
  - Wall outlet boxes. .5
  - Pull and junction boxes. .6
  - .7 Cable Hangers – overhead (within the ceiling space) from the primary pathways to the device locations.

**PHSA** April 1st, 2025

Page 44 of 154

- .2 Pathway design and space assignment shall be coordinated with the mechanical, electrical, plumbing, and pneumatic tube systems designs.
- .3 The work under this section shall also include the planning and coordination with General Contractor (and other trades) of Communications system pathways, the furnishing of necessary materials, and the labour & associated services required to install Communications pathways.

#### 1.5 SUBMITTALS

.1 General: Conform to Submittal requirements as described in Section 27 05 00.

## PART 2 PRODUCTS

#### 2.1 CABLE TRAY

## .1 Basket

- .1 Application: Suitable for the support & management of Communications cables, either overhead or mounted vertically on a wall.
- .2 Description: Cable basket shall be made of steel wires and formed into a standard 50mm x 100mm wire mesh pattern, or in the case of Panduit, 127mm x 94mm wire mesh size. Wire intersections shall be welded. Wire ends along sides (flanges) shall be rounded during manufacturing for safety of installers and to prevent damage to cables.
- .3 Material: Carbon steel wire, ASTM A510, Grade 1008. Wire welded, bent, and surface treated after manufacture.
- .4 CabloFil, Flextray and Panduit are the approved basket tray manufacturers.
- .5 Fittings: Field fabricated in accordance with manufacturer's instructions from straight sections.
- .6 Size: The minimum size tray in Acute Care sites is 100 mm x 610 mm unless specifically noted otherwise.
- .7 Accessories
  - .1 Grounding: Terminal support and cable support for attachment on tray of continuous #6 AWG ground conductor fixing system.
  - .2 Electro-plated zinc: Support accessories and miscellaneous hardware shall be coated in accordance with ASTM B633 SC3.
  - .3 Cable Label Clips: Mark and identify specific cable runs, electro-zinc plated steel.
- All trays in Telecommunications Rooms (TRs) shall have a six inch inside horizontal bend radius on tees and 90-degree bends. On a 90-degree fitting at the corner of a TR or corridor, the inside bend radius can be 6" inches and the outside bend radius can be 0" inches. Vertical bends shall have a minimum 12" bend radius. Ensure the design of the cable tray system will adhere to industry and Authority standards and will support manufacturers' recommendations relative to cable bend radius.
- .2 Totally Enclosed Cable Tray
  - 1 Totally enclosed cable tray shall be used inside Parkade and other similar type locations (exposed public spaces).
  - .2 Use manufactures radius bends for all directional changes to the cable tray.
  - .3 Aluminium Class C1 is the minimum load class for the cable tray.
  - .4 Size: The minimum size tray in Acute Care sites is 100 mm x 610 mm unless specifically noted otherwise.

.3 Chatsworth Runway

Page 45 of 154

- .1 For the Entrance facility room, provide 610 mm wide cable runways. Use manufacturer runway corner bracket kits for radius bends for all directional changes to the cable tray.
- .2 Chatsworth is the approved cable runway.

## 2.2 CABLE HANGERS

- .1 Application: Suitable for indoor installation within ceiling space of community sites only for the support of Communications cables.
- .2 Approved Product: ERICO Caddy J-Hook. Maximum fill ratio is 28% of J-Hook capacity at substantial completion of project.

# 2.3 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

- .1 Conduit: Shall be formed of cold rolled strip steel, electrical resistance welded continuously along the longitudinal seam and hot dip galvanized after fabrication.
- .2 Set Screw Steel type couplings: Electroplate steel or cast malleable iron; concrete tight, with insulated throat, using gland.
- .3 Compression type connectors: Electroplated steel or cast malleable iron, concrete tight, with insulated throat.
- .4 Minimum EMT conduit size for Communications cabling shall be 27mm (1"). Conduits dedicated to Voice and Data cabling shall not be shared with other technology wiring.

## 2.4 PULL BOXES

.1 Unless otherwise specified, the minimum size of a pull box shall be 310 mm x 310 mm x 150 mm deep. Communications Consultant and or the PHSA NE Representative shall be consulted in all cases. Refer to Section 27 05 53 for labelling requirements.

## 2.5 LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT (LFMC)

- .1 Conduit: Shall be fabricated in continuous lengths from galvanized steel strips, interlocking spirally wound, covered with extruded liquid tight jacket of polyvinyl chloride (PVC). Provide conduit with a continuous copper-bonding conductor wound spirally between the convolutions.
- .2 Fittings: Connector body and gland nut shall be of cadmium plated steel or cast malleable iron, with tapered, male, threaded; insulated throat and neoprene "O" ring gasket recessed into the face of the stop nut. The clamping gland shall be of moulded nylon with an integral brass push-in ferrule.
- .3 Application: Suitable for an indoor installation for the support of Communications cables from a feed pathway to furniture systems or similar.

## 2.6 DUCT PLUGS

- .1 Application: Suitable for installation within conduits at termination/end entering into underground maintenance holes/pull boxes and into buildings from underground/exterior, opening into a Communications space. Duct plugs shall provide a watertight (up to 20 psi) seal around inner ducts and cables.
- .2 Duct plugs shall be sized per conduit trade/actual size, per inner duct trade/actual size, and per cable outside diameter as required per instance.
- .3 Duct plugs shall be re-enterable and re-usable.
- .4 Manufacturer: CommScope TDUX Inflatable Duct Sealing System or equal approved

Page 46 of 154

- .1 Applications include ducts containing multiple copper, coax, or fiber cables, and customer premises cable entrances
- .2 CommScope inflation tool and air compressor or air cylinder must be used to install the TDUX sealing system
- .3 TDUX duct seals are not flame retardant and will be used with approved Hilti fire stop material
- .4 Follow Manufacturer installation instructions

#### 2.7 UNDERGROUND CABLE RACKS

- .1 Application: Suitable for support cable / splice cases in underground environment (steam tunnels, vaults).
- .2 Hot-dipped galvanized steel, manufactured from 38-mm x 14-mm x 5-mm hot-rolled steel channel, T-slots spaced at 38-mm.

#### 2.8 COMMUNICATIONS SYSTEM OUTLET BOXES

- .1 A Communications outlet is the point at which the Communications equipment is connected to the Health Authority's network. The outlet consists of an outlet box and cover plate, connecting conduit, several jacks, and its connecting cables.
- .2 Outlet boxes shall be specified on drawing.
- .3 Flush-Mount Box
  - .1 Provide one-piece die formed or drawn steel, knockout type box of size and configuration as indicated on the Electrical Drawings. No sectional boxes.
  - .2 103 mm square by 54 mm deep shall be minimum box size.
  - .3 Mud ring shall be used on top of the electrical box to receive single gang outlet faceplate.
- .4 Surface-Mount Box
  - .1 Manufacturer:
    - .1 Wiremold
      - .1 V5744-2 (dual-gang for use with conduits).
      - .2 V2144-2 (dual-gang for use with V2100).
      - .3 V3044-2 (dual-gang for use with V3000).
    - .2 Hubbell
      - .1 HWPFSCS/HBLFSCS series c/w cover (surface floor box).
    - .3 Panduit
      - .1 JBP2D1W (132 mm x 132 mm x 70 mm dual-gang for use with Panduit).

## 2.9 COMMUNICATIONS SYSTEM OUTLET PLATES

- .1 Unless specified to the contrary, all outlet plates shall be plastic or stainless steel with appropriate cut-outs and permanently marked designations, as specified in the outlet specifications of the related sections.
- .2 Plastic plates shall be the same colour as determined for the power outlets. The architect's decision is final.
- .3 Ensure that total depth of raceway and outlet plate is sufficient for terminating Horizontal cable and jacks.

## 2.10 SURFACE RACEWAYS PRODUCTS

.1 Provide Wiremold or Panduit for Communications outlets.

Page 47 of 154

- .2 Where metallic raceway is required it shall be as manufactured by Wiremold. The colour shall match existing Wiremold installation. Where contradiction exists between colour noted on drawing and on site, the colour on site shall take precedence.
- .3 For large number of cables and multiple outlets adjacent to each other, use Wiremold V-4000 or V-6000 as appropriate. For Wiremold V-4000, Fiber ready elbow V4011FO shall be used for flat 90° bends.
- .4 For individual outlets use Wiremold V-3000 or V-2100 raceway as indicated on drawings. For V-3000 fiber ready elbow, V3011F0 shall be used for flat 90° bends.
- .5 Non-metallic surface raceway shall be manufactured by Panduit or approved equal. Except as noted, colour of Panduit shall be off-white on painted surfaces and grey on unfinished concrete surfaces or as otherwise architecturally specified.
- Surface raceways for Communications systems shall be minimum 120 mm X 45 mm deep raceways with cut-outs and hardware for mounting faceplates. When the surface raceway is used to distribute power and Communications cables, a manufactured barrier, separating Communications cables from power cables shall be installed in the centre of the raceway.
- .7 Non-metallic raceway may be used as per current building codes or as specified on drawings.

## 2.11 MAXCELL INNERDUCT

- .1 Textile Inner duct:
  - .1 Standard Outdoor Textile Innerduct: Micro (33mm), 2-inch, 3-inch and 4-inch single or multi-cell polyester/nylon textile innerduct containing 1250lb polyester flat woven pull tape.
  - .2 Detectable Outdoor Textile Innerduct: Micro (33mm), 2-inch, 3-inch and 4-inch single or multi-cell polyester/nylon textile innerduct containing 1250lb polyester flat woven pull tape, and a solid copper, polyvinyl color coated conductor (19AWG minimum) for tracing purpose.
  - .3 Indoor Textile Innerduct (Riser-listed): Micro (33mm), 2-inch, 3-inch and 4-inch single or multi-cell nylon textile innerduct containing 1250lb polyester flat woven pull tape which meets UL2024A for flame propagation and smoke density values for general applications.
  - .4 Plenum-Listed Textile Innerduct: Micro (33mm), 2-inch and 3-inch single or multicell nylon textile innerduct containing 200lb nylon-resin flat woven pull tape which meets UL2024A for flame propagation and smoke density values for use in air handling spaces.
- .2 Conduit Plugs: Compression-type conduit plugs with locking nuts for sealing and securing one or more textile innerducts within a 4-inch inside diameter conduit, example:
  - .1 4-inch plug with nine holes for cables in a 3 pack (9-cell) configuration.
- .3 Termination Bags: Inflation-type bags for sealing and securing around one or more textile innerducts and cables within 2-inch outside diameter or larger conduit.
- .4 Pull Tape
  - .1 Measuring and pulling tape constructed of synthetic fiber, printed with accurate sequential footage marks. Color-coded.
- .5 Penetration Sealing Materials
  - .1 Duct Water Seal: products suitable for closing underground and entrance conduit openings where innerduct or cable is installed, to prevent entry of gases, liquids, or rodents into the structure.

## PART 3 EXECUTION

Page 48 of 154

## 3.1 GENERAL

.1 Backbone Pathway System

- .1 The backbone pathway (riser) system in any Hospital construction shall provide physically route diverse connections (minimum 20-meter riser separation) between the MER and each TR in the building. The routing of the pathways should be such that a loss of single Telecommunications Room will not impact the connection between the MER and any other Telecommunications Room in the Facility.
- .2 The TRs shall be stacked vertically to facilitate running backbone cables through them. In such cases, backbone pathways typically consist of a combination of Hilti CP-680 cast-in-place fire stop devices with CP-653-4" speed sleeves inserted into them. In cases where stacking is not possible or where a riser needs to traverse through more than a floor slab to get to the next TR then 103mm EMT conduits shall be provided.
- .3 Cable tray can also form part of the backbone pathway system when TRs cannot be stacked vertically. In this instance, trays serve a dual purpose in that they support, protect and organize both backbone and horizontal cabling systems. Cable tray shall be installed in all major building corridors and inside all Communications rooms.
- .4 The most common type of cable tray installed in any building is basket tray. Totally enclosed trays shall be used in Parkades and other similar locations where the tray is exposed in areas accessible to the public. Chatsworth tray shall be installed in the EF room. All cable trays installed will typically be 610mm wide by 110mm deep. Where cable trays are required to pass through any solid walls or floors regardless of fire rating, CP-653-4 speed sleeves coupled with either gang plate assemblies or cast-in-place fire stop devices shall be employed. This applies to all types of full height walls for the purpose of either restoring the fire or acoustical rating of the wall or for infection control. The quantity of speed sleeves provided shall be equal to the capacity of the tray.
- .5 Cable tray shall not be used for the storage of horizontal or backbone cable slack.
- .6 Backbone pathway system in any Hospital construction shall also provide physically route diverse connections (minimum 20-meter riser separation) between the MER and the EF Room. Where both the MER and EF room are located on the same level, the primary and diverse pathways between these rooms will likely be comprised of cable tray.
- .7 Hospitals are post disaster sites and require separate WAN services from two different CO's (Telus Central Offices). The service entrance duct feeders (from the two CO's must also have physical route diversity. Route diversity is achieved by ensuring the two separate and diverse sets of Telus Service entrance ducts and the outside plant duct banks originating from the CO's do not run closer than 20 meters along their entire route, and the Entrance Facility rooms are at least 20 meters apart.
- .2 The Contractor shall supply and install a system of cable raceways consisting of a combination of cable tray, conduit and any other standards compliant non-contiguous support system such as saddles as required by the local facilities. The cable trays extend horizontally from the Communications Rooms, down the hallways or corridors to become the backbone or main highway to support communications cables.
- .3 Except in residential care buildings that do not have a common corridor or accessible ceiling spaces, conduits shall not be used as the main backbone communications pathway.
- .4 Each communications outlet shall be connected to the nearest cable tray with conduit. Individually connect each communications outlet in the Facility to the nearest

Page 49 of 154

- communications cable tray within the zone as the serving TR. Conduit shall be used in new construction.
- .5 Install conduit and sleeves where required prior to pouring concrete. Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure to keep furring to a minimum.
- .6 J-hooks may be used in community sites only.
- .7 All raceway and J-hooks (when applicable) shall be installed parallel to building lines, keeping cable run length at an absolute minimum.
- .8 J-hooks shall be used for supporting horizontal cables and patchcords and not to be used for main backbone communications pathway.
- .9 In open office environments, the preferred method of extending the conduit from the outlet to the cable tray is via perimeter walls. If this is not possible then use Pac poles or run in "pony" walls.
- .10 The conduit shall be sized to not exceed a 28%
  - fill ratio with no more than two 90° bends and after all the cables are installed at the time when a new facility becomes operational. Where there are zero bends in the conduit, the fill ratio may be increased to 40%. The maximum fill capacity of 40% refers to the calculated cable fill percentage. The remaining space shall be filled with firestop material to ensure safety and compliance. At 40% fill, the conduit may appear visually full due to spaces between cables, and random placement. The following exceptions are acceptable:
  - .1 If a Conduit requires more than two 90° bends, a third bend may be acceptable in a pull section without derating the conduit's capacity if one of the following statements is true:
    - .1 Total run is not longer than 10 meters.
    - .2 The conduit size is increased.
    - .3 One of the bends is located within 300 mm of the cable feed end.
- .11 A Mule tape shall be left in all backbone raceways after installation of the cables. Mule tape shall be Greenlee 4435 or approved equal for backbone conduits.
- .12 The Contractor shall ensure adequate support for raceways and cables dropping vertically to equipment where there is no wall support. Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .13 Explosive drive pins shall not be allowed on the works without prior approval of the Communications Consultant. All fixings to be metal expansion type in pre-drilled holes. The Contractor shall not use plastic expansion inserts or fittings. The Contractor shall use coach screws, lag screws or wood screws, minimum 25 mm long, in wood construction.
- .14 The Contractor shall provide supports for equipment and materials supplied. The Contractor shall provide all anchor bolts and other fastenings, where shown on or in tile walls or wall inadequate to support the equipment, provide angle or channel iron supports to bear the equipment, independent of the wall or conduit. All hangers, supports and brackets shall be provided and installed to be consistent with the requirements of the B.C. Building Code.
- The Contractor shall provide seismic bracing of tray. Following installation of all equipment and fixings, the Contractors shall provide a seismic restraint structural review of the fixings of all devices which form part of the Communications infrastructure installation. The Contractor shall provide a structural engineer registered with the APEGBC to sign and seal the report. The Contractor shall reinstall, if necessary, supports for the equipment and fixings to the satisfaction of the structural engineer, at no additional cost to the Owner.
- .16 Cutting and Coring
  - .1 Where floor cutting is necessary for installation of conduits and cable trays, always consult a structural engineer prior to boring holes or cutting slots in floors. Obtain the services of a reputable Ground Penetration Radar" (GPR)/x-ray service

Page 50 of 154

- company. If GPR is not suitable or approved by Facilities have the floor x-rayed and review for interference. Submit report and detail sketch on proposed infrastructure routing, signed and sealed by the structural engineer, to the Communications Consultant for review prior to cutting.
- .2 It is expected that tradesmen skilled in their trades shall do the work of that trade. Electricians performing painting, dry-walling or carpentry work shall not be accepted.
- .3 Ensure that all penetrations through floors or walls are patched to match adjoining finish. Penetrations through concrete are to be sealed with approved fire-stop material.
- .4 See local Facilities Asbestos Procedures for cutting methods through asbestos areas.
- .5 It is the contractor's responsibility to investigate existing building conditions for taking X-ray and other activities. Existing drawings and approval / scheduling are available from Facilities Maintenance and Operations (FMO). Coring of holes shall take place before new walls in close proximity are installed.
- .6 Cutting and patching are to be done to architectural standards and shall be inspected by the architect. Refer to the architectural specifications.
- .7 Refer to Fire Stop Systems Section 27 05 29.
- .8 Carpet at core locations is to be carefully cut out with a knife to the exact diameter of the pipe prior to coring if the pipe is to be exposed. Fire-stop from below at these locations

## 3.2 ENTRANCE DUCTS

- .1 Entrance ducts are to be installed to the CEC 23rd edition C22 1-15.
- .2 Provide orange tracer warning tape above the duct bank.
- .3 Provide drainage on the duct bank prior to entering the structure. T-drains shall be provided for the duct bank, and shall be connected to the perimeter drainage system.
- .4 Provide drainage at each manhole and pull-pit.
- .5 Ducts shall have a grade drop from the building to the entrance manhole for water run-off.
- .6 Where diverse service entrance facilities are specified, the entrance points into a building will be distant from each other and enter from two different streets or sides of the building.

  Minimum distance between service entrance facilities into a building will be 20m.
- .7 Provide a minimum of three (3) Type DB2 PVC orange 100mm ducts per service entrance facility. Each service entrance facility duct will:
  - .1 Not have more than two 90-degree sweeping bends.
  - .2 Be properly drained in accordance with building and electrical codes.
  - .3 Be equipped with watertight expandable duct plugs that seal the duct against water, gas, litter and vermin. Watertight expandable duct plugs shall be installed at both ends of every service entrance facility duct.
  - .4 Where applicable, terminate in pull boxes once they enter the building. Pull box shall be 1219 mm x 1219 mm x 610mm in size, accessible, lockable and equipped with hinged lids.
  - .8 The maximum pulling lengths shall not exceed 100m on any service entrance facility duct or 60m if there are 2 90 degree bends.

## 3.3 CAMPUS PERIMETER PATHWAY SYSTEM

.1 A Campus Perimeter Pathway System (CPPS) shall be considered when designing an Outside Plant duct bank in a Hospital campus site. It provides the distribution system around the campus for all inter-building fiber and copper cabling systems. It also connects to TELUS and the City's underground structures to enable cabling infrastructure and telecommunications services from third parties to be brought into

Page 51 of 154

- and distributed throughout the campus. It includes diverse Service Entrance Facilities to EF rooms and MERs.
- .2 Manhole ducts shall be stubbed out for diverse Service Entrance Facilities.
- .3 A concrete encased Service Entrance Facility shall be extended into either the EF room or MER.
- All Service Entrance Facilities installed shall consist of a minimum of three PVC DB2 103mm ducts. If the ducts have to transition to EMT before entering either the EF room or MER, then four 103mm conduits are to be provided back to the point where PVC ducts enter the building.

## 3.4 DUCT PLUGS

- .1 Provide duct plugs at all underground conduit ends. Install plugs per manufacturer's instructions or guidelines.
- .2 Provide bushings and gaskets in each used duct port.

#### 3.5 UNDERGROUND CABLE RACKS/ SUPPORTS

- .1 Preparation
  - 1 Locate cable racks/supports in existing steam tunnel as required to support new/relocated cable installation requirements.
- .2 Installation
  - .1 Install in accordance with Manufacturer's written instruction.

## 3.6 BACKBONE CONDUITS AND SLEEVES

- .1 Backbone conduits and sleeves in Communications rooms shall be positioned against the wall to the left of the connector blocks (CSTD-06). The exact location shall be verified with Communications Consultant. The use of a pull pit in the Communications rooms shall not be acceptable. (Refer to Section 27 11 00).
- .2 Provide a minimum of 4 x 103mm Riser sleeves or ducts. Add one additional 103mm riser sleeve or duct for every additional Communications room serviced from a riser stack. For example: Where there are six Communications rooms in a riser stack, (one on each level where level 1 (MER is the beginning of the riser and level 6 is the end; provide the following communications riser:
  - .1 Level 1 provide 9 x 103 mm riser sleeves or ducts
  - .2 Level 2 provide 8 x 103 mm riser sleeves or ducts
  - .3 Level 3 provide 7 x 103 mm riser sleeves or ducts
  - .4 Level 4 provide 6 x 103 mm riser sleeves or ducts
  - 5 Level 5 provide 5 x 103 mm riser sleeves or ducts
  - 6 Level 6 provide 4 x 103 mm riser sleeves or ducts
- .3 Ducts shall protrude 100 mm above finished floor level and shall be encased in concrete.
- .4 Riser ducts connecting vertically stacked Communications rooms may consist of sleeves that protrude 50 mm through the ceiling and or 100 mm through the floor.
- .5 After installation of the inter-building cables, the ducts shall be closed with an approved re-enterable sealing material.

Refer to Section 3.6 for further details concerning backbone sleeve requirements.

## 3.7 PATHWAYS THROUGH FIRE-RATED BARRIERS

.1 All communications cable trays that need penetrate through fire rated walls and where there is an accessible ceiling on both sides of the wall; shall terminate on both sides of the rated wall and the following rated assembly shall be installed:

Page 52 of 154

- .1 Provide a rated assembly through a gypsum wall penetration based on a HILTI Speed Sleeve Gang Plate assembly using 103 mm HILTI Speed sleeves.
  - .1 Provide four (4) speed sleeves for a 305 mm x 100 mm cable tray.
  - .2 Provide six (6) speed sleeves for a 450 mm x 100 mm cable tray.
  - .3 Provide eight (8) speed sleeves for a 610 mm x 100 mm cable tray.
- .2 Provide a rated assembly through a concrete wall penetration based on a HILTI Speed Sleeve Gang Plate assembly using 103mm HILTI Speed sleeves.
  - .1 Provide four (4) speed sleeves through concrete (cored holes) for a 305 mm x 100 mm cable tray.
  - .2 Provide six (6) speed sleeves through concrete (cored holes) for a 610 mm x 100 mm cable tray.
  - .3 The installation of HILTI Speed sleeves in combination with HILTI Cast-inplace sleeves are acceptable provided a HILTI system drawing is provided during the shop drawing submittal phase.
- .3 Hilti Speed sleeves are to be provided where cable trays are required to pass through "any solid walls" regardless of whether they are fire rated or not.
- .2 For communications riser sleeves penetrating a concrete floor inside communication rooms.
  - .1 Provide a rated assembly through a concrete floor penetration based on using 103 mm HILTI Speed sleeves through HILTI Cast-in-Place sleeves.
- .3 For the installation of all other communication conduit pathways through fire rated barriers, refer to fire stop section 27 05 29.
- In secured spaces such as clinical or office areas, leaving cables exposed at the transition point between conduits and Hilti speed sleeves is acceptable. However, in public spaces like the parkade, it's essential to install a pull box serving as a transition point between the conduits and sleeves to ensure that no part of the cables remains exposed. Additionally, the pull box should include an intrusion security contact to prevent tampering.

## 3.8 CABLE TRAY SYSTEM

- .1 Division 27 Contractor shall install all trays within Communications rooms. This work relating to Communications room fittings shall not be sub contracted to Division 26 Contractor.
- .2 Within the Communications rooms, install cable tray Unistrut support on the underside of the tray and locate directly above each vertical cable manager for mounting the power receptacles.
  - .1 The appropriate power extension cords shall be ordered as per the parts list in Appendix C.
  - .2 All power cord ends must be molded.
- .3 Provide cable tray in approximate location and general routing as shown on drawings.
- .4 Cable trays are usually installed in the false ceiling space of hallways and located to keep conduit lengths to a minimum. When raceway is not installed in a readily accessible false ceiling space, access hatches shall be installed at a nominal spacing of 9m.
- .5 Do not route cable tray through Electrical room and Mechanical room spaces.
- .6 Locate new cable tray away from existing maintenance openings in the ceiling.
- .7 Cable tray may require installation of risers, bends, etc. to adjust tray up or down as well as sideways for the tray routing to fit within limits of space available, and to clear other services, ducts, pipes etc. along the route. Routing may be adjusted somewhat as necessary to enable installation of services under other trades. These field adjustments are to be done at no extra cost to the Owner.

Page 53 of 154

- .8 Provide communication cable trays with depth and width as specified. Install 300 mm radius minimum bend kits and all manufacturer fittings required for a complete cable tray system. Provide an allowance for all changes in direction or elevation of the cable tray.
- Do not cut the basket tray for cable exit, instead use manufacturer dropout that is designed to be attached to the tray side with the dropout hanging over the tray. Adjust the tray layout such that the dropout enables the cables to be routed directly and fully into entire cross sectional area of the the rear half of the vertical cable managers, GigaBIX cable management modules or false wall. Perimeter basket tray inside the Communications room shall be offset at about 250 mm from the wall to the near side of the tray for attachment of tray dropouts to deliver cables into GigaBIX cable management modules and any low voltage wall-mount panels.
  - 1 Provide a cable tray dropout for all wall mounted equipment in the Communications room and at a minimum every 1200 mm along the perimeter cable tray of the Communications room.
- Two sections of tray shall not be installed in lieu of a single wider tray. Example: when a 914mm wide tray is required; do not install two (2) 450mm wide sections of tray instead of a single 914mm wide section of tray. Cutting and re-building trays to form a single wider tray is also not acceptable. Tray larger than 610mm wide shall be from the specified approved tray manufacturers. Optionally, it is acceptable to add more horizontal pathway entry points on separate walls of the Communications room using 103 mm Hilti Speed sleeves. Refer to Communications standard drawings, Section 27 00 00.01.
- .11 Sharp metal edges in cable trays which could cut the cable shall be smoothed and the cable dressed away from these edges. Manufacturer surface imperfections shall be touched up with a cold galvanizing coating before installing cable.
- .12 Connect the new cable tray system to the existing cable tray (if exists). Re-work existing tray ends to suit tie-in.
- .13 Cable Tray Installation
  - Cable tray shall have a maximum fill of 50 percent, but the day one planned fill when a new facility becomes operational shall be 25 percent to allow for later additions. A calculated fill of 50% for four-pair and similar diameter cables will physically fill the entire tray due to spaces between cables, and random placement. The maximum fill depth of any cable tray shall be 150 mm.
  - .2 Install cable system in accordance with manufacturer's instructions and recognized industry practices, and ensure that the installed system complies with requirements of the "Manufacturer's Cable Tray Installation Guidelines" pertaining to general electrical installation practices. Install cable system using splice connectors, support components, and other accessories by the same manufacturer.
  - .3 Provide supports for cable tray system at a maximum 1220 mm on centre and at both sides of each tray transition per a given route. A support should be placed within 600 mm on each side of any connection to a bend, tee, or cross. Supports shall be dual support hangers, trapeze hangers or wall brackets. Trapeze hangers shall be supported by structurally approved anchoring system, and shall consist of 9.5 mm (maximum size) threaded rod with appropriate hardware (nuts, washers, etc.)
  - .4 All support systems for cable tray will be threaded rod.
  - Provide materials necessary to properly support system from existing building constructions per manufacturer's instructions and meeting or exceeding recognized industry practices, and as appropriate for this project. Provide special accessories as required to protect, support and install a cable tray system.
  - .6 Interface With Other Work:
    - .1 Field verify route prior to installation.
    - .2 Coordinate the installation of the cable tray system with other trades.
    - .3 Do not support from ductwork, piping, or other equipment hangers.

.14

Page 54 of 154

- .7 Installation clearances:
  - .1 Install system a minimum of 1220 mm from any motor.
  - .2 Install system a minimum of 50 mm from fluorescent light fixtures, or other EMI sources.
  - .3 Install system a minimum of 250 mm from the adjacent wall, unless otherwise instructed by the Communications Consultant and or the PHSA NE Representative.
  - .4 Install system to allow a minimum of 300 mm vertical clearance from the top of the cable tray to all ceilings, heating ducts, and heating equipment and 150 mm for short length obstructions; 600 mm horizontal clearance on one side of cable trays; and 75mm below bottom of the cable tray of clearance from piping, conduits, ductwork, etc.
  - .5 When designing and installing cable tray, maintain a minimum of 600 mm horizontal clearance on one side of cable trays mounted adjacent to one another or to walls or other obstructions. The 600mm unsupported distance of the cables between the cable tray and the Hilti speed sleeves is acceptable to the Authority. In locations where the cable tray runs perpendicular to the sleeves and within the 600mm gap requirement, Contractor will provide evidence that all the sleeves will remain accessible (for the removal and re-installation of cables), at the completion of the project when the T-bar is in place along with all the T-bar mounted equipment.
- .8 Install cable tray support hangers between 150 mm and 305 mm above ceiling grid. Vertical Cable Tray
  - .1 For a riser sleeve configuration consisting of 5 x 100mm (4") sleeves per row with each sleeve consisting of a combination of Hilti speed sleeve inside a cast-in-place sleeve, a minimum tray width of 914mm (36") shall be required.
  - .2 For a riser sleeve configuration consisting of 4 x 100mm (4") sleeves per row with each sleeve consisting of a combination of Hilti speed sleeve inside a cast-in-place sleeve, a minimum tray width of 762mm (30") shall be required.
- .15 Cable tray must be designed to reduce the opportunity for congestion and bottlenecks. Planning for installation of cable tray shall consider having the right capacity well into the future, and having diverse routing within the cable tray system. There should be diverse cable tray pathways to provide physically route diverse connections, and to minimize choke points or pile-up points that prevent all the cables from going through the exact same piece of cable tray. Assessing current cable counts and planning for future cable growth is key in creating a future-proofed network infrastructure.
- In exposed public areas, such as parking levels, a totally enclosed cable tray ensures the security of the cabling system. However, in secured spaces with exposed ceilings (e.g., clinical, office or mechanical areas), a basket-type tray is acceptable since cabling security is not a primary concern.

#### 3.9 CABLE HANGERS

- .1 Install J-Hooks a maximum spacing interval of 1200 mm.
- .2 Do not attach the J-Hook to the T-Bar wire support.

## 3.10 CONDUIT

# .1 Zone Conduit System for Residential

.1 It is acceptable to install a zoned conduit and pull-box system instead of cable tray in existing and new residential care buildings that do not have a common corridor or accessible ceiling spaces. Consult with the Communications Consultant and or

Page 55 of 154

- the PHSA NE Representative to confirm the suitability of a zone conduit system prior to designing and specifying this solution.
- .2 When zone conduit is used, install in a minimum 305 mm X 305 mm X 150 mm deep pull-box in each room's ceiling space. Conduit to Communications outlet shall be from this pull-box.
- .3 A maximum of two (2) outlets may share the same 30 mm conduit of short distribution distance.
- .4 Provide pull boxes such that conduit length shall not exceed 9m and the number of 90° bends shall not exceed two (2).

## .2 Zone Conduit System for Acute Care sites (Refer to C-STD-013)

- .1 The minimum conduit size for data outlets (surface or flush) shall be 27 mm. If a larger number of data outlets needs to be installed in the same area, a single 53 mm feeder conduit may be used as a "Zone conduit" for each area. The conduit shall terminate in a large pull-box inside the area which shall be the conduit distribution point for that area.
- .2 When zone conduit is used, install in a minimum 305 mm X 305 mm X 150 mm deep pull-box inside each area's ceiling space as near as possible to the corridor wall and above the ceiling tile immediately to the left or right of the entrance door. The data outlet conduit will enter the pull box on the side opposite the 53 mm zone conduit.
- .3 Zone box cabling is restricted to horizontal data cables that terminate on the IMIT racks designated for horizontal cabling. Leave a mule tape in the Zone conduit for future cable installation.
- .4 The Zone conduit fill ratio will be based on 20% maximum fill ratio for Cat6A horizontal cabling at the time of project completion.
- .5 Contractor must locate all conduits, JB, including size, routing, and cable count associated with each zone conduit system on the project as-built drawings. These become part of the of the record drawings submitted at the completion of the project.
- Provide a unique zone conduit pathway ID label at each pull box as per BICSI labelling standards. Contractor to add zone pull box ID label (white lettering on black background) in the Zone Pull Box cover and to the ceiling grid (or access hatch if applicable) directly below the zone pull box location.
- .3 Unless specified to the contrary in the outlet specification or drawings, each drop conduit or Communications outlet shall be connected to the nearest cable tray.
- .4 Unless specified to the contrary by the Communications Consultant and or the PHSA NE Representative, flexible metal and PVC jacketed conduit shall can only be used to connect to modular furniture or custom millwork.
- .5 All conduits shall have sweeping bends with inside radius being no less than six (6) times the internal diameter of the conduit. For conduit 50mm or larger, the bend radius shall be no less than ten (10) times the internal conduit diameter. Fittings such as LB type joints are not acceptable.
- .6 Provide sweeping 90° bends for conduits where conduits are above cable trays and cables are running from the conduits to cable trays to create a water fall effect to reduce the strain on cables.
- .7 When cable trays are used, conduit shall be attached to the edge of the tray with a conduit bracket designed for this purpose. If this is not possible, conduit shall be stubbed within 150 mm above the tray and terminate in a bonding type bushing.
- .8 The colour scheme for painted bands used to identify conduits, pull boxes, junction boxes, etc. that are used for communications cabling shall be green. The low voltage systems covered under this colour scheme include Voice and Data, Security, Door Intercom, CATV/CCTV and Building Automation.

Page 56 of 154

- .9 Install surface conduits on exposed walls where additional outlets are to be installed on existing walls. Install conduits and cables within new walls. In rooms where conduits are exposed, locate them so as not to interfere with the installation of white boards or other obstructions.
- All conduit shall be fixed to or hung from building structure and shall not be fixed to or hung from building services, i.e. ducts, pipes, electrical conduits, sprinkler pipes, etc. Install fastenings and supports at regular intervals as required for each type of equipment, cables and conduits, and in accordance with manufacturer's installation recommendations. Provide and correctly locate all hangers and clips for the installation of all work under this Division. They shall be firmly secured to the structure.
- .11 The Contractor shall use rigid conduit for penetrations through exterior masonry/concrete walls and foundations, concrete floor slabs on grade
- .12 Electrical Metallic Tubing (EMT) and Fittings
  - .1 Electrical metallic tubing (EMT): Shall be used to conceal interior low voltage cables where runs are concealed above suspended ceilings, in walls, furred spaces and crawl spaces.

# .2 Preparation:

- .1 Locations of conduit runs shall be planned in advance of the installation and coordinated with ductwork, plumbing, ceiling and wall construction in the same areas and shall not unnecessarily cross other conduits or pipe, nor block access to mechanical or electrical equipment.
- .2 Where practical, install conduits in groups in parallel vertical or horizontal runs and at elevations that avoid unnecessary offsets.
- .3 All conduits shall be run parallel or at right angles to the centrelines of columns and beams.
- .4 Conduits shall not be placed closer than 305 mm to a flue, parallel hot water, steam line or other heat producing source or 75 mm from such lines when crossing perpendicular to the runs.
- .5 Exposed conduit installation shall not encroach into the ceiling height headroom of walkways or doorways. Where possible, install horizontal raceway runs above water and below steam piping.
- .6 In long runs of conduit provide sufficient pull boxes inside buildings to facilitate pulling wires and cables, with spacing not to exceed 45 m. Support pull boxes from structure independent of conduit supports. These pull boxes are not indicated on the Drawings.
- .7 Provide all reasonably inferred standard conduit fittings and products required to complete conduit installation to meet the intended application whether noted, indicated or specified in the Contract Documents or not.

#### .3 Installation

- .1 Install conduit as indicated on Drawings and as specified herein.
- .2 Install conduits in complete runs before pulling in cables or wires.
- .3 Install conduit free from dents, bruises or deformations. Remove and replace any damaged conduits with new undamaged material.
- .4 Conduits shall be well protected and tightly covered during construction using metallic bushings and bushing "pennies" to seal open ends.
- .5 Clean any conduit in which moisture or any foreign matter has collected before pulling in conductors. Paint all field-threaded joints to prevent corrosion.
- .6 Conduit systems shall be mechanically and electrically continuous throughout.
- .7 Metallic conduit shall not be in contact with other dissimilar metal pipes (i.e. plumbing).

Page 57 of 154

- .8 Make bends with standard conduit bending hand tool or machines. The use of any item not specifically designed for the bending of electrical conduit is strictly prohibited.
- .9 A run of conduit between terminations at wire pulling points shall not contain more than the equivalent of two quarter bends (180 deg. total).

# .4 Penetrations

- .1 Cutting of holes:
  - 1 Cut holes through concrete, masonry block or brick floors and floors of structure with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed, except where permitted by the Structural Engineer as required by limited working space. Obtain the approval of the Structural Engineer prior to drilling through structural sections.
  - .2 Fire stop: Where conduits pass through fire rated partitions, walls, smoke partitions or floor; install a UL classified fire stop material to provide an effective barrier against the spread of fire, smoke and gases. Completely fill and seal clearances between raceways and openings with the fire stop material. Refer to Fire Stop Systems 27 05 29.
  - .3 Waterproofing: At floor, exterior wall and roof conduit penetrations, completely seal clearances around the conduit and make watertight.
  - .4 For roof penetrations furnish and install roof flashing, counter flashing and pitch-pockets.
  - .5 Provide membrane clamps and cable sealing fittings for any conduit that horizontally penetrates the waterproof membrane. Conduits that horizontally penetrate a waterproof membrane shall fall away from and below the penetration on the exterior side a minimum of two times the conduit diameter.

## .5 Terminations and Joints

- .1 Use raceway fittings that are of types compatible with the associated raceway and suitable for use at the location.
- .2 Raceways shall be joined using specified couplings or transition couplings where dissimilar raceway systems are joined.
- .3 Conduits shall be securely fastened to cabinets, boxes and gutters using two locknuts and an insulating bushing or specified insulated connectors. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Where terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors.
- .4 Conduit terminations exposed at weatherproof enclosures and cast outlet boxes shall be made watertight using specified connectors and hubs.

## .6 Supports

- All raceways systems shall be secured to building structures using specified fasteners, clamps and hangers spaced according to the CEC.
- .2 Support single runs of conduit using one-hole pipe straps. Where run horizontally on walls in damp or wet locations, install "clamp backs" to space conduit off the surface.
- .3 Multiple conduit runs shall be supported using "trapeze" hangers fabricated from specified construction channel, mounted to 9.5 mm diameter and threaded steel rods secured to building structures. Fasten conduit to construction channel with standard one-hole pipe clamps or the equivalent. Provide lateral seismic bracing for hangers.

Page 58 of 154

- .4 Fasteners and supports in solid masonry and concrete:
  - .1 Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
- .5 After concrete installation:
  - .1 Steel expansion anchors not less than 6 mm bolt size and not less than 28 mm embedment.
  - .2 Power set fasteners not less than 6 mm diameter with depth of penetration not less than 75 mm.
  - .3 Use vibration and shock resistant anchors and fasteners for attaching to concrete ceilings.
- .6 Hollow masonry: Toggle bolts are permitted. Bolts supported only by masonry block are not acceptable.
- .7 Metal structures: Use stainless steel machine screw fasteners or other devices specifically designed and approved for the application.

#### 3.11 OUTLET BOXES

## .1 Preparation

- .1 Locate pull boxes and junction boxes in accessible locations.
- .2 Install outlet boxes at the locations and elevations indicated on the Drawings or specified herein. Make adjustments to locations as required by structural conditions and to suit coordination requirements of construction conditions.

## .2 Installation

- .1 Install boxes as indicated on Drawings and as specified herein.
- .2 Do not install outlets back-to-back in wall; and allow a minimum of 150 mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, provided distance does not exceed 3 m, and information is given before installation.
- .4 Locate electrical boxes as indicated on Drawings and as required for splices, taps, wire pulling, equipment connections and Code compliance.
- .5 Install junction or pull boxes where required to limit bends in conduit runs to not more than 180 degrees or where pulling tension achieved shall exceed the maximum allowable for the cable to be installed. Note that these boxes are not indicated on the Drawings.
- .6 Leave no unused openings in any box. Install close-up plugs as required to seal openings.
- .7 Provide cast metal boxes with gasketed cast metal cover plates where boxes are exposed in damp or wet locations or located in hazardous areas.
- .8 Use conduit outlet bodies to facilitate pulling of conductors or to make changes in conduit directions only. Do not make splices in conduit outlet bodies.
- .9 Mounting height of equipment is from finished floor to centre line of equipment unless specified or indicated otherwise.
- .10 If mounting height of equipment is not specified or indicated, verify with Communications Consultant and or the PHSA NE Representative before proceeding with the installation.
- .11 Communications outlets:
  - .1 Above finished floors generally 300 mm, or match mounting height of existing voice/data outlets.
  - .2 Above counters splash backs 150 mm.

# .3 Supports

.1 Support boxes independently of conduit system.

Page 59 of 154

.2 Support boxes, mounted above suspended acoustical tile ceilings, directly from the structure above.

## 3.12 PULL BOXES

.1 Pull boxes installed inside accessible ceilings shall be within 600 mm of T-bar ceiling grid for ease of access in future.

## 3.13 SURFACE RACEWAYS INSTALLATION

- .1 Install Wiremold raceway where indicated on the drawings for power and Communications outlets.
- .2 The surface raceway shall parallel building lines and hug ceilings, baseboards, and corners. Raceway length shall be kept to a minimum.
- .3 The surface raceway base shall be mechanically fastened to walls and supporting structures. Use of double-sided tape alone is not acceptable. For non-metallic surface raceway the maximum spacing of fastener is 400 mm. The recommended fasteners are as follow:
  - .1 Masonry surface Tapcon masonry type fastener, 6 mm dia.
  - .2 Dry wall with no stud Toggler AF "Alligator type" anchor. AF8 or AFG6.
  - .3 Dry wall with stud Dry wall screw.
- .4 The surface raceway shall maintain its integrity when passing through a wall or supporting structure. The raceway cover shall be cut 100 mm from either side of the penetration.
- .5 Surface raceway extending into the ceiling shall connect to the conduit extending from the cable tray with the appropriate fitting or pull box.
- .6 When installing surface raceway, manufactured bends and fittings must be used. Installation shall be in accordance with the manufacturer's instructions.
- .7 Wire clips shall be installed in two-piece surface raceway installations at 450 mm centres. Additional wire clips shall be used when the raceway is secured to a ceiling or large amounts of cables are installed.

When installing cable in surface raceway, cable fill shall not exceed 28% with no more than two 90° bends after all the cables are installed at the time when a new facility becomes operational. Where there are zero bends in the surface raceway, the fill ratio can be increased to 40%.

## 3.14 MAXCELL INNERDUCT

- .1 Maxcell flexible fabric textile innerduct system shall be used in conduits in inter-building outside plant and intra-building in-premise pathway environments.
  - .1 Install Maxcell innerducts inside the conduits of campus perimeter pathway system.
  - .2 Install Maxcell innerducts inside the conduits of premise-riser pathway system.
  - .3 Swivels must always be used. Consult MaxCell representative for complete swivel options.
  - .4 The factory installed pull tape or rope must free-float during installation.
  - .5 Follow manufacturer's installation instructions.

## **END OF SECTION 27 05 28**

Page 60 of 154

## 27 05 29 FIRE STOP SYSTEMS

## PART 1 GENERAL

## 1.1 SUMMARY

- .1 Summary
- .2 Related Sections
- .3 Requirements
- .4 References
- .5 Quality assurance
- .6 Training

#### 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 01 10 Basic Requirements
  - .2 Section 27 05 29 Pathways for Communications
  - .3 Section 27 21 33 Data Communications Wireless Access Points

## 1.3 REQUIREMENTS

- .1 The Contractor shall submit to the Communications Consultant and or the PHSA NE Representative for approval, the following items relating to the fire-stop system:
  - HILTI Speed Sleeve manufacturer, or approved alternative, technical data for each product intended to be used on site including product description, specifications and storage requirements.
- .2 Firestop design documentation shall include a schedule indicating:
  - .1 Listed firestop system tested to CAN/ULC-S115-11.
  - .2 Number of firestop locations.
  - .3 Type of penetration.
  - .4 Type of building construction at point of penetration.
  - .5 Hourly fire-rating of floors and walls.
  - .6 Firestop device or system proposed.
  - .7 Installation Procedures and Material Safety Data Sheets shall be included with products delivered to the job site.
  - .8 Maintenance manuals and maintenance data that may be published by Manufacturer.

## 1.4 DOCUMENTS

.1 This section of the Specification forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

## 1.5 REFERENCES

- .1 CAN/ULC-S115-11, Standard Method of Fire Tests of Through Penetration Fire Stops.
- .2 CAN/ULC-S102-M, Standard Test Method for Surface Burning Characteristics of Building Materials.
- .3 ASTM E814, Standard Method of Fire Tests of Through-Penetration Fire Stops.

Page 61 of 154

- .4 UL 1479, Fire Tests of Through-Penetration Firestops.
- .5 UL Fire Resistance Directory: Through Penetration Firestop Devices (XHCR) and Through Penetration Firestop Systems (XNEZ).
- .6 ASTM E119, Fire Tests of Building Construction and Materials (for fire-rated architectural barriers).
- .7 ASTM G-21, Standard Test for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- .8 BICSI Current Edition, Telecommunications Distribution Methods Manual (TDMM), Chapter 11, Firestopping
- .9 Factory Mutual Approval Guide.
- .10 ULC List of Equipment and Materials, VOL. II.
- .11 Current Canadian Electrical Code
- .12 Current BC Building Code
- .13 Installed fire stopping systems shall meet approval of Local Authorities having jurisdiction.

#### 1.6 QUALITY ASSURANCE

- .1 A manufacturer's direct representative (account manager, fire protection specialist, not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This shall be done per manufacturer's written recommendations published in their literature and drawing details.
- .2 For those firestop applications that exist for which no UL tested system is available through a manufacturer, a manufacturer's firestop custom detail derived from similar UL system designs or other tests shall be submitted to the AHJ for their review and approval prior to installation. Firestop custom detail drawings must follow requirements set forth by the International Firestop Council.
- .3 Manufacturer's fire protection specialist to provide site walk-through report detailing visual review of a random sampling of applications.

#### 1.7 TRAINING

.1 The Contractor must receive training through the Firestop University program offered from HILTI, or approved alternative, and possess current certification prior to installing firestop products.

## PART 2 PRODUCTS

# 2.1 GENERAL

- .1 Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with CAN/ULC-S115-11.
  - .1 F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.
  - .2 FT-Ratings: For penetrations of a firewall that is required to have a fire resistance rating in conformance with BCBC Article 3.2.1.2, not less than the fire-resistance rating of the fire separation being penetrated.
- .2 Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with CAN/ULC-S115-11.
  - .1 F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.

.3

Page 62 of 154

- .2 FT-Rating: For penetrations of a fire separation required to have a fire-resistance rating in conformance with BCBC Article 3.2.1.2, not less than the fire-resistance rating of the floor construction being penetrated.
- .3 T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
- .4 W-Rating: Class 1 rating in accordance with water leakage test per UL 1479. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with CAN/ULC-S115-11.
  - .1 L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.
- .4 Mould Resistance: Provide penetration firestopping with mould and mildew resistance rating of 0 as determined by ASTM G21.

	Hilti Canada
<b>Sealants</b> Firestop products such as FS-	
One MAX, CP606. CFS-S SIL GG, and CFS-S SIL SL used to seal openings	
Cast in Place CP 680 M (metal) & P/PX	
(plastic)	
Simple cast-in place device and adaptor for firestopping pipes	
Mortar	
CP 637	
Item No.: 340645	
Quick-setting compound for	
firestopping a wide variety of applications including large	
penetration openings in floors or	ů.
walls. "This is approved for Conduit Penetrations Only"	Manage and San
Putty Pads, Sticks & Wraps	
Firestop sticks (CP 618), pads	
(CFS-P PA, CP 617) and wrap	of the last of the
strips (CP 648E/648S) used in cable and pipe applications	
Cable Collar	(17)
CFS-CC 4"	H
Item No.: 2065421	
Surface mounted repenetrable	
solution for cables through walls and floors	0

Page 63 of 154

Collars Collars (CP 643N, CP 644) used for firestopping combustible pipes	
Speed Sleeve CP 653-4" Firestop sleeve: Item No.: 00236324 Ready-to-use, one-step cable management firestop device.	
CFS-BL Fire Blocks Item No: 2030020 Ready-to-use, Intumescent Flexible Block Based on a Two- Component Polyurethane Foam	
Firestop Plugs CFS-PL Reusable intumescent firestop plug used for small round openings	Frato Pia GFS-PL GGS-PL

## 2.2 SPECIFIC REQUIREMENT

- .1 For communications rooms, provide the Hilti CP-653-4" speed sleeves in the walls. For riser sleeves, use a combination of Hilti CP 680 cast-in-place firestop devices c/w CP-653-4" speed sleeves inserted into them. Refer to the Hilti Systems drawing.
- .2 Refer to Hilti F-A-3060 system drawing and C-STD-033.3 Cast-in place/Speed sleeve fire stop drawing.
- .3 Use the Hilti CFS-SL GP ganging wall plate when installing 2 or more Hilti Speed sleeves.

## 2.3 ACCEPTABLE MANUFACTURERS

.1 Subject to compliance with through penetration firestop systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:

Hilti (Canada) Corporation, Mississauga, Ontario 1-800-363-4458

www.,hilti.ca.

.1 Provide products from the above acceptable manufacturer; only reviewed and approved alternates can be used as substitutions.

## 2.4 MATERIALS

.1 Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

Page 64 of 154

- .2 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- .3 Re-penetrable, round cable management devices for use with new or existing cable bundles penetrating gypsum or masonry walls, the following products are acceptable:
  - .1 Hilti Speed Sleeve (CP 653) with integrated smoke seal fabric membrane.
  - .2 Hilti Firestop Sleeve (CFS-SL SK)
  - .3 Hilti Retrofit Sleeve (CFS-SL RK) for use with existing cable bundles.
  - .4 Hilti Cable Collar (CFS-CC)
  - .5 Hilti Gang plate (CFS-SL GP) for use with multiple cable management devices.
  - .6 Hilti Gang plate Cap (CFS-SL GP CAP) for use at blank openings in gang plate for future penetrations.
- .4 Pre-formed, round firestop devices with integrated intumescent strips for use with non-combustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors and/or gypsum walls, the following products are acceptable:
  - .1 Hilti Cast-In Place Firestop Device (CP 680-P/PX) for use with combustible penetrants.
  - .2 Hilti Cast-In Place Firestop Device (CP 680-M) for use with non-combustible penetrants.
  - .3 Hilti Speed Sleeve (CP 653) for use with cable penetrations.
  - .4 Hilti Firestop Drop-In Device (CFS-DID) for use with non-combustible and combustible penetrants.
- .5 Sealants, foams or caulking materials for use with non-combustible items including rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
  - .1 Hilti Intumescent Firestop Sealant (FS-ONE MAX)
  - .2 Hilti Fire Foam (CP 620/CP 660)
  - .3 Hilti Flexible Firestop Sealant (CP 606)
  - .4 Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
  - .5 Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
- .6 Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including PVC jacketed, flexible cable or cable bundles, and plastic pipe, the following products are acceptable:
  - .1 Hilti Intumescent Firestop Sealant (FS-ONE MAX)
- .7 Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:
  - .1 Hilti Intumescent Firestop Sealant (FS-ONE MAX)
  - .2 Hilti Fire Foam (CP 620/CP 660)
  - .3 Hilti Flexible Firestop Sealant (CP 606)
  - 4 Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
- .8 Non-curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
  - .1 Hilti Firestop Putty Stick (CP 618)
  - .2 Hilti Firestop Plug (CFS-PL)
- .9 Wall opening protective materials for use with cUL / ULC listed metallic and specified non-metallic outlet boxes, the following products are acceptable:
  - .1 Hilti Firestop Putty Pad (CFS-P PA/CP 617)
  - .2 Hilti Firestop Box Insert
- .10 Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
  - .1 Hilti Firestop Mortar (CP 637)
  - .2 Hilti Firestop Block (CFS-BL)

Page 65 of 154

- .3 Hilti Fire Foam (CP 620/CP 660)
- .4 Hilti Firestop Board (CP 675T)
- .5 Hilti Composite Sheet (CFS-COS)
- .11 Non curing, re-penetrable materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
  - .1 Hilti Firestop Block (CFS-BL)
  - .2 Hilti Firestop Board (CP 675T)
- .12 For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:
  - .1 Hilti Firestop Block (CFS-BL)
  - .2 Hilti Firestop Plug (CFS-PL)
  - .3 Hilti CP 680 Cast-In Place Firestop Device (for floors only)
- .13 The Contractor shall use firestop materials that have no irritating or objectionable odours, when firestopping occupied areas of existing buildings.
- .14 Firestop products used in cross-sectional areas of pathway such as inside sleeves, or cable tray penetrations of fire barriers shall be of re-enterable and reusable type to enable future Moves, Additions, or Changes.

## PART 3 EXECUTION

## 3.1 COORDINATION

- .1 Firestop systems installed by the Contractor shall meet the requirements of all applicable codes and ULC standards.
- .2 The Contractor shall firestop new Communication pathway and/or cable penetrations of building fire barriers with an approved firestop system, following cable installation.
- .3 The Contractor shall firestop with an approved firestop system, any holes created by the Work of this Contract.
- .4 The Contractor shall coordinate all Work with Division 26 and the site's Facilities Maintenance and Operations department.
- .5 The Contractor shall obtain inspection approval from local Authority Having Jurisdiction (AHJ) and the site's Facilities Maintenance and Operations department and shall be responsible for all associated costs.
- .6 The Contractor shall provide equipment, materials, labour, and services not specifically mentioned or shown which may be necessary to complete or perfect all parts of this installation and in compliance with requirements stated or reasonably inferred by the Contract Documents

## 3.2 INSTALLATION

- .1 The Contractor shall select appropriate firestop assembly to suit the type of penetration, and base the selection on criteria specified herein.
- .2 Refer to Appendix F for other firestop systems that align with the applications that are described in this Section.
- .3 Selected firestop systems shall not be less than the hourly fire-ratings indicated in the Contract Documents for each respective penetration through fire-rated floor, wall, or other partition of building construction.
- .4 Firestop for each type of penetration shall conform to manufacturer's firestop design drawings or approved modifications, and meet requirements of an independent testing laboratory.

Page 66 of 154

- .5 The Contractor shall perform all necessary coordination with trades constructing floors, walls, or other partitions with respect to size and shape of each opening, device, or firestop system approved for use in each instance. Also, the Contractor shall resolve any feasibility or obstruction issues.
- .6 In areas accessible to public and other "finished" areas, the Contractor shall prepare the surface area surrounding firestop penetrations to match finished quality of adjoining surfaces.
- .7 The Contractor shall provide damming materials, plates, wires, restricting collars, and devices necessary for proper installation of a firestop system.
- .8 The Contractor shall remove combustible installation aids after firestopping material has cured.
- .9 All Firestop assemblies shall be installed in accordance with the manufacturer instructions in order to maintain the specific rating assigned by the independent testing laboratory.
- .10 The Contractor shall remove excess materials and debris and clean adjacent surfaces immediately after application.

#### 3.3 EXISTING PENETRATIONS

- .1 In existing buildings, the Contractor shall firestop any gaps or cavities between penetrating cable tray, ducts, or sleeves and surrounding surface area.
- .2 In existing buildings, even if there are existing cables running in the riser and the holes and slots are not filled with firestop products, if the Contractor is running any new cabling in, then that is their responsibility to ensure it is firestopped correctly.
- .3 The Contractor shall firestop with an approved firestop system, the following existing penetrations of building fire barriers:
  - .1 Existing Communication pathway, cables, or holes that are not firestopped and are within 1 m (3') of new Communication pathway, or cable penetrations of fire barriers
  - .2 Existing Communication cables abandoned by the Work of this Contract.
- .4 Firestop assemblies consisting of wrap around individual steel collar sections complete with intumescent putty material that completely surround penetrations, shall be used for non-metallic pipes.

#### 3.4 MASONRY POINTING PATTERN

.1 Where firestop systems penetrate masonry barriers, the Contractor shall make good surrounding area by replicating original pointing pattern and matching in quality of workmanship.

## 3.5 INSPECTING AUTHORITIES

- .1 The Contractor shall remove and expose firestop systems to the extent directed by Inspecting Authority for the purpose of carrying out the inspection.
- .2 The Contractor shall re-install firestop system and restore any affected building components removed for inspection, at no cost to the Owner.

#### **END OF SECTION 27 05 29**

Page 67 of 154

## 27 05 53 IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

## PART 1 GENERAL

## 1.1 SUMMARY

- .1 Summary
- .2 General

## 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 01 10 Basic Requirements
  - .2 Section 27 11 00 Communication Room Fittings
  - .3 Section 27 13 13 Copper Backbone Systems
  - .4 Section 27 13 23 Fiber Backbone Systems
  - .5 Section 27 15 00 Horizontal Cabling
  - .6 Section 27 21 33 Data Communications Wireless Access Points

## 1.3 GENERAL

- .1 Overview
  - .1 Before commencing the labelling, the Contractor shall supply samples of methods of labelling and materials used for approval by Communications Consultant and or the PHSA NE Representative.

## PART 2 PRODUCTS

## 2.1 LABELS

- .1 Labels for GigaBIX termination hardware.
  - .1 Labels are supplied in sheets:

White LAN, PBX, Multiplexer, Category 3 tie cable between VP1 patch

panel and the GigaBIX

Green label Entry connect (ISP Interface), Category 3 cable from the EF to

MER

Blue label Horizontal

Purple label 1st level Backbone Riser (MER to TR)

Grey label 2<sup>nd</sup> level Backbone Riser Tie (TR to TR or MER to 2<sup>nd</sup> MER)

Brown label Inter-building Backbone Campus

## SUBSTITUTES ARE NOT ACCEPTED

- .2 Colour scheme for jacks: Black.
- .3 Colour scheme for faceplates: match colour of electrical faceplate.
- .2 Cable label for indoor cable and indoor/outdoor Interlocking armoured type fiber optic cables,

Page 68 of 154

- .1 Label type for cable labels: Labels shall be pre-cut for quick and easy application.
- .2 Labels shall be in self-adhesive polyester or non-adhesive polyester (depending on label type).
- .3 Fiber Optic Cable label for marking cables inside outdoor pull-boxes and manholes.
  - 1 Self-Laminating Rigid Vinyl equal to: Panduit Part # PST-FO.
- .4 Labels used for patch panels, jack outlets and ceiling T-bar, junction box covers, access panels and any other similar infrastructure used for Communications systems:
  - .1 Equal or better than Brothers P-Touch labels with extra strength adhesive.
  - .2 Depending on the finish of the surface, the contractor may need to provide an alternate solution to ensure the label sticks correctly and doesn't fall off over time.
  - .3 Stainless Steel Faceplate
    - .1 Labels shall be equal to or superior to P-Touch TZe or Brady B-747A, both with extra strength adhesive.
    - .2 Labels shall be reinforced with clear nail polish for added durability.
    - .3 A spare backup label shall be installed inside the outlet box as a contingency for missing faceplate labels.

#### PART 3 EXECUTION

#### 3.1 INSTALLATION

- .1 All Communications rooms shall be assigned a unique alpha-numeric ID number. The number shall be displayed in the form of a lamacoid label supplied by the Contractor. Each character shall be 50 mm high x 40 mm wide permanent Blue digits on a Yellow background. The Contractor shall install the lamacoid. The exact placement shall be highly visible on top of cable termination wall in the Communications rooms.
  - In new construction, labelling of Communications room exterior door frames requires that a plaque or lamacoid identifying the Communications room ID number be added to the door frame in the opposite corner from the plaque or lamacoid identifying the architectural room number. Background colour and lettering colour, size of Communications room ID plaque or lamacoid, and font type and size to equal what is provided for the architectural room number plaque or lamacoid.
  - .2 In existing facilities, labelling of Communications room exterior door frames requires that in the absence of the architectural room ID number, a plaque or lamacoid identifying the architectural room ID number be added to the door frame in the opposite corner from the plaque or lamacoid identifying the Communications room number. Background colour and lettering colour and size of architectural room ID plaque or lamacoid to equal what is provided for the Communications room number plaque or lamacoid. The numbers and not the background shall be 25 mm high x 20 mm wide engraved on lamacoid in permanent Blue on Yellow background unless otherwise prescribed by onsite Facilities Maintenance and Operations.
- .2 Communications Cabinet and Rack Identification Labeling Requirements
  - 1 Alpha-Numeric ID Assignment:
    - .1 All cabinets and racks shall be assigned a unique alpha-numeric ID.
    - .2 Cabinets shall be labeled sequentially as C1, C2, C3, and so on.
    - Racks shall be labeled sequentially as R1, R2, R3, and so on.
  - .2 Label Format:
    - .1 Each character on the label shall be:
      - .1 50 mm high and 40 mm wide
      - .2 Engraved on lamacoid
      - .3 In permanent white on a black background

3 Installation Details:

Page 69 of 154

- .1 For Racks, the label shall be placed at the center of the front top frame of the rack.
- .2 For Cabinets, the label shall be positioned at the top center of the cabinet door.
- All fiber and copper patch panels shall be assigned an alpha-numeric ID number e.g. FP1, VP1, P1, APP1, etc. The number shall be displayed in the form of a lamacoid label supplied by the Contractor. Each character shall be 12 mm high x 9 mm wide permanent Black digits on a White background. The Contractor shall install the lamacoid. The exact placement shall be at the left-side post of the rack and cabinet, beside the centre of the associated patch panel.
- .4 Unless specified otherwise, designation labels on outlet plates shall be machine-printed on tape and inserted in the top and bottom label windows of faceplates, as detailed in these and related specifications. Alternate methods must be submitted to the Communications Consultant and or the PHSA NE representative for approval. Lamacoid labels shall not be accepted.
- .5 After terminating and identifying a Communications cable, each cable shall be identified with a unique cable number, as detailed in these and related specifications. A sample database sheet for cable identification is included in Appendix A. The Contractor shall use the sample database format to populate cable information without any modification and provide one database file in same format for each building.
- .6 Labelling shall conform to standard faceplate drawing. Refer to C-STD drawings in 27 00 00.
- .7 Commscope or Belden label strips or equal shall be approved by the Communications Consultant and or the PHSANE Representative. The Contractor shall label each outlet with 9 mm high black on white mechanical label.
- .8 Unless specified otherwise, all labels shall be machine-printed. Brother "P-touch" electronic labelling system, or equal approved by the Communications Consultant and or the PHSA NE Representative. Hand-lettered labels shall not be accepted. Labels shall have a design life equal to or greater than that of the labeled component. They shall be resistant to the environmental conditions at the point of installation.
- .9 Distribution terminals shall use standard TIA colour coding on all terminations as follows: Green = Termination of network connection on the customer side of the demarcation point (Category 3 cable from the EF to MER).
  - White/Silver = Termination of cables originating from common equipment (PBXs, computers, LANs and multiplexers, Category 3 tie cable between VP1 patch panel and the GigaBIX).

Brown = Inter-building Backbone.

Purple = First-level Backbone, Riser/Backbone and between MER and TR's.

Blue = Stations served directly from TR's or MER's, i.e. horizontal wiring.

Grey = Second-level Backbone.

- .2 Faceplate Work Area (Refer to C-STD drawings in 27 00 00.01).
- .3 Faceplates shall have the following labels:
  - .1 Alpha-numeric ID of Communications room at top label window of faceplate e.g. XXX-01A.
  - .2 Architectural room number of Communications room at bottom of faceplate e.g. 1008.
  - .3 Jack ID directly above or below jack e.g. R1P1-01, R1P1-02.
- .10 Communications Rooms
  - 1 EF/MER/TR Communications Room ID Assignments
  - .2 All Communications rooms shall have unique alpha numeric numbers assigned, example "XXX-01A". The numbers and not the background shall be 50 mm high x 40 mm wide engraved on lamacoid in permanent Blue on Yellow background. It shall be placed on a visible location at the top of the GigaBIX wall whenever feasible and

Page 70 of 154

secured with screws at four corners. Contractor shall label Communications room in consultation with NE and Facilities Maintenance and Operations and in accordance with the following format:

B1A shall be basement level – representing 1st Communications room.

NOA shall be interstitial level between basement and 1st floor level – "A" representing 1st Communications room..

01A shall be 1st floor level – representing 1st Communications room.

N1A shall be interstitial level between 1<sup>st</sup> floor level and 2<sup>nd</sup> floor level - "A" representing 1st Communications room.

02A shall be 2nd floor level – representing 1st Communications room.

N2A shall be interstitial level between 2<sup>nd</sup> floor level and 3<sup>rd</sup> floor level - "A" representing 1st Communications room.

03A shall be 3rd floor level – representing 1st Communications room.

03B shall then be the 3rd floor level – representing 2nd Communications room.

Label the MER with the appropriate floor number and the letter A. Then assign letters B, C etc. to the TR Communications rooms on the same floor starting at the MER and moving in sequence. On each successive floor, label the Communications room located directly above the MER with the letter A and then label the remaining local Communications rooms on that floor in sequence accordingly to the established flow.

- Using interstitial floors for building Communications rooms is highly discouraged due to significant limitations. These floors often lack sufficient space and accessibility for regular maintenance and upgrades. They typically cannot support the structural load and specialized cooling requirements of communications equipment. Additionally, the proximity to mechanical systems can introduce electromagnetic interference, compromising equipment performance. The complexities and costs associated with ensuring compliance with fire safety standards and routing cabling further make interstitial floors unsuitable for Communications rooms. Therefore, alternative locations should be considered to ensure optimal functionality, safety, and cost-effectiveness.
- .12 Patch Cable and Icon Colours
  - .1 All Copper patch cables shall be Grey.
  - .2 Black is avoided as they get mixed up with power cords and are tough to see in the black cabinets.
- .13 UTP Horizontal Cable
  - Communications horizontal cables shall be identified at each termination end with a unique number at the faceplate (outlet jack), at the patch panel and on both ends of the cable jacket.

Patch Panel in TR (originating end)

i.e. XXX-01A-R1P1-01

XXX Represents combined site/building code in campus setting or `

XXX-01A Represents MER 1st floor Communications room A.

R1 Represents Rack #1.
P1 Represents Panel #1.
01 Represents Port #1.

Note:

The Architectural number of the destination room shall be added to the associated port on the front of the patch panel.

.2 Communications horizontal cables for wireless access points shall be identified at each termination end with a unique number at the faceplate (outlet jack), at the patch panel and on both ends of the cable jacket.

Patch Panel in TR (originating end)

i.e. XXX-01A-R1P1-01(WP)

Page 71 of 154

XXX	Represents	combined	site/building	code in	campus	setting	or
	atandalana l	مم ممنامانییم	برام م مار				

standalone building code only.

XXX-01A Represents MER 1st floor Communications room A.

R1 Represents Rack #1.
P1 Represents Panel #1.
01 Represents Port #1.

(WP) Represents Wireless Access Point.

Note:

The Architectural number of the destination room shall be added to the associated port on the front of the patch panel

- .3 The unique number used to identify horizontal cables for wireless access points shall also be identified on the T-bar at the location of the ceiling outlet or, in the case of a solid ceiling, on the access hatch co-located with the ceiling outlet. The label used in this instance shall be black with white alpha numeric characters.
- .4 Wireless Access Point Patch Panel Label (existing CAT6 installations)
  - .1 Label "APP1", "APP2", etc. on the patch panels for the termination of CAT6A Wireless Access Point Horizontal cabling only in existing CAT6 installations.
  - .2 Install "APP1", "APP2", etc. above the existing patch panel "P1".
  - .3 CAT6A and CAT6 shall not be mixed in the same patch panel.
  - .4 "APP1", "APP2", etc. shall not be used when all the cables are of the same Category.

i.e. XXX-01A-R1APP1-01

XXX-01A Represents MER 1st floor Communications room A.

R1 Represents Rack #1.

APP1 Represents CAT6A Wireless Access Point Panel #1 in

existing CAT6 installations.

01 Represents Port #1.

# .14 Backbone Cabling

- Along the corridors, provide a cable label every 10 m along the entire exposed run of the backbone cable as well as within 1 m of both sides of any wall and floor penetrations. Identify destination and originating Communications room number on each wrap around cable label.
  - .1 Label can be arranged in two lines with the following format example: SBBL-01A / SBAL-01A
  - .2 Size of Font is to be as maximum possible, depending on the diameter of the cable.
- .2 Inside the MER, TR, or EF, all backbone cables after exiting conduits or conduit sleeves shall be labelled every 3 meters along the exposed section as well as within 1 meter of each side of a wall or floor slab the cable passes through. The wrap around labelling also applies to the fiber slack storage ring and the inner duct (from ring to rack), for the fiber cable.
- .3 For CommScope indoor/outdoor fiber cable with a black jacket running along corridors, apply a yellow band for singlemode and a lime green band for OM5 multimode every 10 meters along the entire exposed backbone cable. corresponding bands within 1 meter on both sides of any wall or floor penetration.
- .4 Voice Riser Copper
  - .1 The first GigaBIX mount on the lower half of the GigaBIX field shall be reserved for Entrance cables.
  - .2 When the Contractor has been instructed to install multiples of 25 pair CAT. 3 UTP cable in the Riser/Backbone from MER to each of the TR's, these Backbone cables shall be identified at both ends and on the GigaBIX designation strips.

Page 72 of 154

.1 On the GigaBIX designation strip, the Riser/Backbone cable number shall appear sequentially starting at "V1-001" at the top left-hand comer of the second GigaBIX mount (lower half of the GigaBIX wall). Next mount shall continue the sequence. A spare mount shall be installed for growth.

i.e. XXX-01A/XXX-02A-V1(1-100).

XXX-01A Represents from MER 1st floor Communications room A.

XXX-02A Represents to TR 2nd floor Communications room A.

V1 Represents first voice Backbone cable.

1–100 Represents cable pairs 1 to 100 within cable V1.

- .3 Voice tie cables (25 pair bundles) from the rack to the GigaBIX shall be terminated on 24-port patch panels and label as VP1, VP2, etc. in the rack and shall appear sequentially starting at the top left-hand corner of the first mount (upper half of the GigaBIX wall). Next mount shall continue the sequence. A spare GigaBIX mount shall be reserved for growth.
- .4 Voice Patch Panel label
  - i.e. XXX-01A-R1VP1-01

XXX-01A Represents MER 1st floor Communications room A.

R1 Represents Rack #1.

VP1 Represents Voice Panel #1.

01 Represents Port #1. GigaBIX Designation Strip Label

i.e. XXX-01A-R1VP1(1-25) XXX-01A-R1VP2(1-25) XXX-01A-R2VP1(1-25)

XXX-01A-R2VP2(1-25)

- .5 ISP Backbone Cable Labels
  - .1 General: machine printable labels with a laser printer, thermal transfer printer, or hand-held printer and adhesive backed and having a self-laminating feature.
  - .2 Printable area: 50 mm (2") x 12 mm (0.5") minimum.
  - .3 Colour: White
    - .1 Laser labels for cable diameters 4.06mm 8.13mm white.
    - .2 Labels for cable diameters 7.87mm 17.5mm, white.
    - .3 Labels for cable diameters 7.87mm 36mm white.
- .6 GigaBIX Labels
  - .1 General: machine printable labels with a laser printer, thermal transfer printer, or hand-held printer and adhesive backed and having a self-laminating feature.
  - .2 Colour: Purple for 1<sup>st</sup> level backbone termination field; Grey for 2<sup>nd</sup> level backbone termination field.
- .7 Fiber
  - .1 Where the Contractor has been instructed to install OS2 Singlemode fiber cable from the MER to each TR, each end of the cable and termination panel shall be labelled with a unique number. For example:

Fiber Cable Label (Older Product Line such as FiberExpress, etc.)

i.e. XXX-01A-R2FP3.1-F1/XXX-02B-R1FP1.4-F1(24 OS2) XXX Represents building code

Page 73 of 154

01A	Represents from 1st Floor Communications Room A
R2 FP3.1 F1	Represents Rack 2 Represents Fiber Panel 3, Module Bay 1 Represents Fiber Cable 1
1	Represents between the originating and terminating Communications Rooms
XXX	Represents building code
02B	Represents to 2nd Floor Communications Room B
R1	Represents Rack 1
FP1.4	Represents Fiber Panel 1, Module Bay 4
F1	Represents Fiber Cable 1
(24 OS2)	Represents 24 strands OS2 Cable
Fiber Panel Lab	el
i.e. XXX-01A-	R1FP1
XXX-01A	Represents MER 1st floor Communications room A.
R1	Represents Rack 1.
FP1	Represents Fiber Panel 1.

# .8 CommScope Propel and Belden DCX Labels

Fiber Cable Label

i.e.	XXX-01A-R2FP3.T1	.C1-F1/XXX-02B-R1FP1.T3.C2-F1(24 OS2)
	XXX	Represents building code
	01A	Represents from 1st Floor Communications
		Room A
	R2	Represents Rack 2
	FP3	Represents Fiber Panel 3
	T1	Represents Tray 1
	C1	Represents Cassette 1
	F1	Represents Fiber Cable 1
	1	Represents between the originating and
		terminating Communications Rooms
	XXX	Represents building code
	02B	Represents to 2nd Floor Communications Room
		В
	R1	Represents Rack 1
	FP1	Represents Fiber Panel 1
	T3	Represents Tray 3
	C2	Represents Cassette 2
	F1	Represents Fiber Cable 1
	(24 OS2)	Represents 24 strands OS2 Cable

# .15 Telecommunications Ground

Bonding conductors shall be identified on both ends of the conductors, with data plate cable marker completed with double straps, to indicate where the destination end of the conductor is located.

TBB Cable Label

SBBL-01A-PBB/SBBL-04A-SBB

Bonding Conductor from Busbar to and Object

Page 74 of 154

- SBBL-01A-PBB /Object e.g. building steel, cable trays, etc. at both ends prior to conductor routed into its termination.
- .2 Label TBB every 6 m and within 1 m of both sides of any wall and floor penetrations with the description: "Communications Ground Only" The lettering size is 6 mm white on green background.
- .3 Examples of Telecommunications Ground Bar Labelling

PBB Busbar Label SBBL-01A-PBB

SBB Busbar Label SBBL-01B-SBB

- .4 Provide all required lamacoid labels within the Communications room including the following text sizes for bonding:
  - .1 PBB/SBB labels 25mm high x 20mm wide (White text on a Green background).
  - .2 TBB labels 9mm high x 6mm wide (White text on a Green background).
- .16 Communications Conduits, Pull Boxes and Junction Boxes
  - ldentify all conduits, raceways, pull boxes, and junction boxes using painted colour bands. Colouring scheme shall be determined by the Authority at a later date. Provide all power and communication systems with unique colours in accordance with the colouring scheme. Major colour to be 100 mm wide and minor colour to be 50 mm wide. Identify raceways with coloured bands (using either spray paint or coloured duct tape) at intervals of 6 m, plus at the point where the raceway enters a wall or floor (i.e. raceway is identified on both sides of a penetration to facilitate tracing of raceway).
  - .2 Colour-code all junction boxes using spray paint on the cover. Neatly identify the relevant system and circuit ID using permanent marker pen. Identify parallel conduit runs at common locations.
- .17 Vendor Equipment Label
  - All FMO and 3rd party wall-mount or rack-mount (Vendor rack) equipment inside Communications spaces shall be clearly labelled on lamacoid with owner's department name and application information e.g. FMO Panic/Duress.
  - .2 The variety of low voltage equipment shall include but is not limited to Overhead Paging, CATV/IPTV, Security Systems (Access Control, Intrusion Detection, CCTV, Panic Duress), Audio/Visual (Video Conferencing), Distributed Antenna System (DAS), Public Address, Clock System, BMS, Nurse Call, Intercom Systems, RFID Based Systems, Biomedical Systems (Physiological Monitoring, Telemetry), and Interactive Patient Infotainment System.
  - .3 The information will be displayed in the form of a lamacoid label supplied and installed by 3rd party equipment Vendor. The exact placement of the label will be on the front surface of the wall-mount panel or on the top surface of a rack-mount equipment to maximize visibility.
  - .4 The numbers and not the background shall be 9 mm high engraved on lamacoid in permanent Black on White background.
  - .5 Examples of a 3<sup>rd</sup> party Vendor equipment label ID:
    - .1 IPS Door Access 1, IPS Door Access 2, etc.
    - .2 FMO Panic Duress
- .18 For Identification for Biomedical Patched Cables, refer to Appendix G.1.
- .19 For Identification for Copper and Fiber Patched Cables, refer to Appendix G.2.
- .20 For Identification for Wireless Access Points and Network Switches, refer to Appendix G.3.

Page 75 of 154

# **END OF SECTION 27 05 53**

Page 76 of 154

# 27 08 11.01 TESTING FOR COMMUNICATIONS FIBER

# PART 1 GENERAL

# 1.1 SUMMARY

- .1 Summary
- .2 Related Sections
- .3 Overview
- .4 Testing
- .5 Test Results Documentation
- .6 Work Included
- .7 Fiber Quality Assurance

# 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 01 10 Basic Requirements
  - .2 Section 27 11 00 Communication Room Fittings
  - .3 Section 27 13 23 Fiber Backbone Systems

## 1.3 OVERVIEW

- .1 Test equipment shall be approved by the Communications Consultant and or the PHSA NE Representative in writing before it can be used to test the structured cabling systems.
- .2 Final details of all test parameters, scope, and methodology to be performed by the Contractor, as described in this section, shall be verified with the Communications Consultant and or the PHSA NE Representative.
- .3 All terminations shall be completed and all Communications equipment installed before the tests are performed.
- .4 The installation shall be tested in the presence of the Communications Consultant and or the PHSA NE Representative when requested.

# 1.4 TESTING

- .1 The maximum fiber optic connector loss allowable is 0.5 Db. Note this includes the fusion splice on the connector for connection to the fiber strand.
- .2 Measured results shall be within PHSA's maximum loss budget calculations. Correct improper splices and replace damaged cables or connectors at no cost to the Owner.
- Optical Loss Testing Contractor shall set up their Fluke OLTS in custom settings with the maximum loss parameters identified in these specifications for MPO, LC and Fiber cable. Tester Pass or Fail results shall be based on the Project Specifications for maximum dB loss which is 0.50 dB per mated pair of connectors, not the Industry Standards of a maximum 0.75 dB loss for mated pairs.

# 1.5 TEST RESULTS DOCUMENTATION

Page 77 of 154

- .1 Test results saved within the field-test instrument shall be transferred into a Windows ™-based database utility that allows for the maintenance, inspection and archiving of the test records. These test records shall be uploaded to the PC unaltered, i.e., "as saved in the field-test instrument". For the purposes of review only, the contractor shall transfer field test results into a spreadsheet. The connector loss at both ends of the fiber link along with the fiber strand loss shall be used by the Communications Consultant and or the PHSA NE Representative to determine pass or fail. The OTDR test results shall be used to determine whether each connector of a fiber link is within the maximum of 0.5 dB loss level.
- .2 The database for the complete project, including twisted-pair copper cabling links, if applicable, shall be stored and delivered on USB key prior to Owner acceptance of the building. This USB key shall include the software tools required to view, inspect, and print any selection of the test reports.
- .3 Circuit IDs reported by the test instrument shall match the specified label ID.
- .4 The detailed test results documentation data is to be provided in an electronic database for each tested optical fiber and shall contain the following information:
  - .1 The identification of the customer site as specified by the end-user.
  - .2 The name of the test limit selected to execute the stored test results.
  - .3 The name of the personnel performing the test.
  - .4 The date and time the test results were saved in the tester's memory.
  - .5 The manufacturer, model and serial number of the field-test instrument.
  - .6 The version of the test software and the version of the test limit database held within the test instrument.
  - .7 The fiber identification number.
  - .8 The length for each optical fiber.
  - .9 Optionally the index of refraction used for length calculation when using a length capable OLTS.
  - .10 Test results to include OLTS attenuation link and channel measurements at the appropriate wavelength(s) and the margin (difference between the measured attenuation and the test limit value).
  - .11 Test results to include OTDR link and channel traces, tables at the appropriate wavelength(s).
  - .12 The length for each optical fiber as calculated by the OTDR.
  - .13 The overall Pass/Fail evaluation of the link-under-test for OLTS and OTDR measurements.

# 1.6 WORK INCLUDED

- .1 Provide all labour, materials, tools; field-test instruments and equipment required for the complete testing, identification and administration of the work called for in the Contract Documents.
- .2 In order to conform to the overall project event schedule, the cabling contractor shall monitor work progress and coordinate cable testing with other applicable trades.
- .3 In addition to the tests detailed in this document, the contractor shall notify the Communications Consultant and or the PHSA NE Representative of any additional tests that are deemed necessary to guarantee a fully functional system. The contractor shall carry out and record any additional test results at no additional charge.

## 1.7 FIBER QUALITY ASSURANCE

.1 All testing procedures and field-test instruments shall comply with applicable requirements of:

Page 78 of 154

- .1 ANSI Z136.2, ANS for Safe Use of Optical Fiber Communications Systems Utilizing Laser Diode and LED Sources.
- .2 ANSI/TIA-455 50B, Light Launch Conditions for Long-Length Graded-Index Optical Fiber Spectral Attenuation Measurements.
- .3 ANSI/TIA-455-59A, Measurement of Fiber Point Discontinuities Using an OTDR.
- .4 ANSI/TIA-455 60A, Measurement of Fiber or Cable Length Using an OTDR.
- .5 ANSI/TIA-455 61A, Measurement of Fiber or Cable Attenuation Using an OTDR.
- .6 ANSI/TIA-526-7-A (2015), Optical Power Loss Measurements of Installed Single-mode Fiber Cable Plant.
- .7 ANSI/TIA-526-14-C (2015), Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.
- .8 ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard, Part 1, General Requirements.
- .9 ANSI/TIA-568-C.3, Optical Fiber Cabling Components Standard.
- .10 ANSI/TIA-TSB-140, Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems.
- .11 ANSI/TIA-606B, Administration Standard for Commercial Telecommunications Infrastructure, including labelling requirements specified by PHSA.
- .2 Trained technicians who have successfully attended an appropriate training program, which includes testing with an OLTS and an OTDR and have obtained a certificate as proof thereof shall be allowed to execute the tests. These must be issued by any of the following organizations or an equivalent organization:
  - .1 Manufacturer of the Fiber optic cable and/or the Fiber optic connectors.
  - .2 Manufacturer of the test equipment used for the field certification.
  - .3 BICSI and its authorized training partners.
- .3 The Communications Consultant and or the PHSA NE representative shall be invited to witness and/or review field-testing.
  - .1 The Communications Consultant and or PHSA NE representative shall be notified of the start date of the testing phase five (5) business days before testing commences.
  - .2 The Communications Consultant and or PHSA NE representative shall select a random sample of 5% of the installed links. The Communications Consultant and or the PHSA NE Representative shall witness the testing of these randomly selected links and the results are to be stored in accordance with this document. The results obtained shall be compared to the original data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the Communications Consultant and or the PHSA NE Representative shall repeat 100% testing at no cost to the Owner.

### PART 2 PRODUCTS

# 2.1 OPTICAL FIBER CABLE TESTERS

- .1 The field-test instrument shall be within the calibration period (12 months) recommended by the manufacturer.
- .2 Optical loss test set (OLTS).
  - .1 Multimode optical fiber light source
    - .1 Provide dual LED light sources with central wavelengths of 850 nm (±30 nm) and 1300 nm (±20 nm).
    - .2 Output power of –20 dBm minimum.

Page 79 of 154

- .3 The light source shall meet the launch requirements of ANSI/TIA-455-50B, Method A. This launch condition can be achieved either within the field test equipment or by use of an external mandrel wrap (as described in clause E.7 of ANSI/TIA-568-C.0) with a Category 1 light source.
- .4 Acceptable manufacturers
  - .1 Fluke Networks.
- .2 Singlemode optical fiber light source
  - Provide dual laser light sources with central wavelengths of 1310 nm (±20 nm) and 1550 nm (±20 nm).
  - .2 Output power of -10 dBm minimum.
  - .3 Acceptable manufacturers
    - .1 Fluke Networks.
- .3 Power Meter
  - .1 Provide 850 nm, 1300/1310 nm, and 1550 nm wavelength test capability.
  - .2 Power measurement uncertainty of  $\pm$  0.25 dB.
  - .3 Store reference power measurement.
  - .4 Save at least 100 results in internal memory.
  - .5 PC interface (serial or USB).
  - .6 Acceptable manufacturers
    - .1 Fluke Networks.

# 2.2 OPTICAL TIME DOMAIN REFLECTOMETER (OTDR)

- .1 Multimode OTDR
  - .1 Wavelengths of 850 nm ( $\pm$  10 nm) and 1300 nm ( $\pm$  15 nm).
  - .2 Event dead zones of 0.5 m typical at 850 nm and 0.7 m typical at 1300 nm.
  - .3 Attenuation dead zones of 2.2 m typical at 850 nm and 4 m typical at 1300 nm.
  - .4 Distance range not less than 8 km at 850 nm and 35 km at 1300 nm.
  - .5 Dynamic range 28 dB typical at 850 nm and 1300 nm.
- .2 Singlemode OTDR
  - .1 Wavelengths of 1310 nm ( $\pm$  25 nm) and 1550 nm ( $\pm$  30 nm).
  - .2 Event dead zones of 0.6 m maximum at 1310 nm and 1550 nm.
  - .3 Attenuation dead zones of 4 m typical at 1310 nm and 1550 nm.
  - .4 Distance range not less than 130 km at 1550 nm and 80 km at 1310 nm.
  - .5 Dynamic range 30 dB typical at 1310 nm and 1550 nm.
  - .6 Acceptable manufacturers
    - .1 Fluke Networks.
- .3 Fiber Microscope
  - .1 Magnification of 200X or 400X for end-face inspection
  - .2 Acceptable manufacturers
    - .1 Fluke Networks.

# PART 3 EXECUTION

# 3.1 FIBER TESTING

.1 Initially test every fiber strand within the Fiber optic cable with a light source and power-meter utilizing procedures as stated in ANSI/TIA -526-14-C, Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant, and ANSI/TIA-526-7-A (currently Standard Proposal Number 2974-B): OFSTP-7 Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant. Measured results shall be within manufacturers' cable and PHSA's loss budget calculations.

Page 80 of 154

- This includes testing the attenuation and polarity of the installed cable plant with an .1 optical loss test set (OLTS) and the installed condition of the cabling system and its components with an optical time domain reflectometer (OTDR). The condition of the fiber end faces shall also be verified.
- .2 Testing shall be performed on each cabling link (connector to connector).
- Testing shall be performed on each cabling channel (equipment to equipment) that is .3 identified by the Communications Consultant and or the PHSA NE Representative where required.
- .4 Testing shall not include any active devices or passive devices within the link or channel other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.
- All tests shall be documented including OLTS dual wavelength attenuation .5 measurements for multimode and singlemode links and channels and OTDR traces and event tables for multimode and singlemode links and channels.
- Field-test instruments shall have the latest software and firmware installed. .6
- Link and channel test results from the OLTS and OTDR shall be recorded in the test .7 instrument upon completion of each test for subsequent uploading to a PC in which the administrative (reports) may be generated.
- .8 Fiber end faces shall be inspected at 250X or 400 X magnifications. 250X magnification shall be used for inspecting multimode and single-mode fibers. 400X magnification shall be used for detailed examination of single-mode fibers. Scratched, pitted or dirty connectors shall be diagnosed and replaced at no cost to the Owner.
- .9 It is mand atory that the end face images be recorded in the memory of the test instrument for subsequent uploading to a PC and reporting.
- .10 Testing of the cabling shall be performed using high-quality test cords of the same Fiber type as the cabling under test. The test cords for OLTS testing shall be between 1 m and 5 m length, maximum 0.1 dB loss for multimode, and 0.2 dB loss for singlemode. The test cords for OTDR testing shall be approximately 100 m for the launch cable and at least 25 m for the receive cable.
- All tests performed on optical fiber cabling that use a laser or LED in a test set shall be .11 carried out with safety precautions in accordance with ANSI Z136.2.
- .12 All outlets, cables, patch panels and associated components shall be fully assembled and labelled prior to field-testing. Any testing performed on incomplete systems shall be redone on completion of the work. The following test parameters shall be adhered to:
  - .1 .2 Multimode fiber optic cables shall be tested at 850 nm and 1300 nm.
  - Single-mode fiber optic cables shall be tested at 1310 nm and 1550 nm.
  - .3 Testing procedures shall utilize "Method B" – one jumper reference.
  - .4 Fiber testing
    - Tier 1: Attenuation testing using Optical Loss Test Set (OLTS). For . 1 horizontal cabling, one direction and one wavelength. For backbone cabling, two directions and both wavelengths.
    - .2 Tier 2: Trace using Optical Time Domain Reflectometer (OTDR). For all cabling, one direction and both wavelengths.
  - .5 Test every strand of fiber with an OTDR.
  - Fiber links shall be tested with test equipment based on laser light sources categorized by a Coupled Power Ratio (CPR) of Category 2, under filled, as per IEC 60825-2.
  - This rule shall be followed to support Gigabit Ethernet applications. .7
  - Gigabit Ethernet only specifies laser light sources and not LED (light emitting .8 diode) light sources. Field test equipment based on LED light sources is a Category 1 device as per IEC 60825-2 and typically yields high attenuation results.
  - .9 For Gigabit Ethernet compliant certification (IEEE std 802.3z application), use

Page 81 of 154

Test equipment which uses a VCSEL (Vertical Cavity Surface Emitting Laser) at 850 nm (compliant with 1000BASE-SX) and an FP laser at 1310 nm (compliant with 1000BASELX).

# 3.2 ACCEPTANCE OF FIBER TEST RESULTS

- .1 Application drive distance assurance must be completed at the design draft phase. The RCDD designer shall calculate the link loss budgets using the Manufacturer Link Loss calculator. The results from this shall be supplied to the cabling Contractor to ensure the installed link or channel conforms to the designed attenuation specification when performing the testing. The results of the proposed links from the Manufacturer link loss calculator and the final passing results from the fiber tester shall be included in the test results documentation.
- .2 Unless otherwise specified by the Communications Consultant and or PHSA NE Representative, each cabling link shall be in compliance with the following test limits:
  - 1 Optical loss testing
    - .1 Multimode and Singlemode links
      - .1 The link attenuation shall be calculated by the following formulas as specified in ANSI/TIA-568-C.0.
        - .1 Link Attenuation (dB) = Cable\_Attn (dB) + Connector\_Attn (dB)+ Splice Attn (dB)
        - .2 Cable\_Attn (dB) = Attenuation\_Coefficient (dB/km) \* Length (Km)
        - .3 Connector\_Attn (dB) = number\_of\_connector\_pairs \* connector loss (dB)
        - .4 Maximum allowable connector loss = 0.50 dB
        - .5 Splice Attn (dB) = number of splices \* splice loss (dB)
        - .6 Maximum allowable splice loss = 0.03 dB
        - .7 The values for the Attenuation\_Coefficient (dB/km) are listed in the table below:

Type of Optical Fiber	Wavelength (nm)	Attenuation coefficient (dB/km)	Wavelength (nm)	Attenuation coefficient (dB/km)
Multimode 62.5/125 µm	850	3.5	1300	1.2
Multimode 50/125 µm OM2	850	3.5	1300	1.2
Multimode 50/125 µm OM3	850	3.25	1300	1.0
Multimode 50/125 µm OM4	850	3.0	1300	1.0
Multimode 50/125 µm OM5	850	3.0	1300	1.5
Single-mode (Inside plant)	1310	0.5	1550	0.5
Single-mode (Outside plant)	1310	0.5	1550	0.5

- .3 OTDR testing
  - .1 Reflective events (connections) shall not exceed 0.5 dB.
  - .2 Non-reflective events (splices) shall not exceed 0.3 dB.
  - .3 Fiber links shall be tested at the appropriate operating wavelengths for anomalies and to ensure uniformity of cable attenuation and connector insertion loss.
  - .4 Multimode: 850 nm and 1300 nm
  - .5 Singlemode: 1310 nm and 1550 nm
  - .6 Each fiber link and channel shall be tested in both directions.

Page 82 of 154

- .7 A launch cord shall be installed between the OTDR and the first link connection.
- .8 A tail cord shall be installed after the last link connection
- .4 Magnified end-face inspection
  - 1 Fiber connections shall be visually inspected for end-face quality.
  - .2 Scratched, pitted or dirty connectors shall be diagnosed and corrected.
- All installed cabling links and channels shall be field-tested and pass the test requirements and analysis. Any link or channel that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected link or channel meets performance requirements. The final and passing result of the tests for all links and channels shall be provided in the test results documentation.
- .6 Acceptance of the test results shall be given in writing after the project is fully completed and tested in accordance with Contract Documents and to the satisfaction of the Communications Consultant and or the PHSA NE Representative.

**END OF SECTION 27 08 11.01** 

Page 83 of 154

#### 27 08 11.02 **TESTING FOR COMMUNICATIONS CATEGORY 3**

### PART 1 **GENERAL**

#### 1.1 **SUMMARY**

- .1 Summary
- .2 Related Sections
- .3 Description
- .4 Quality Assurance
- .5 Codes Standards and Guidelines
- .6 Submittals
- .7 Identification
- .8 Definitions
- .9 Warranty

#### 1.2 **RELATED SECTIONS**

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.
  - .1 Section 27 01 10 – Basic Requirements
  - .2 Section 27 11 00 – Communication Room Fittings
  - .3 Section 27 13 13 - Copper Backbone Systems
  - Section 27 16 00 Connecting Cords, Devices and Adaptors .4

#### **DESCRIPTION** 1.3

- The work covered by this section of the Specifications includes all labour necessary to .1 perform and complete such construction, all materials and equipment incorporated or to be incorporated in such construction and all services, facilities, tools and equipment necessary or used to perform and complete such construction. The work of this section shall include, but is not limited to, the following:
  - Cable testing for copper cables. .1
  - Providing testing results in accordance with the strictest manufacturers' written .2 recommendations.

#### **QUALITY ASSURANCE** 1.4

.1 Refer to Section 27 00 00 for general details.

#### 1.5 **CODES, STANDARDS AND GUIDELINES**

- .1 Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations in Section 27-00-00.
- .2 The PHSA representative, Telecommunications Standards Document and the Labelling, Design and Syntax Standards. Circuit IDs reported by the test instrument shall match the specified label ID.

### **SUBMITTALS** 1.6

February 28th, 2023 **PHSA** 

Page 84 of 154

- .1 Refer to Section 27-00-00 for general details.
- .2 B. Shop Drawings:
  - .1 None Required
- .3 Submit Manufacturer's Cut Sheets for the following:
  - .1 Any products not specifically listed in the PRODUCTS section shall require a submittal of the manufacturer's cut sheets and approval by the PHSA representative group.
- .4 List of test equipment to be used.
- .5 Sample of test data to be provided to the PHSA representative prior to the start of testing for review, comment and acceptance.
- .6 Identity and qualifications of Contractor's personnel who will perform the testing.
- .7 Submit the proposed schedule for performing testing at least 2 weeks prior to the start of testing.

# 1.7 IDENTIFICATION

.1 For details, refer to Section 27-05-53 Labelling and BICSI Design Standards.

## 1.8 DEFINITIONS

.1 N/A

## 1.9 WARRANTY

.1 Refer to Section 27 00 00 for general details.

# PART 2 PRODUCTS

# 2.1 CATEGORY 3 CABLE TESTERS

- .1 Testing for all cables 25 pair or larger are to use a tester that tests 4 pairs at a time.
- .2 The field tester must meet the requirements of ANSI/TIA/EIA-568.
- .3 Make and model to be submitted for approval by the PHSA representative prior to start of testing.

# PART 3 EXECUTION

## 3.1 GENERAL

- .1 The Contractor shall test, as described below, all metallic cables installed under these specifications.
- .2 Visually inspect all cables, cable reels, and shipping cartons to detect cable damage incurred during shipping and transport. Return visibly damaged items to the manufacturer.
- .3 Where post-manufacturer test data has been provided by the manufacturer on the reel or shipping carton: Submit 2 copies to the PHSA representative prior to installing cables.
- .4 Test fully completed systems only. Piecemeal testing is not acceptable.
- Testing shall not be performed until after all termination hardware is installed and attached, and all labelling and identification has been completed. If all work is not

Page 85 of 154

- completed prior to testing, test data will be considered not acceptable and shall be redone and resubmitted.
- .6 Any cable that does not pass all required testing shall be removed, replaced, and retested.
- .7 Remove and replace any defective cables from pathways system. Do not abandon cables in place.
- .8 For 100 pair or smaller replace entire cable if a pair or conductor fails a required test. For larger pair count cables, replace if more than 2% of pairs fail a required test.
- .9 The PHSA reserves the right to observe all portions of the testing process.
- .10 The PHSA representative further reserves the right to conduct "Proof of performance testing," using Contractor equipment and labour. This shall be a random re-test of up to ten percent (10%) of the cable plant to confirm documented test results. If multiple errors are found, test percentages shall rise.
- .11 Perform all tests as required by the manufacturer in support of the structured cabling system warranty

# 3.2 QUANTITIES

.1 N/A

## 3.3 INSTALLATION

.1 N/A

## 3.4 GROUNDING AND BONDING

.1 All grounding and bonding is to be complete before any system testing is to be attempted.

# 3.5 TESTING

- .1 All test results are to be defined as acceptable / unacceptable using the requirements of ANSI/TIA/EIA568 B.
- .2 Copper Cables General Requirements
  - .1 After terminating and splicing all cables, test all cable pairs for:
    - .1 Continuity to the remote end.
    - .2 Shorts between any 2 or more conductors or ground
    - .3 Transposed pairs
    - .4 Reversed Pairs
    - .5 Split Pairs
    - .6 Crossed Pairs
    - .7 Wire map.
    - .8 Length.
    - .9 Shield Continuity (If Shielded)
    - .10 Continuity to Grounding (If Shielded)
  - .2 Using a (low ohm) multimeter, test continuity to ground (SBB or PBB) for a maximum resistance of  $1\Omega$ , see section 27-05-26 for additional detail.
- .3 Indoor Riser or OSP Copper Cable
  - .1 After terminating and splicing the cables. Test all cable pairs for:
    - .1 DC Loop Resistance for any 2 conductors in the cable

# 3.6 ACCEPTANCE

Page 86 of 154

- .1 All test results for CAT 3 cable are to be documented and submitted in the Manufacturer's native format to the PHSA representative (both in a binder and electronically) within five (5) working days of test completion. Alternate reporting software may be used if the associated software (with license if required) is given to PHSA. (Software not to be returned)
- .2 All test results for CAT 63 cable to be documented and submitted in Fluke LinkWare format to the PHSA representative electronically within five (5) working days of test completion. Alternate reporting software may be used if the associated software (with license if required) is given to PHSA. (Software not to be returned)
- .3 Test result shall be recorded per cable and three identical copies placed on removable media (CD) for delivery to the PHSA representative for review and acceptance. If test results are found acceptable, the PHSA shall inform the Project Manager in writing or by email.
- .4 Each test report shall contain the following general information:
  - .1 Date of Preparation.
  - .2 Date of Test.
  - .3 Project Name (PHSA building number).
  - .4 Contractor's Name
  - .5 Media Type.
  - .6 Make, Model and Serial Number of test equipment used.
  - .7 Date of Last Calibration.
  - .8 Names of Test Crew.
- .5 In addition to the results of the specific tests specified, reports shall also include:
  - .1 Cable ID Number (See the PHSA Labelling, Design Standards).
  - .2 Cable Type.
  - .3 Pair or Conductor Count.
  - .4 Individual Pair or Conductor Numbers.
  - .5 Results of Each Test for Each Pair or Conductor.
  - .6 Total Number of Serviceable Pairs or Conductors in Cable.
  - .7 Ground Resistance Measurements.
- .6 Once the testing has been completed and the PHSA representative is satisfied that all work is in accordance with the Contract Documents, the PHSA representative will notify the Contractor and/or Project Manager in writing or via email.

**END OF SECTION 27 08 11.02** 

Page 87 of 154

# 27 08 11.03 TESTING FOR HORIZONTAL CATEGORY 6 AND 6A

# PART 1 GENERAL

# 1.1 SUMMARY

- .1 Summary
- .2 Related Sections
- .3 Work included
- .4 Scope
- .5 Quality assurance
- .6 Submittals
- .7 Acceptance of test results

## 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 01 10 Basic Requirements
  - .2 Section 27 11 00 Communications Room Fittings
  - .3 Section 27 15 00 Horizontal Cabling
  - .4 Section 27 16 00 Connecting Cords, Devices and Adaptors
  - .5 Section 27 21 33 Data Communications Wireless Access Points

## 1.3 WORK INCLUDED

- .1 Provide all labour, materials, tools, field-test instruments and equipment required for the complete testing, identification and administration of a Horizontal Category 6 or 6A cabling system.
- .2 The cabling contractor shall survey the work areas and coordinate cabling testing with other applicable trades.
- .3 In addition to the tests detailed in this document, the contractor shall notify the Communications Consultant and or the PHSA NE Representative of any additional tests that are deemed necessary to guarantee a fully functional system. The contractor shall carry out and record any additional measurement results at no additional charge.

# 1.4 SCOPE

- .1 This Section includes the minimum requirements for the test certification of horizontal Category 6 and 6A balanced twisted pair cabling.
- .2 This Section includes minimum requirements for:
  - .1 Copper cabling test instruments
  - .2 Copper cabling testing
  - .3 Administration
    - .1 Test results documentation
    - .2 As-built drawings
- .3 Testing shall be carried out in accordance with this document.
- .4 Testing shall be performed on each cabling link. (100% testing)

.5 All tests shall be documented.

Page 88 of 154

# 1.5 QUALITY ASSURANCE

- .1 All testing procedures and field-test instruments shall comply with applicable requirements of:
  - .1 ANSI/TIA-1152, Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
  - .2 ANSI/TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises.
  - .3 ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard
  - .4 ANSI/TIA-568-C.2, Balanced Twisted-Pair Telecommunications Cabling and Components Standards.
  - .5 ANSI/TIA-606-B, Administration Standard for Commercial Telecommunications Infrastructure, including the requirements specified by PHSA.
- .2 Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests. These certificates may have been issued by any of the following organizations or an equivalent organization:
  - .1 Manufacturer of the connectors or cable.
  - .2 Manufacturer of the test equipment used for the field certification.
  - .3 Training organizations (e.g., BICSI, A Telecommunications Association headquarters in Tampa, Florida; ACP [Association of Cabling Professionals™] Cabling Business Institute located in Dallas, Texas).
- .3 The Communications Consultant and or the PHSA NE representative shall be invited to witness and/or review field-testing.
  - .1 The Communications Consultant and or PHSA NE representative shall be notified of the start date of the testing phase five (5) business days before testing commences.
  - .2 The Communications Consultant and or the PHSA NE representative shall select a random sample of 5% of the installed links. The Communications Consultant and or the PHSA NE Representative shall witness the testing of these randomly selected links and the results are to be stored in accordance with Part 3 of this document. The results obtained shall be compared to the original data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the Communications Consultant and or the PHSA NE Representative shall repeat 100% testing at no cost to the Owner.

# 1.6 SUBMITTALS

.1 Refer to Section 27 05 00.

# 1.7 ACCEPTANCE OF TEST RESULTS

- .1 Unless otherwise specified by the Owner or the Owners representative, each Category 6Acabling link shall be in tested for:
  - .1 Wire Map
  - .2 Length
  - .3 Propagation Delay
  - .4 Delay Skew
  - .5 DC Loop Resistance recorded for information only
  - .6 DC Resistance Unbalance recorded for information only
  - .7 Insertion Loss
  - .8 NEXT (Near-End Crosstalk)
  - .9 PS NEXT (Power Sum Near-End Crosstalk)
  - .10 ACR-N (Attenuation to Crosstalk Ratio Near-End) recorded for information only

Page 89 of 154

- .11 PS ACR-N (Power Sum Attenuation to Crosstalk Ratio Near-End) recorded for information only
- .12 ACR-F (Attenuation to Crosstalk Ratio Far-End)
- .13 PS ACR-F (Power Sum Attenuation to Crosstalk Ratio Far-End)
- .14 Return Loss
- .15 TCL (Transverse Conversion Loss) recorded for information only
- .16 ELTCTL (Equal Level Transverse Conversion Transfer Loss) recorded for information only
- .17 PS ANEXT (Power Sum Alien Near-End Crosstalk) sampled per section 3.2
- .18 Average PS ANEXT (Average Power Sum Alien Near-End Crosstalk) sampled per section 3.2
- .19 PS AACR-F (Power Sum Alien Attenuation to Crosstalk Ratio Far-End) sampled per section 3.2
- .20 Average PS AACR-F (Average Power Sum Alien Attenuation to Crosstalk Ratio Far-End) sampled per section 3.2
- .2 Unless otherwise specified by the Owner or the Owners representative, each Category 6 cabling link shall be in tested for:
  - .1 Wire Map
  - .2 Length
  - .3 Propagation Delay
  - .4 Delay Skew
  - .5 DC Loop Resistance recorded for information only
  - .6 DC Resistance Unbalance recorded for information only
  - .7 Insertion Loss
  - .8 NEXT (Near-End Crosstalk)
  - .9 PS NEXT (Power Sum Near-End Crosstalk)
  - .10 ACR-N (Attenuation to Crosstalk Ratio Near-End) recorded for information only
  - .11 PS ACR-N (Power Sum Attenuation to Crosstalk Ratio Near-End) recorded for information only
  - .12 ACR-F (Attenuation to Crosstalk Ratio Far-End)
  - .13 PS ACR-F (Power Sum Attenuation to Crosstalk Ratio Far-End)
  - .14 Return Loss
  - .15 TCL (Transverse Conversion Loss) recorded for information only
  - .16 ELTCTL (Equal Level Transverse Conversion Transfer Loss) recorded for information only
- All installed cabling Permanent Links shall be field-tested and pass the test requirements and analysis as described in Part 3. Any Permanent Link that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected Permanent Link meets performance requirements. The final and passing result of the tests for all Permanent Links shall be provided in the test results documentation in accordance with Part 3.
- .4 Acceptance of the test results shall be given in writing after the project is fully completed and tested to the satisfaction of the Owner.

# PART 2 PRODUCTS

# 2.1 PRODUCTS

- .1 Balanced twisted-pair CABLE Testers
  - .1 The field-test instrument shall be within the calibration period recommended by the manufacturer, typically 12 months.

Page 90 of 154

# .2 Certification tester

- .1 Accuracy
  - .1 Level Ille accuracy in accordance with ANSI/TIA-1152
  - .2 Independent verification of accuracy
  - .3 Acceptable manufacturers
    - .1 Fluke Networks
- .2 Permanent Link Adapters
  - .1 RJ45 plug must meet the requirements for NEXT, FEXT and Return Loss in accordance with ANSI/TIA-568-C.2 Annex C
  - .2 Twisted pair Category 5e, 6, 6A, 7 or 7<sub>A</sub> cords are not permitted as their performance degrades with use and can cause false Return Loss failures
- .3 Results Storage
  - .1 Must be capable of storing > 10,000 results for all measurements found in 2.1.B.4 below
- .4 Measurement capabilities
  - .1 Wire Map
  - .2 Length
  - .3 Propagation Delay
  - .4 Delay Skew
  - .5 DC Loop Resistance
  - .6 DC Resistance Unbalance
  - .7 Insertion Loss
  - .8 NEXT (Near-End Crosstalk)
  - .9 PS NEXT (Power Sum Near-End Crosstalk)
  - .10 ACR-N (Attenuation to Crosstalk Ratio Near-End)
  - .11 PS ACR-N (Power Sum Attenuation to Crosstalk Ratio Near-End)
  - .12 ACR-F (Attenuation to Crosstalk Ratio Far-End)
  - .13 PS ACR-F (Power Sum Attenuation to Crosstalk Ratio Far-End)
  - .14 Return Loss
  - .15 TCL (Transverse Conversion Loss)
  - .16 ELTCTL (Equal Level Transverse Conversion Transfer Loss)
  - .17 Time Domain Reflectometer
  - .18 Time Domain Xtalk Analyser
  - .19 PS ANEXT (Power Sum Alien Near-End Crosstalk)
  - .20 Average PS ANEXT (Average Power Sum Alien Near-End Crosstalk)
  - .21 PS AACR-F (Power Sum Alien Attenuation to Crosstalk Ratio Far-End)
  - .22 Average PS AACR-F (Average Power Sum Alien Attenuation to Crosstalk Ratio Far-End)
- .3 PC Software
  - .1 Windows® based.
  - .2 Must show when 3 dB and 4 dB rules are applied
  - .3 Re-certification capability, where results must have their Cable IDs suffixed with (RC).
  - .4 Built in PDF export no additional third party software permitted.
  - .5 Built-in statistical analysis.

Page 91 of 154

# PART 3 EXECUTION

# 3.1 GENERAL

.1 All outlets, cables, patch panels and associated components shall be fully assembled and labelled prior to field-testing. Any testing performed on incomplete systems shall be redone on completion of the work.

# 3.2 BALANCED TWISTED PAIR CABLE TESTING

- .1 Field-test instruments shall have the latest software and firmware installed.
- .2 Permanent Link test results including the individual frequency measurements from the tester shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC in which the administrative documentation (reports) may be generated.
- .3 Permanent Link testing shall be performed on each cabling segment (connector to connector). Sampling is not acceptable.
- .4 Alien Crosstalk testing shall be performed using a sampling plan. An acceptance quality level (AQL) of 0,4 %, normal inspection, general inspection level I as defined in ISO 2859-1 for populations of up to 500,000 links shall be used. The following table represents this sampling level.

Installation size (No. of total links)	_Sample size _(No. of links to test)
3 – 33	100%
34 – 3,200	33
3,201 — 35,000	126
35,001 - 150,000	201
150,001 - 500,000	_315

Disturbed (Victim) links chosen for Alien Crosstalk testing shall be an equal combination of short, medium and long links.

- .5 Permanent Link adapters made from twisted pair Category 5e, 6, 6A, 7 or 7A cords are not permitted as their performance degrades with use and can cause false Return Loss failures.
- .6 The installer shall build a reference link. All components shall be anchored so it is not possible to disturb them. The technician is to conduct a Category 6A Permanent Link test each day to ensure no degradation of the tester or its Permanent Link adapters.
- .7 Wire Map Measurement
  - The wire map test is intended to verify pin-to-pin termination at each end and check for installation connectivity errors. For each of the 8 conductors in the cabling, the wire map indicates:
    - .1 Continuity to the remote end
    - .2 Shorts between any two or more conductors
    - .3 Reversed pairs
    - .4 Split pairs
    - .5 Transposed pairs
    - .6 Distance to open on shield
    - .7 Any other miss-wiring

Page 92 of 154

- .2 The correct connectivity of telecommunications outlets/connectors is defined in ANSI/TIA-568-C.2. T568A shall be used. The field tester shall use this colour scheme.
- .8 Length Measurement
  - .1 The length of each balanced twisted pair shall be recorded.
  - .2 Since physical length is determined from electrical length, the physical length of the link calculated using the pair with the shortest electrical delay shall be reported and used for making the pass or fail determination.
  - .3 The pass or fail criteria is based on the maximum length allowed for the Permanent Link as specified in ANSI/TIA-568-C.2 plus the nominal velocity of propagation (NVP) uncertainty of 10%. For a Permanent Link, the length measurement can be 325 ft. (99 m) before a fail is reported.
- .9 Propagation Delay measurement is the time it takes for a signal to reach the end of the link.
  - .1 The measurement shall be made at 10 MHz per ANSI/TIA-1152.
  - .2 The propagation delay of each balanced twisted pair shall be recorded.
  - .3 Is not to exceed 498 ns per ANSI/TIA-568-C.2 Section 6.3.18.
- .10 Delay Skew measurement is the difference in propagation delay @ 10 MHz between the shortest delay and the delays of the other wire pairs.
  - .1 The delay skew of each balanced twisted pair shall be recorded.
  - .2 Is not to exceed 44 ns per ANSI/TIA-568-C.2 Section 6.3.19.
- .11 DC Resistance
  - .1 Often reported as Resistance, is the loop resistance of both conductors in the pair.
  - .2 Is not specified in ANSI/TIA-1152, but shall be recorded for all four pairs.
- .12 DC Resistance Unbalance
  - 1 Often reported as Resistance Unbalance, is the difference in resistance of the two wires within the pair.
  - .2 Is not specified in ANSI/TIA-1152 for a Permanent Link, but shall be recorded for all four pairs.
- .13 Insertion Loss is the loss of signal strength over the cabling (in dB).
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .2 Worst case shall be reported for all four pairs in one direction only.
  - .3 Reported margins found to be within the accuracy of the field tester shall be marked with an asterisk (\*).
  - .4 Is not to exceed the Category 6A Permanent Link limits found in ANSI/TIA-568-C.2 Section 6.3.7.
- .14 NEXT (Near-End Crosstalk) is the difference in amplitude (in dB) between a transmitted signal and the crosstalk received on other wire pairs at the same end of the cabling.
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
    - .5 Shall be measured in both directions. (12 pair to pair possible combinations)
    - .6 Both worst case and worst margins shall be reported.
    - .7 Is not to exceed the Category 6A Permanent Link limits found in ANSI/TIA-568-C.2 Section 6.3.8.
    - .8 Reported margins found to be within the accuracy of the field tester shall be marked with an asterisk (\*).

Page 93 of 154

- .9 The Time Domain Xtalk data shall be stored for any marginal or failing NEXT results.
- .15 PS NEXT (Power Sum Near-End Crosstalk) is the difference (in dB) between the test signal and the crosstalk from the other pairs received at the same end of the cabling.
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .2 Shall be measured in both directions. (8 pair possible combinations)
  - .3 Both worst case and worst margins shall be reported.
  - .4 Is not to exceed the Category 6 and 6A Permanent Link limits found in ANSI/TIA-568-C.2 Section 6.3.9.
  - .5 Reported margins found to be within the accuracy of the field tester shall be marked with an asterisk (\*).
  - .6 The Time Domain Xtalk data shall be stored for any marginal or failing PS NEXT results.
- .16 ACR-N (Attenuation Crosstalk Ratio Near-End) is a calculation of NEXT minus Insertion Loss of the disturbed pair in dB.
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .2 Shall be calculated in both directions.
  - .3 Is not specified in ANSI/TIA-1152, but shall be recorded for all 12 possible combinations.
- .17 PS ACR-N (Power Sum Attenuation Crosstalk Ratio Near-End) is a calculation of PS NEXT minus Insertion Loss of the disturbed pair in dB.
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .2 Shall be calculated in both directions.
  - .3 Is not specified in ANSI/TIA-1152, but shall be recorded for all 8 possible combinations.
- .18 ACR-F (Attenuation Crosstalk Ratio Far-End) is a calculation of FEXT minus Insertion Loss of the disturbed pair in dB.
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .2 Shall be measured in both directions. (24 pair to pair possible combinations)
  - .3 Both worst case and worst margins shall be reported.
  - .4 Is not to exceed the Category 6A Permanent Link limits found in ANSI/TIA-568-C.2 Section 6.3.11.
  - .5 Reported margins found to be within the accuracy of the field tester shall be marked with an asterisk (\*).
- .19 PS ACR-F (Power Sum Attenuation to Crosstalk Ratio Far-End) is a calculation of PS FEXT minus Insertion Loss of the disturbed pair in dB.

.1 The frequency resolution shall be:

Page 94 of 154

- .1 1 31.25 MHz: 150 kHz
- .2 31.25 100 MHz: 250 kHz
- .3 100 250 MHz: 500 kHz
- .4 250 500 MHz: 1000 kHz
- .2 Shall be measured in both directions. (8 pair possible combinations)
- .3 Both worst case and worst margins shall be reported.
- .4 Is not to exceed the Category 6A Permanent Link limits found in ANSI/TIA-568-C.2 Section 6.3.13.
- .5 Reported margins found to be within the accuracy of the field tester shall be marked with an asterisk (\*).
- .20 Return Loss is the difference (in dB) between the power of a transmitted signal and the power of the signals reflected back.
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .2 Shall be measured in both directions. (8 pair possible combinations)
  - .3 Both worst case and worst margins shall be reported.
  - .4 Shall be ignored at all frequencies where the Insertion Loss is less than 3 dB for that pair.
  - .5 Is not to exceed the Category 6A Permanent Link limits found in ANSI/TIA-568-C.2 Section 6.3.6.
  - .6 Reported margins found to be within the accuracy of the field tester shall be marked with an asterisk (\*).
  - .7 The Time Domain Reflectometer data shall be stored for any marginal or failing Return Loss results.
- .21 TCL (Transverse Conversion Loss) is the ratio (in dB) between a differential mode signal inject at the near-end and the common-mode signal measured at the near-end on the same wire pair.
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .2 Shall be measured in both directions.
  - .3 Is not specified in ANSI/TIA-1152 for a Permanent Link, but shall be recorded for all 8 possible combinations.
- .22 ELTCTL (Equal Level Transverse Conversion Transfer Loss) is the ratio (in dB) between a differential mode signal inject at the near-end and the common-mode signal measured at the far end on the same wire pair minus the Insertion Loss of that pair.
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .2 Shall be measured in both directions.
  - .3 Is not specified in ANSI/TIA-1152 for a Permanent Link, but shall be recorded for all 8 possible combinations.
- .23 PS ANEXT (Power Sum Alien Near-End Crosstalk) (Category 6A)
  - .1 Takes into account the combined alien crosstalk (statistical) on a receive pair from all external near-end disturbers operating simultaneously.
  - .2 The frequency resolution shall be:

Page 95 of 154

- .1 1 31.25 MHz: 150 kHz
- .2 31.25 100 MHz: 250 kHz
- .3 100 250 MHz: 500 kHz
- .4 250 500 MHz: 1000 kHz
- .3 The disturbed (victim) link shall have links to the left and right of it and if present, links above and below it.
- .4 Disturber cables shall include all links within the same bundle as the disturbed (victim) link and adjacent links
- .5 Should be measured in both directions if the link is patch panel to patch panel. If the link is patch panel to telecommunications outlet, then it shall be measured from the patch panel end only.
- .6 Is not to exceed the Category 6A Permanent Link limits found in ANSI/TIA-568-C.2 Section 6.3.21.
- .24 Average PS ANEXT (Power Sum Alien Near-End Crosstalk) (Category 6A) is calculated by averaging the individual PSANEXT loss values, in dB, for all four pairs in the disturbed (victim) link.
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .2 Is not to exceed the Category 6A Permanent Link limits found in ANSI/TIA-568-C.2 Section 6.3.22.
- .25 PS AACR-F (Power Sum Alien Attenuation to Crosstalk Ratio Far-End) (Category 6A)
  - AFEXT loss is the coupling of crosstalk at the far-end from external link pairs into a disturbed (victim) pair of the 4-pair link under test. PS AACR-F is the calculated power sum from all external pairs into the disturbed (victim) pair.
  - .2 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .3 The disturbed (victim) link shall have links to the left and right of it and if present, links above and below it.
  - .4 Disturber cables shall include all links within the same bundle as the disturbed (victim) link and adjacent links
  - .5 Should be measured in both directions if the link is patch panel to patch panel. If the link is patch panel to telecommunications outlet, then it shall be measured from the patch panel end only.
  - .6 Is not to exceed the Category 6A Permanent Link limits found in ANSI/TIA-568-C.2 Section 6.3.25.
- .26 Average PS AACR-F (Power Sum Alien Attenuation to Crosstalk Ratio Far-End) (Category 6A) is calculated by averaging the individual PS AACR-F values, in dB, for all four pairs in the disturbed (victim) link.
  - .1 The frequency resolution shall be:
    - .1 1 31.25 MHz: 150 kHz
    - .2 31.25 100 MHz: 250 kHz
    - .3 100 250 MHz: 500 kHz
    - .4 250 500 MHz: 1000 kHz
  - .2 The disturbed (victim) link shall have links to the left and right of it and if present, links above and below it.
  - .3 Disturber cables shall include all links within the same bundle as the disturbed (victim) link and adjacent links

Page 96 of 154

- .4 Should be measured in both directions if the link is patch panel to patch panel. If the link is patch panel to telecommunications outlet, then it shall be measured from the patch panel end only.
- .5 Is not to exceed the Category 6A Permanent Link limits found in ANSI/TIA-568-C.2 Section 6.3.26.

# 3.3 ADMINISTRATION

# .1 Test results documentation

- Test results saved within the field-test instrument shall be transferred into a Windows ™-based database utility that allows for the maintenance, inspection and archiving of the test records. These test records shall be uploaded to the PC unaltered, i.e., "as saved in the field-test instrument". The file format, CSV (comma separated value), does not provide adequate protection of these records and shall not be used.
- .2 Alien Crosstalk measurements shall be stored to a PC upon completion of the test.
- .3 The test results documentation shall be available for inspection by the Communications Consultant and or the PHSA NE Representative during the installation period and shall be passed to the Communications Consultant and or the PHSA NE Representative within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The installer shall retain a copy to aid preparation of as-built information.
- .4 The database for the complete project, including twisted-pair copper cabling links, if applicable, shall be stored and delivered on a USB thumb drive prior to Owner acceptance of the building. This USB thumb drive shall include the software tools required to view, inspect, and print any selection of the test reports.
- .5 Circuit IDs reported by the test instrument shall match the specified label ID. For Permanent Link testing, the detailed test results documentation data is to be provided in an electronic database for each tested balance twisted-pair and shall contain the following information:
  - .1 The overall Pass/Fail evaluation of the link-under-test
  - .2 The date and time the test results were saved in the memory of the tester
  - .3 The identification of the customer site as specified by the end-user
  - .4 The name of the test limit selected to execute the stored test results
  - .5 The name of the personnel performing the test
  - .6 The version of the test software and the version of the test limit database held within the test instrument
  - .7 The manufacturer, model and serial number of the field-test instrument
  - .8 The adapters used
  - .9 The factory calibration date
  - .10 Wire Map
  - .11 Propagation Delay values, for all four pairs
  - .12 Delay Skew values, for all four pairs
  - .13 DC Resistance values, for all four pairs
  - .14 DC Resistance Unbalance, values for all four pairs
  - .15 Insertion Loss, worst case values for all four pairs
  - .16 NEXT, worst case margin and worst case values, both directions
  - .17 PS NEXT, worst case margin and worst case values, both directions
  - .18 ACR-F, worst case margin and worst case values, both directions
  - .19 PS ACR-F, worst case margin and worst case values, both directions
  - .20 Return Loss, worst case margin and worst case values, both directions
  - .21 TCL, worst case values both directions
  - .22 ELTCTL, worst case values, both directions.

Page 97 of 154

- .23 Time Domain Crosstalk data if the link is marginal or fails
- .24 Time Domain Reflectometer data if the link is marginal or fails
- .6 For Alien Crosstalk testing, the detailed test results documentation data is to be provided in an electronic database for each tested balance twisted-pair and shall contain the following information
  - .1 The overall Pass/Fail evaluation of the link-under-test
  - .2 The date and time the measurements were made
  - .3 The identification of the customer site as specified by the end-user
  - .4 The name of the test limit selected to execute the stored test results
  - .5 The name of the personnel performing the test
  - .6 The version of the test software
  - .7 PS ANEXT, worst case margin for all four pairs
  - .8 Average PS ANEXT, worst case margin
  - .9 PS AACR-F, worst case margin for all four pairs
  - .10 Average PS AACR-F, worst case margin

**END OF SECTION 27 08 11.03** 

Page 98 of 154

## 27 11 00 COMMUNICATIONS ROOM FITTINGS

# PART 1 GENERAL

# 1.1 SUMMARY

- .1 Summary
- .2 Related Sections
- .3 Communications Rooms Overview
- .4 Communications Room Design

# 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 01 10 Basic Requirements
  - .2 Section 27 13 13 Copper Backbone Systems
  - .3 Section 27 13 23 Fiber Backbone Systems
  - .4 Section 27 15 00 Horizontal Cabling
  - .5 Section 27 16 00 Connecting Cords, Devices and Adaptors
  - .6 Section 27 21 33 Data Communications Wireless Access Points

# 1.3 COMMMUNICATIONS ROOMS OVERVIEW

- .1 EF (Entrance Facilities) The EF is an environmentally controlled space consisting of the pathways(s), space(s), cables, connecting hardware, protection devices and other passive and active equipment that support the access and service provider. For Acute Hospitals, multiple entrance points and route diversity shall be provided. Entrance points shall be established distant from each other with a minimum separation of 20m, entering the building from two or more different streets. The functions of the EF are:
  - .1 Demarcation point between the access and service provider cabling and equipment and the hospital's network infrastructure.
  - .2 Electrical protection for inter-building campus backbone and access and service provider cabling. Electrical protection is governed by local electrical codes.
  - .3 Connection point between outside plant cabling and building cabling that is accomplished by splicing or other means.
  - .4 House electronic equipment owned by the carriers that is required to provide their network services (In-building Cellular Node B equipment, Wide Area Network (WAN) Data, PSTN Connectivity, CATV/IPTV) to the building.
- MER (Main Equipment Room) The MER is to be considered distinct from Telecommunication Rooms (TR) and Telecommunications Enclosures (TE) because of the complexity of the equipment they contain. An MER may alternatively provide any or all of the functions of a TR or TE. The main cross-connect (MC) of a healthcare facility is located in the MER. Intermediate cross-connects (IC), horizontal cross-connects (HC), or both, of a healthcare facility may also be located in the MER. For Acute Hospitals, a minimum of two diverse pathways shall be provided between the MER and the EF. The MER is an environmentally controlled space whose functions are to:
  - House core telecommunications equipment (determined at the discretion of PHSA NE based on specific site requirements), connecting hardware, cables, pathways, splice closures, grounding and bonding facilities and appropriate protection

Page 99 of 154

- apparatus. The MER may also house horizontal terminations for a portion of the facility.
- .2 Contain either the MC or the IC used in the backbone cabling hierarchy.
- .3 Provide for the administration and routing of the equipment cabling, and or cords, from the MC or IC to the telecommunications equipment.
- .3 TR (local Telecommunications Room) The TR is an environmentally controlled space that provides a common access point for pathways, backbone cabling and horizontal cabling. The TR may also contain cabling used for cross-connection. The horizontal cross-connect (HC) is located in the TR. The intermediate cross-connects (IC) may also be located in a TR. The functions of a TR are to:
  - .1 House horizontal and backbone cables to connecting hardware.
  - .2 House telecommunication equipment, connecting hardware and splice closures serving a portion of the building. The TR shall not house PABX, Servers, Core Equipment, Network Storage equipment, etc.
  - .3 Provide for the administration and routing of equipment cords from the HC to the telecommunications equipment.
- .4 HE (Antenna Headend Equipment Room) The HE shall be located on the roof and as close to the antennas as possible. The room shall accommodate all provided and planned radio frequency based (RF) Special Systems and Headend Equipment Cabinets required for site wide wireless systems (such as clock GPS, Facilities and Security 2-way radio systems, SAT Com, ECOMM 911) intra-site wireless communications systems and carrier macro cellular antenna systems.
- .5 The quality of the Communications room details shall match or exceed the PHSA Communications standard drawings in details.

# 1.4 COMMUNICATIONS ROOM DESIGN

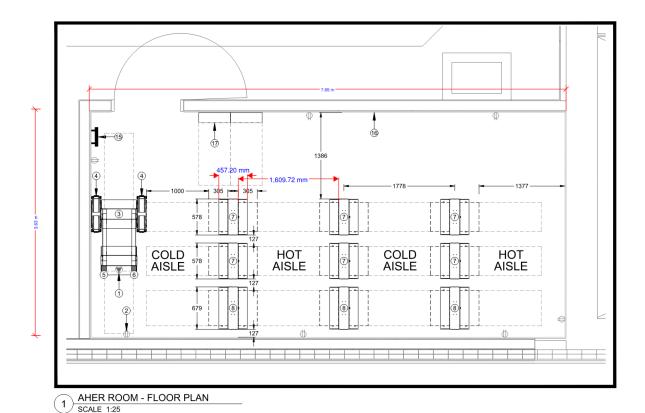
- .1 Communications rooms shall be designed and located with expansion and maintenance as the foremost thought taking into consideration factors such as building size, post-disaster survivability, the variety of IT and low voltage systems that are required in a modern healthcare facility, working space (1m clearances shall apply around the front, rear and at least one side of an equipment rack line-up) and horizontal cable density and length. Healthcare facilities have many types of electronic systems sharing same pathways and spaces. A sampling of these systems include Voice, Data, Overhead Paging, CATV/IPTV, Security Systems (Access Control, Intrusion Detection, CCTV, Panic Duress), Audio/Visual (Video Conferencing), Distributed Antenna System (DAS), Public Address, Clock System, BMS, Nurse Call, Intercom Systems, RFID Based Systems and Biomedical Systems (Physiological Monitoring, Telemetry) and Interactive Patient Infotainment System. Each of these and related systems shall have specific space requirements for maintainability that must be considered when designing all communications rooms.
- .2 General Requirements and Restrictions
  - .1 Communications rooms shall only contain low voltage wiring, terminations and distribution equipment. Fire alarm, BMS and Lighting Control wiring and panels that are 50V and under are permitted in any type of Communications room. Network switches required to provide IP connectivity to BAS, Access Control, Fire Alarm, Nurse Call, Patient Entertainment and Lighting Control Systems are permitted within Communications rooms.
  - Any equipment, material, or service located in Communications Rooms which requires access by the Building Occupant shall be restricted to authorized Building Personnel. Non-authorized Maintenance Personnel, or outside Agencies are prohibited.

Page 100 of 154

- .3 HVAC, electrical, plumbing, heating, sprinkler, medical gases, fluids, pneumatic tubes and any other non-telecommunications building service shall not be routed through Communications Rooms.
- .4 Communications Rooms or adjoining walls shall not have drain pipes, sprinkler risers and plumbing pipes located within them. Communications rooms shall be vertically stacked on all floors throughout the height of the building. If an additional TR is required on any floor, spatially separate the rooms on the plan and position these in different architectural fire-compartments.
- .5 Primary and Secondary Communications cabling riser shafts shall be located in separate architectural fire-compartments.
- Triangle, L-shaped, curved or any other odd shaped room is not acceptable for use as a Communications Room.
- .7 If the space required to support all the electronic or low voltage systems required in the facility exceeds the minimum sizes and or growth factor requirements specified herein, Communications Rooms shall be increased in size to provide adequate space for these systems.
- .8 Room sizing shall take into consideration the wall mounting area required for each system.
- .9 Communications rooms shall not be located in areas that are restricted by building components (stairwells, exterior walls, sheer structural walls, elevator shafts) that limit expansion.
- .10 Communications rooms shall be located away from services or conditions that will endanger or adversely affect active equipment and cabling.
- .11 Communications rooms cannot be situated in areas where there are occupancy constraints or limitations or conditions that would not comply with WorkSafe BC and internal Occupational Health and Safety regulations.
- .12 The height required within the Communications rooms shall be no less than 3048
- .13 Communications rooms must always be accessible from an elevator and the access path from the elevator to the Communications room must be:
  - .1 Well lit
  - .2 Have sufficient height and width to move equipment racks and enclosures
  - .3 Designed to enable the use of mechanical handling aids such as pallet jacks, hand trucks and carts easily
- .4 Unimpeded by permanent obstacles such as mechanical ducts and pipes
  .14 In Communications rooms where conduits are exposed, locate them at the corner
  or at the bettern of the walls so as not to interfere with the installation of current or
- or at the bottom of the walls so as not to interfere with the installation of current or future wall-mount panels or hardware. Where the exposed conduits need to get from the electrical panel to the opposite wall, run the conduits under the supporting trapeze of the tray, and then run down the corner to get to the bottom of the wall.
- .15 All aspects of the installation of Communications Rooms shall be reviewed and approved by the Communications Consultant and or the PHSA NE Representative.
- .3 Acute Hospitals
  - The Communications Consultant in consultation with the PHSA NE Representative shall provide a communications room design based on ANSI/TIA 1179-A Healthcare Facility telecommunications cabling standard and best practices, and ANSI/BICSI 004-2012, Information Technology Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities.
  - .2 Entrance Facilities (EF):
    - .1 The minimum design and installation standard for an EF is ANSI/TIA-569-D.
    - .2 If the EF is to support additional access and service provider systems such as Carrier Node B cellular equipment to provide input into an in-building DAS

Page 101 of 154

- system or CATV, the EF shall be increased in size to provide adequate space for these systems.
- .3 When multiple EF's are used, they shall have a minimum separation of 20 m to maintain diversity.
- .4 Must be located above the 200-year flood plain.
- .3 Main Equipment Room (MER):
  - .1 Minimum sizing specification for an MER is 3.66m x 7.62m. Refer to C-STD drawings in 27 00 00.01 for typical layouts and elevations.
  - .2 A growth factor of 100% shall be considered when determining room size. This growth can be accommodated by dedicating space adjacent to the MER that can be claimed in the future if so required (e.g. storage room).
  - .3 Must be located above the 200-year flood plain.
- .4 Telecommunications Rooms (TRs):
  - .1 Determined by the size of the building, 80 meter coverage area (based on a maximum permissible permanent link length of 80m), and density of drops in application specific work areas and spaces. Example: The location of the TR is based on the 80m maximum length of cable required to reach the extremities of a building's interior space, for current and future outlets.
  - .2 The TR shall be located on the same floor as the work areas served.
  - .3 A growth factor of 50% shall be included when determining the room size.
  - .4 The minimum sizing specifications for a TR is 3.66m x 4.88m. Refer to C-STD drawings in 27 00 00.01 for typical layouts and elevations.
- .5 Antenna Headend Equipment Room (HÉ)
  - The minimum size of the HE is 3639mm wide x 7620mm in length and it will house 3 carrier lineups of 3 racks each. Each carrier will line up with 1x 584mm (23") wide and 2x 483mm (19") wide rack, and 1x IMIT rack, all complete with design for overhead tray. The carrier racks are single rack type and do not use the IMIT type of vertical cable manager. Note: these requirements do not include macro Antenna equipment requirements. Example of floor layout:



- .2 The HE shall be connected to the building backbone riser and be furnished with the same supporting infrastructure as any other Communications room.
- .4 Community Sites
  - The Communications Consultant in consultation with the PHSA NE Representative shall provide a communications room design based on ANSI/TIA 569-D Commercial Building Telecommunications Cabling Standard,
  - .2 Entrance Facilities (EF):
    - .1 If the EF is to support additional access and service provider systems such as Carrier Node B cellular equipment to provide input into an in-building DAS system or CATV, the EF shall be increased in size to provide adequate space for these systems.
  - .3 Main Equipment Room (MER):
    - .1 Minimum sizing specification for an MER is 3.66m x 4.88m. Refer to C-STD drawings in 27 00 00.01 for typical layouts and elevations.
  - .4 Telecommunications Rooms (TRs):
    - .1 Determined by the size of the building, 80 meter coverage area (based on a maximum permissible permanent link length of 80m), and density of drops in application specific work areas and spaces. Example: The location of the TR is based on the 80m maximum length of cable required to reach the extremities of a building's interior space, for current and future outlets.
    - .2 The TR shall be located on the same floor as the work areas served.
    - .3 A growth factor of 50% shall be included when determining the room size. Maximum number of horizontal cables per rack/cabinet shall be 240 at the time when a new facility becomes operational.

Page 103 of 154

- .4 The minimum sizing specifications for a TR is 3.66m x 3.05m. Refer to C-STD drawings in 27 00 00.01 for typical layouts and elevations.
- .5 For standalone buildings dedicated to office use situated outside an Acute Hospital campus, the following definitions are provided to help clarify the planning requirements for each space:
  - .1 Buildings larger than 100 m² and smaller than 500m² may be served by a large Communications closet. Refer to C-STD drawings in 27 00 00.01 for typical layouts and elevations applicable to the design of the large Communications closet. The Communications closet shall have the following clear dimensions: 3658 mm x 1220 mm with a minimum height of 3048 mm.
  - .2 Buildings less than 100 m², a small Communications closet may be considered. Refer to C-STD drawings in 27 00 00.01 for typical layouts and elevations applicable to the design of the small Communications closet. The Communications closet shall have the following clear dimensions: 2150 mm x 1220 mm with a minimum height of 3048 mm.
  - .3 Where the data and voice equipment or the service providers' demarcation points are installed in the Communications closet, a detailed design must be completed of the closet to determine the space requirements and the layout of the closet. The detailed design shall follow the same intent as the PHSA standardized designs and must be submitted for PHSA NE Representative for approval.

# PART 2 PRODUCTS

## 2.1 EQUIPMENT RACKS / CABINETS

- .1 Four Post Equipment Rack
  - .1 Free standing 4-post rack, 2133.6 mm high x 610 mm wide x 914.4 mm deep, gang-able, c/w RU markings (RU1 at top & RU44 at bottom) on front and rear posts and rails.
  - .2 Top adjustable channels with mounting hardware.
  - .3 When assembled as a single unit, the 4-post rack must conform to seismic Zone 4 NEBS Telcordia GR-63-CORE Earthquake requirements
  - .4 Must provide 482.6 mm (19") rack mount capability for rack mountable components.
  - .5 Must provide 1955.8 mm of vertical mounting space. (44U)
  - .6 Must have 10-32 tapped mounting holes on uprights, front and rear.
  - .7 Shall be black medium texture durable powder coat finish.
  - .8 Must provide ground stud at the top and bottom of the frame.
  - .9 Include equipment mounting hardware.
  - .10 Provide solid bottom shelf when required.
  - .11 Accepted Manufacturer: Belden and Hammond
- .2 MER Server Cabinet
  - Cabinets shall be open type, (2133.6 mm high x 915 mm wide x 1066 mm deep c/w integrated wire managers front and rear, and be made of 14 gauge cold-rolled steel welded construction. Frame shall include ganging hardware, and grounding studs in front and rear of the frame base. Frame shall have (4) four 4-inch KO brush openings (one directly over each vertical manager section for horizontal cabling) in top for cable entry when required.
  - .2 Server cabinets c/w RU markings (RU1 at top & RU45 at bottom) on front and rear posts and rails.
  - .3 Seismic Zone 4 NEBS Telcordia GR-63-CORE certified

Page 104 of 154

- .4 Cabinets with 4 sets of 11 gauge 482.6 mm (19") EIA mounting rails, 2 sets are adjustable. Includes 50 count mounting hardware.
- .5 Loaded with 10-32 cage nuts.
- .6 Black medium texture durable powder coat finish.
- .7 Top Panel removable: Solid when required.
- .8 Front Door: Perforated with Locking Swing Handle when required.
- .9 Rear Door: Perforated with Locking Swing Handle when required.
- .10 Two Half Height (Top and Bottom), Bolted on, Easy Lift Off, Flush Mount, Locking Side Panels on Both Sides when required.
  - 1.10.1 Side panels will have (1) four 4-inch KO opening (in line with top horizontal manager in front of rack/cabinet for patch cord cabling).
- .11 Bottom Panel: Solid with Rear Brushed Opening when required.
- .12 Finger strips on all rails front and rear.
- .13 (2) 7.0" lacing panels mounted in the rear.
- .14 Accepted Manufacturer: Belden or equal.
- .3 Wall Mount Totally Enclosed Cabinet
  - .1 Cabinets shall be enclosed type; (1130 mm high x 762 mm deep x 762 mm wide c/w integrated vertical wire managers: 75mm wide on both sides of front (finger style) and lacing bars on both sides of the rear.
  - .2 Removable side panels with c/w two (2) 310mm square ventilated knockouts. If required the knockouts can be removed in lieu of 310mm square filter kits.
  - .3 The bottom panel is solid.
  - .4 The top panel is vented with (4) 102 mm fan mounting provisions and (2) 75 mm
  - .5 Wall cabinets c/w RU markings (RU1 at top & RU22 at bottom) on front and rear posts and rails.
  - .6 Four (4) 102 mm cabinet fans and thermostat kit
  - .7 Cabinets with 3 sets of adjustable mounting rails. (c/w RU markings)
  - .8 Loaded with 10-32 cage nuts.
  - .9 Accepted Manufacturer: Belden and Hammond
  - .10 Filter kits for the side panels

# 2.2 CABLE MANAGEMENT SYSTEMS (CMS)

- .1 Vertical Cable Management System
  - .1 Double sided
  - .2 Front Channel
    - .1 152mm- 305mm wide x 254mm deep (refer to detail drawing).
  - .3 Rear Channel
    - .1 152mm- 305mm wide x 254mm deep (refer to detail drawing).
    - 2 305mm wide between racks; 152mm wide at end unit.
  - .4 Acceptable Manufacturers: Belden, Commscope and Hammond.
  - .5 Vertical cable management shall be from the same Manufacturer as the racks / cabinets. When the rack and vertical manager are not made by the same manufacturer, the acceptable manufacturers for the vertical manager are Commscope, Hammond and Belden.
  - .6 Must be equipped with removable doors and straps, removable side fingers,
  - .7 access cut-outs at the back, and 2 sets of removable spools per front channel to take up patch cable slacks.
  - .8 The back of the cable trough must have stances to provide fastening for
  - .9 Horizontal cabling to the back of the trough.
  - .10 CMS must be gang-able.
  - .11 Shall be black in colour.

Page 105 of 154

- .2 Horizontal Cable Management.
  - .1 Horizontal cable manager at the top of each rack shall be a newest released 2U finger-type horizontal manager compatible with the finger-type vertical manager (Refer to C-STD drawings in 27 00 00.01).
  - .2 Acceptable Manufacturers: Belden and Commscope.

# 2.3 UTP PATCH PANELS

- .1 Patch panels for UTP horizontal cabling shall be a newest released flat 1U modular 24-port unit or 2U modular 48-port unit, suitable for mounting on 482.6mm (19") racks. Refer to rack elevation drawings.
- .2 Patch panels for UTP 25-pair voice tie cabling shall be a newest released flat 1U modular 24-port unit, Category 6, suitable for mounting on 482.6mm (19") racks.
- .3 IDC RJ45 discreet modular jacks shall be used on the patch panel.
- .4 Acceptable Manufacturers: Belden or Commscope.
- .5 For all existing Acute sites, migrating from an existing Cat.6 or Cat.5e cabling system to Cat.6A system provide the followings:
  - .1 A 1U 24 port Cat.6A patch panel (fully loaded) on the upper most suitable position on a rack (P1).
  - .2 A 1U 48 port Cat.6A patch panel (fully loaded) for all other panels (P2, P3, etc.) located below P1 on a rack.
- .6 Provide a manufacturer's patch cord extraction tool for each rack c/w a seven foot tether (rope or chain) attached to the top of the rack.

# 2.4 OPTICAL FIBER PATCH PANELS

.1 Refer to Section 27 13 23 for components and details.

# 2.5 IDC TERMINATION BLOCKS

- .1 Shall be Belden, GigaBIX Mount, GigaBIX Connector, 25-pair, to terminate voice multi pair (25 pair) backbone cables.
- .2 Belden GigaBIX Wire Guard.
- .3 Belden GigaBIX Designation Strip,
- .4 Belden GigaBIX Management Ring
- .5 Belden GigaBIX cable management module (installed behind GigaBIX mount to facilitate cable routing).
- .6 Belden GigaBIX horizontal channel plate.

# 2.6 UNINTERRUPTABLE POWER SUPPLY (REFER TO APPENDIX B & C ON UPS)

- .1 General Guidelines for Centralized IMIT Network Dedicated 3 Phase UPS.
  - .1 The following are the key requirements for a Centralized Network Dedicated UPS system:
    - .1 Powerware Model: Power Xpert 9395 Series in an N+1 configuration
    - .2 High Efficiency Mode
    - .3 ESS: Energy Saver System
    - .4 boosts efficiency to 99% across all load ranges
    - .5 less than 2ms transition time
    - .6 inherent surge protection, non-degenerative filtering for lighting strikes
    - 7 load fault detection and clearing, with a fault at source or load

.2 Multi Module Management:

Page 106 of 154

- .1 VMMS: Variable Module Management System
- .2 Automatically scale the UPS to match demand, loading required modules to gain efficiency
- .3 Automatically rotates through the power modules to increase MTBF by spreading load evenly across the system
- .3 Centralized UPS shall be configured in an N+1 configuration.
- .4 UPS Lithium Batteries to be Flame Retardant and carry a full 5-year replacement warranty directly with UPS manufacturer.
- .5 Inherent battery system that eliminates float charging and predicts pending battery failure.
- .6 UPS to be supported directly by manufacturer, with 4 (or at least 3) UPS dedicated service technicians resident in BC.
- .2 General Guidelines for rack mount for existing acute sites and community sites.
  - .1 The local UPS for this configuration shall be:
    - .1 Powerware 9PX models. Refer to Appendix C for guidelines.
    - .2 Four post rack mount kit
    - .3 Temperature Probe
    - .4 Network Management Card

# 2.7 METERED POWER BARS (EPDU)

- .1 Refer to Appendix C for approved vertical and horizontal metered power bars (ePDUs).
- .2 Provision for additional power bar to the work scope on an as needed basis to power clinical and vendor equipment.

# PART 3 EXECUTION

# 3.1 COMMUNICATIONS ROOM FINISHES

- .1 All types of Communication Rooms require a minimum one-hour fire rating.
- .2 Penetrations through walls, floors and ceilings shall be fire-stopped using products based on the requirements of Fire Stop Systems 27 05 29 and in accordance with Section 27 05 28 Pathways for Communications Systems.
- All walls shall be to underside of slab. All walls shall be lined with rigidly installed 20 mm (3/4"), AAA G1S plywood painted with two coats of light coloured fire resistant paint applied to all sides. Sanding between coats is mandatory. The plywood panels shall extend from floor level to a height of 2438mm. Treated fire-retardant plywood shall have two coats of light coloured paint applied on the surface. In this instance, expose the certified stamped mark.
- .4 There shall be no suspended ceiling installed in a Communications Room
- .5 All communications rooms shall have a minimum of two horizontal pathway entry points for access from adjoining ceiling spaces using 103 mm Hilti Speed sleeves. They shall be located on separate walls of the communications room. Refer to pathways section 27 05 28 for coordination with cable tray installation in the hallways.
- .6 Unless specified to the contrary, a minimum of one equipment rack shall be supplied and installed in each Communications room.
- .7 The use of a pull pit in Communications Rooms shall not be acceptable.

# 3.2 DOORS

Page 107 of 154

- .1 All doors shall be commercial grade and fitted with a auto closer and card access system.
- .2 Where the Communications Room is directly accessible from the building's exterior or from parkade areas, door hinges are to be recessed or hiddent with a full length astragal installed.
- .3 Lockset to be store room function.

The door shall swing 180° out to gain valuable floor and wall spaces inside the room for equipment and cable installs, and to provide working space for pulling entrance and riser cables. If the door must swing into the room, then the room shall be increased in size by the width of the door to compensate for lost space.

- .4 Communications rooms shall be accessible from corridor with minimum door opening of 1066mm wide and 2133mm high.
- .5 Provide a door sweep.

# 3.3 SECURITY

- .1 Access Control:
  - .1 The Contractor shall coordinate and arrange for installation of Communications Room's card access system prior to the installation of network equipment, with Communications Consultant and Integrated Protection Services.
  - .2 Only the main entry door shall be equipped with a network access control card reader. Supplementary doors shall be for exit only.
  - .3 Manual punch code locks are not permited on any Communications Room doors.
- .2 Keys:
  - .1 Key shall be cut to fit all the Communications Rooms within the same building.
  - .2 A copy of the key shall be given to Facilities Maintenance and Operations (FMO).
  - .3 If the Communications Room is equipped with a supplementary door, no keys shall be issued for these doors in order to ensure the audit trail through the access control system remains intact. Keys issued for the main entry doors that bypass the card reader should be limited for emergency access only.
- .3 Intrusion Alarm:
  - .1 An intrusion alarm shall be provided when the Communications Room is directly accessible from the building's exterior or from parkade areas.
  - .2 Alarm shall consist of door contacts on all doors, dual tech motion detector(s) and keypad.
  - .3 Control panel is to be located within a secure space.
  - .4 Intrusion system is not to be integrated with access control to arm or disarm the alarm.
- .4 All Communications Rooms shall be equipped with CCTV camera(s). CCTV camera(s) shall be used to identify people entering the room, and the CCTV coverage shall be such that there are no blind spots. CCTV camera footage to be recorded on base building security systems and stored for a minimum of 30 days.

# 3.4 FINISHES

.1 Wall and floor finishes shall be light in colour to enhance the brightness of the room.

#### 3.5 FLOORING

.1 New Communications Room floor coverings shall be anti-static linoleum composite sheeting (i.e. "Marmolium") or as noted on drawings. Vinyl tiles or sheeting are not acceptable.

Page 108 of 154

.2 There are Conductive or Static Dissipative linoleum flooring products on the market and if this is selected then the installer must ground the floor to the Telecommunications Bus Bar.

# 3.6 FLOOR LOADING

- .1 Floor loading (static and dynamic) capacity in the space shall be sufficient to bear both the distributed and concentrated load of the installed equipment. A structural engineer shall be consulted during the design to specify the floor loading limit. If equipment that exceeds these limits is anticipated, the areas of the floors where the equipment shall be moved and installed shall be appropriately reinforced.
- .2 The minimum floor load capacity shall be 100 lbs/square foot in TRs and 150 lbs/square foot in EF and main ER Rooms.

# 3.7 SIGNAGE

.1 For communications room signage, refer to Section 27 05 53.

# 3.8 SMOKE DETECTOR, HEAT DETECTOR, SPRINKLER SYSTEM

- Communications rooms must be isolated from the rest of the building using rated fire barriers and equipped with smoke and heat detection systems. The primary fire suppression choice shall be a Vortex fire suppression system. If a Vortex system is not feasible, a double-interlocked, cross-zoned pre-action sprinkler system shall be provided as the secondary option. Wet sprinkler systems are strictly prohibited. Additionally, a double-interlocked, cross-zoned pre-action sprinkler system is required in the UPS room.
- .2 Install the floor-mount cabinets and cylinders for the Vortex fire suppression system in an adjacent room (such as an electrical or mechanical room).
- .3 For existing "wet" sprinkler systems in Communication spaces, replace existing sprinkler head with high temperature type and provide drip tray under sprinkler head if sprinkler head is over equipment racks and cabinets.
- .4 Provide cage to sprinkler heads for mechanical protection in all cases.
- Provide a VESDA (Very Early Smoke Detection Apparatus) with controls inside the Communication rooms where needed. The controls shall be located on the rear wall of Rack 1.

#### 3.9 FIRE EXTINGUISHER

In accordance with NFPA 10 A5.5.6 and BCBC 2018 codes, a 15-pound carbon dioxide (CO2) fire extinguisher shall be required in Communications rooms (ER, MER, TR, HE). The extinguisher shall be installed on the inside wall of the Communications room, on the striker side of the door, with the top of the extinguisher no more than 1.5 meters (5 feet) above the floor.

# 3.10 LIGHTING

- .1 The lighting in Communications rooms shall be coordinated with the equipment layout, particularly overhead cable trays, equipment racks and server cabinets, to ensure the light is not obstructed.
- .2 The lighting provided in each Communications room shall meet the following requirements:
  - Lighting fixtures will be mounted at a minimum of 2.8m AFF unless otherwise approved by the Authority through the review procedure.

Page 109 of 154

- .2 Lighting fixtures and associated power cables will have a minimum separation of 50 mm from Communications cabling.
- .3 The minimum light levels will be 500 lux in the horizontal plane and 200 lux in the vertical plane @ 1 m above the finished floor. When performing lighting calculations, take into account the light loss due to a full cable tray.
- .4 Interior room lighting will be supplied from both the vital and conditional power branches of the building emergency generator system with a minimum of 50% of the lights supplied from the vital branch; or from battery packs where the generator system is not available.
- .5 Lighting will not be powered from the same panel as the telecommunications and IT equipment in the space.
- .6 Provide local light switching and an occupancy sensor(s) to control the lights.

# 3.11 HVAC

- .1 The HVAC requirements for Communications Rooms are as follows:
  - .1 HVAC systems serving Communications Rooms will maintain a temperature between 18-24 degree Celsius (dry bulb temperature) with a relative humidity between 25% and 60%. Anything outside these ranges will generate an alarm that will be visible on the Facility's building management system.
  - .2 HVAC systems for Communications Rooms shall be scalable, reliable and operate without interruption (24/7, 365 days per year) while being efficient to operate, both in terms of energy consumption and from a maintenance perspective.
  - .3 The HVAC system shall be powered from the Emergency Generator Power system.
  - .4 The MER shall be equipped with a minimum of two dedicated HVAC units to share the total forecasted cooling load.
  - .5 Supply and install separate, in room controls for the HVAC systems serving all Communications Rooms in order to enable the correct amount of cooling capacity and humidity control to be delivered to each Communications Room.
  - .6 The air pressure inside the room shall be positive to force the air out of the room to mitigate dust accumulation. Provide a minimum of 1 complete air change per hour.
  - .7 For Existing Acute Care site, the forecasted maximum cooling load of the room shall be determined by the Communications Consultant in consultation with the PHSA NE Representative during the design stage of the project. This information shall be provided to the Mechanical Engineer to design the appropriate cooling solution to meet the forecasted heat load for the room. Mechanical equipment such as fan coils and associated supply and return air ducting that are providing dedicated cooling to communications rooms are to be located outside of the communications rooms unless otherwise approved by the Communications Consultant and or the PHSA NE Representative).
  - .8 For new Acute Care sites, the mechanical designer will design a dedicated scalable, reliable and N+1 redundant cooling capacity in a consistent manner in all the Communications Rooms to permit all equipment racks (including carrier racks) to be fully populated.
    - .1 A minimum of 6000 BTUs of cooling capacity will be provided per equipment rack and server cabinet in all Communications Rooms in the Facility. This includes the provision of 6000 BTUs of cooling capacity for future equipment racks and server cabinets that can be accommodated within the Communications Rooms.
  - .9 Each Communications Room will be provided with supply and return air through dedicated ducts that serve only the room in order to ensure that the environment inside each Communications Room is not influenced by external factors.

Page 110 of 154

.10 For Acute Care facilities, the supply and return air distribution system for providing cooling to the racks and cabinets will be built in a Hot Aisle Cold Aisle orientation in all Communications rooms without the air ducts entering the rooms. Provide a design that maximizes the cooling efficiency for the rooms.

# 3.12 EQUIPMENT RACKS / CABINETS (REFER TO DRAWINGS FOR SIZING)

- .1 Each rack / cabinet shall be plumbed and levelled, and solidly bolted to the floor with bolts, washers and brackets. Bonding of rack to ground per TIA -J-STD-607B and Section 27 05 26.
- .2 Equipment racks / cabinets shall be seismically restrained and approved per Seismic Engineer of record.
- .3 Where two or more racks are mounted side by side, the racks shall have a double sided 12 wide vertical manager installed in between and ganged with metal bolts and washers.
- .4 Provide access clearance of 1m in the front, the side and the rear of the racks. Where several rows of racks are located side by side, the row spacing shall be a minimum of 1 m. A minimum clearance of 50 mm shall be maintained between one side of the rack vertical manager and the wall. All clearances are to be measured from the face of any equipment mounted to the wall and from the front of vertical cable managers.
- .5 Typical rack / cabinet data port capacity shall be 240 horizontal cables at the time when the facility becomes operational.
- The number of Racks in a communication room is based on the horizontal cable count of the floor area being served and the spare space requirements in each room. This along with the 3<sup>rd</sup> party rack requirements as identified in the Communications Standard Drawings determines the rack count in each communication room.
- .7 Wall-mount open Rack and wall-mount enclosed Cabinet may be considered when the building is less than 100 m² and there is no wall space requirement for any low voltage systems. Refer to Appendices E.1 and E.5 for product manufacturers, dimensions and specifications.
  - .1 The applicability of wall-mount open Rack is when it is located in secured or protected Communications spaces e.g. existing Communications room that has limited space for growth.
  - .2 The applicability of wall-mount enclosed lockable Cabinet is when it is located outside the security of Communications spaces e.g. mechanical room, electrical room, and unsecured spaces accessible to the general public but located in the area of staff presence.

# 3.13 BACK-UP POWER AND POWER OUTLETS

- .1 Where rack mount UPS units are used in Acute care sites the power outlets servicing Communications racks are on Vital/Generator Power Panels and Utility Power Panels;
- .2 Where Centralized UPS equipment is used in Acute care sites, the power outlets servicing Communications racks are on UPS Power Panels and Vital Power Panels;
- Where rack mount UPS units are used in Community sites the power outlets servicing Communications racks are on Utility Power Panels;
- .4 Electrical Engineer shall coordinate with Communications Consultant and or the PHSA NE Representative to design power and UPS requirements for all network and low voltage equipment in every type of communication space.
- .5 Typical requirements for ePDU power feeds to Racks and or Cabinets in Acute Care Sites each Rack/Cabinet will have two (2) ePDU's from the following power supplies (Refer to C-STD drawings and Appendix B):

.1 Best Option

Page 111 of 154

- one Power Distribution Unit is powered from a Centralized UPS source on UPS Electrical Panel;
- .2 the second Power Distribution Unit is fed from a Vital/Generator Power Panel
- .2 Option 2
  - .1 one ePDU is powered from a rack mount UPS source. (Rack mount UPS feed from Vital/Generator Power Panel)
- .2 the second Power Distribution Unit is fed from a second Utility Power Panel
  .6 The Contractor shall provide a minimum of (2) dedicated 20A, 120V AC on
  Vital/Generator power circuits. These circuits are to appear in double gang duplex (520RA) convenience outlets located at not more than 6ft intervals around perimeter walls
  of EF, MER and each TR. Convenience outlets shall be set flush-mounted and centred at
  305 mm AFF (or match mounting height of existing receptacles) and be identified and
  marked (Refer to C-STD drawings in 27 00 00.01). They shall not appear under GigaBIX
  wall.
- .7 In Community sites, use Emergency Generator power whenever available. Otherwise utility power is an acceptable alternative for convenience and equipment rack receptacles.
- Minimum IMIT UPS runtime where the input power source is from a Vital/Generator Power is ten minutes. Minimum runtime for Network UPS is increased to 30 minutes when Utility power is used as the sole input power source. If the required runtimes cannot be maintained by the UPS internal batteries, engage the Communications Consultant and or the PHSA NE Representative regarding the installation of additional battery modules.
- .9 Power distribution to and inside an Entrance Facility (EF) room shall vary from site to site based on the specific needs of the facility. Establishing specific requirements above each equipment rack shall need to be coordinated with service providers and the Communications Consultant and or the PHSA NE Representative.
- .10 For a summary of Rack and/or Cabinet Power Requirements and a list of acceptable products refer to:

 $\label{eq:appendix B-PHSA Communications Standard - Power Distribution for all Communications Spaces$ 

Appendix C - PHSA Communications Standard - UPS & Power Distribution Unit

# .11 Rack Mount UPS Power

- .1 The installation of rack mount UPS units is acceptable in the following scenarios:
  - .1 Existing communication rooms in existing Acute and Community sites.
  - .2 New communication rooms in existing Acute and Community sites.
  - .3 New communication rooms in new Community sites.
  - .4 Remote Sites
- .2 Within existing sites, the application of the specifications and guidelines detailed within this section are subject to specific site conditions. If existing site conditions prevent the design and implementation of the specifications and guidelines as detailed within this section, the Electrical Engineer must work with the Communications Consultant and or the PHSA NE Representative to find a suitable solution
- .3 If a rack mount UPS system is being provisioned for an MER room; the Communications Consultant and or the PHSA NE Representative shall be consulted for specific UPS requirements.
- .4 Specifications and Guidelines are based on Eaton Powerware 9PX UPS products.

Page 112 of 154

- .5 All UPS systems and Power Distribution Units are to be physically connected by the Division 27 Contractor to a network switch port designated by a PHSA NE Representative.
- .6 Telecommunication Room consisting of a single rack serving a wiring space with 0-240 horizontal drops:
  - Provide two (2) L6-30R receptacles each on dedicated circuits above the rack one on Vital/Generator Power and one on Utility Power. One L6-30R (Vital/Generator) shall be used to provide input power into the UPS and the other shall be used for a metered Power Distribution Unit.
  - .2 Provide a rack mount 6000VA UPS c/w
    - .1 L6-30P input cord (Contractor is expected to provide input feed cord of sufficient length to plug into the UPS input receptacle. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards. Refer to C-STD drawings in 27 00 00.01 for receptacle locations)
    - .2 2 x L6-30R output receptacles
    - .3 Four post rack mount kit
    - .4 Temperature Probe
    - Network Management Card
       \* If 1500VA UPS system is required to distribute 120V UPS Protected
       Power to the equipment rack refer to Appendix C for appropriate model number.
  - .3 Provide one basic and one monitored/metered Power Distribution Unit c/w L6-30P input cords (3.05m /10 feet)
    - .1 Zero U Power Distribution Unit
    - .2 ePDU #1 plugs (basic) directly into the 6000VA UPS unit
    - .3 ePDU #2 plugs (metered) into the L6-30R receptacle located above the Rack
    - .4 All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.

# .7 For an Acute Care Telecommunication Room consisting of two racks serving a wiring space with 0-240 horizontal drops:

- .1 Rack 1 Provide one (1) L6-30R receptacle, on dedicated circuits above the rack on Utility Power. The Utility Power will be used for a metered Power Distribution Unit.
- .2 Rack 2 Provide two (2) L6-30R receptacles, each on dedicated circuits above the rack 2, one (1) on Vital/Generator and one (1) on Utility Power. The Vital/Generator Power will be used to provide input power into the UPS and the other will be used for a metered Power Distribution Unit.
- .3 Provide a rack mount 6000VA UPS in Rack 2 c/w
  - 1 L6-30P input cord (Contractor is expected to provide input feed cord of sufficient length to plug into the UPS input receptacle. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards. Refer to C-STD drawings in 27 00 00.01 for receptacle locations)
  - .2 3 x L6-30R output receptacles
  - .3 Four post rack mount kit
  - .4 Temperature Probe
  - .5 Network Management Card
    - \* If 1500VA UPS system is required to distribute 120V UPS Protected Power to the equipment rack, refer to Appendix C for appropriate model number.

Page 113 of 154

- .4 Rack 1 Provide one basic and one monitored/metered Power Distribution Unit c/w L6-30P input cords (3.05m/10 feet)
  - .1 Two (2) Zero U ePDUs
  - .2 Power Distribution Unit #1 (basic) plugs directly into the 6000VA UPS unit
  - .3 Power Distribution Unit #2 plugs (metered) into the L6-30R receptacle located above the Rack
  - .4 All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.
- .5 Rack 2 Provide one basic and one monitored/metered ePDUs, c/w L6-30P input cords (3.05m/10 feet)
  - .1 Zero Ù ePDUs
  - .2 ePDU #1 (basic) plugs directly into the 6000VA UPS unit
  - .3 ePDU #2 (metered) plugs into the L6-30R receptacle located above the Rack
  - .4 All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.

# .8 For Acute Care Telecommunication Room consisting of three racks serving a wiring space with 0-480 horizontal drops:

- .1 Rack 1, 2 & 3 Provide one (1) L6-30R receptacle per Rack 1, 2, & 3; on Utility Power. Utility Power will be used for a metered Power Distribution Unit.
- .2 Provide a rack mount 8KVA UPS in Rack 2 c/w
  - Direct feed or hardwired connection to the UPS from Vital/Generator power
  - .2 Three (3) L6-30R output receptacles
  - .3 Four post rack mount kit
  - .4 Temperature Probe
  - .5 Network Management Card
  - Monitoring software and licensing

    \* If 3KVA UPS system(s) are required to distribute 120V UPS
    Protected Power to the equipment rack, refer to Appendix C for appropriate model number.
- .3 Rack 1, 2 & 3 Provide one monitored/metered Power Distribution Unit per rack, c/w L6-30P input cords (3.05m/10 feet)
  - .1 Zero U ePDUs
  - ePDU (metered) plugs into the L6-30R receptacle located above the Rack
  - .3 All power cords are to be properly dressed and secured as per acceptable cable management practices and standards
- .4 Rack 1, 2 & 3 Provide one basic Power Distribution Unit per rack, c/w L6-30P input cords (3.05m/10 feet)
  - .1 Zero U Power Distribution Unit
  - .2 ePDU (basic) plugs directly into the 8KVA UPS unit
  - All power cords are to be properly dressed and secured as per acceptable cable management practices and standards

# .9 For Acute Care Telecommunication Room consisting of four racks serving a wiring space with more than 480 horizontal drops:

- .1 Rack 1, 2, 3 & 4 Provide one (1) L6-30R receptacle per Rack 1, 2, 3 & 4; on Utility Power. The Utility Power will be used for a metered Power Distribution Unit.
- .2 Rack 1 Provide one (1) L6-30R receptacle on Vital/Generator Power. The L6-30R will provide input power to the 6000VA UPS.

Page 114 of 154

- .3 Provide a rack mount 11KVA UPS in Rack 3 c/w
  - .1 Direct feed or hardwired connection to the UPS from Vital/Generator or Utility power.
  - .2 Three (3) L6-30R output receptacles
  - .3 Four post rack mount kit
  - .4 Temperature Probe
  - .5 Network Management Card
  - Monitoring software and licensing
     \* If 3KVA UPS system(s) are required to distribute 120V UPS
     Protected Power to the equipment rack, refer to Appendix C for appropriate model number.
- .4 Rack 1, 2, 3 & 4 Provide one metered Power Distribution Units per rack, c/w L6-30P input cords (10 feet)
- .5 Rack 1, 2, 3 & 4 Provide one basic Power Distribution Units per rack, c/w L6-30P input cords (10 feet):
  - .1 Zero U Power Distribution Unit.
  - .2 Power Distribution Unit #1 (basic) plugs directly into the Rack 1 to 6000VA UPS unit & Rack 2, 3 & 4 to the 11000VA UPS unit
  - .3 Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located above the Rack
  - .4 All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.

# .10 For Acute Care Telecommunication Room consisting of seven racks serving a wiring space with more than 960 horizontal drops:

- .1 Rack 1, 2, 3, 4, 5, 6 & 7 Provide one (1) L6-30R receptacle per Rack 1, 2, 3, 4. 5, 6 & 7; on Utility Power. The Utility Power will be used for a metered Power Distribution Unit.
- .2 Rack 1 Provide one (1) L6-30R receptacle on Vital/Generator Power. The L6-30R will provide input power to the 6000VA UPS.
- .3 Provide a rack mount 11KVA UPS in Racks 3 and 6 c/w
  - .1 Direct feed or hardwired connection to the UPS from Vital/Generator or Utility power.
  - .2 Three (3) L6-30R output receptacles
  - .3 Four post rack mount kit
  - .4 Temperature Probe
  - .5 Network Management Card
  - .6 Monitoring software and licensing
- .4 Power Distribution Unit #1 (basic) plugs directly into the Rack 1 to 6000VA UPS unit & Rack 2. 3 & 4 to the 11000VA UPS unit
- .5 Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located above the Rack
- .6 All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.

# .11 For Community Sites Telecommunication Room consisting of a single rack serving a wiring space with 0-144 horizontal drops:

- .1 Provide two (2) L5-30R receptacles, each on dedicated circuits above the rack. One L5-30R is on Vital/Generator Power and the second L5-30R is on Utility Power. In sites that are not equipped with Vital/Generator power, Utility power is acceptable. One L5-30R The Vital/Generator Power will be used to provide input power into the UPS, and the other will be used for a metered Power Distribution Unit.
- .2 Provide a rack mount 3000VA UPS (refer to Appendix C for appropriate model number) c/w:

Page 115 of 154

- .1 2 x L5-30R output receptacles
- .2 Four post rack mount kit
- .3 Temperature Probe
- .4 Network Management Card
- .3 Provide one basic and one monitored/metered Power Distribution Units (refer to Appendix C for appropriate model number), c/w L5-30P input cords (10 feet)
  - .1 Zero U Power Distribution Units
  - .2 Power Distribution Unit #1 (basic) plugs directly into the 3000VA UPS unit
  - .3 Power Distribution Unit #2 (metered) plugs into the L5-30R receptacle located above the Rack
  - .4 All power cords are to be properly dressed and secured as per acceptable cable management practices and standards

# .12 For Community Sites Telecommunication Room consisting of two racks serving a wiring space with 145-240 horizontal drops:

- .1 Rack 1 Provide one (1) L6-30R receptacle on Utility Power.
- .2 Rack 2 Provide two (2) L6-30R receptacles, each on dedicated circuits above the rack, one on Vital/Generator and one on Utility Power. Utility Power is acceptable where Vital/Generator is not available. The Vital/Generator Power will be used to provide input power into the UPS, and the other will be used for a metered Power Distribution Unit. Provide a rack mount 6000VA UPS (refer to Appendix C for appropriate model number) c/w:
  - .1 3 x L6-30R output receptacles
  - .2 Four post rack mount kit
  - .3 Temperature Probe
  - 4 Network Management Card
- .3 \* If 3000VA UPS system is required to distribute 120V UPS Power to third party equipment in the rack, refer to Appendix C for appropriate model number.
- .4 Provide one basic and one monitored/metered Power Distribution Units (refer to Appendix C for appropriate model number), c/w L6-30P input cords (10 feet)
  - .1 Zero U Power Distribution Units
  - .2 Power Distribution Unit #1 (basic) plugs directly into the 6000VA UPS unit
  - .3 Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located above the Rack
  - .4 All power cords are to be properly dressed and secured as per acceptable cable management practices and standards. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.

# .13 For Community Sites Telecommunication Room consisting of three racks serving a wiring space with 241-480 horizontal drops:

- .1 Rack 1, 2, & 3 Provide one (1) L6-30R receptable per Rack 1, 2, & 3; on Utility Power. The other Utility Power will be used for a metered Power Distribution Unit.
- .2 Provide a rack mount 8000VA UPS in Rack 2 (refer to Appendix C for appropriate model number) c/w
  - Direct feed or hardwired connection to the UPS from Vital/Generator Power or Utility power when Vital/Generator Power is not available.

Page 116 of 154

- .2 Three (3) L6-30R output receptacles
- .3 Four post rack mount kit
- .4 Temperature Probe
- .5 Network Management Card
- .3 \* If 3000VA UPS system is required to distribute 120V UPS Power to third party equipment in the rack, refer to Appendix C for appropriate model number.
- .4 Provide one basic and one monitored/metered Power Distribution Units (refer to Appendix C for appropriate model number), c/w L6-30P input cords (10 feet)
  - .1 Zero U Power Distribution Units
  - .2 Power Distribution Unit #1 (basic) plugs directly into the 6000VA UPS unit
  - .3 Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located above the Rack
  - .4 All power cords are to be properly dressed and secured as per acceptable cable management practices and standards. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.

# .14 For Community Sites Telecommunication Room consisting of four racks serving a wiring space with 241-480 horizontal drops:

- .1 Rack 1, 2, & 3 Provide one (1) L6-30R receptable per Rack 1, 2, & 3; on Utility Power. The other Utility Power will be used for a metered Power Distribution Unit.
- .2 Provide a rack mount 8000VA UPS in Rack 3 (refer to Appendix C for appropriate model number) c/w
  - Direct feed or hardwired connection to the UPS from Vital/Generator Power or Utility power when Vital/Generator Power is not available.
  - .2 Three (3) L6-30R output receptacles
  - .3 Four post rack mount kit
  - .4 Temperature Probe
  - 5 Network Management Card
- .3 \* If 3000VA UPS system is required to distribute 120V UPS Power to third party equipment in the rack, refer to Appendix C for appropriate model number.
- .4 Rack 1, 2, 3 & 4 Provide one metered Power Distribution Units per rack, c/w L6-30P input cords (10 feet)one basic and one monitored/metered Power Distribution Units
- .5 Rack 2, 3 & 4 Provide one basic Power Distribution Units per rack, c/w L6-30P input cords (10 feet) (refer to Appendix C for appropriate model number), c/w L6-30P input cords (10 feet)
  - .1 Zero U Power Distribution Units
  - .2 Power Distribution Unit #1 (basic) plugs directly into the 8000VA UPS unit
  - .3 Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located above the Rack
  - .4 All power cords are to be properly dressed and secured as per acceptable cable management practices and standards. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.

# .15 Centralized Network Dedicated UPS Power

Page 117 of 154

- .1 The installation of Centralized Network Dedicated UPS Power is acceptable in the following scenarios:
  - .1 Existing communication rooms in an existing Acute Hospital site (undergoing a wholesale power retrofit).
  - .2 New communication rooms in a new Acute Site.
- .2 Centralized Network Dedicated UPS & UPS Distribution shall support all the network and low voltage equipment located within Communication Room Spaces within a given building or buildings. In a campus environment, it is permissible to install multiple Centralized Network Dedicated UPS systems to feed individual or groups of buildings if it is not feasible to extend the UPS power distribution to all buildings from a single central location.
- .3 Centralized UPS shall be configured in an N+1 configuration
- .4 All Centralized Network Dedicated UPS systems shall be equipped with an external wrap around maintenance by-pass.
- .5 Centralized Network Dedicated UPS shall be located in their own dedicated room or within the facility's Main Electrical Room.
- .6 Zone 4 certified seismic installation is required on all installations of a Centralized Network Dedicated UPS System.
- .7 All Centralized Network Dedicated UPS systems must undergo a load bank test as part of the commissioning process.
- .8 Centralized Network Dedicated UPS and associated Power Distribution Units are to be physically connected by the Division 27 Contractor to a network switch port designated by a PHSA NE Representative.
- .9 The selection of the make and model of the Centralized Network Dedicated UPS system and its associated capacity, efficiency, features, configuration and extended (support and maintenance) warranties shall be done in consultation with the Communications Consultant and or the PHSA NE Representative. Remote management and monitoring capabilities are to be determined in consultation with Facilities Maintenance and Operations as well as the Communications Consultant and or the PHSA NE Representative.
- .10 In new Acute Sites and in Existing Acute Sites where the power distribution systems are being retrofitted, all UPS and Vital power distribution panels servicing communication rooms must be dedicated and located inside the communication room. Refer to C-STD drawings in 27 00 00.01 for panel locations.
- .11 Standard Configuration for MER and TR Communications Rooms:
  - Vendor or Third Party Equipment Rack Provide two (2) dedicated circuits L21-30R receptacles above the rack; one (1) L21-30R on Centralized Network Dedicated UPS power and one (1) L21-30R on Vital Power.
  - .2 Health Authority Equipment Racks Provide two (2) dedicated circuits L21-30R receptacles above the rack; one (1) L21-30R on Centralized Network Dedicated UPS power and one (1) L21-30R on Vital Power.
  - .3 Provide two monitored/metered Power Distribution Units, c/w L21-30P input cords (3.05m/10 feet) per rack. Equip one Power Distribution Unit in the centre of line-up with a temperature probe. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.

# **END OF SECTION 27 11 00**

Page 118 of 154

#### 27 13 13 COMMUNICATIONS COPPER BACKBONE CABLING

# PART 1 GENERAL

# 1.1 SUMMARY

- .1 Summary
- .2 Related Sections
- .3 List of Terms as Used in this Specification
- .4 Communications Copper Backbone Cabling

#### 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 01 10 Basic Requirements
  - .2 Section 27 08 11.02 Copper Testing
  - .3 Section 27 11 00 Communications Room Fittings
  - .4 Section 27 16 00 Connecting Cords, Devices and Adaptors

# 1.3 LIST OF TERMS AS USED IN THIS SPECIFICATION

- .1 "ISP": Inside Plant [cabling]
- .2 "OSP" Outside Plant [cabling]
- .3 "PIC": Plastic Insulated Conductor
- .4 "PVC": Polyvinyl Chloride
- .5 "PE": Polvethylene
- .6 "CMP": Communications Media Plenum [plenum rating]
- .7 "CMR": Communications Media Riser [riser rating]

#### 1.4 COMMUNICATIONS MULTIPAIR COPPER BACKBONE CABLING

# .1 Overview

- .1 The backbone configuration shall be a hierarchical star structure with separate dedicated cables from the MER Communications Room to each Telecommunications Room. The second level of backbone when required is used between buildings only, connecting the MER of each building to the campus Entrance room or a PABX room.
- .2 In a MER, Entrance and Intra Building Backbone cables shall be bundled separately from Horizontal cables.
- .3 In a TR Communications Room, Horizontal cables shall be bundled separately from Intra Building Backbone cables.
- .4 No backbone cables shall be left un-terminated in a Communications Room.
- .2 Category 3 Voice Intra-Building Backbone Cables
  - Voice backbone cabling consisting of multiples of 25, 50 or 100 pair Category 3 unshielded twisted-pair shall be installed by the Contractor, from the MER to each zone TR as directed by the Communications Consultant and or the PHSA NE Representative. The voice riser shall be sized by allocating 50 pairs per 929 m² (10,000 square feet). The pair count shall be rounded to the next 25 pair multiple. Example: 1022 m² (11,000 square feet) is 75 pairs.

Page 119 of 154

- .2 Multi-pair cable bundles entering GigaBIX mounts and the hinging of connectors shall be on the jumper side of the mount.
- .3 Backbone 25, 50 or 100-pair UTP cables from the same Communications room must be grouped together and terminated sequentially on the GigaBIX connectors; group the cables from each Communications room together. Once the first riser is terminated and numbered, every other riser in its group continues the number sequence. (Refer to Standard Drawing C-STD in 27 00 00.01).
- .4 Space for the protectors shall be provided to the left of the GigaBIX mounts. (Refer to Standard Drawing C-STD in in 27 00 00.01).
- .3 Category 3 Voice Inter-Building Backbone Cables
  - .1 Install and terminate a multi pair, UTP, 24 AWG outside plant cable between buildings for voice. The number of multi pair to be used varies depending on if it is serving an occupied or unoccupied office. For occupied office, the minimum number of multi pair to be used shall be 100. For unoccupied office, the minimum number of multi pair to be used shall be 25. The cable shall have a gel-filled core. Provide primary protection at both ends or as required by the AHJ. If the cable is routed underground, it shall be installed in conduit. The conduit shall be sized with 100 % spare cable capacity based on a fill of 40%. Terminate the cable on GigaBIX terminations.

# PART 2 PRODUCTS

# 2.1 MULTIPAIR INSIDE UNSHIELDED TWISTED PAIR CABLE

- .1 Intra-building Application:
  - .1 Cable suitable for indoor installation, between floors in vertical riser system, utility tunnels, under access flooring, and through overhead ceiling space (in cable tray, conduit & hangers).
  - .2 Each and every cable run shall have a continuous single cable, homogenous in nature. Splices are not permitted anywhere.
  - .3 Twisted pair PIC type, air core cable for intra-building cabling.
  - .4 Accepted Manufacturers: Belden and Commscope.
- .2 Conductors:
  - .1 Conductors of 24 AWG annealed solid copper.
  - .2 Conductors fully insulated, consisting of an inner layer of expanded polyolefin, covered with an outer layer (skin) of solid PVC.
  - .3 Twisted pair conductors, stranded into 25-pair bundles and into units.
  - .4 Colour Coding: Twisted pairs and units individually color-coded to industry standards (ANSI/ICEA Publications S-80-576, and TIA-230).
- .3 Core & Sheath
  - 1 Cable sheath consisting of an overall flame-retardant PVDF or equivalent jacket.
  - .2 Cable that is CEC rated as CMP or CMR as required by the authority having jurisdiction, and UL listed as such.
  - .3 Jacket Color: Grev
- .4 Performance:
  - .1 Electrical performance of the twisted pairs and overall cable that complies with TIA-568-C requirements for Category 3 UTP cabling.

# 2.2 SEALPIC-F CORE MULTIPAIR BACKBONE CABLE

- .1 Inter-building Application:
  - 1 Cable suitable for outdoor duct bank installation

Page 120 of 154

- .2 Each and every cable run shall have a continuous single cable, homogenous in nature. Splices are not permitted anywhere
- .2 Conductors:
  - .1 Conductors of 24 AWG annealed solid copper.
  - .2 Twisted pair conductors, stranded into 25-pair bundles and into units.
  - .3 Colour Coding: Twisted pairs and units individually color-coded to industry standards (ANSI/ICEA Publications S-80-576, and TIA-230).
- .3 Core & Sheath
  - .1 All outdoor duct bank copper backbone cabling shall be SEALPIC-F backbone cabling, with solid copper conductors.
  - .2 The cable shall be CSA certified and stamped CMR rating.

# .4 Performance:

.1 Electrical performance of the twisted pairs and overall cable that complies with TIA-568-C requirements for Category 3 UTP cabling.

# 2.3 TERMINATION EQUIPMENT

- .1 GigaBIX suitable for installation within a telecommunications facility for the termination of the backbone twisted pair cables and suitable for either wall or rack installations, vertically oriented for a wall mounted column configuration.
- .2 "GigaBIX" type.
- .3 GigaBIX accompanied by the quantity of management equipment, for both horizontal and vertical routing of cords and cross connect wires.
  - .1 GigaBIX kit, 300 pair, 5-pair based.
  - .2 Vertical management panel.
  - .3 Cable management module shall be provided behind each GigaBIX mount.

# 2.4 CROSS-CONNECT WIRE

- .1 Cross connect Wire, 1-Pair
  - 1 Cross connect wire suitable for installation within a telecommunications facility and fully compatible with the GigaBIX. Each and every cross connect wire manufactured from a single, continuous length of insulated wire, homogenous in nature. Splices are not permitted anywhere.
  - .2 Factory splices of insulated conductors are expressly prohibited.
  - .3 Conductors:
    - .1 Insulated Conductors: 24 AWG conductors of solid copper. Fully insulated conductors with a flame retardant thermoplastic material (such as PVC, or equivalent).
    - .2 Twisted Pairs: Two insulated conductors "twisted" into a "pair" (twisted pair), individually color-coded.

# PART 3 EXECUTION

# 3.1 INSTALLATION

- .1 Backbone Cable
  - .1 Cable runs shall have continuous sheath continuity, homogenous in nature. Splices are not permitted anywhere.
  - .2 Maximum cable length of 500 meters from the termination point within the Entrance Facility to the termination point in Communications Rooms.

Page 121 of 154

# .3 Placement

- .1 Maintain a minimum bend radius of 20 times the cable diameter during installation and 10 times the cable diameter after installation.
- .2 Maintain pulling tension within manufacturer's limits.
- .3 Place cables within designated pathways.
- .4 Place and suspend cables in a manner to protect them from physical interferences or damage. Replace cables if damaged during installation.
- .5 Place cables with no kinks, twists, or impact damage to the sheath.
- .6 Place a pull rope along with cables where run in conduit and spare capacity still exists in the conduit. Tie off ends of the pull rope.

# .4 Routing

- .1 When routing horizontally within Communications rooms, utilize the overhead cable support. When routing vertically within Communications rooms, utilize the vertical cable support (vertical basket tray) and provide cable ties every 610mm (24") on centre.
- .2 Route cables a minimum of 50mm (2") away from power sources to reduce interferences from EMI.
- .3 Provide minimum 7.62 meters (25') sheathed cable slack loop at each end of the run. Coil and place the slack on wall outside and above the overhead cable tray.
- .4 All cabling must be supported by fire-resistant fastenings and fixings.

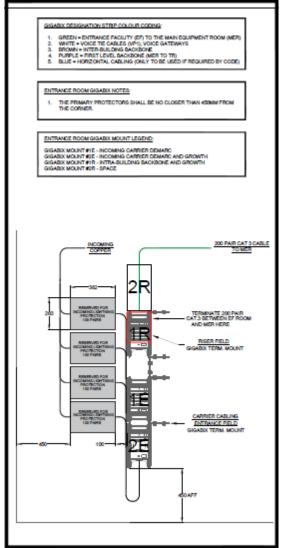
# .5 Termination

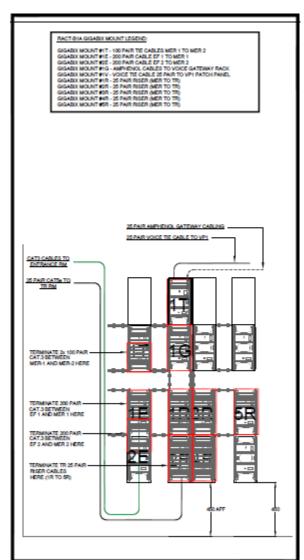
- .1 Properly strain-relieve cables at termination points per manufacturer's instructions.
- .2 Terminate twisted pairs onto the GigaBIX in accordance with manufacturer's latest instructions and TIA-568D standard installation practices.
- .3 Perform post-installation testing as described in the Testing for Communications specification.

# .2 GigaBIX

- .1 Provide accessories required for a complete installation.
- .2 Install cable management module layout such that the 1st cable management module starts at 203mm (8") from the wall and 457mm (18") from the floor.
- .3 Mount GigaBIX plumb and square.
- 4 Voice GigaBix Category 3 Communications Room Detail Examples:

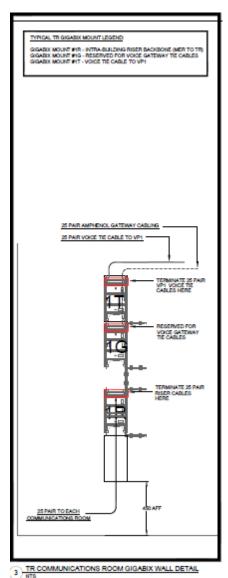
Page 122 of 154





1 MAIN ENTRANCE FACILITY

2 MAIN EQUIPMENT ROOM



- GigaBIX Distribution for Voice Tie Cables .3
  - Install patch panels in data rack as per CSTD -10 series drawings. Label front of voice tie patch panel as VP1, VP2, etc.
  - .2 Provide minimum 2x25 pair per rack or as specified from the rack Voice Tie Distribution panel to GigaBIX wall mount.
  - .3 Terminate all 25 pairs on GigaBix 25-pair connector. Terminate the other end on the rack-mount 24-port patch panel on discreet RJ45 jacks. Terminate 1 pair per port, pins 4 and 5. Terminate pair #24 and pair #25 on port #24 (pins 4 and 5, and pins 3 and 6).
- .4 Cross connects
  - At the Main Cross-connect, provide one 1-pair cross connect to length from the equipment field to the backbone field based on the records from the TR cross connections.
  - .2 Utilize the horizontal and vertical management components to properly route the cross connect wire.

**PHSA** April 1st, 2025

Page 124 of 154

- .5 Splices in cross connect wire are prohibited.
- .6 Rack-mount Phone System
  - Where there's a rack-mount phone system, it shall be installed and tied with several 25-pair Category 3 Amphenol cables to the GigaBIX wall to access the voice backbone cables. The Amphenol connector end of the cable shall be terminated on each phone media gateway. The other loose end of the cable shall be terminated on GigaBIX 25-pair connector on a new column of GigaBIX blocks positioned in sequence to the last column for the regular voice tie cables. The termination area of the voice tie cables shall be on the upper half of the GigaBIX wall.

**END OF SECTION 27 13 13** 

Page 125 of 154

#### 27 13 23 COMMUNICATIONS FIBER BACKBONE CABLING

#### **NETWORK CORE REQUIREMENT**

A requirement to clarify intention regarding the single-mode fibre topology described within the cabling specification. The intended design for single mode backbone cabling is to have no passive patch points between the two locations of active equipment, they create extra points of documentation, failure, troubleshooting, as well as consume more space. For any transitions from intra-building SM fibre to interbuilding SM fibre 1:1 fusion splicing is expected, no passive patching environments. The end point locations for the purposes of single-mode fibre are: The telecommunications room, entrance facility, or other defined IT spaces requiring single-mode fibre and the Main Equipment Room(s) that contain the active network equipment. For campuses with more than 2 Main Equipment Rooms please engage the Network Core resource assigned to the project to confirm the required destinations. Full path diversity is to be maintained as defined in the specifications.

# PART 1 GENERAL

#### 1.1 SUMMARY

- .1 Summary
- .2 Related Sections
- .3 List of terms as used in this specification
- .4 Communications Fiber Backbone Cabling

# 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.
  - .2 Section 27 01 10 Basic Requirements
  - .3 Section 27 08 11.01 Fiber Optic Testing
  - .4 Section 27 11 00 Communication Room Fittings
  - .5 Section 27 16 00 Connecting Cords, Devices and Adaptors

# 1.3 LIST OF TERMS AS USED IN THIS SPECIFICATION

- .1 In addition, define the following list of terms as used in this specification as follows:
  - .1 "MM": Multimode (Fiber type OM5 or better).
  - .2 "OFNP": Optical Fiber Non-conductive, plenum rated.
  - .3 "OFNR": Optical Fiber Non-conductive, riser rated.
  - .4 "OFCP": Optical Fiber Conductive, plenum rated.
  - .5 "OFCR": Optical Fiber Conductive, riser rated.
  - .6 "PVC": PolyVinyl Chloride.
  - .7 "SM": Singlemode (fiber type OS2 or better).

# 1.4 APPLICATION DRIVE DISTANCE

.1 Application drive distance assurance must be completed at the design draft phase based on Manufacturer channel attenuation tables.

Page 126 of 154

#### PART 2 PRODUCTS

# 2.1 FIBER BACKBONE CABLING

- .1 Fiber Optic Intra-building (Indoor) Backbone Cables (Refer to Standard Drawing C-STD in 27 00 00.01)
  - .1 Intra-building Backbone (SM)
    - .1 Transmission requirements shall meet or exceed all applicable requirements of TIA-568-C.3 & C.3.1 Specifications:
      - .1 OS2 SM distribution fiber, tight buffer, all dielectric.
      - .2 Shall be FT6 CMP plenum-rated (OFNP/OFCP) or FT4 CMR riser rated (OFNR/OFCR) as required by the AHJ.
      - .3 Cables shall be mechanically protected along their entire length using interlocking armoured cable.
  - .2 Intra-building Backbone (MM)
    - .1 OM5 laser optimized Multimode distribution fiber, tight buffer, all dielectric.
    - .2 Shall be FT6 CMP plenum-rated (OFNP/OFCP) or FT4 CMR riser rated (OFNR/OFCR) as required by the AHJ.
    - .3 The fiber shall support 10 GIGABIT ETHERNET @ 400 meters. Operating at wavelength of 850 nm, it shall have maximum attenuation of 3.0dB/km for tight buffered fiber, and effective Modal Bandwidth of 4700 MHz/km.
    - .4 Cables shall be mechanically protected along their entire length using interlocking armoured cable.
  - .3 Fiber Backbone Count (MM/SM) Network Core Requirement
    - Primary and secondary Fiber backbone cables consisting of OM5 multi mode and or OS2 single mode optical cables shall be installed through physically diverse paths with minimum 20-meter separation from two separate intermediate cross-connect rooms to each TR of the same building. One of the intermediate cross-connect shall be located in the MER, and the other intermediate cross-connect shall be located in a TR. Minimum strand count per cable shall be 24. Termination type shall be LC. For community sites, contact the PHSA Network Edge and Network Core Representatives to determine specific requirements as it relates to intra-building fiber type, strand count and diversity requirements.
    - .2 Fiber strand count shall be provided by PHSA.
- .2 Fiber Optic Inter-building Backbone Cables
  - .1 Acute Site
    - .1 Inter-building Backbone (SM)
      - 1 Transmission requirements shall meet or exceed all applicable requirements of TIA-568-C.3 & C.3.1 Specifications:
        - .1 OS2 SM OSP fiber, indoor/outdoor, OFCP/OFCR (as required by the AHJ), all dielectric c/w yellow overall jacket and inner cable jacket
        - .2 The fiber shall support 100 GIGABIT ETHERNET (100GBASE-LR4). It shall have maximum attenuation of 0.5 dB/km at 1310 nm and 0.5 dB/km at 1550 nm wavelengths.
        - .3 Cables shall be interlocking armoured type.
    - .2 Inter-building Backbone (MM)
      - .1 OM5 laser optimized Multimode OSP fiber, indoor/outdoor, OFCP/OFCR (as required by the AHJ), all dielectric.

Page 127 of 154

- .2 The fiber shall support 10 GIGABIT ETHERNET (10G BASE-SR) @ 400 meters. Operating at wavelength of 850 nm, it shall have an effective Modal Bandwidth of 4700 MHz/km.
- .3 Cables shall be interlocking armoured type.
- .3 Fiber Backbone Count (MM/SM) Network Core Requirement
  - .1 Primary and secondary Fiber backbone cables consisting of OM5 multi mode and or OS2 single mode optical cables shall be installed from two separate intermediate cross-connect rooms of each building to Network Core A MER (primary fiber) and Network Core B MER (secondary fiber). Termination type shall be LC.
    - .1 Fusion splice OS2 in the two intermediate cross-connect rooms of each building straight through to Network Core A MER and Network Core B MER. One of the intermediate cross-connect shall be located in the MER, and the other intermediate cross-connect shall be located in a TR of the same building.
    - .2 Terminate OM5 in the two intermediate cross-connect rooms of each building. One of the intermediate cross-connect shall be located in the MER, and the other intermediate cross-connect shall be located in a TR of the same building.
  - .2 Primary and secondary Fiber backbone cables consisting of OM5 multi mode and or OS2 single mode optical cables shall be installed through physically diverse paths with minimum 20-meter separation from two separate intermediate cross-connect rooms in each building to Network Core A MER and Network Core B MER.
- .4 Network Core Fiber Backbone Count (MM/SM) Network Core Requirement
  - .1 Primary and secondary Fiber backbone cables consisting of OM5 multi mode and or OS2 single mode optical cables shall be installed from Network Core A MER (primary fiber) to Network Core B MER (secondary fiber). Minimum strand count per cable shall be 24. Termination type shall be LC.
  - .2 Primary and secondary Fiber backbone cables consisting of OM5 multi mode and or OS2 single mode optical cables shall be installed through physically diverse paths with minimum 20-meter separation from Network Core A MER to Network Core B MER.
- .5 Final fiber strand count shall be provided by PHSA Network Core Provincial Manager or Representative during design phase.

# .2 Community Site

.1 Contact the PHSA Network Edge and Network Core Representatives to determine specific requirements as it relates to inter-building fiber type, strand count and diversity requirements.

# 2.2 FIBER OPTIC CABLE CONSTRUCTION

- .1 Application:
  - Cable shall be suitable for indoor and or indoor/outdoor installation between buildings, floors, in vertical riser system, under access flooring, and through overhead ceiling space (in basket cable tray, conduit, and/or inner duct).
  - .2 Optical transmission performance shall not be significantly affected by environmental fluctuations, installation, or aging.
- .2 Singlemode fiber strands shall meet or exceed the following geometry criteria:
  - .1 Core diameter = 8.3 um.
  - .2 Mode field diameter = 8.8 um, +/- 0.5 um.

Page 128 of 154

- .3 Cladding diameter = 125 um, +/- 1.0 um.
- .4 Core/Cladding Concentricity = <0.8 um.
- .5 Minimum Tensile Strength = 100,000 psi.
- .3 Singlemode fiber strands shall meet or exceed the following performance criteria:
  - .1 Attenuation = 0.7 dB/km at 1310 nm and 0.7 dB/km at 1550 nm wavelengths, maximum.
  - .2 Cutoff wavelength = 1260 nm.
  - .3 Dispersion = 3.5 pa/nm km at 1550 nm.
- .4 Primary Coating:
  - .1 Each fiber shall be completely covered with a "primary coating" (acrylate material).
  - .2 Coating diameter = 250 um, +/- 5um.
- .5 Buffering
  - 11 Each coated fiber shall be fully covered with a material extruded over and directly onto the coating. This shall be the tight buffer. Tight buffer diameter = 900um, +/- 5 um. Material = PVC, or equivalent flame retardant thermoplastic.
  - .2 Buffered strands shall be individually color-coded to meet the requirements of ANSI/TIA-598-A-1995. (Also, ref. ANSI/ICEA S-83-596-1994, and TIA-230)
- .6 Interlocking Armour:
  - .1 Strength Element: The cable shall have an internal strength element such as aramid yarn (e.g. Kevlar).
  - .2 Inner Jacket: The cable shall have a seamless inner jacket material (plenum rated thermoplastic) applied to and completely covering the internal components (fiber strands, strength element, other).
  - .3 Armour: The cable shall have an interlocking metallic armour applied spirally and longitudinally to and completely covering the cable.
  - .4 Outer Jacket: The cable shall have a seamless outer jacket material (FT4 or FT6 plenum rated thermoplastic) applied to and completely covering the armour.
  - .5 Tensile Strength: The cable shall have a 150 lb, minimum, rated load.
  - .6 Colours for armoured cables:
    - .1 OM5 Colour: The following colours shall be used on OM5 (inner/outer interlocking armoured jacket) and for inner duct containing OM5 without
    - .2 exception to differentiate from Violet-coloured OM4 and Aqua-coloured OM3
      - .1 Commscope Lime Green;
      - .2 Belden Lime Green.
    - .3 OS2 Colours: The following colours shall be used on OS2 (inner/outer interlocking armoured jacket):
      - .1 Commscope Yellow stripe;
      - .2 Belden Yellow.
      - .3 Yellow inner duct containing OS2 shall be used without exception.
  - .7 Inner Duct colour
    - .1 Lime Green shall be used for inner duct containing OM5 without exception.
    - .2 Yellow shall be used for inner duct containing singlemode cable without exception.
  - .8 Rigid inner duct size:
    - .1 Minimum size is 25mm (1 inch)
    - .2 FT4 or FT6 rated as required by the AHJ

# 2.3 TERMINATION EQUIPMENT

- .1 High Density Optical Fiber Patch Panels
  - .1 Patch panels for Fiber Optic cabling shall be Commscope or Belden newest released high density 1U modular unit. If additional capacity is required substitute with newest released 4U panels.

Page 129 of 154

- .2 Patch panels are to come complete with cover, LC connectors, and all other components required to terminate, splice, store and identify the fiber
- .3 1U Fiber Optic patch panels shall be capable of supporting a density of 144 LC connectors and accept MPO/LC/Splice cassettes.
  - .1 Equip with 24-fiber or 36-fiber Duplex LC adapters
  - .2 Equip with 24-fiber or 36-fiber Duplex LC MPO adapters
- .4 If wall mount unit is required due to rack or equipment mounting restrictions then Commscope or Belden wall mount enclosure/panel shall be used.
- .5 Provide splice cassette type terrmination hardware for all fiber connectivity.

# 2.4 CONNECTORS

- .1 Multimode / Singlemode Fiber Optic Connectors LC Type.
  - .1 Materials:
    - .1 Ferrule: ceramic (zirconia or alumina) with pre-radiuses finish/face.
    - .2 Connector housing: plastic.
    - .3 Connector shall meet or exceed Ultra PC performance (LC-UPC).
    - .4 Connector shall have an integral strain relief feature, including a bend limiting rear boot.
    - .5 Connector shall be installable via fusion splice connector for multimode.
    - .6 Connector shall be installable via fusion spliced pigtails for singlemode.
- .2 Different connectors may need to be applied to tie cables in order to extend Carrier services to the MER. Consult with the Communications Consultant and or the PHSA NE Representative regarding the termination requirements for Carrier services.

# 2.5 FIBER MANAGEMENT COMPONENTS

- .1 Polygon Fiber Slack Storage Reel
  - .1 Fiber slack storage reel for supporting of fiber optic service loops at both ends.
  - .2 For INSIDE Fiber backbone cabling, one 305mm reel per cable (part number 8900-1).
  - .3 For OUTSIDE plant Fiber backbone cabling, one 610mm reel per cable (part number 8900-24).
  - .4 Refer to C-STD Drawings in 27.00.00.01 for the mounting method for slack storage reel.
- .2 Velcro Cable Ties
  - .1 Width: 19mm (0.75")

#### PART 3 EXECUTION

# 3.1 INSTALLATION

- .1 Fiber Optic Installation
  - All fiber optic cable system work completed by the Contractor must meet quality approval as stipulated by the Communications Consultant and or the PHSA NE Representative. The following requirements must be met to gain system acceptance.
    - .1 Run the cable along the route identified on the plan drawings
    - .2 Install materials and equipment in accordance with applicable standards, codes, requirements and recommendations of national, provincial and local authorities having jurisdiction and with manufacturer's printed instructions.

Page 130 of 154

- .3 Adhere to manufacturers' published specifications for pulling tension, minimum bend radii and sidewall pressure when installing cables.
- .4 Any scoring or pitting within the fiber core (regardless of test result) shall result in re-termination by the Contractor using a new connector. Any retermination shall be done at no cost to the Owner.
- .5 Provide 7.62 meters of fiber optic cable slack at both ends of all cables.
- .6 Fiber optic cable slack is required for all fiber cable installs, whether it is a tie cable between racks within the same room or a backbone cable between rooms.
- .7 All single-mode fiber shall be fusion spliced utilizing 900 micron pigtails supplied by the Contractor. The fusion splicer used must be fully automated with full X and Y alignment and shall employ fusion splice loss estimation. Fiber splice protection shall be via 3M heat shrink sleeves. Any splice as estimated by the splicing equipment must not exceed 0.03 dB. If test results show attenuation out of specification limits then the Contractor is responsible to troubleshoot the link and determine corrective procedures. Any re-splicing or pigtail replacement shall be at no cost to the Owner.
- .8 No manual fusion splicing shall be performed.
- .9 Fiber cable preparation, pigtail routing, and forming within the splice or distribution panel shall be as per manufacturer's training and printed instructions.
- .10 Leave dust plugs on couplers to keep dust out and to block lazer light if active gear is turned on and not connected at one end.

**END OF SECTION 27 13 23** 

Page 131 of 154

#### 27 15 00 HORIZONTAL CABLING

# PART 1 GENERAL

#### 1.1 SUMMARY

- .1 Summary
- .2 Related Sections

#### 1.2 RELATED SECTIONS

- .1 This section forms part of the PHSA Communications Infrastructure Standards and Specifications and is to be read, interpreted, and coordinated with all other parts of PHSA Communications Infrastructure Standards and Specifications.
  - .1 Section 27 01 10 Basic Requirements
  - .2 Section 27 08 11.03 Horizontal Cat6 & Cat6ATesting
  - .3 Section 27 11 00 Communication Room Fittings
  - .4 Section 27 15 00 Horizontal Cabling
  - .5 Section 27 16 00 Connecting Cords, Devices and Adaptors
  - .6 Section 27 21 33 Data Communications Wireless Access Points

# PART 2 PRODUCTS

# 2.1 CATEGORY 6 HORIZONTAL CABLE

- .1 Approved cable shall be Commscope or Belden Category 6 UTP, 23AWG, 100-ohm solid copper, CMR or CMP rated as required by the AHJ. To enhance operational supportability, the two manufacturers shall not be mixed in a new or an existing building.
- .2 All horizontal cable and associated jacks, connectors, patch panels and faceplates shall be manufactured by Commscope or Belden.
- .3 Approved cable jacket colour is blue.
- .4 Refer to Appendices E.1 and E.2 for part numbers and details.
- .5 Site applications:

Project	Copper Cabling	Commscope Product	Belden Product
	System	Line	Line
Acute Site – Renovation Project with existing CAT6 MER/TR	Category 6	Uniprise CS37	2400 series
Community Site – New Construction Project	Category 6	Uniprise CS37	2400 series
Community Site – Renovation Project	Category 6	Uniprise CS37	2400 series

# 2.2 CATEGORY 6A HORIZONTAL CABLE

.1 Approved cable shall be the latest Commscope or Belden Category 6A, UTP, 23AWG, 100-ohm solid copper, CMR or CMP rated as required by the AHJ. To enhance

Page 132 of 154

- operational supportability, the two manufacturers shall not be mixed in a new or an existing building.
- .2 All horizontal cable and associated jacks, connectors, patch panels and faceplates shall be manufactured by Commscope or Belden.
- .3 Approved cable jacket colour is blue.
- .4 Refer to Appendices E.1 and E.3 for part numbers and details.

.5 Site applications:

Project		Commscope Product	Belden Product
	System	Line	Line
Acute Site – New Construction Project	Category 6A	Systimax Cat. 6A	10GXS Cat. 6A
Acute Site – Renovation Project with new MER/TR	Category 6A	Systimax Cat. 6A	10GXS Cat. 6A
Wireless Access Points Wiring	Category 6A	Systimax Cat. 6A	10GXS Cat. 6A

#### 2.3 COMMUNICATIONS CONNECTORS

- .1 Jacks shall be of the latest and most reliable termination modules.
- .2 Category 6 and Category 6A UTP connectors shall be 8-pin modular jacks (RJ-45-style) terminated in T568A Wire Map configuration. The Jacks must accept RJ-45 modular plugs without causing any damage or degradation to the connectors or pins.
- .3 Approved colour for 8-pin modular jacks is black.

# PART 3 EXECUTION

# 3.1 OVERVIEW

- .1 The horizontal configuration shall be a star structure with separate dedicated continuous cables run from the servicing zone Communications Rooms to the outlets on the same floor.
- .2 The maximum length of horizontal cable shall not exceed 80 m.
- .3 Where there is more than one Communications room on the same floor, Communications boundary lines shall be established so that horizontal cables shall not cross the lines to another zone to be served by another Communications room.
- .4 In a Communications Room, horizontal cables shall be bundled separately from Inter and Intra backbone cables.
- .5 All horizontal cables shall be terminated at both ends. CMR-CMP rated Velcro straps shall be used to support the cables depending on location. The straps shall be loosely tightened in such a manner that it can slide around cable bundle.
- .6 The use of Consolidation Points shall not be allowed.
- .7 Each cable shall be terminated at workstation outlets on eight-position modular jacks with pin/pair assignment wired to T568A.
- .8 The Contractor shall leave minimum 300 mm slack in the cable at the outlet box following termination. Too much slack at the point of termination may result in testing failures and too little slack can compromise future maintenance.
- .9 The Contractor shall neatly dress all cables within the Communications room to follow building lines, the objective being to provide a reasonable amount of slack into each cable run, while at the same time provide neatness and promote order as the cables migrate from the point-of-entry to the termination point.

Page 133 of 154

- .10 The minimum allowable balanced twisted-pair cable / cord bend radius is 4 times the outside diameter of the cable / cord.
- .11 The cable pair twist must be maintained as per the Manufacturer specifications at the point of termination.
- .12 Refer to the following documents for guidelines on installation:
  - .1 Manufacturer Installation Guideline Documentation.
  - .2 TIA-568-C and C.1, as well as C-STD Drawings in 27 00 00.01 for installation.

#### 3.2 HORIZONTAL CABLE INSTALLATION

- .1 Faceplate Configuration (Reference C-STD Drawings in 27 00 00.01))
  - .1 Communications Outlet
    - .1 A standard Communications outlet shall have two 4-pair cables (Jacks 1 and 2 on a 4-port faceplate) terminated on rack mount patch panel.
    - .2 Two more 4-pair cables (Jacks 3 and 4) shall be pulled together at the same time to the 4-port faceplate on an as needed basis (cost effective).
    - .3 Jack 1, Jack 2, Jack 3 and Jack 4 can be used for any application (PC/VOIP/data services, analogue, PBX, business lines, ADSL, fax, alarm, security, access control, elevator, etc.).
- .2 All UTP cable system work completed by the Contractor must be inspected by the Communications Consultant and or the PHSA NE Representative.
- .3 Install materials in accordance with applicable standards, codes, requirements and recommendations of national, provincial and local authorities having jurisdiction and with manufacturer printed instructions.
- .4 Adhere to manufacturer published specifications for pulling tension, minimum bend radii and sidewall pressure when installing cables.
- When installing, ensure cable is not subjected to stress due to contact with tray/conduit support mechanisms, bonding lugs or any metal burrs within the support structure. Particular care must be taken when working around corners and offsets. Pulling lubrication must be used at all times to ensure a stress-free installation.
- .6 Cable dressing and termination procedures shall confirm to the following requirements:
  - When cables are pulled in and the area is not ready for termination, do not leave cables hanging off cable tray unsupported. They shall be bundled together and hung from a Velcro tie fixed to the wall at high level, or lifted back up onto the tray.
  - .2 All cable installation shall be done in a neat and tidy fashion. All cable dressing within the EF, MER and TR shall follow building lines.
  - .3 Within the Communications rooms, for Category 6, provide one Velcro tie every 600mm (24"). For Category 6A, provide one Velcro tie every 300mm (12").
  - .4 Different cable types shall not be bundled together.
  - Cable shall be neatly dressed with no crossovers within the bundle. The Communications Consultant and or the PHSA NE Representative shall have final approval of cable dressing quality and any workmanship issues. Bundles shall be dressed using Velcro fasteners. Cables must not exhibit sheath deformation due to poor installation or bundle over-tightening. If cable dressing is not performed to the satisfaction of the Communications Consultant and or the PHSA NE Representative, the Contractor shall be responsible to re-install or re-dress the bundles at no cost to the Owner. Termination practices must strictly comply with manufacturer recommendations and all referenced wiring installation standards. Particular care must be taken to limit sheath removal length and pair untwisting at point of termination. For Category 6 and Category 6A, the twist should appear within 6.5 mm of pair termination on the connector.
  - .6 Cables shall be terminated in sequential order.

Page 134 of 154

- .7 At each Communications outlet follow the same termination practices as stipulated for the Communications Room.
- .8 In Communications Rooms, horizontal cables shall be bundled and terminated on patch panels. Refer to C-STD Drawings in 27 00 00.01.
- .9 In existing buildings where the GigaBix method of termination is used and shall be maintained for horizontal cabling, the use of patch panels is not permitted.
- .10 Horizontal distribution cables shall be loosely bundled in no more than 48 cables.
- .11 Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.
- .12 All cables shall be terminated in Communications Rooms and at Communications outlets. Leave no cables un-terminated unless specified in T drawings or as directed by the Communications Consultant and or the PHSA NE Representative.
- .7 Patch Cables (within the Rack)
  - Only 310mm (12") standard patch cable (based Grey) shall be used to patch between the panel jacks and the switch ports.
  - .2 Where clinical and vendor equipment resides near the bottom of the rack (provided rack space is available below the switch cluster) for patching to the horizontal cables that connect to their end devices, longer patch cables shall be used to route neatly through the horizontal and vertical cable managers based on shortest path.
- .8 Patch Cable Lengths
  - 1 Patch cables for data switches shall be 310mm (12") long (within the same rack). Category 6A and Category 6 cords must be 28AWG small diameter type.
  - .2 Patch cables for analog services, clinical and vendor equipment typically range from 914mm (3'), 152mm (5'), to 1828mm (7') (within the same rack).
  - .3 Patch cables for all workstations shall be 3m (10') long.
  - .4 Patch cables for wireless access points shall be 7.6m (25') long.
- .9 Harness Cables, Cross Connect Cables and Patch Cords
  - .1 In existing buildings where Category 6 horizontal cable is being installed and the GigaBIX method of termination is used, the Contractor shall install harness cables and cross connects.
  - .2 Harness cables shall be maintained for horizontal cabling. Harness Cables are installed from the GigaBIX cross-connect in the Communications Room to the Owner's equipment installed on the racks and bundled per individual switch in groups of 48 and breakout into bundles of 24 for accessing the switch from the left and right vertical cable management channels. Where there are 24 port switches, the harness cables shall be bundled in groups of 24 and breakout into bundles of 12 for accessing the switch from the left and right vertical cable management channels. Cable tie bar for supporting the harness cables shall be 150 mm (6") deep.
  - .3 The harness cables shall be 4-pair Category 6 of the same colour and shall meet the requirements of TIA 568-C.
  - .4 For Acute site, the quantity of harness cables to be supplied shall be equal to 100% of the total quantity of horizontal data cables installed raised to the next increment of 48. For example, if 100 horizontal data cables are installed then 100 harness cables raised to the next increment of 48 shall require 144 harness cables.
  - .5 For Community sites, the quantity of harness cables to be supplied shall be equal to the number of horizontal data and spare cables installed raised to the next increment of 48. The harness cables shall be all the same colour. One end of the patch cord shall have an 8 Position Modular Plug (RJ45 plug) with a boot installed. The other end shall be terminated on the GigaBIX wall.
  - .6 Copper harness cables shall be provided as part of the structured cabling system.

Page 135 of 154

- .7 If the Owner does not supply the rack mount equipment during cable installation, the cabling contractor is to coordinate with the Communications Consultant and or the PHSA NE Representative regarding the placement of the harness cables on the rack.
- .8 Data cross-connect jumpers shall be GigaBIX Cross-Connect Category 6 jumper wires or better.
- .9 The installation of the data jumper wire is part of this scope of work.

  Painting over any Communications cabling is strictly prohibited as it alters the flame and smoke characteristics of the cables. Painting over them obscures the flame-rating designations which are required to be printed on the jacket. Communications cable jackets and insulation are porous which allows water and other chemicals to penetrate the cable. In time the jacket and insulation can become brittle and break while the copper becomes corroded causing shorts and impacting cable performance. It voids the Manufacturer's system application and performance warranties that are mandatory to gain Owner acceptance. The remediation is to remove and replace all affected cables and connectivity. The new cable channels must be installed and commissioned by PHSA prequalified cabling contractor for the replacement cable channels to qualify for the Manufacturer Certification Warranty.
- .11 Mission Critical Equipment Cabling Termination New Construction
  - .1 Redundancy and Reliability: To mitigate the risk of single points of failure, ensure that all Mission Critical Equipment (MCE) connections are evenly distributed across available racks and switch stacks. Utilize both vertical and horizontal cable managers to organize patch cords effectively, ensuring proper dressing.
  - .2 Coordination: The IMIT Project Manager and/or TPM, in collaboration with clinicians, shall identify the location of all MCE outlets. This information should be incorporated into the design drawings by the RCDD Designer.
  - dentification: The Division 27 Contractor shall mark MCE jacks with a red manufacturer icon (CommScope 760164434 | H61K-ICON-RD or Belden AX104632-RD) at both ends of the cable run. For jacks that cannot accommodate an icon, a red sticker shall be used instead.



CommScope 760164434 | H61K-ICON-RD, Red



Belden RVUICRD-B24. Red

- .4 Patch Cords: Use appropriately sized patch cords for optimal connection length within the racks.
- .5 Vendor-Managed Systems: Vendor-managed systems are exempt from these requirements.

# 3.3 ACCESSIBILITY

- .1 Install all work in a manner that allows easy access for adjustment, operation and maintenance. Provide access panels where required to allow access to junction boxes and devices for maintenance purpose.
- .2 Locate access panels in service areas wherever possible. Do not locate in finished walls.

# 3.4 MISCELLANEOUS CABLES

Page 136 of 154

.1 PHSA does not accept hybrid or under-carpet cabling.

# 3.5 LIGHTNING PROTECTION

- .1 Surge protection must be utilized when a device connected to the network is located outside the cone of protection; in these applications, the Contractor must provide surge protection at both ends. Two surge protectors are required to protect both source and device.
- .2 Primary Protectors for PoE equipment installed inside Communications Rooms:
  - .1 DITEK's DTK-110RJC6APOE is a 4-Pair CAT6A surge protective device (SPD) that provides maximum protection to PoE circuits transmitting video and data over CAT5e, CAT6 or CAT6A cable with 110 block In / RJ45 Out connection.
  - .2 Provide the DITEK's surge protector on each horizontal cable run entering the building. See picture below. Backward compatible with Category 6 cables.
  - .3 Provide a #6 AWG Green Insulated Bonding Conductor from the Telecommunications Grounding Bus bar, to the communication room end surge protector.
  - .4 Daisy Chain the #6 ground between each horizontal cable Surge Protector.
  - Provide a #6 ground connection to the device end of each cable, and connect the #6 ground to the nearest earth ground.
    - .1 The Contractor must install a ground rod in applications where an earth-ground connection does not exist.
  - .6 Bond the metallic conduit used for running the horizontal 4-pair cables.
  - .7 Surge Protector Installation is based on current CEC Code Section 60 and EIA/TIA 607-D-2019.

# DTK's Cat6A 10 Gbps Network Surge Protector



**END OF SECTION 27 15 00** 

#### 27 15 00.01 MODULAR FURNITURE

# PART 1 GENERAL

# 1.1 SUMMARY

- .1 Summary
- .2 Related Sections
- .3 Overview

#### 1.2 RELATED SECTIONS

- .1 This section forms part of the PHSA Communications Infrastructure Standards and Specifications and is to be read, interpreted, and coordinated with all other parts of PHSA Communications Infrastructure Standards and Specifications.
  - .1 Section 27 01 10 Basic Requirements
  - .2 Section 27 15 00 Horizontal Cabling
  - .3 Section 27 16 00 Connecting Cords. Devices and Adaptors

# 1.3 OVERVIEW

.1 Unless specified otherwise, modular furniture system and custom millwork shall be designed to Commercial Building Standard for Telecommunications Pathways and Spaces, TIA-569-D. This defines the furniture pathways and spaces contained in work areas.

# PART 2 PRODUCTS

# 2.1 FURNITURE PRODUCT

- .1 The modular furniture system and custom millwork must be functional, flexible, durable, replaceable and proven for cable infrastructure.
- .2 The quality of the Communications cutouts shall be robust in design to hold the Communications faceplate firmly in place to prevent it from being knocked out easily.
- .3 Belden and Commscope standard compliant modular furniture faceplates are specified to be used.
- .4 The Communications faceplate cutouts shall meet the following dimensions:
  - .1 Belden faceplate cutout is 69 mm x 35.5 mm.
  - 2 Commscope faceplate cutout is 67.56 mm 69.95 mm x 34.04 mm 35.56 mm.
- .5 The wiring channels (raceways) shall not have sharp / abrasive corners that can potentially damage Communications cables or power whips particularly at corners where cables make the bend.
- .6 The wiring channels shall be constructed of metal to hold the power and Communications outlets firmly in place. PVC raceway shall not be accepted.
- .7 The modular furniture shall have a versatile layout to enable a number of connected workstations in a cluster to be supported via top feed (system's pac pole), bottom feed or wall feed.
- .8 The wall panels shall be interchangeable. 610 mm or 1220 mm panels are more versatile than 914 mm or 1524 mm panels.

Page 138 of 154

.9 All custom and modular millwork furniture structured cabling wiring channels shall be sized according the BICSI standards max. 40% fill ratio after all the cabling is installed.

#### PART 3 EXECUTION

# 3.1 INSTALLATION

- .1 The maximum furniture pathway fill shall be 40%. It is calculated by dividing the sum of the cross-sectional area of all cables by the most restricted cross-sectional area of the pathway. Cable fill capacity takes into consideration that there is unusable space between cables and that cables may take independent paths.
- .2 Where the raceway is joint-used, the power system shall be isolated from the Communications system by a metallic shield within the power cable or a metallic barrier separating the two.
- .3 Where ergonomic consideration ranks high, the power and Communications cut-outs and outlets shall be located on the wiring channel above the desk.
- .4 Where any furniture is placed against the wall, it shall have a back wall clearance at the bottom 457 mm AFF to access wall mount Communications and power outlets.
- .5 Where full-height modular wall system is used, and Communications outlet is installed on the wall, a 27mm emt conduit or two 19mm emt conduits, straight-run through the modular wall cavity into the Communications outlet box, is acceptable provided the following conditions are met:
  - .1 The box shall be 103mm square, 54mm deep complete with a single-gang mud ring to receive a single gang Commscope or Belden 4-port modular furniture faceplate only, without any modification.
  - .2 Preplanning of Communications outlet locations is required by adding outlet box with blank faceplate, and conduit stubbed up in the ceiling space everywhere an outlet is anticipated to be required, and only cable those outlets that are currently needed.
  - .3 The conduit stubbed up in the ceiling space shall connect to the conduit extending from the cable tray with the appropriate fitting or pull box.
  - .4 Leave a mule tape in the conduit after installation of the cables, and tie off both ends of the tape.
- .6 Where full-height modular wall is used to conceal vertical pathway (conduit or raceway) that feeds a cluster of half-height modular furniture, the pathway shall be sized based on 40% cable fill ratio and where there are zero bends in the pathway.
  - .1 Where there are two 90° bends or less, the cable fill ratio shall not exceed 28%.
  - .2 The outlet box and or faceplate at the bottom of the wall, and the fitting at the top that connects to the conduit from the cable tray, shall be appropriately sized to suit the pathway size.
  - .3 The backbone pathway running along the length of the cluster of modular furniture, shall likewise be sized according to the same fill ratio requirements.

**END OF SECTION 27 15 00.01** 

Page 139 of 154

# 27 16 00 CONNECTING CORDS, DEVICES AND ADAPTORS

#### PART 1 GENERAL

# 1.1 SUMMARY

.1 This section describes any cords, cross-connect wire, devices, and adapters required to connect the OSP, riser, and horizontal cabling as called for in these specifications and related drawings.

# 1.2 RELATED SECTIONS

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other sections of these specifications.
  - .1 Section 27 05 00 Common Works for Communications Systems
  - .2 Section 27 11 00 Communications Room Fittings
  - .3 Section 27 13 13 Copper Backbone Systems
  - .4 Section 27 13 23 Fiber Backbone Systems
  - .5 Section 27 15 00 Horizontal Cabling
  - .6 Section 27 21 33 Data Communications Wireless Access Points

# 1.3 COPPER AND FIBER PATCH CORDS

- .1 Division 27 Contractor shall identify the quantity of Category 6A patch cords for Wi-Fi and RTLS systems, and the quantity of Singlemode and Multimode patch cords.
  - All Category 6A patch cords used in Communications Rooms will be 28 AWG stranded with an outer diameter less than or equal to 4.72 mm (0.186 inches).
  - .2 All Category 6 patch cords used in Communications Rooms will be will be 28 AWG stranded with an outer diameter less than or equal to 3.83 mm (0.15 inches).
  - .3 Supply four Category 6A patch cords for each Telecommunications Outlet associated with the Category 6A cabling Wi-Fi grid (two for the access point and two for connection to the switch in the MER or TR.
  - .4 Supply two Category 6A patch cords for each Telecommunications Outlet associated with the Category 6A cabling RTLS Wireless grid (one for the access point and one for connection to the switch in the MER or TR.
  - .5 Supply multimode and single mode patch cords required for port activation at the time when the building turns operational. The final amount and the variety of lengths of the patch cords will be provided to the Division 27 Contractor by the Authority.
- .2 The Contractor is responsible to provide as a base all patch cords (fiber, copper) and cross connect jumpers required to activate equipment (IMIT, clinical and builder provided equipment) and systems that are within the scope of the contract. This includes any patch cords and cross connect jumpers required for the integration of systems as well. Lengths shall be determined in consultation with the Authority prior to the procurement of the patch cords.

#### PART 2 PRODUCTS

Page 140 of 154

# 2.1 COMMUNICATIONS ROOM COPPER PATCH CORDS

- .1 The Contractor is responsible to provide all copper patch cords required to activate equipment and systems.
- .2 For voice analogue services, if no count of patch cords is provided during tender, a quantity equalling 25% of the total copper patch panel port count shall be provided, of which 50% shall be 2.1m (7') and the other 50% shall be 3m (10').

#### 2.2 WORK AREA COPPER CONNECTING CORDS

- In renovation projects, during project design stage and prior to tender, the Health Authority's IMIT Project Manager or Technical Project Manager shall confirm the workstation patch cord count with the Communications Consultant for stipulation into the scope of work statement. The count shall take into consideration all types of equipment and systems that require network connectivity including clinical equipment systems, security systems and FM systems as well as all forms of connected equipment. If no count of patch cords is provided during tender, a quantity equalling 10% of the total horizontal drop count shall be provided.
- .2 In new construction or redevelopment projects, the Builder is responsible to provide all workstation patch cords required to activate equipment and systems, plus 5% spare patch cords over above that if no sparing formula is stipulated.
- .3 Patch cables for all workstations shall be 3m (10') long.

# 2.3 COPPER CONNECTING CORDS FOR WIRELESS ACCESS POINTS

.1 Refer to Section 27 21 33.

# 2.4 COMMUNICATIONS ROOM FIBER PATCH CORDS

- .1 Fiber Cord –LC Duplex.
  - .1 Fiber patch cord suitable for indoor installation within a fiber patch panel.
  - .2 Cord assembled from a single, continuous length of cordage, homogenous in nature; Splices are not permitted.
  - .3 Cords terminated at both ends via specified connector type.
  - .4 Colours
    - .1 The following cable sheath colours shall be used on OM5 without exceptions to differentiate from Violet-coloured OM4 and Aqua-coloured OM3:
      - .1 Commscope Lime Green.
      - .2 Belden Lime Green.
    - .2 For singlemode patch cords, a yellow sheath colour shall be used.
  - .2 Fiber Patch Cords shall be Commscope or Belden MM/SM, LC/LC Duplex.
  - .3 Typical MM/SM patch cord lengths and quantity shall be:
    - A mixture of 1.5m (5'), 2.1 m (7'), 3m (10'), and 4.6m (15'), 6.1m (20') and shall be verified with Communications Consultant and or the PHSA NE Representative.
    - .2 Communications closet requirements: 240 horizontal copper cables require 8 fiber patch cords. Verify quantities with the PHSA NE Representative.

# 2.5 CROSS-CONNECT WIRE

.1 Where IDC blocks are used, Contractor shall supply and install cross connection wires. All voice cross connections shall be neatly routed via D-rings and bundled with Velcro wraps.

Page 141 of 154

- .2 Wires shall be 24 AWG solid tinned copper, 1-pair Category 3. Conductors shall be insulated with semi-rigid PVC. One insulated conductor in a pair shall be white and the other in visibly distinct solid colour. Pair-untwist shall not exceed 75mm from the point of termination.
- .3 The quantity of cross connection wires shall be 24 pairs per 24 port voice tie cable patch panel, plus 10% spare.

# PART 3 EXECUTION

# 3.1 DUPLEX FIBER POLARITY GUIDELINES FOR SC/LC CONNECTORS

- .1 Introduction, refer to TSB-125 Reserve Pair Positioning
  - .1 Most fiber systems today are based on transmission along fiber pairs, using one fiber for one direction of signal propagation and the other fiber for the opposite direction. When installing and maintaining these systems, it is important to make sure that the signals are kept on the correct fibers, so that the transmit-to-receive polarity is always maintained.
  - .2 Duplex crossover cords and pair-wise crossover backbone wiring greatly simplify cable administration for this type of optical fiber network. When installed correctly, these systems automatically ensure proper signal polarity, so end users do not need to worry about maintaining transmit and receive signal integrity at connection points.
- .2 General Principles
  - All duplex opto-electronic transceivers within the same application (Ethernet for example) have the same transmit and receive port positions. When looking into the ports of the transceiver with the keyways of the receptacle facing up, the transmitter is on left and the receiver on the right.
  - .2 When connecting transceivers together, the signals must cross over. The crossover connects the transmitter of one device to the receiver of the second device.
  - .3 All individual elements of a channel shall provide a crossover. Channel elements include every patch cord, every adapter (coupling), and every cable segment between patch panels.
  - .4 There are always an odd number of elements in a channel, whether the channel is made from a single patch cord or a concatenation of many cables and cords.
  - .5 The net effect of an odd number of crossovers is a single crossover.

# 3.2 PHSA PATCHING METHODOLOGY

- .1 Patch Cables (within the Rack)
  - .1 Only 310mm (12") standard patch cable (based Grey) shall be used to patch between the panel jacks and the switch ports.
  - .2 Where clinical and vendor equipment resides near the bottom of the rack (provided rack space is available below the switch cluster), for patching to the horizontal cables that connect to their end devices, longer patch cables shall be used to route neatly through the horizontal and vertical cable managers based on shortest path.
- .2 Patch Cable Lengths
  - .1 Patch cables for data switches shall be 310mm (12") long (within the same rack).
  - .2 Patch cables for analogue services, clinical and vendor equipment typically range from 914mm (3'), 152mm (5'), to 1828mm (7') (within the same rack).
  - .3 Patch cables for all workstations shall be 3m (10') long.

Page 142 of 154

.4 Patch cables for wireless access points shall be 7.6m (25') and up to 13m (42') in length.

**END OF SECTION 27 16 00** 

Page 143 of 154

#### 27 21 33 DATA COMMUNICATIONS WIRELESS ACCESS POINTS

#### PART 1 GENERAL

#### 1.1 SUMMARY

- .1 Summary
- .2 Cabling for Wireless
- .3 Wireless Installation

#### 1.2 CABLING FOR WIRELESS

- .1 TSB-162-A provides guidelines for pre-cabling a building using a grid approach. The pre-cabled grid makes the building ready for a wireless infrastructure at any time simply by plugging a wireless access point into a ceiling Communications outlet. The square cell structure helps designers determine how much cabling shall be required for the WLAN and it allows for flexibility for coverage (AP density), capacity and growth in the wireless infrastructure.
- .2 A grid is a collection of uniform cells where each cell is a square. The ceiling Communications outlet is at the centre of the cell. The size for a square shall be 10.0m x 10.0mfor seamless wireless access point coverage for both 5 Ghz frequency range and
- .3 2.4 GHz. Note: this cell size has been deemed appropriate for a Healthcare setting. For underground parking and parkades, it may be permissible to increase the cell size to 15m x 15m with approval from the PHSA NE Representative.
- The wireless grid is for the installation of horizontal cable outlets (not access points) in the ceiling at strategic locations (every 10 meters square). A wireless survey is performed after the space is populated with walls, equipment layouts and finishes (furniture) to determine where and how many wireless access points are required for the desired coverage. This cabling deployment shall ensure that when the wireless environment changes over the lifetime of the institution, there shall be a ceiling outlet available for the new or relocation wireless access point.
- .5 In large medical educational spaces with high occupancy such as classrooms, conference rooms and auditoriums, requirements for higher than average access point density to support a larger number of wireless devices may drive the need for additional outlets over and above what the 10m x 10m grid shall allow for. Refer to Table 3 in TIA PN-4966 and contact the PHSA NE Representative for specific direction.
- .6 The ceiling Communications outlet is to be located at the centre of the square cell.
  - .1 Patch cords to be provided that allow an access point to be installed anywhere within the cell.
  - .2 A ceiling Communications outlet is required for any partial cell.
- .7 To ensure contiguous and ubiquitous wireless coverage, the wireless cabling grid shall cover all areas within the deployment scope including utility spaces (mechanical, electrical, elevator machine, communication rooms), stairwells, parking levels, service links and tunnels. The wireless access point ceiling Communications outlet nearest to the perimeter of the building shall be within 5 meters of all building edges to provide a complete wireless grid coverage for the entire floor plate.
- .8 Wireless communications outlets with two Category 6A Data Drops are to be located at the centre of each square cell. Where only a portion of a square cell resides within the interior of the Facility (such as at the Facility's perimeter), a wireless communication

Page 144 of 154

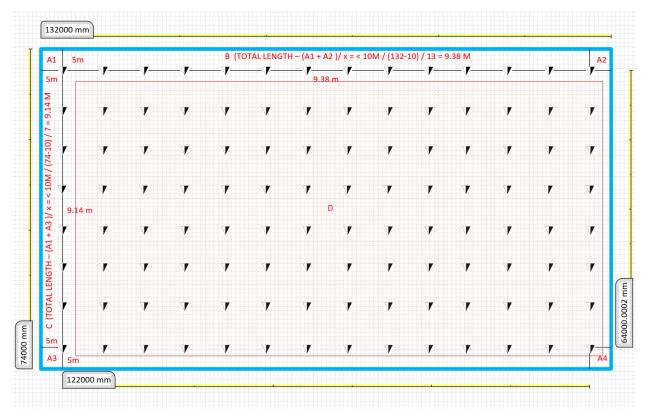
outlet with two Category 6A Data Drops shall still be provided in the interior of the Facility for that cell. Specific installation method of the communication outlet, pathways and cabling shall vary depending on the type of ceiling and location.

- .9 If required, Communication outlets shall be installed in exterior locations (lamp posts, exterior walls, etc.) so that wireless coverage can be provided outside the building. The location and quantity of exterior Communication outlets for wireless coverage shall be determined in consultation with the Communications Consultant and or the PHSA NE Representative. If the cabling length between the nearest Telecommunication Room and the exterior wireless communication outlet exceeds 80m, fiber and power shall be provided to each access point location identified by the PHSA NE Representative. In this instance, all associated equipment, power and connecting hardware shall be mounted on the wall of the Communications room. They shall not be located in network racks or cabinet. Refer to C-STD drawings in 27 00 00.01, specifically C-STD-039, drawing title Communications Media Converter Detail.
- .10 Power shall typically be delivered through the horizontal cabling.

#### 1.3 DESIGN GUIDELINE FOR A WIRELESS GRID

- .1 The guideline below is intended to assist the Design-Builder in the design of the wireless cabling grid.
- .2 When laying out the Category 6A cabling grid on each floor of the Facility, the general guidance to be followed for the Design is to:
  - .1 Place TOs in the interior of the Facility five (5) meters off of all exterior perimeter walls (See example below steps A1 thru A4);
  - .2 Divide the remaining length of each perimeter wall equally to get as close as possible to 10m between outlets without going over 10m (See example below steps B & C). Completion of this step will establish the TO spacing for the Category 6A cabling grid;
  - .3 Once the TO spacing is determined along the perimeter walls, populate the remainder of the floor area applying the same spacing to establish the Category 6A cabling grid for entire floor (see example below – step D);
  - .4 Adjust the placement of specific TOs as required to resolve accessibility issues and conflicts with architectural, structural and other design elements (examples: interior partitions, columns, shafts, elevators, large equipment (such as generators, air handlers, boilers, etc.), etc.). In areas where there are high ceilings, the Design of the Category 6A cabling grid will need to be approached differently and in consultation with the Authority; and
  - .5 Augment the Category 6A grid with additional TOs as required or as specified the Statement of Requirements.

Page 145 of 154



10m x 10m grid example: for a floor plan that is 132m x 74m

### PART 2 PRODUCT

## 2.1 SEE HORIZONTAL CABLING SECTION 27 15 00

#### PART 3 EXECUTION

### 3.1 WIRELESS INSTALLATION

- .1 PHSA is responsible for:
  - .1 The design of the facility's wireless (WIFI) network and the procurement, configuration and commissioning of all wireless and wired network hardware including access points, antennas, switches and controllers.
  - .2 The procurement, configuration and commissioning of all hardware and software related to wireless network management systems and tools.
  - .3 Providing centralized authentication and security appliances or latest equivalent to support the wireless network within the Facility.
  - .4 The procurement of all standard vendor supplied access point mounting brackets, lighting arrestors and accessories required to install wireless hardware.
  - .5 Conducting all predictive, active and passive wireless RF surveys necessary to determine access point placement and to validate and calibrate the wireless network to ensure all required technical parameters (coverage, SNR, etc.) are met.

Page 146 of 154

- .6 Identifying the mounting locations for all wireless hardware. To assist in the correct installation of wireless hardware, PHSA shall provide drawings, written instructions and or pictures detailing mounting locations and, where possible, shall also identify access point and antenna locations on site.
- .7 Labelling and supplying the wireless access points, antennas, mounting brackets and other standardized hardware based upon a mutually agreed to schedule.
- .2 In general, the responsibility of the builder, project consultants and the Division 27 Contractor in the deployment of a wireless infrastructure are as follows:
  - Furnishing PHSA with all documentation required to accurately complete a software based predictive wireless survey. This includes, but is not restricted to floor plans, reflective ceiling plans, elevations and section drawings, furniture and equipment layouts and information on building materials and finishes. The Builder and or the project consultants are required to keep the PHSA NE Representative appraised of all changes to this documentation throughout the course of constructing or renovating the Facility.
  - .2 Designing the Facility including equipment locations (e.g., microwave ovens) in a manner that does not introduce interference beyond the noise floor and impact signal strength requirements (SNR) of the wireless network. The resulting RF environment in the Facility must be consistent with the strictest specifications of the wireless end-use equipment.
  - .3 Providing PHSA and its representatives with access to the site during construction to conduct wireless RF surveys and testing.
  - .4 Supplying, installing, testing and certifying a horizontal cabling grid throughout the facility's ceiling spaces to connect wireless access points.
  - .5 Installing all access points, antennas and associated accessories and hardware as prescribed by PHSA's wireless design.
    - Wireless network hardware provided to the Contractor for the interior of the Facility shall not be installed until the building is enclosed, weather tight, temperature and humidity conditions are approximately the same as final conditions expected, wireless cabling grid is installed and tested, most construction activities are complete and surfaces have been swept and treated for dust control. The Contractor shall not be allowed to install wireless and wired network hardware until PHSA has inspected the interior building conditions and provided written approval to proceed with the installation.
    - .2 Prior to receipt of wireless network hardware and components for installation, the Contractor is required to provide PHSA with as-built documentation of the wireless cabling grid identifying the cable IDs associated with each wireless communication outlet.
    - .3 Upon receipt of wireless and wired network hardware and components, the Contractor shall be financially responsible for any damage or disappearance of PHSA provided material due to improper handling and storage, negligence, fire, theft and environmental conditions during construction.
  - Moving and or adding wireless network hardware as prescribed by PHSA after completion of pre and post occupancy wireless surveys. In addition to labour and equipment, the Contractor is required to cover all costs associated with moving access points such as replacement of ceiling tiles and the installation of sleeves through walls.
  - .7 Installing two patch cords between each access point and its designated wireless outlet as specified in PHSA's design. If required due to the ceiling type, the Contractor shall install conduit to run the patch cords between the wireless communication outlet and the access point. In the Communications Room, the

Page 147 of 154

- Contractor must also install two patch cords to connect the access point to the switch ports designated by PHSA.
- .8 Installing lightning arrestors and associated grounding on all outdoor access point locations where specified by PHSA. The Contractor shall also be required to supply and install surge protectors in Communications Rooms for each horizontal cable run entering the building.
- .9 If the mounting of wireless hardware requires the procurement of non-standard or specialty mounts, brackets, vanity skins or covers or the fabrication of custom solutions, the Contractor shall be expected to bear all associated design, fabrication, procurement and installation costs. Furthermore, if alterations in the design, fabrication and installation of components provided by others are needed to install any aspect of the wireless infrastructure then the Contractor shall be expected to bear the full cost of all such customization.
- .10 For the safety of patients and staff, the Contractor shall be required to supply, install and label ceiling (hard cap and tile) enclosures to house wireless hardware in areas of the Facility specified by the Communications Consultant and or the PHSA NE Representative. These enclosures shall hide wireless hardware from view and or prevent unauthorized access to the access point and the connecting cabling. The enclosures provided must allow RF transmissions to penetrate with little or no attenuation and match the surrounding ceiling colour. Prior to purchase of the enclosures, the Contractor shall submit shop drawings to the Communications Consultants and or the PHSA NE Representative for approval and, if required, provide samples for RF testing purposes and to check for interoperability with wireless hardware.
- .11 To protect wireless hardware from the environment, theft or vandalism, the Contractor shall be required to supply, install and label indoor/outdoor NEMA rated access point enclosures in certain areas within and outside the Facility as specified by the Communications Consultant and or the PHSA NE Representative. The enclosures must be able to protect wireless hardware from wet and dirty environments, UV stabilized for exposure to directly sunlight, virtually transparent to wireless signals, lockable and work with all variations of provided wireless hardware. Prior to purchase of the enclosures, the Contractor shall submit shop drawings to the Communications Consultants and or the NE Representative for approval and, if required, provide samples to PHSA for RF testing purposes and to check for interoperability with wireless hardware.

### 3.2 INSTALLATION (INDOOR)

- .1 Regardless of the location and mounting method of the wireless access point, <u>maximum</u> permanent link length is 80 meters.
- .2 Two horizontal cables shall be installed to each wireless Communications outlet. Terminate two horizontal cables on Belden or Commscope jack.
- .3 Mounting Scenarios for different ceiling types:
  - .1 Solid (drywall) ceiling:
    - .1 The dual horizontal cable runs are to be installed in conduit between the ceiling Communications outlet box and the nearest cable tray.
    - .2 Patch cords are to be fished across solid ceilings between the ceiling Communications outlet box and the wireless access point location.
    - .3 The standard patch cord length used to connect to the wireless access point is 25' / 7.62m. Store and support any slack length in the ceiling above the access point.
    - .4 The ceiling Communications outlet box to be mounted above ceiling for the termination of horizontal runs.

Page 148 of 154

- .1 Ceiling Communications outlet box is a 100mm x 100mm x 54mm with a 100mm x 100mm shoe box steel cover for a 4-port decora strap.
- .2 faceplate.
- .3 The ceiling Communications outlet box shall be fastened directly to the ceiling's structural support member with a Caddy clip and/or screws no more than 305mm above the access hatch opening.
- .5 An access panel (305mm x 305mm) shall be installed at the ceiling Communications outlet box location (painting is by the contractor).
- .6 Wireless access point installation (directly) to ceiling using vendor supplied mounting bracket.
- .7 All access points must be seismically restrained.
- .8 Label the wireless access point, faceplate, patch cords and the access hatch For identification requirements, refer to Section 27 05 53.
- .2 Exposed ceiling (Parkade, utility spaces, stairwells, etc.):
  - The dual horizontal cable runs are to be installed in conduit between the ceiling Communications outlet box and the nearest cable tray. If it is determined after completion of the survey that the ceiling Communications outlet box is to be used in the initial deployment, a 27mm conduit shall also be installed for the patch cords to the access point location.
  - .2 Use a standard patch cord length that closely matches to the length of the conduit between the ceiling Communications outlet box and the wireless access point. Store any slack length in the ceiling Communication outlet box and/or electrical box supporting the wireless access point.
  - .3 Ceiling Communications outlet box to be mounted to the ceiling for the termination of horizontal runs.
    - .1 Ceiling Communications outlet box is a 150mm x 150mm x 100mm with a solid cover plate. Locate a 2-port Surface jack Assembly inside the JB
  - .4 Install wireless access point to a 100mm x 100mm x 54mm electrical box using supplied mounting bracket or alternatively inside a wireless enclosure or to specialty mount as required
  - .5 All access points must be seismically restrained.
  - .6 Label the wireless access point, ceiling Communications outlet box, surface jack assembly and patch cords.
- .3 Accessible (T-bar) Ceiling:
  - .1 The dual horizontal cable runs are to be installed in conduit between the ceiling Communications outlet box and the nearest cable tray.
  - .2 Patch cords are to be fished across ceilings between the ceiling Communications outlet box and the wireless access point location.
  - .3 The standard patch cord length used to connect to the wireless access point is 25' / 7.62m. Store and support any slack length in the ceiling above the access point.
  - .4 The ceiling Communications outlet box to be mounted above ceiling for the termination of horizontal runs
    - .1 Ceiling Communications outlet box is a 100mm x 100mm x 54mm with a 100mm x 100mm shoe box steel cover for a 4-port decora strap.
    - .2 The ceiling Communications outlet box shall be fastened directly to the ceiling's structural support member with a Caddy clip
  - .5 Wireless access point installation (directly) to ceiling Main Tee using vendor supplied mounting bracket.
  - .6 All access points must be seismically restrained.
  - .7 Label the wireless access point, faceplate and patch cords and the T-bar ceiling grid. For identification requirements, refer to Section 27 05 53.

Page 149 of 154

- .4 In mounting scenarios that don't meet with the examples above, the Communications Consultant and or the PHSA NE representative is to be consulted.
- .5 Wireless Access Point Enclosures:
  - .1 In a Mental Health setting with an anti-ligature requirement, hard cap and/or tile ceiling enclosures may be required to house wireless hardware in specific areas. These enclosures shall hide wireless hardware from view and or prevent unauthorized access to the wireless access points and the connecting patch cords.
  - .2 To protect wireless hardware from the environment, theft and vandalism, NEMA rated indoor/outdoor enclosures shall be required in certain areas within and outside a facility. These enclosures shall protect wireless hardware from wet and dirty environments and shall be UV stabilized, virtually transparent to wireless signals and lockable.
  - .3 All types of wireless access point enclosures shall be supplied by the Division 27 Contractor.
- .4 Division 27 Contractor to label the exterior of the Wireless Access Point Enclosure.
   .6 At the communications room end, the wireless cabling from the same drop location shall be distributed evenly across patch panels for patching to different switches within each rack.
- .7 Two horizontal patch cords shall be plugged into each wireless outlet. The maximum length of the patch cords allowed is 7.62m (25'), The use of patch cords between the Communications outlet and the AP enables moving the AP around within the cell for specialized coverage. If a larger cell size is approved in underground parking levels and parkades, the patch cord length may be as long as 13m as specified in TSB-162-A.
- .8 The method of mounting the outlet shall suit the level of security at each location. PHSA to be consulted for security detail.
- .9 For all outdoor wireless access point installation, the applicable CEC and BC codes shall govern the location, mounting, grounding and type of service cable and enclosures used. Reference "Outdoor Cabling" in Horizontal Section.
- .10 Staircases must be included in cabling infrastructure. AP deployment shall be based on a wireless outlet per landing starting at the first landing.
- .11 Every lobby must include cabling infrastructure for AP deployment to ensure wireless coverage for the elevator cars.
- .12 The installation of reusable Nite Ize KeyRing Locker stainless steel S-Biner MicroLock with center locking lever (part number KRGSM-07-R3) shall be part of an AP installation or replacement work. Prefabricated holes in the AP and in the bracket shall line up with one another once the AP is mounted correctly. A KeyRing Locker S-Biner through these holes shall be used to secure the AP and prevent it from falling out of the bracket.
- All AP devices attached to the ceilings are to be seismically restrained as per the BC Building Code and the onsite FMO requirements. A Seismic Engineer is required to sign off on the installation including the associated assemblies and the KeyRing.

Page 150 of 154



**END OF SECTION 27 21 33** 

# 27 00 00.01 COMMUNICATIONS STANDARD - DRAWINGS

# TABLE 1 DRAWING INDEX

Drawing No.	Drawing Title	Rev.					
C-STD-001.0	Communications Pathways, Power/Security Outlets Drawing Symbols	4					
C-STD-001.1	Communications Voice-Data Outlet Drawing Symbols	4					
C-STD-001.2	Communications Voice-Data Outlet	4					
C-STD-002.0	Communications North Wall Elevation Drawing						
C-STD-002.1	Communications South Wall Elevation Drawing	4					
C-STD-002.2	Communications West Wall Elevation Drawing	4					
C-STD-002.3	Communications East Wall Elevation Drawing	4					
C-STD-003	Future - Cable Tray Dropout Detail						
C-STD-004.1-H-MER	Hospital MER Rooms Floor Plan	4					
C-STD-004.2-C-MER	Community MER Communications Room Floor Plan	4					
C-STD-004.3-C-LCC	Community Large Communications Closet Floor Plan (500m²)	4					
C-STD-004.4-C-SCC	Community Small Communications Closet Floor Plan (100m²)	4					
C-STD-004.5-H-EF	Hospital Entrance Facility (EF) Floor Plan	4					
C-STD-005.1-H-MER	Hospital MER Reflected Ceiling Plan (Typical)	4					
C-STD-005.2-C-MER	Community MER Communications Room Reflected Ceiling Plan (Typical)						
C-STD-005.3-C-LCC	Community Large Communications Closet Reflected Ceiling Plan (Typical)						
C-STD-005.4-C-SCC	Community Small Communications Closet Reflected Ceiling Plan (Typical)						
C-STD-005.5-H-EF	Hospital Entrance Facility (EF) Reflected Ceiling Plan (Typical)	4					
C-STD-006	EF, MER Room UTP Terminal (Typical)	4					
C-STD-007.1-H-TR	Hospital TR Communications Room Floor Plan (Typical)	4					
C-STD-007.2-C-TR	Community TR Communications Room Floor Plan (800m²)	4					
C-STD-008.1-H-TR	Hospital TR Communications Room Reflected Ceiling Plan (Typical)	4					
C-STD-008.2-C-TR	Community TR Communications Room Reflected Ceiling Plan (Typical)	4					
C-STD-009	TR Communications Room UTP Termination (Typical)	4					
C-STD-010.1-H-MER	Hospital MER Rack Layout (Typical)	4					
C-STD-010.2-H-TR	Hospital TR Communications Room Rack Layout (Typical)	4					
C-STD-010.3.1-C-MER	Community MER Communications Room Rack Layout (Typical)	4					
C-STD-010.4-C-TR	Community TR Communications Room Rack Layout (Typical)	4					
C-STD-010.5-C-LCC	Community Large Communications Closet Rack Layout (Typical)	4					
C-STD-010.6-C-SCC	Community Small Communications Closet Rack Layout (Typical)	4					
C-STD-011	Communications Room Grounding and Bonding (Typical)	5					

C-STD-012	Ctacked Communications Doom & Dathway in Duildings (Typical)				
	Stacked Communications Room & Pathway in Buildings (Typical)	4			
C-STD-013	Communication Zone Conduit Pathways including Acute Sites	6			
C-STD-014	Communications Demarcation for Special Services (Typical)	4			
C-STD-015.1	Future				
C-STD-015.2	Future				
C-STD-016	Communications Closet Rack, Remote Cabinet & Building Grounding	4			
C-STD-017	Communications Suspended Fluorescent Luminaire Mounting Details	4			
C-STD-018	Future				
C-STD-019	Communications Wiremold 4000 & 6000 Series Details	4			
C-STD-020	Communications Wiremold Details	4			
C-STD-021	Communications Receptacle Details	4			
C-STD-022	Future				
C-STD-023	Communications Labeling Diagram	4			
C-STD-024	Communications Typical Faceplate Labeling	4			
C-STD-025	Future				
C-STD-026	Future				
C-STD-027	Communications Cable Support Details for 4000 & 6000 Wiremold Vertical Riser	4			
C-STD-028	Communications Typical Connection Between Conduit and 4000/6000 Wiremold				
C-STD-029	Future - Communications Fiber Panel Label				
C-STD-030	Future				
C-STD-031	Communications Panduit LDP-010 Series Non Metallic Details	4			
C-STD-032	Communications Reverse Fiber Pair Positioning	4			
C-STD-033.1	Communications Typical Fire Stopping Details	4			
C-STD-033.2	Communications (HILTI) Speed Sleeve Ganging Plate CFS-SL GP 16" and 24"	4			
C-STD-033.3	Communications (HILTI) Cast-In-Place / Speed Sleeve F-A-3060 System Drawing	4			
C-STD-033.4	Communications (HILTI) Cast-In-Place / Speed Sleeve Spacing	4			
C-STD-034	Communications Intra Building Fiber Backbone Details	4			
C-STD-035	Communications Intra Building Voice Riser Multi-Pair Cable Details	4			
C-STD-036	Communications UTP 24 Port Voice (TIE) Patch Panel	4			
C-STD-037	Communications Horizontal Patch Panel	4			
C-STD-038	Communications Fiber Slack Storage Unit	4			
C-STD-039					
C-STD-040	Mobile Medical Unit Pedestal Enclosure	5			

Drawing No.	Drawing Title	Rev.
C-STD-041	Mobile Medical Unit Wall Mount Enclosure	5
C-STD-042	Hospital Boom Connection Detail – Belden Solution	6
C-STD-043	Hospital Boom Connection Detail – CommScope Solution	6

## Appendix A - PHSA Communications Standard Sample Database

- .1 HorizontaL Cable Information
- .2 Intra-building UTP Riser Cable Information
- .3 Inter-building UTP Riser Cable Information
- .4 Intra-building Fiber Riser Cable Information
- .5 Inter-building Fiber Riser Cable Information
- .6 Fiber Riser Cable Information Propel & DCX Fiber Panels

NEW CONDUIT (SIZE AS SHOWN ON DRAWING) NEW RACEWAY (SIZE AS SHOWN ON DRAWING) HORIZONTAL SLEEVE 0 VERTICAL SLEEVE EXISTING CONDUIT (SIZE AS SHOWN ON DRAWING)  $\mathbb{Z} \mathbb{Z} \mathbb{Z}$ EXISTING RACEWAY (SIZE AS SHOWN ON DRAWING) Р PULLBOX (SIZE AS SHOWN ON DRAWING)  $\left( J\right)$ JUNCTION PULLBOX FLOOR MOUNT DUPLEX RECEPTACLE  $\bigoplus$ DUPLEX RECEPTACLE 5-20R  $\bigoplus$ 4-PLEX RECEPTACLE 5-20R IJ CEILING J-HOOKS WM WIREMOLD (T)TERMINATION LOCATION CR CARD READER

## NOTE:

1. STANDARD OUTLETS LOCATED IN SURFACE RACEWAY OR MODULAR FURNITURE SHALL BE SHOWN ON THE DRAWINGS WITH ONE SINGLE SYMBOL.

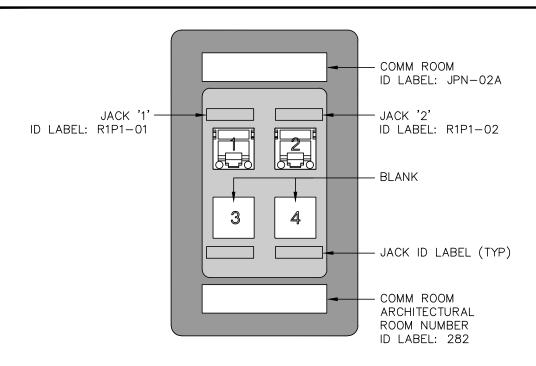
							Building/Facility Name		
No.	BY	DATE		REVISION	IS	App'd			
Scale				BY	DATE	COMMUNICATION DATIUMAYS			
Sheet No.		Drawn	СТ	08 02 22	COMMUNICATION PATHWAYS				
	of			Check'd	EG/NM	08 02 22	POWER/SECURITY OUTLETS		
Projec	t No.			Design'd	NM/EG	08 02 22	DRAWING SYMBOLS		
				Approv'd	SL	08 02 22	DIAWING STWIDGES		
15		Provin Servic	CIAL Health	and are for th	nd it's contents are e private information relied upon or used	PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)			
8	Services Authority Province-wide solutions. Better health.  Services Authority Province-wide solutions. Better health.  Province-wide solutions. Better health.						C-STD-001.0 Rev. 4		

HORIZONTAL CABLES - # DENOTES NUMBER OF DROPS 2x HORIZONTAL CABLES - WALL OUTLET ΨŽ EXISTING 2x HORIZONTAL CABLES - WALL MOUNTED OUTLET  $\langle \mathbf{V} \rangle$ 2x HORIZONTAL CABLES - FURNITURE OUTLET ⟨**Ţ**Ţ⟩ EXISTING 2x HORIZONTAL CABLES - FURNITURE OUTLET  $|\nabla|$ 2x HORIZONTAL CABLES - FLOOR OUTLET  $\Psi$ EXISTING 2x HORIZONTAL CABLES - FLOOR MOUNTED DATA OUTLET NEW 1x HORIZONTAL CABLE - WALL MOUNTED TELEPHONE PV $\mathbb{V}_{\Box}$ EXISTING 1x HORIZONTAL CABLE - WALL MOUNTED TELEPHONE  $\mathbf{V}$ 2x HORIZONTAL CABLES - CEILING MOUNTED DATA OUTLET  $\mathbf{V}$ WIRELESS ACCESS POINT CEILING OUTLET AΡ c/w 2x HORIZONTAL CABLES CAMERA: 1x HORIZONTAL CABLE - CEILING OUTLET CR CARD READER DIV.27 TO INCLUDE FOR THE INSTALLATION OF A HEALTHCARE PROVIDED ACCESS POINT AT THESE LOCATIONS AND PATCH IN THE DUAL PATCH CORDS

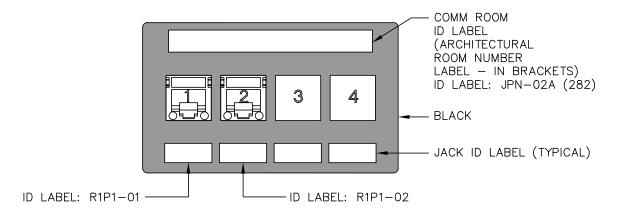
# NOTE:

- 1. THE SYMBOL FOR STANDARD OUTLETS INDICATES A COMBINATION VOICE-DATA OUTLET.
- 2. REFER TO SECTION 27 15 00 HORIZONTAL CABLING FOR UTP CATEGORY CAT.6 OR CAT.6A AS REQUIRED.

							Building/Facility Name
No.	BY	DATE		REVISION	NS	App'	
Scale				BY	DATE	COMMUNICATIONS	
Sheet No.				Drawn	СТ	08 02 2	
			of	Check'd	EG/NM	08 02 2	VOICE-DATA OUTLET
Projec	t No.			Design'd	NM/EG	08 02 2	DRAWING SYMBOLS
				Approv'd	SL	08 02 2	DIAWING STWIDGES
Provincial Health Services Authority  This drawing and it's contents are confidential, and are for the private information of the PHSA It is not to be relied upon or used in whole or in part for other purposes or by or for the benefit							PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)
4	Services Authority Province-wide solutions. Better health.  It is not to be relied upon or used in whole or in part for other purposes or by or for the benefit of others without prior adaptation and specific written verification by PHSA						File No. C-STD-001.1 Rev. 4



### EXAMPLE: 4-PORT WALL PLATE

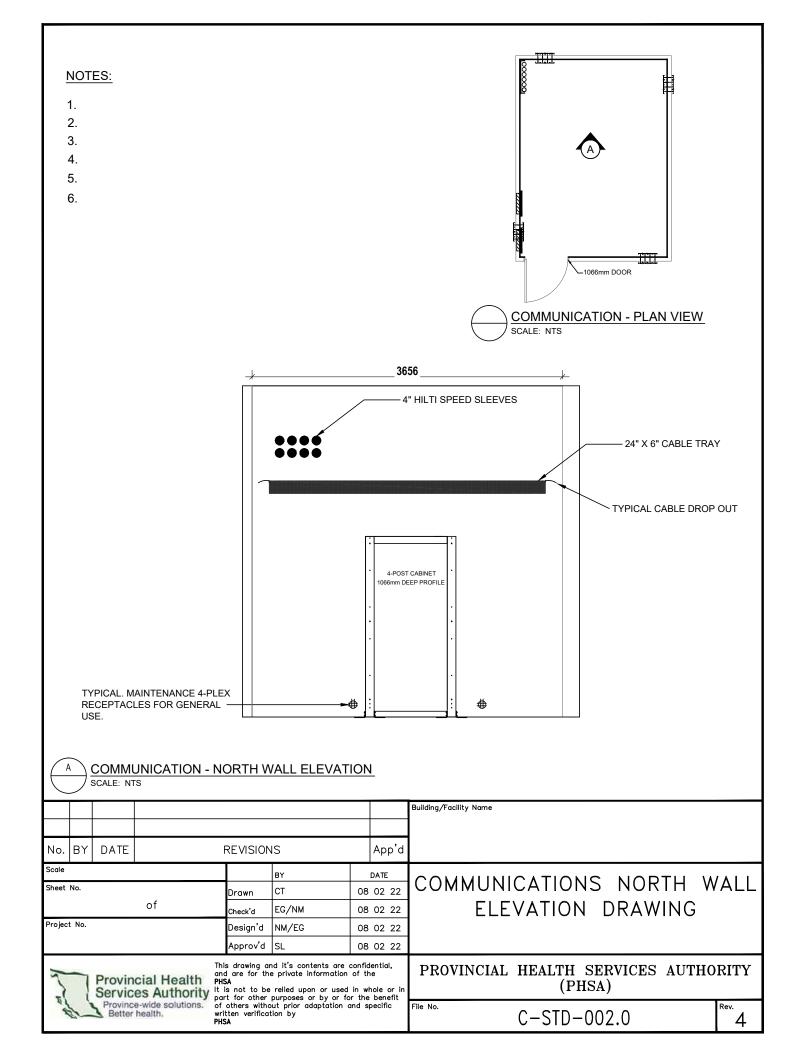


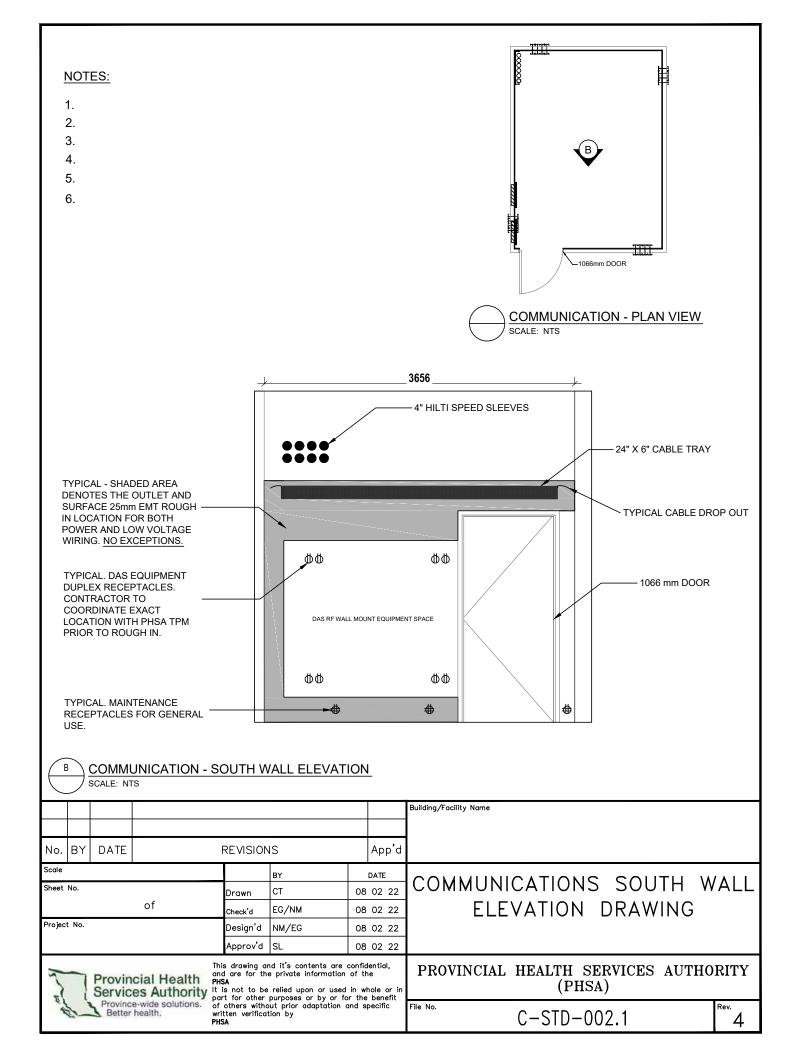
# EXAMPLE: 4-PORT FURNITURE PLATE

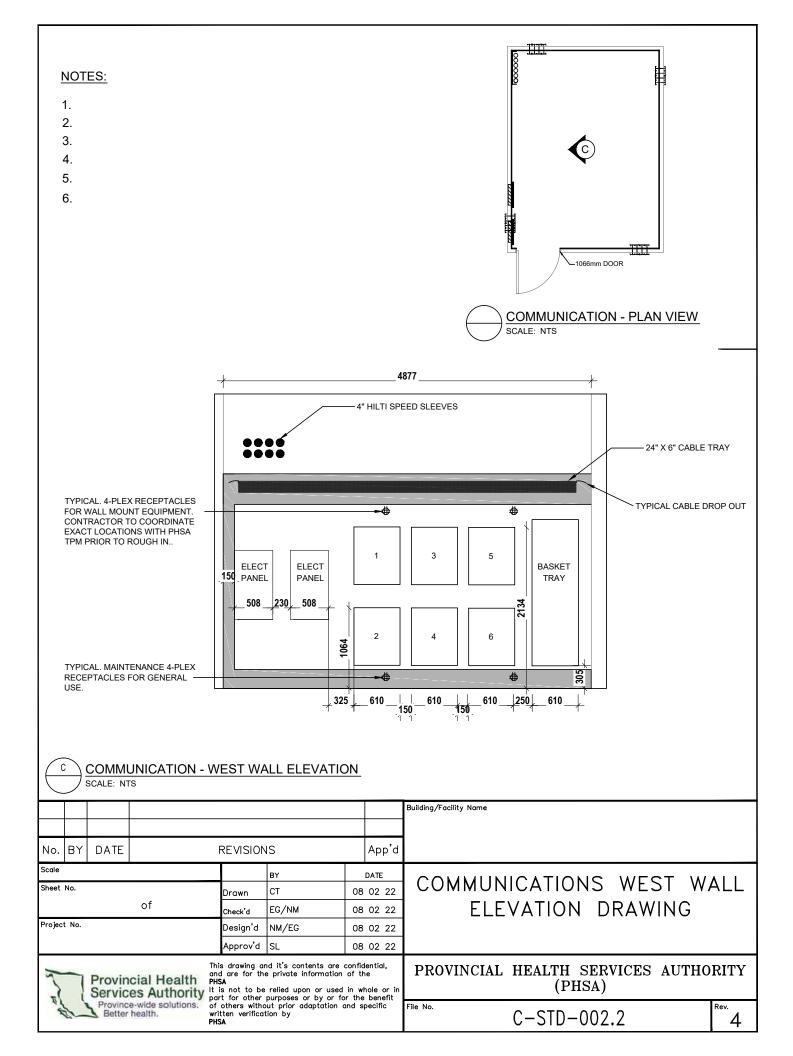
2 2 NEW HORIZONTAL JACKS

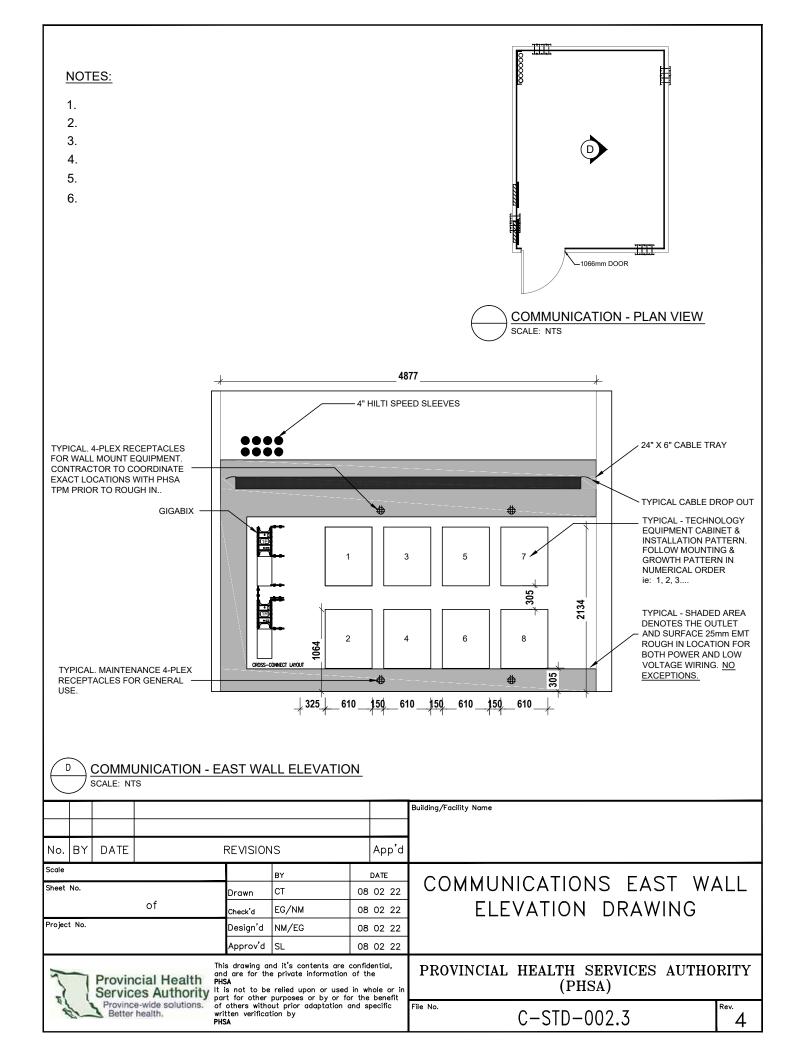
NOTE: WALL MOUNT PHONE WITH 1 JACK

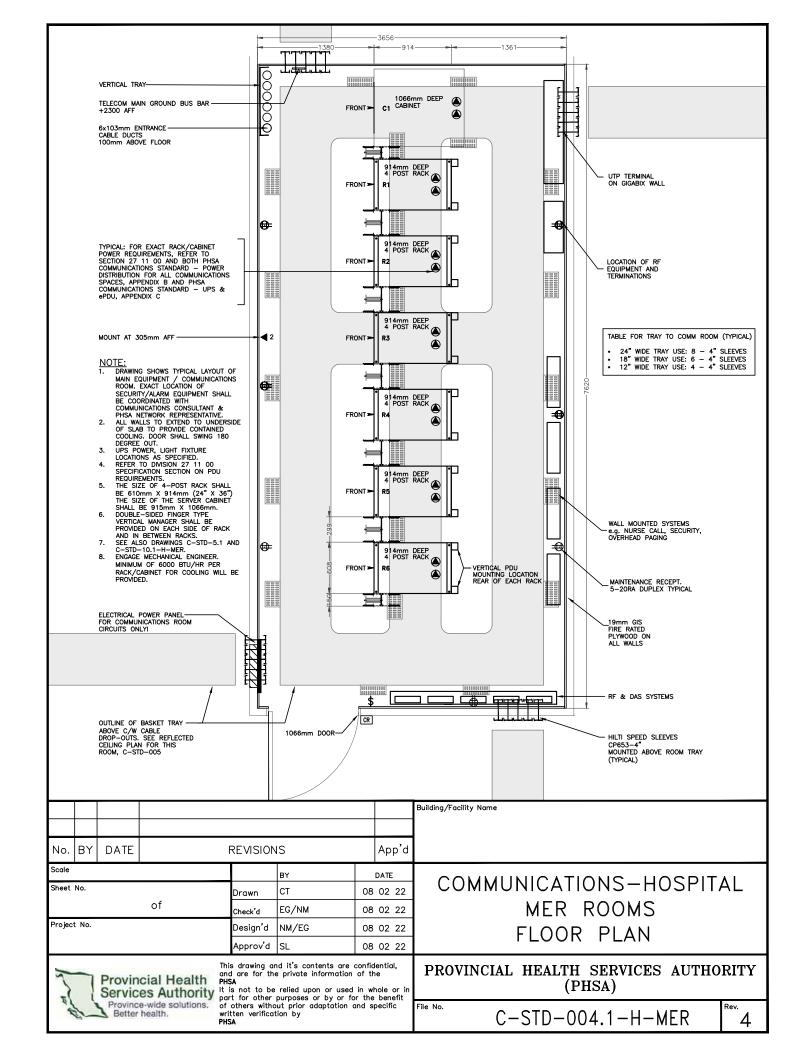
								Building/Facility Name		
No.	BY	DATE REVISIONS								
Scale BY				BY	DATE		COMMUNICATIONS			
Sheet No.				Drawn	СТ	08 02	22	COMMUNICATIONS		
	of		Check'd	EG/NM	08 02	22	VOICE-DATA OUTLET			
Projec	t No.			Design'd	NM/EG	08 02	22			
				Approv'd	SL	08 02	22			
Provincial Health Services Authority  This drawing and it's contents are configured for the private information of the PHSA it is not to be relied upon or used in what part for other purposes or by or for the								PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)		
4	Province-wide solutions.  Better health.  PHSA  part for other purposes or by or for the of others without prior adaptation and specification by PHSA						C	File No. C-STD-001.2 Rev. 4		

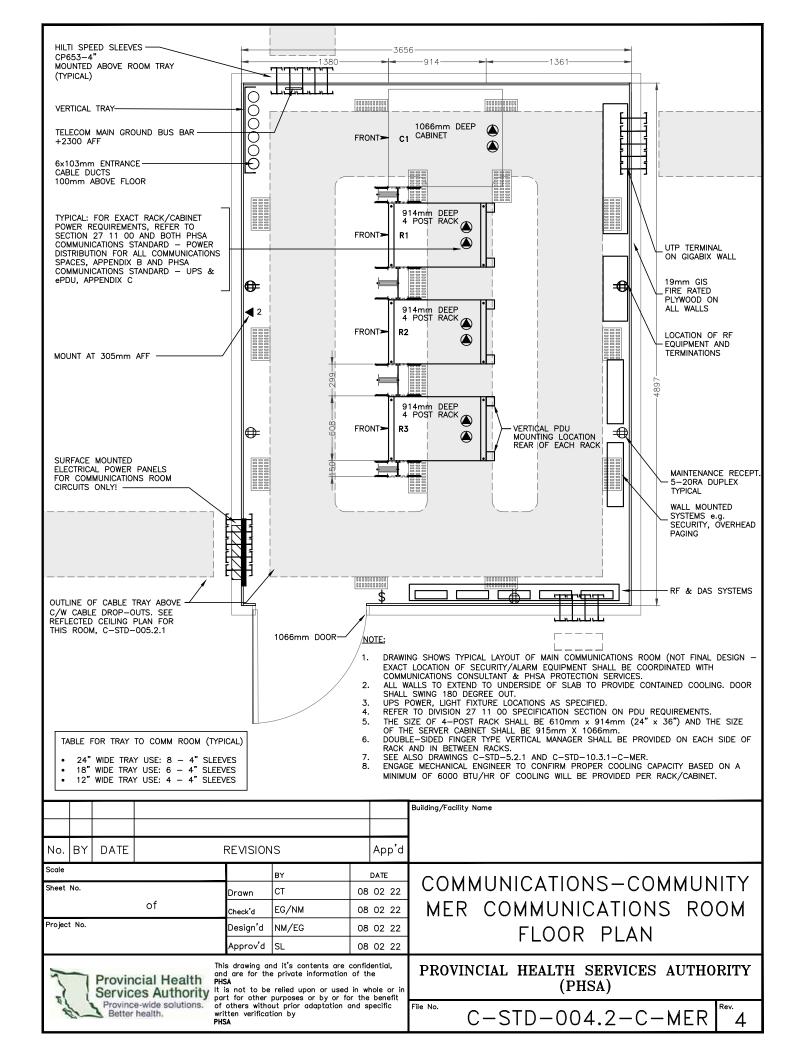


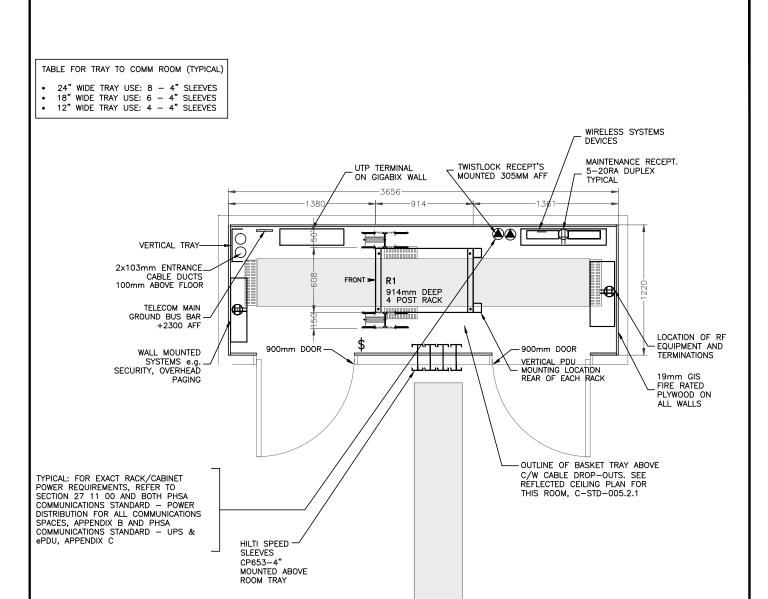






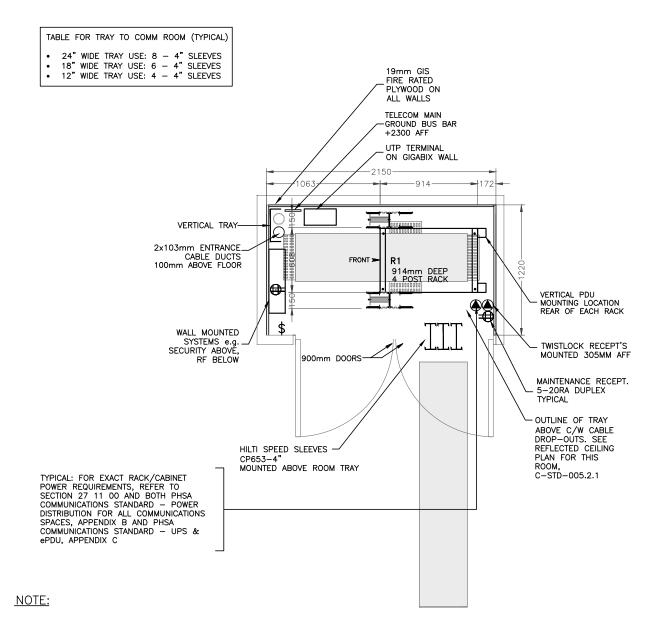






- NOTE:
- 1. DRAWING SHOWS TYPICAL LAYOUT OF COMMERCIAL LARGE COMMUNICATIONS CLOSET (NOT FINAL DESIGN SERVES FLOOR AREA OF 500m2 (5,000ft2)).
- 2. EXACT LOCATION OF SECURITY/ALARM EQUIPMENT SHALL BE COORDINATED WITH COMMUNICATIONS CONSULTANT & PHSA PROTECTION SERVICES.
- 3. ALL WALLS TO EXTEND TO UNDERSIDE OF SLAB TO PROVIDE CONTAINED COOLING. DOORS SHALL SWING 180 DEGREE OUT.
- 4. UPS POWER, LIGHT FIXTURE LOCATIONS AS SPECIFIED.
- 5. REFER TO DIVISION 27 11 00 SPECIFICATION SECTION ON PDU REQUIREMENTS.
- 6. THE SIZE OF 4-POST RACK SHALL BE 610mm x 914mm (24" x 36").
- 7. DOUBLE-SIDED FINGER TYPE VERTICAL MANAGER SHALL BE PROVIDED ON EACH SIDE OF RACK.
- 8. SEE ALSO DRAWINGS C-STD-5.3 AND C-STD-10.5-C-LCC.
- 9. ENGAGE MECHANICAL ENGINEER TO CONFIRM PROPER COOLING CAPACITY BASED ON A MINIMUM OF 6000 BTU/HR OF COOLING WILL BE PROVIDED PER RACK/CABINET. NOTE: MINIMUM HVAC IN A TR IS 1 TON.

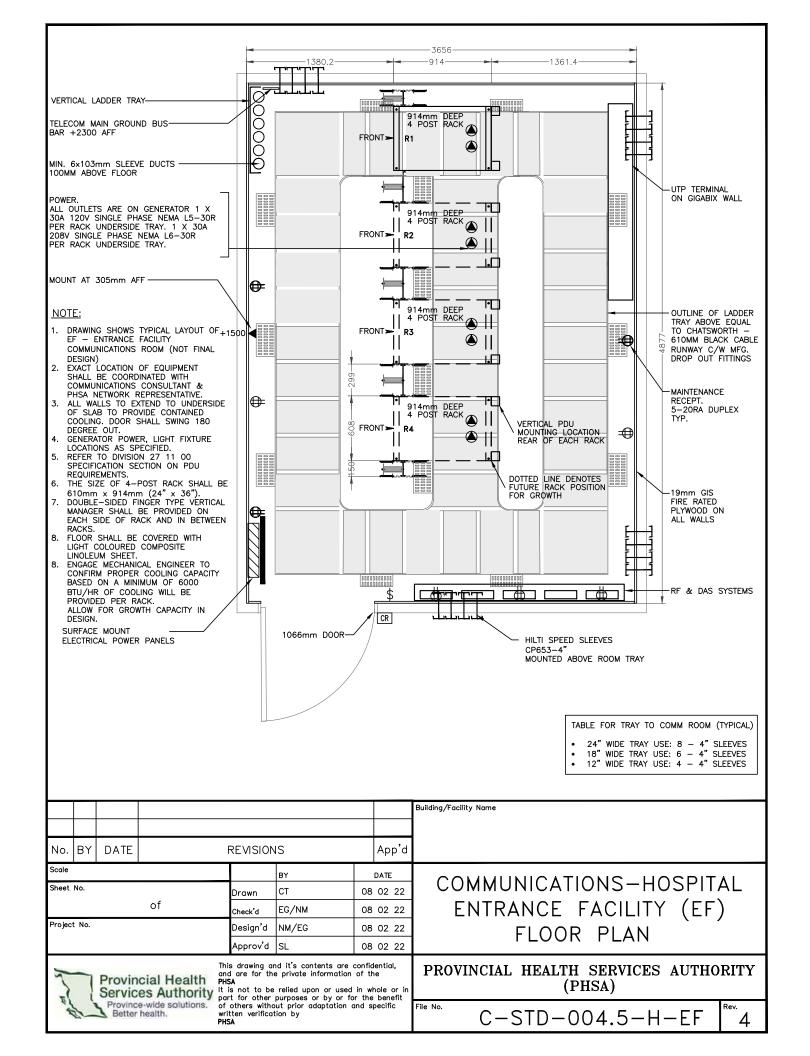
							Building/Facility Name
							1
No.	BY	DATE		REVISION	IS	App'd	
Scale				BY	DATE	COMMUNICATIONS COMMUNITY	
Sheet	Sheet No.		Drawn	ст	08 02 22	COMMUNICATIONS-COMMUNITY	
			Check'd	EG/NM	08 02 22	LARGE COMMUNICATIONS CLOSET	
Projec	t No.			Design'd	NM/EG	08 02 22	FLOOR PLAN (500m2)
				Approv'd	SL	08 02 22	TEOOR TEAN (SOUTHE)
15		Servic	cial Health es Authority	and are for th PHSA	nd it's contents are e private information relied upon or used	PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)	
8	1	Provinc	e-wide solutions. health.	of others withouriten verifica PHSA	out prior adaptation o	and specific	File No. C-STD-004.3-C-LCC Rev. 4

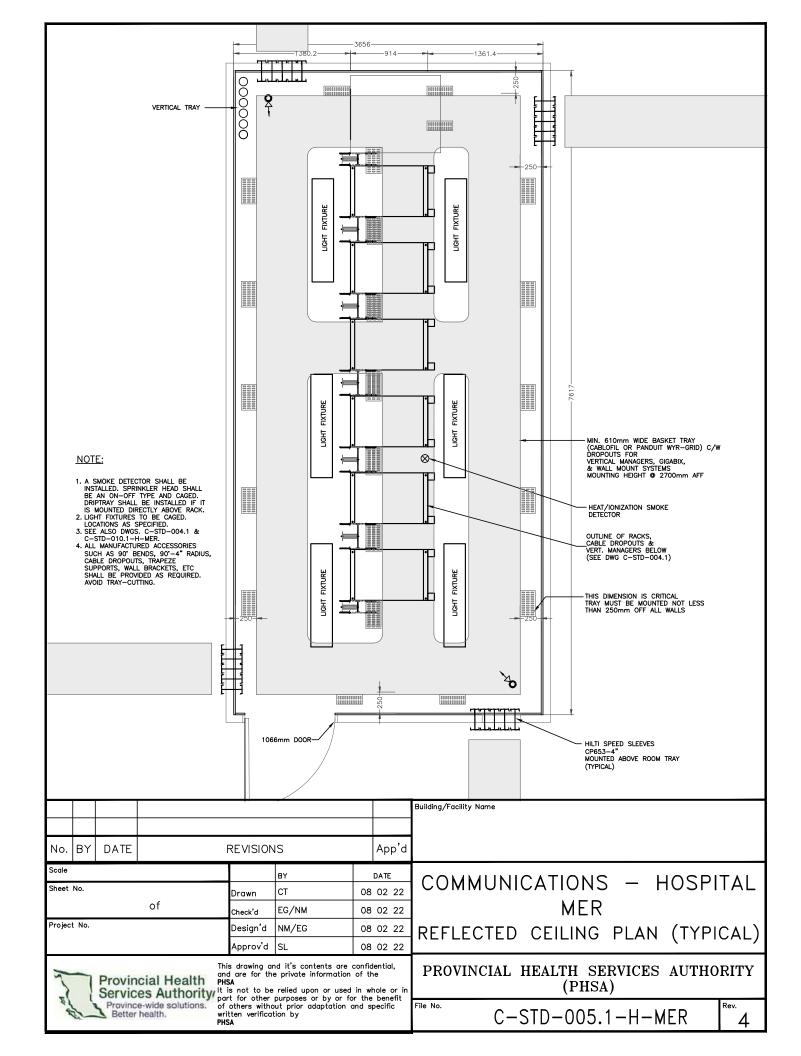


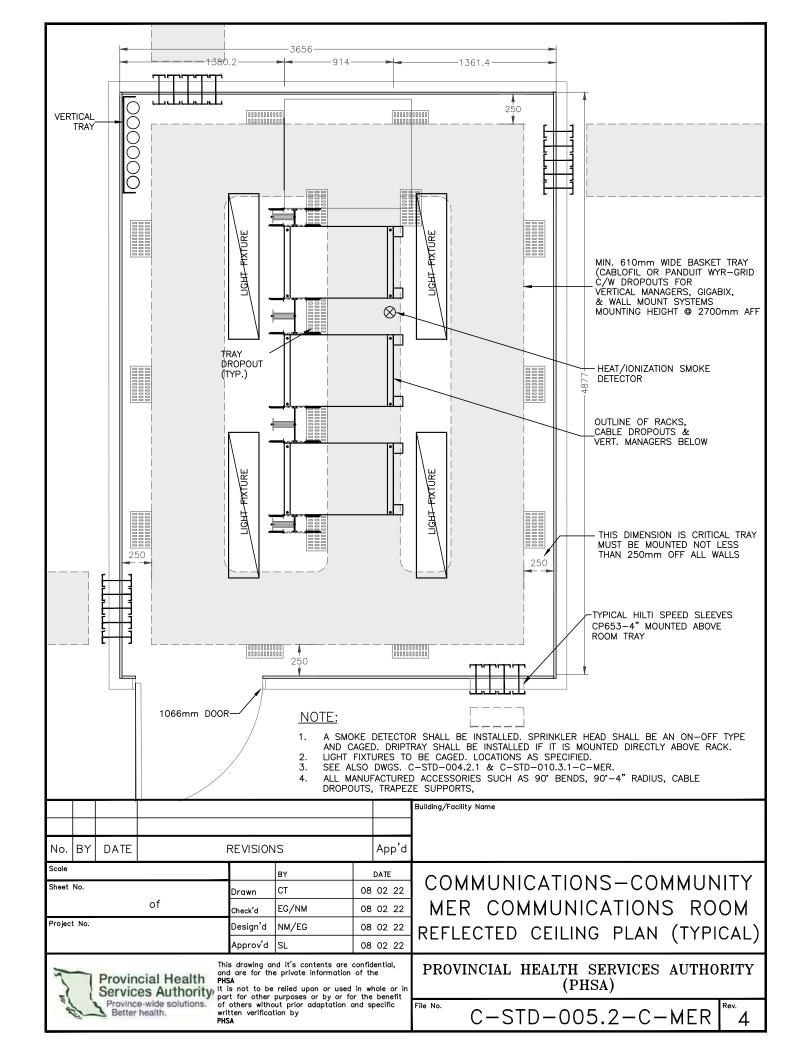
- 1. DRAWING SHOWS TYPICAL LAYOUT OF COMMERCIAL SMALL COMMUNICATIONS CLOSET (NOT FINAL DESIGN SERVES FLOOR AREA OF 100m2 (1,000ft2).
- 2. EXACT LOCATION OF SECURITY/ALARM EQUIPMENT SHALL BE COORDINATED WITH COMMUNICATIONS CONSULTANT & PHSA PROTECTION SERVICES.
- 3. ALL WALLS TO EXTEND TO UNDERSIDE OF SLAB TO PROVIDE CONTAINED COOLING. DOORS SHALL SWING 180 DEGREE OUT.
- 4. UPS POWER, LIGHT FIXTURE LOCATIONS AS SPECIFIED.

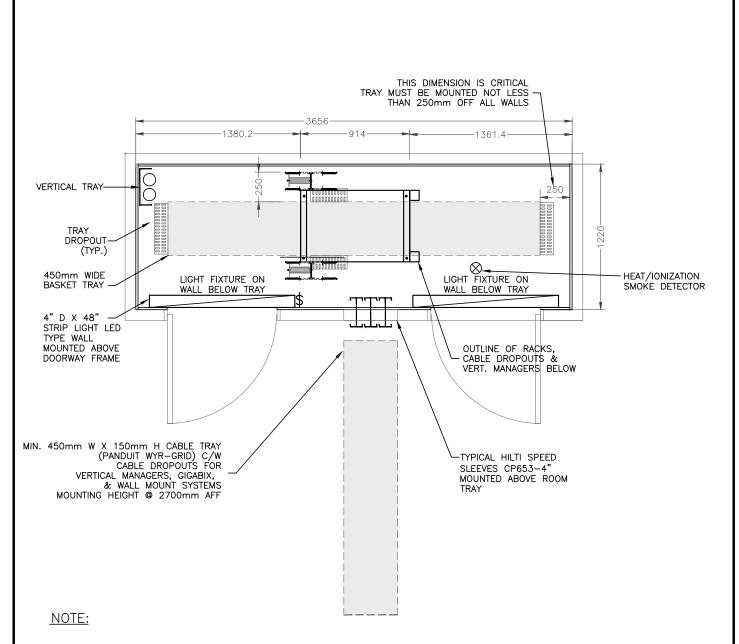
- 5. REFER TO DIVISION 27 11 00 SPECIFICATION SECTION ON PDU REQUIREMENTS.
- 6. THE SIZE OF 4-POST RACK SHALL BE 610mm x 914mm (24" x 36").
- 7. DOUBLE-SIDED FINGER TYPE VERTICAL MANAGER SHALL BE PROVIDED ON EACH SIDE OF RACK.
- 8. SEE ALSO DRAWINGS C-STD-5.4 AND C-STD-10.6-C-SCC.
- 9. ENGAGE MECHANICAL ENGINEER TO CONFIRM PROPER COOLING CAPACITY BASED ON A MINIMUM OF 6000 BTU/HR OF COOLING WILL BE PROVIDED PER RACK. ALLOW FOR SPARE CAPACITY IN DESIGN. NOTE: MINIMUM HVAC IN A TR IS 1 TON.

								Building/Facility Name
No.	BY	DATE	TE REVISIONS					
Scale					BY	D	ATE	COMMUNICATIONS COMMUNITY
Sheet	Sheet No.		Drawn	СТ	80	02 22	COMMUNICATIONS—COMMUNITY	
			Check'd	EG/NM	80	02 22	SMALL COMMUNICATIONS CLOSET	
Projec	Project No.			Design'd	NM/EG	80	02 22	FLOOR PLAN (100m2)
				Approv'd	SL	08	02 22	TEOOR TEAN (TOOME)
12	Provincial Health Services Authority  This drawing and it's contents are confidential, and are for the private information of the PHSA  It is not to be relied upon or used in whole or in part for other purposes or by or for the benefit							PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)
4	Province-wide solutions. Better health.					and spe	ecific	File No. C-STD-004.4-C-SCC Rev. 4



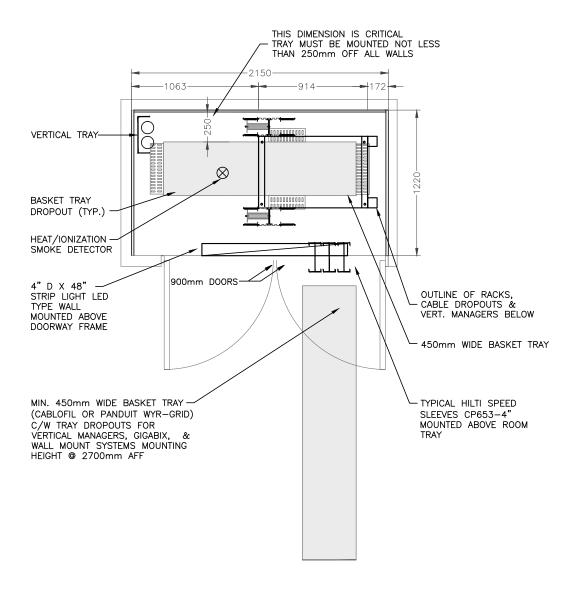






- 1. A SMOKE DETECTOR SHALL BE INSTALLED. SPRINKLER HEAD SHALL BE AN ON-OFF TYPE AND CAGED. DRIPTRAY SHALL BE INSTALLED IF IT IS MOUNTED DIRECTLY ABOVE RACK.
- 2. LIGHT FIXTURES TO BE CAGED. LOCATIONS AS SPECIFIED.
- 3. SEE ALSO DWGS. C-STD-004.3 & C-STD-010.5-C-LTC.
- 4. ALL MANUFACTURED ACCESSORIES SUCH AS 90° BENDS, 90°-4" RADIUS, CABLE DROPOUTS, TRAPEZE SUPPORTS, WALL BRACKETS, ETC SHALL BE PROVIDED AS REQUIRED. AVOID TRAY-CUTTING.

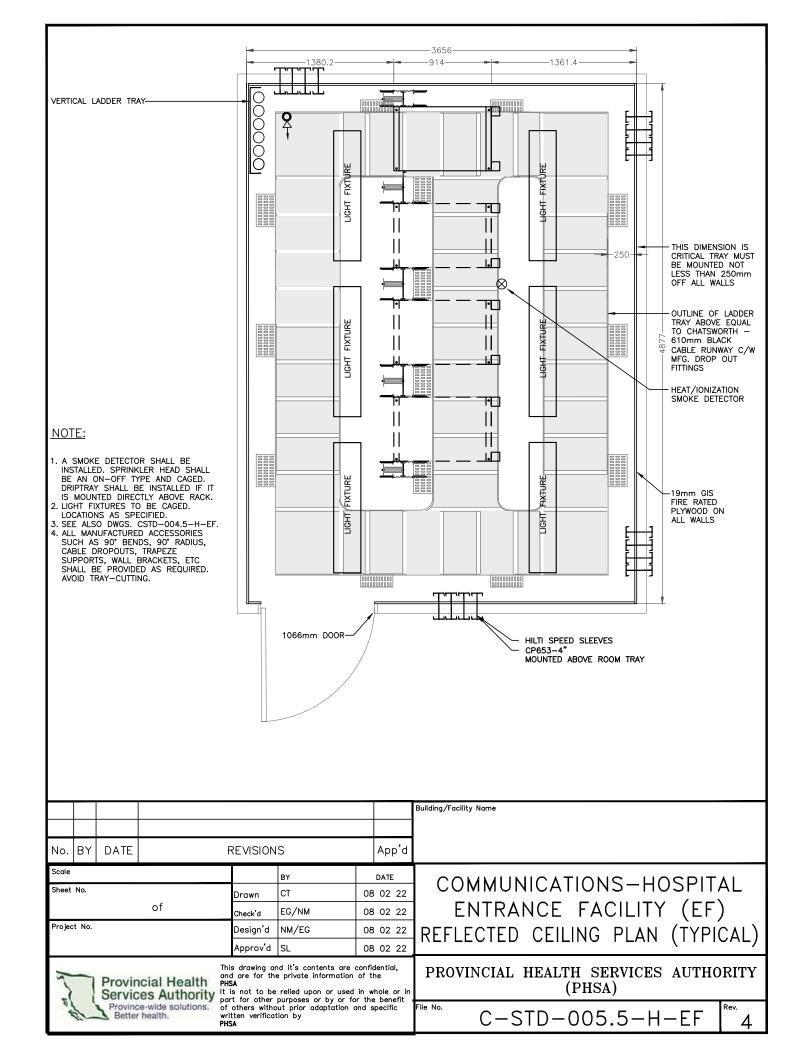
								Building/Facility Name
No	. BY	DATE	REVISIONS					
Scale					BY	DA	TE	COMMUNICATIONS COMMUNITY
Shee	Sheet No.		Drawn	СТ	08 02	2 22	COMMUNICATIONS—COMMUNITY	
			of	Check'd	EG/NM	08 02	2 22	LARGE COMMUNICATIONS CLOSET
Proje	ct No.			Design'd	NM/EG	08 02	2 22	REFLECTED CEILING PLAN (TYPICAL)
				Approv'd	SL	08 02	2 22	THE LEGIED CEILING FEAR (THICKE)
15	Provincial Health Services Authority  This drawing and it's contents are confidential, and are for the private information of the PHSA  It is not to be relied upon or used in whole or in							PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)
20	de-	Services Authority Province-wide solutions. Better health.  It is not to be relied upon or used in whole part for other purposes or by or for the ben of others without prior adaptation and specific written verification by PHSA					ific	File No. C-STD-005.3-C-LCC Rev. 4

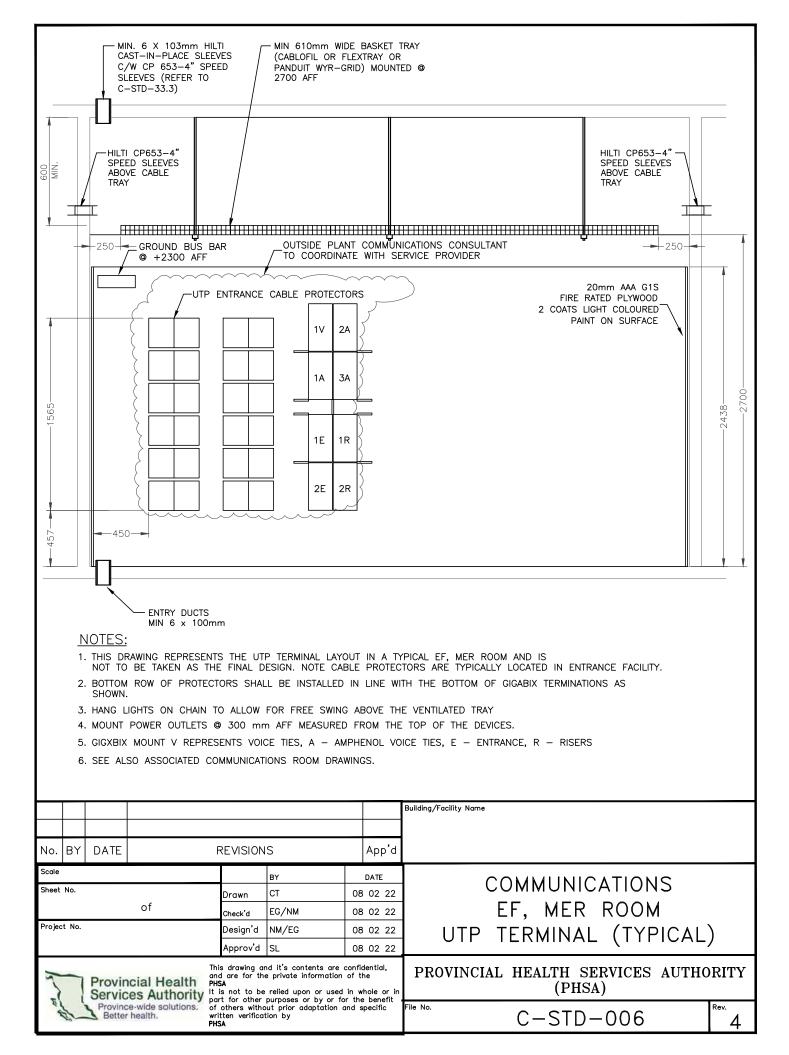


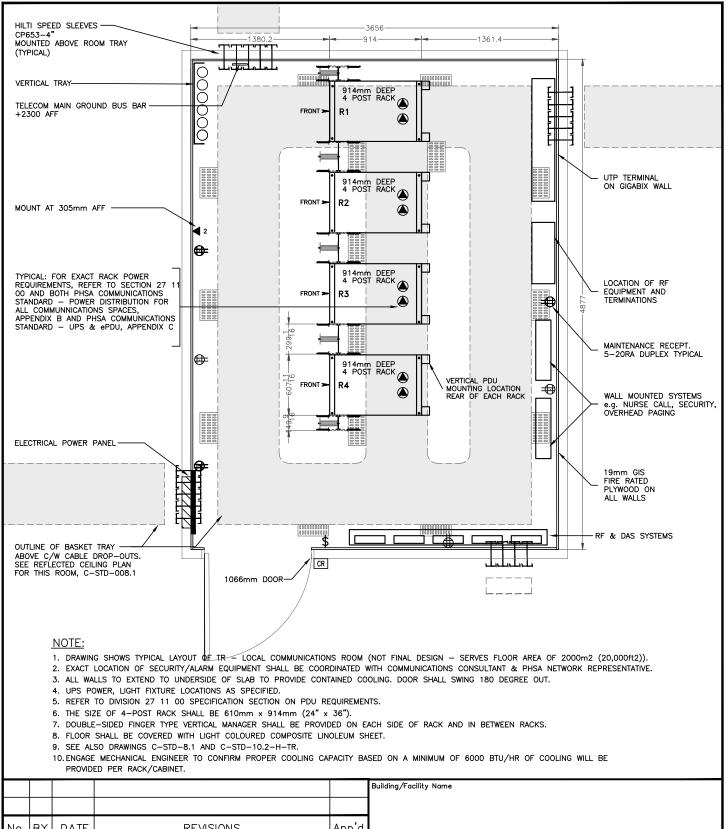
## NOTE:

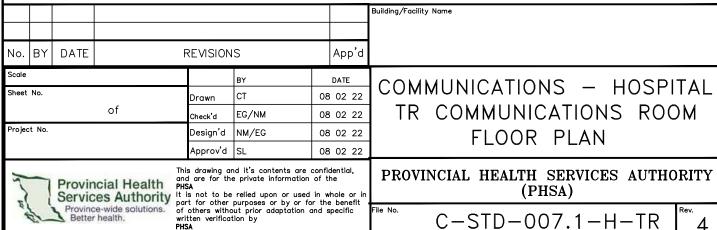
- 1. A SMOKE DETECTOR SHALL BE INSTALLED. SPRINKLER HEAD SHALL BE AN ON-OFF TYPE AND CAGED. DRIPTRAY SHALL BE INSTALLED IF IT IS MOUNTED DIRECTLY ABOVE RACK.
- 2. LIGHT FIXTURES TO BE CAGED. LOCATIONS AS SPECIFIED.
- 3. SEE ALSO DWGS. C-STD-004.4 & C-STD-010.6-C-SCC.
- 4. ALL MANUFACTURED ACCESSORIES SUCH AS 90° BENDS, 90°-4" RADIUS, CABLE DROPOUTS, TRAPEZE SUPPORTS, WALL BRACKETS, ETC SHALL BE PROVIDED AS REQUIRED. AVOID TRAY—CUTTING.

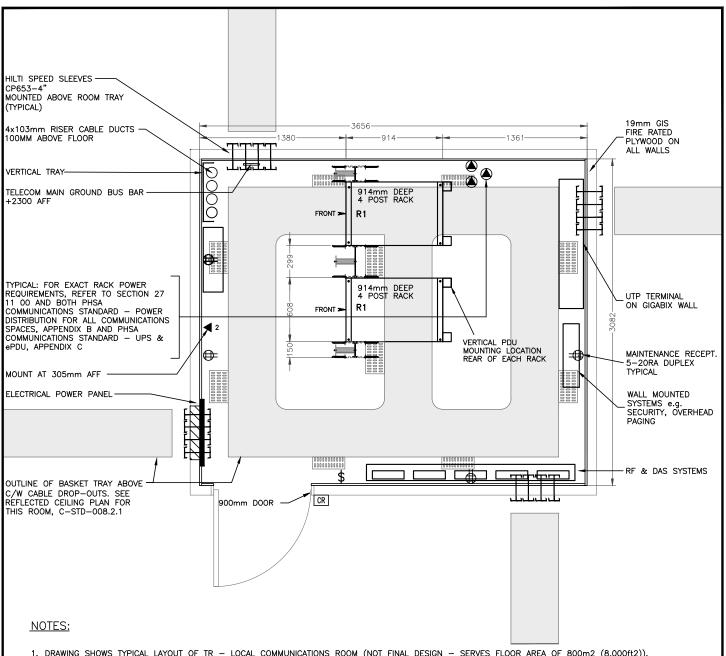
							Building/Facility Name
No.	BY	DATE		REVISION	IS	Арр	d
Scale					BY	DATE	COMMUNICATIONS-COMMUNITY
Shee	Sheet No.		Drawn	СТ	08 02	2	
			Check'd	EG/NM	08 02	SMALL COMMUNICATIONS CLOSE	
Proje	ct No.			Design'd	NM/EG	08 02	REFLECTED CEILING PLAN (TYPICAL)
				Approv'd	SL	08 02	
15		Service	ncial Health ces Authority	and are for th PHSA	nd it's contents are e private information e relied upon or used purposes or by or fo	PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)	
B	Province-wide solutions. Better health.  Province-wide solutions. Better health.  Province-wide solutions.  of others without written verification  PHSA				out prior adaptation o	ind specific	File No. C-STD-005.4-C-SCC Rev. 4





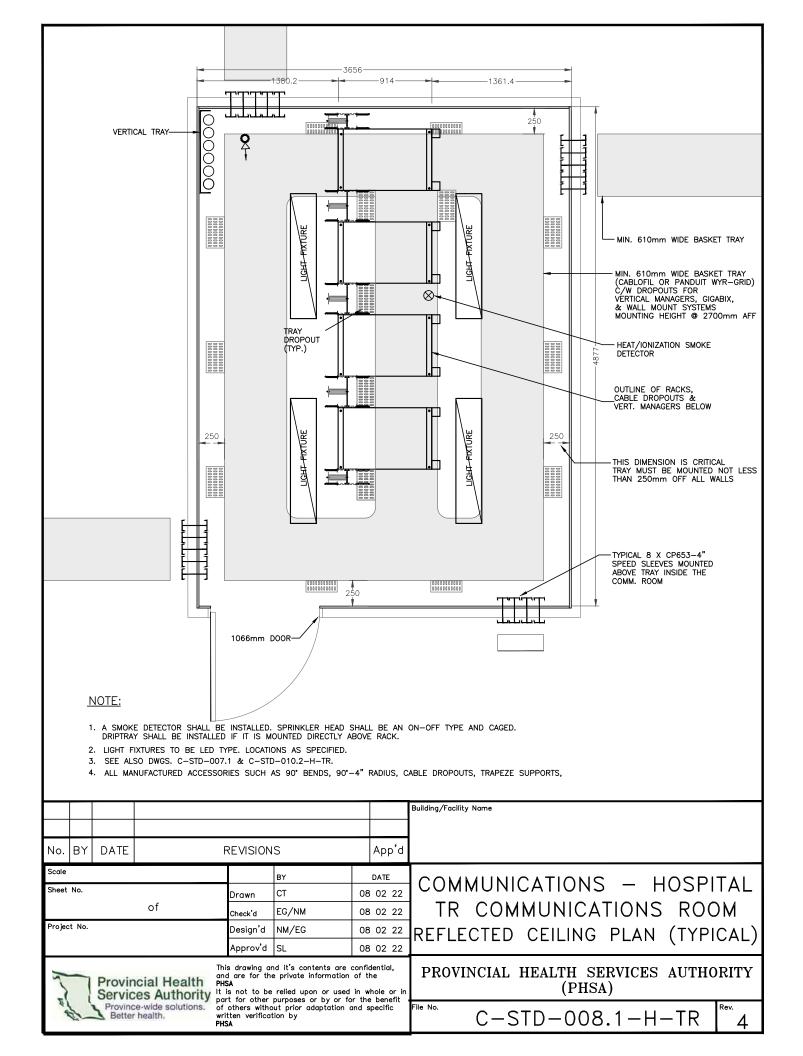


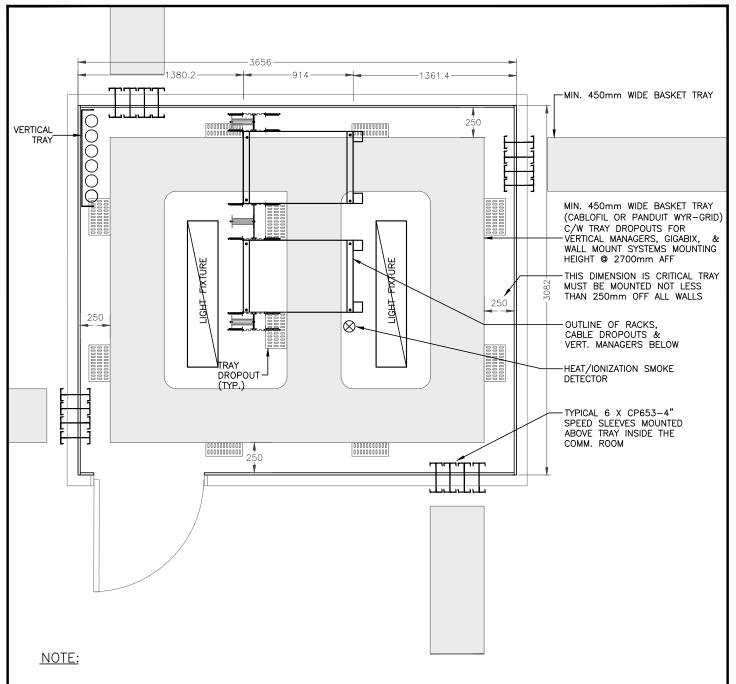




- 1. DRAWING SHOWS TYPICAL LAYOUT OF TR LOCAL COMMUNICATIONS ROOM (NOT FINAL DESIGN SERVES FLOOR AREA OF 800m2 (8,000ft2)).
- 2. EXACT LOCATION OF SECURITY/ALARM EQUIPMENT SHALL BE COORDINATED WITH COMMUNICATIONS CONSULTANT & PHSA PROTECTION SERVICES.
- 3. ALL WALLS TO EXTEND TO UNDERSIDE OF SLAB TO PROVIDE CONTAINED COOLING. DOOR SHALL SWING 180 DEGREE OUT.
- 4. UPS POWER, LIGHT FIXTURE LOCATIONS AS SPECIFIED.
- 5. REFER TO DIVISION 27 11 00 SPECIFICATION SECTION ON PDU REQUIREMENTS.
- 6. THE SIZE OF 4-POST RACK SHALL BE 610mm x 914mm (24" x 36").
- 7. DOUBLE-SIDED FINGER TYPE VERTICAL MANAGER SHALL BE PROVIDED ON EACH SIDE OF RACK AND IN BETWEEN RACKS.
- 8. FLOOR SHALL BE COVERED WITH LIGHT COLOURED COMPOSITE LINOLEUM SHEET.
- 9. SEE ALSO DRAWINGS C-STD-008.2.1, C-STD-009 AND C-STD-010.4.1-C-TR TO C-STD-013.
- 10. ENGAGE MECHANICAL ENGINEER TO CONFIRM PROPER COOLING CAPACITY BASED ON A MINIMUM OF 6000 BTU/HR OF COOLING WILL BE PROVIDED PER RACK/CABINET. ALLOW FOR GROWTH CAPACITY IN DESIGN, NOTE: MINIMUM HVAC IN A TR IS 1 TON.

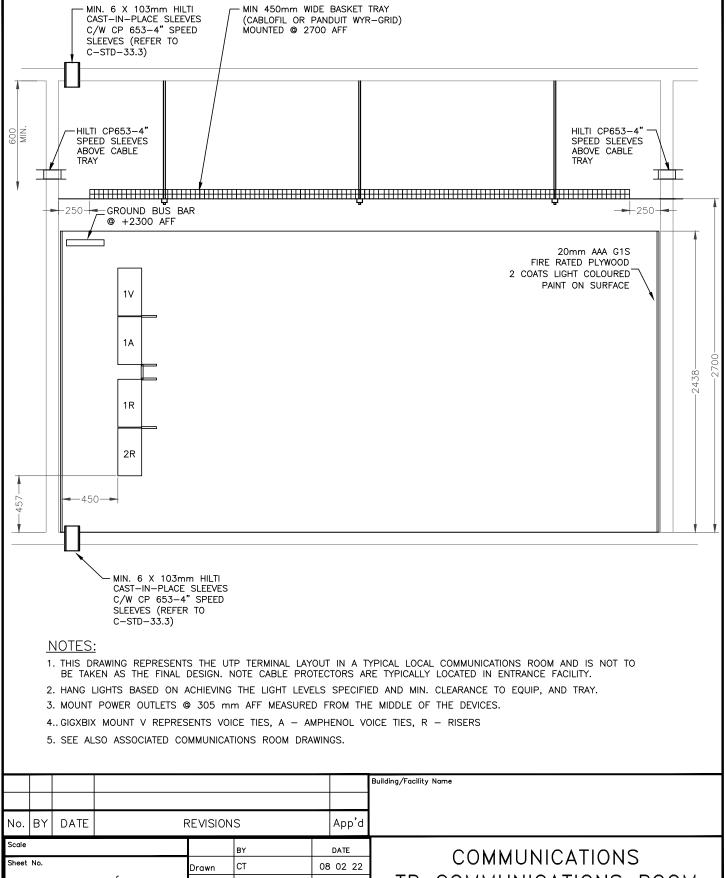
		-11 1010117			74770111 114 02010	IV. IVOTE: MITVIN	
							Building/Facility Name
No.	BY	DATE	REVISIONS				
Scale				BY	DATE	COMMUNICATIONS-COMMUNITY	
Sheet	Sheet No.		Drawn	СТ	08 02 22		
			Check'd	EG/NM	08 02 22	TR COMMUNICATIONS ROOM	
Projec	Project No.		Design'd	NM/EG	08 02 22	FLOOR PLAN (800m2)	
				Approv'd	SL	08 02 22	TEOOR TEAR (GOOTHE)
15		Servic	cial Health es Authority	and are for th PHSA It is not to be	nd it's contents are e private information relied upon or use	on of the ed in whole or in	PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)
4	Province-wide solutions.  Better health.  Province-wide solutions of others without prior adaptation and specific written verification by  PHSA					and specific	File No. $C-STD-007.2-C-TR$ Rev. 4



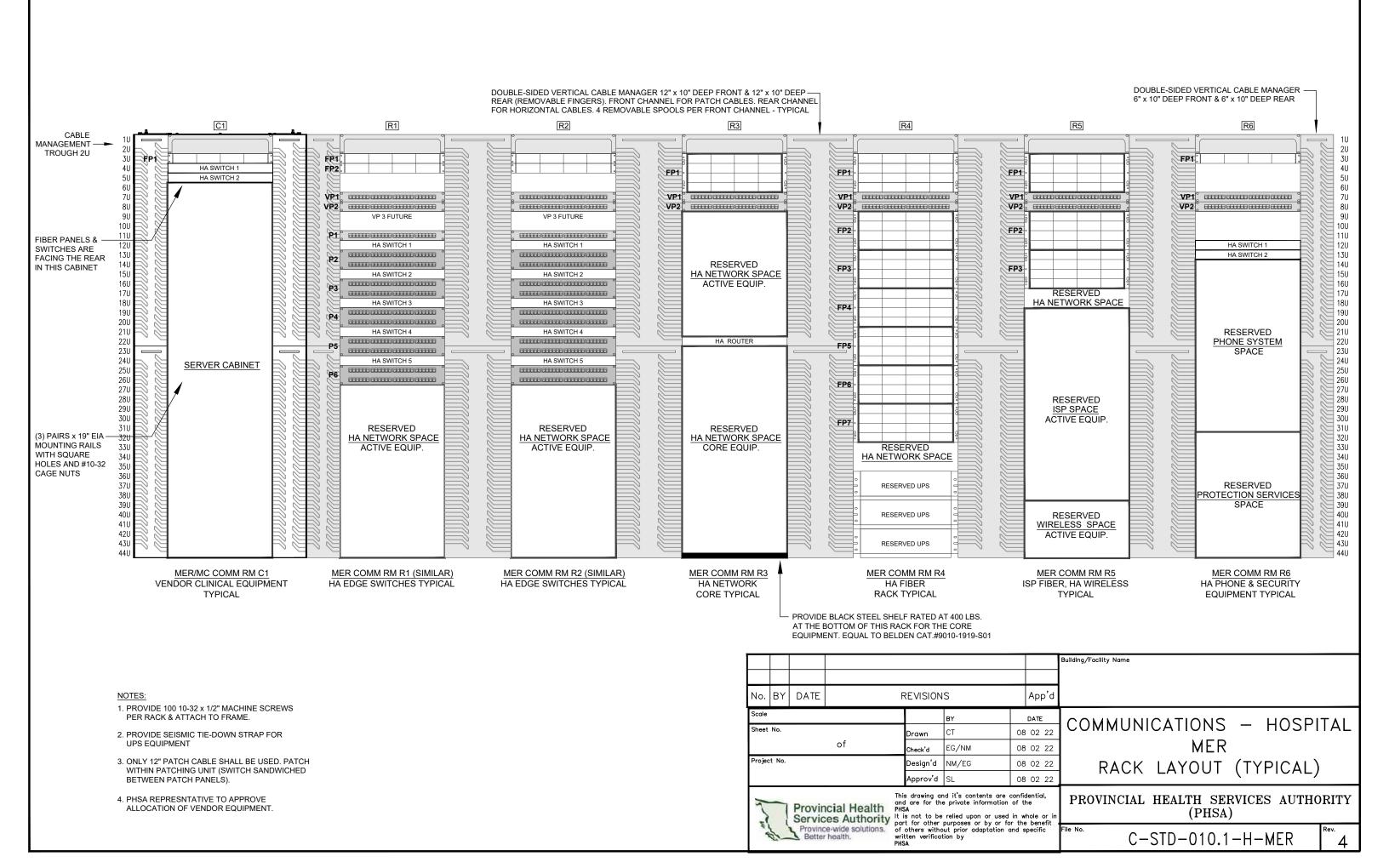


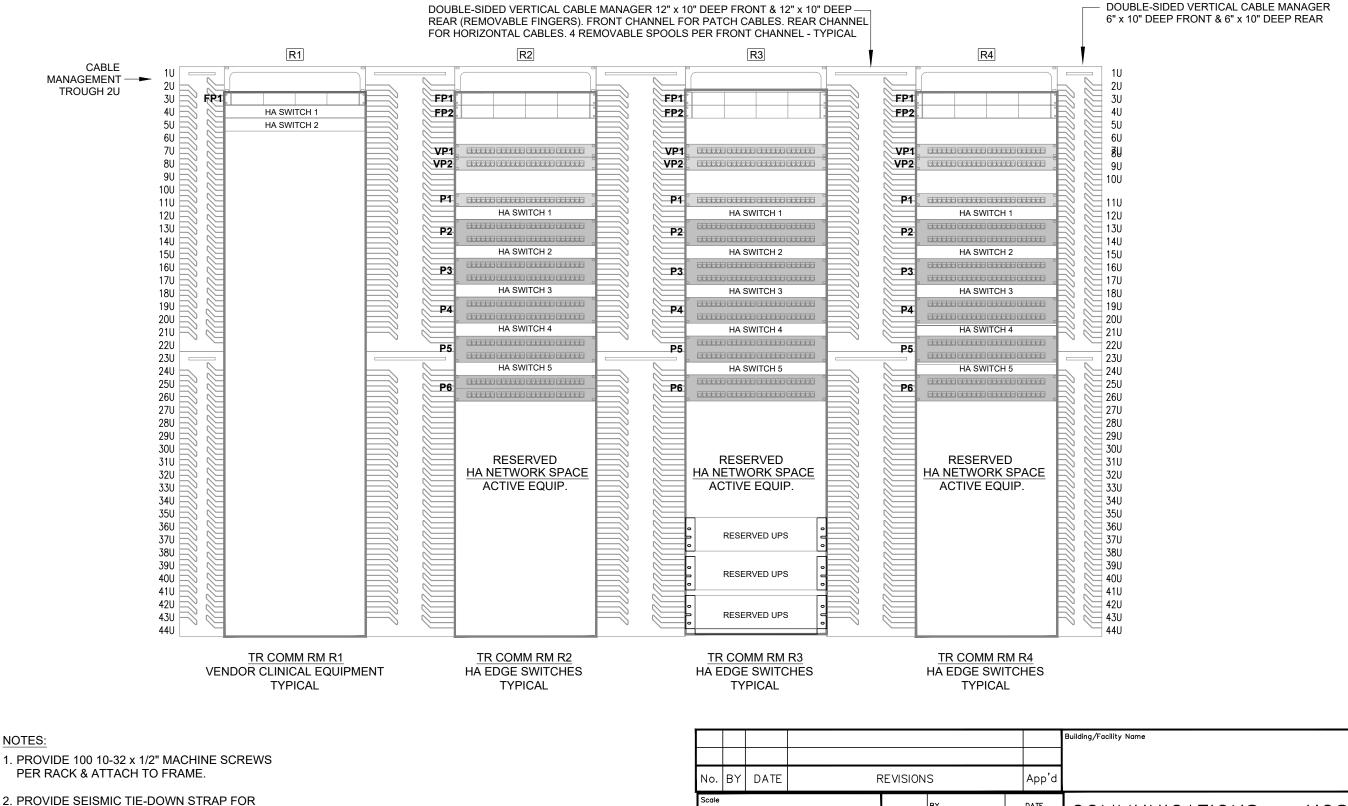
- 1. A SMOKE DETECTOR SHALL BE INSTALLED. SPRINKLER HEAD SHALL BE AN ON-OFF TYPE AND CAGED. DRIPTRAY SHALL BE INSTALLED IF IT IS MOUNTED DIRECTLY ABOVE RACK.
- 2. LIGHT FIXTURES TO BE LED TYPE. LOCATIONS AS SPECIFIED.
- 3. SEE ALSO DWGS. C-STD-007.2.1 & C-STD-010.4-C-TR.
- 4. ALL MANUFACTURED ACCESSORIES SUCH AS 90° BENDS, 90°-4" RADIUS, CABLE DROPOUTS, TRAPEZE SUPPORTS,

							Building/Facility Name
No.	BY	DATE		REVISION	lS	App'd	
					BY	DATE	COMMUNICATIONS-COMMUNITY
Sheet No.		Drawn	СТ	08 02 22			
	of		Check'd	EG/NM	08 02 22	TR COMMUNICATIONS ROOM	
Projec	ct No.			Design'd	NM/EG	08 02 22	REFLECTED CEILING PLAN (TYPICAL)
				Approv'd	SL	08 02 22	(111 10 / L)
Provincial Health Services Authority  This drawing and it's contents are confidential, and are for the private information of the PHSA  It is not to be relied upon or used in whole or in part for other purposes or by or for the benefit							PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)
E)	8	Provinc	e-wide solutions. health.		out prior adaptation	and specific	File No. C-STD-008.2-C-TR Rev. 4

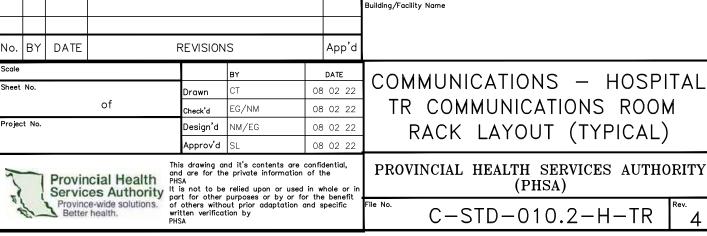


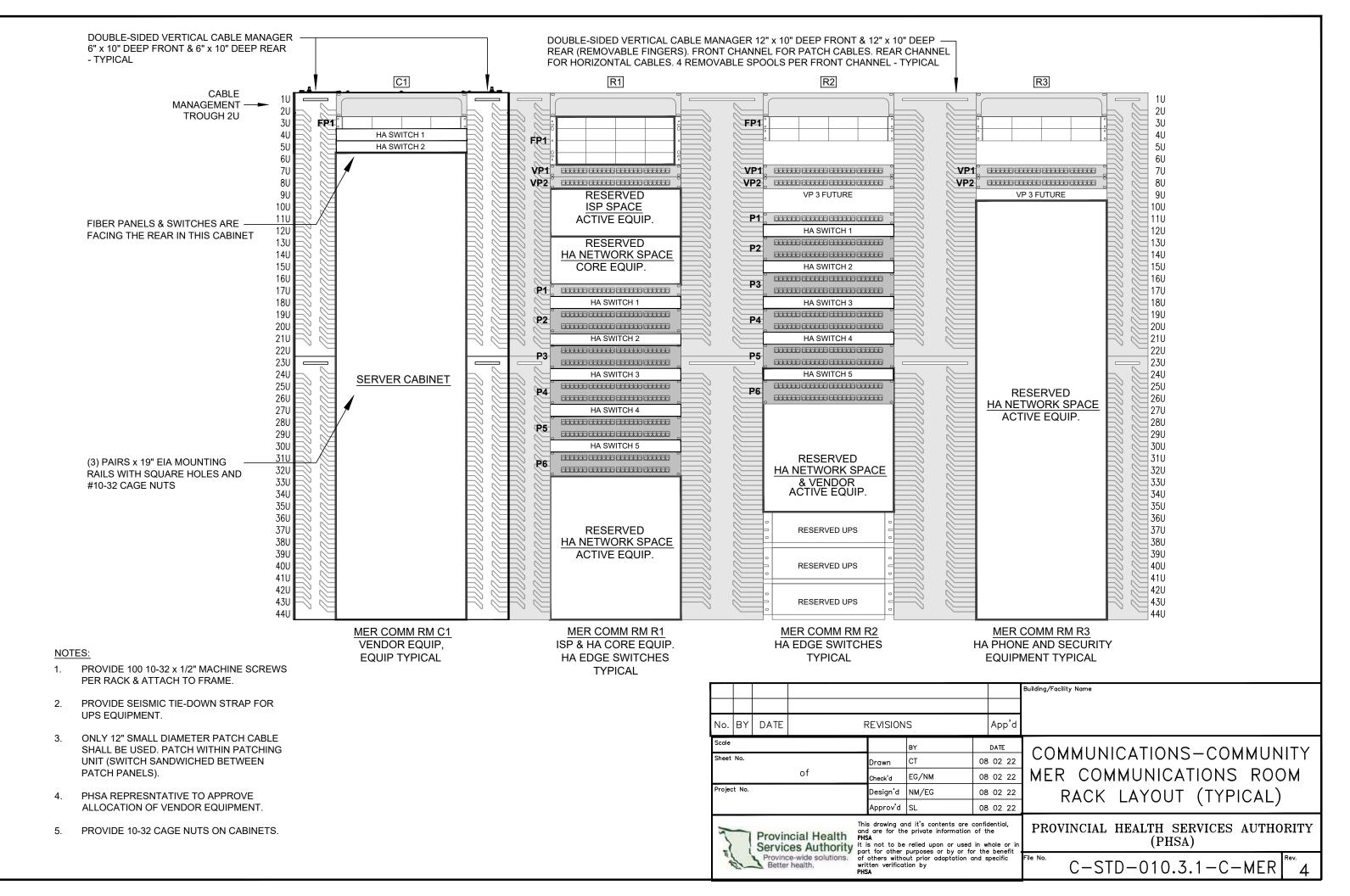
							Building/Facility Name
No.	BY	DATE	REVISIONS			App'd	
Scale					BY	DATE	COMMUNICATIONS
Sheet No.				Drawn	ст	08 02 22	
			of	Check'd	EG/NM	08 02 22	TR COMMUNICATIONS ROOM
Project No.				Design'd	NM/EG	08 02 22	UTP TERMINATION (TYPICAL)
				Approv'd	SL	08 02 22	1 on Teximination (Throat)
Provincial Health Services Authority  This drawing and it's contents are confidential, and are for the private information of the PHSA It is not to be relied upon or used in whole or part for other purposes or by or for the benef						of the	PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)
8	1	Provinc	e-wide solutions. health.	of others without prior adaptation and s written verification by PHSA			File No. C-STD-009 Rev. 4

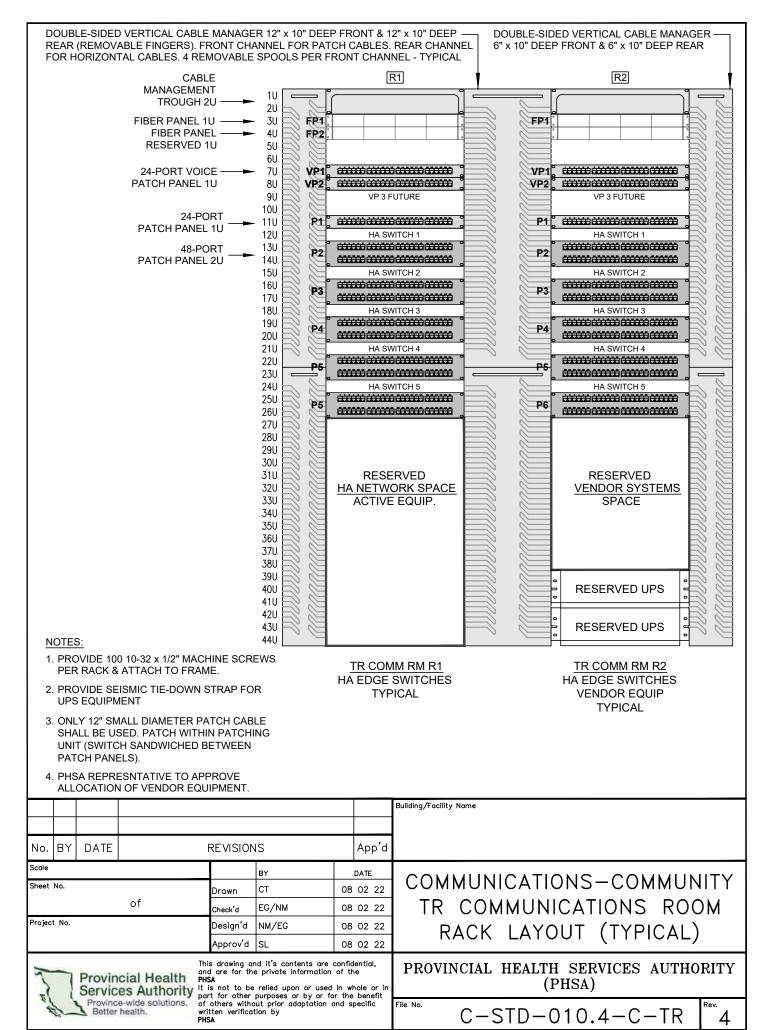


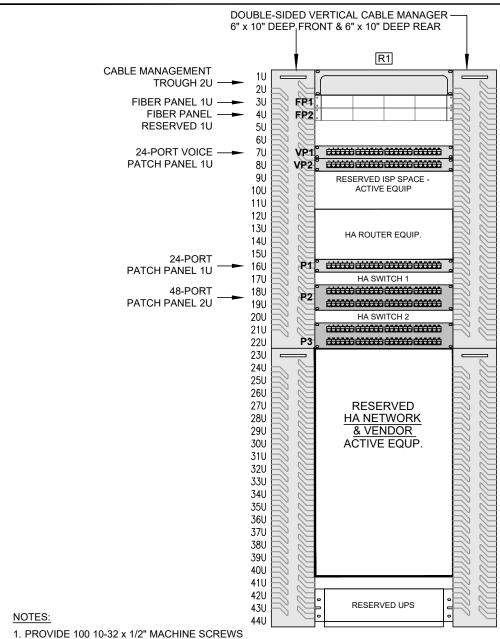


- PER RACK & ATTACH TO FRAME.
- UPS EQUIPMENT
- 3. ONLY 12" PATCH CABLE SHALL BE USED. PATCH WITHIN PATCHING UNIT (SWITCH SANDWICHED BETWEEN PATCH PANELS).
- 4. PHSA REPRESNTATIVE TO APPROVE ALLOCATION OF VENDOR EQUIPMENT.









- PER RACK & ATTACH TO FRAME.
- 2. PROVIDE SEISMIC TIE-DOWN STRAP FOR **UPS EQUIPMENT**
- 3. ONLY 12" SMALL DIAMETER PATCH CABLE SHALL BE USED. PATCH WITHIN PATCHING UNIT (SWITCH SANDWICHED BETWEEN PATCH PANELS).
- 4. PHSA REPRESNTATIVE TO APPROVE ALLOCATION OF VENDOR EQUIPMENT.

LARGE COMM CLOSET R1 HA NETWORK & VENDOR EQUIP. **TYPICAL** 

								Building/Facility Name
No.	BY	DATE		REVISION				
Scale						DATE	COMMAN	
Sheet	No.			Drawn	СТ	08	02 22	COMMU
			of	Check'd	EG/NM	08	02 22	LARGE (
Projec	t No.			Design'd	NM/EG	08	02 22	RAC
				Approv'd	SL	08	02 22	NAC

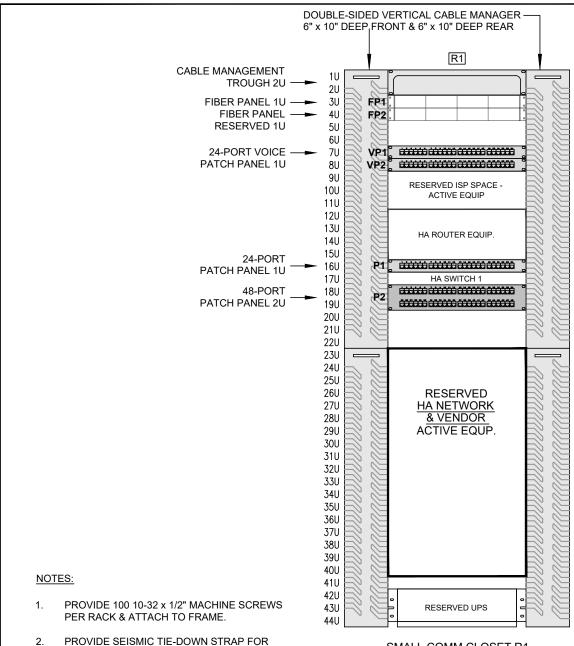
COMMUNICATIONS-COMMUNITY LARGE COMMUNICATIONS CLOSET RACK LAYOUT (TYPICAL)

Provincial Health Services Authority Province-wide solutions. Better health.

This drawing and it's contents are confidential, and are for the private information of the PHSA It is not to be relied upon or used in whole or in part for other purposes or by or for the benefit of others without prior adaptation and specific written verification by PHSA

PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)

File No. C-STD-010.5-C-LCC



SMALL COMM CLOSET R1 HA NETWORK & VENDOR EQUIP. **TYPICAL** 

- 2. UPS EQUIPMENT.
- ONLY 12" SMALL DIAMETER PATCH CABLE SHALL BE USED. PATCH WITHIN PATCHING UNIT (SWITCH SANDWICHED BETWEEN PATCH PANELS).
- PHSA REPRESNITATIVE TO APPROVE ALLOCATION OF VENDOR EQUIPMENT.

								Building/Facility Name
						App'd		
No.	BY	DATE		REVISION				
Scale					BY		DATE	COMMAN
Sheet	No.			Drawn	СТ		3 02 22	СОММО
			of	Check'd	EG/NM	08	3 02 22	SMALL (
Projec	t No.			Design'd	NM/EG	08	3 02 22	RAC
				Approv'd	SL	08	02 22	NAC

Provincial Health
Services Authority
Province-wide solutions.
Better health.

This drawing and it's contents are confidential, and are for the private information of the PHSA

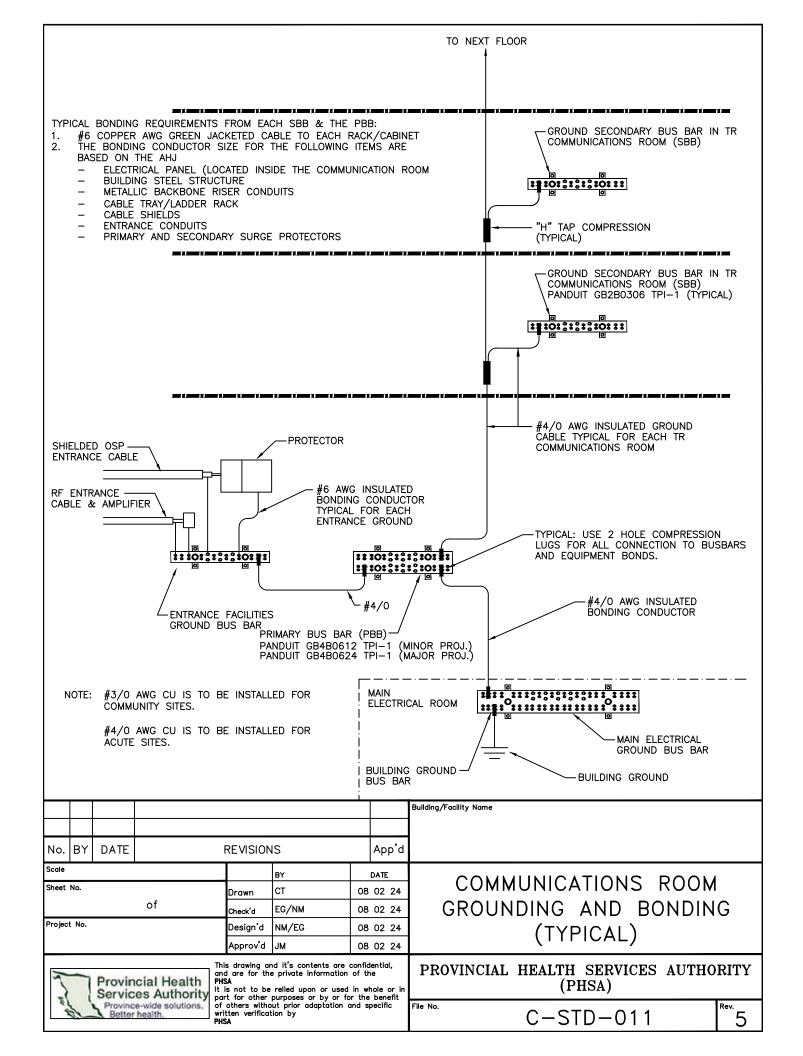
It is not to be relied upon or used in whole or in part for other purposes or by or for the benefit of others without prior adaptation and specific written verification by PHSA

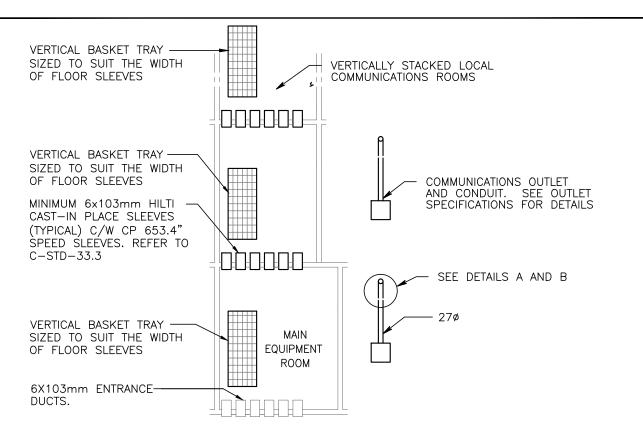
COMMUNICATIONS-COMMUNITY SMALL COMMUNICATIONS CLOSET RACK LAYOUT (TYPICAL)

PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)

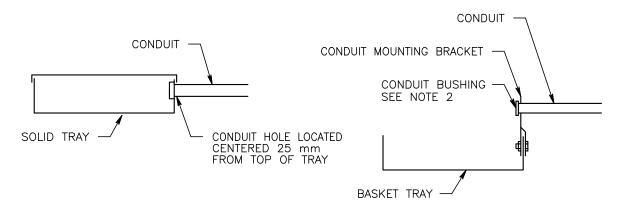
File No.

C-STD-010.6-C-SCC





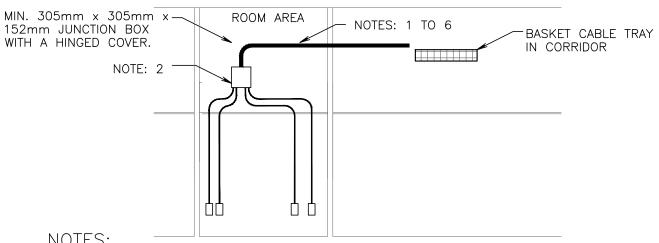
### TYPICAL RISER DIAGRAM



<u>DETAIL A — CONDUIT TO SOLID TRAY</u> <u>NOTES:</u> <u>DETAIL B - CONDUIT TO BASKET TRAY</u>

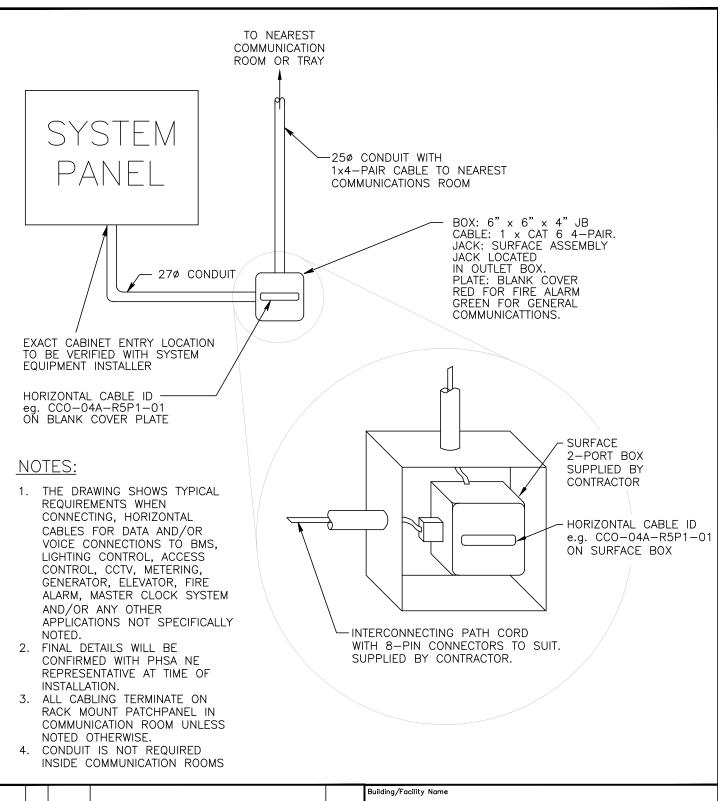
- 1. FOR RESIDENTIAL BUILDINGS CONSULT C-STD-013.
- 2. IF CONDUIT MOUNTING BRACKET IS NOT USED ON BASKET TRAY, USE GROUNDING BUSHING TO GROUND CONDUIT WITH A #12 AWG WIRE TO THE TRAY.
- 3. FOR FLOOR SLEEVE COUNT REFER TO SPECIFICATIONS TO DETERMINE THE CORRECT COUNT.

								Building/Facility Name				
No.	BY	DATE		REVISION	IS		App'd					
Scale	BY						DATE	CTACKED				
Sheet	No.			Drawn	СТ	08	02 22	STACKED				
			of	Check'd	EG/NM	08	02 22	_ COMMUNICATIONS ROOM & PATHWA				
Projec	t No.			Design'd	NM/EG	08	02 22	IN BLDGS. (TYP.)				
				Approv'd	SL	08	02 22	114 BEBGS. (111.)				
3	Provincial Health Services Authority  This drawing and it's contents are confidentia and are for the private information of the PHSA  It is not to be relied upon or used in whole aprit for other purposes or by or for the benefit of the purposes or by or for the benefit of the purposes.							PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)				
4	Province-wide solutions.  Better health.  Province-wide solutions.  Better health.  Province-wide solutions.  of other purposes or by or for the bound of others without prior adaptation and spewritten verification by PHSA							File No. C—STD—012 Rev. 4				



- 1. MINIMUM CONDUIT SIZE FOR DATA OUTLETS SHALL BE 270. IF A LARGER NUMBER OF DATA OUTLETS NEEDS TO BE INSTALLED IN THE SAME AREA, A SINGLE 530 FEEDER CONDUIT MAY BE USED AS A "ZONE CONDUIT" FOR EACH AREA. THE CONDUIT SHALL TERMINATE IN A LARGE PULL-BOX INSIDE THE AREA WHICH SHALL BE THE CONDUIT DISTRIBUTION POINT FOR THAT AREA.
- 2. WHEN ZONE CONDUIT IS USED, INSTALL A MINIMUM 305 mm x 305 mm x 152 mm DEEP PULL-BOX IN EACH AREA'S CEILING SPACE AS NEAR AS POSSIBLE TO THE CORRIDOR WALL AND ABOVE THE TILE IMMEDIATELY TO THE LEFT OR RIGHT OF THE ENTRANCE DOOR. THE DATA OUTLET CONDUIT WILL ENTER THE PULL BOX ON THE SIDE OPPOSITE TO THE 530 ZONE CONDUIT. (REFER TO DETAIL DRAWING)
- 3. ZONE BOX CABLING IS RESTRICTED TO HORIZONTAL DATA CABLES THAT TERMINATE ON THE IMIT RACKS DESIGNATED FOR HORIZONTAL CABLING. LEAVE A MULE TAPE IN THE ZONE CONDUIT FOR FUTURE CABLE INSTALLATIONS.
- 4. ZONE CONDUIT SIZING: THE ZONE CONDUIT WILL BE BASED ON 20% MAXIMUM FILL RATIO FOR CAT6A HORIZONTAL CABLING AT TIME OF PROJECT COMPLETION.
- 5. CONTRACTOR MUST LOCATE ALL CONDUITS, JB, INCLUDING SIZE, ROUTING AND CABLE COUNT ASSOCIATED WITH EACH ZONE CONDUIT SYSTEM ON THE PROJECT AS-BUILT DRAWINGS. THESE BECOME PART OF THE RECORD DRAWINGS SUBMITTED AT THE COMPLETION OF THE PROJECT.
- 6. PROVIDE A UNIQUE ZONE CONDUIT PATHWAY ID LABEL AT EACH PULL BOX ID LABEL AS PER BICSI LABELLING STANDARDS. CONTRACTOR TO ADD ZONE PULL BOX ID LABEL (WHITE LETTERING ON BLACK BACKGROUND) TO THE CEILING GRID (OR ACCESS HATCH IF APPLICABLE) DIRECTLY BELOW THE ZONE PULL BOX LOCATION.

							Building/Facility Name			
							1			
No.	BY	DATE		REVISION	IS	App'c				
Scale	BY						COMMUNICATION			
Sheet	No.			Drawn	СТ	14 02 25	COMMUNICATION			
			of	Check'd	EG/NM	14 02 25	ZONE CONDUIT PATHWAYS			
Projec	t No.			Design'd	NM/EG	14 02 25	ACUTE SITES			
				Approv'd		14 02 25	ACOTE SITES			
.\\	This drawing and it's contents are con and are for the private information of PHSA.  .\WORKING DRAWINGS\PHSA.jpg part for other purposes or by or for t					on of the	PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)			
			, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	of others without prior adaptation and spe written verification by PHSA			C-STD-013 Rev. 6			



	_							
								Building/Facility Name
No.	BY	DATE		REVISION	NS		App'd	
Scale					ВУ			C O A A A L I A L I
Sheet	Sheet No.		Drawn	СТ	08	02 22	COMMUNIC	
			of	Check'd	EG/NM	08	02 22	DEMARCAT
Project No.				Design'd	NM/EG	08	02 22	SPECIAL SERVIC
				Approv'd	SL	08	02 22	SI LOIAL SERVIC
			•					

Provincial Health
Services Authority
Province-wide solutions.
Better health.

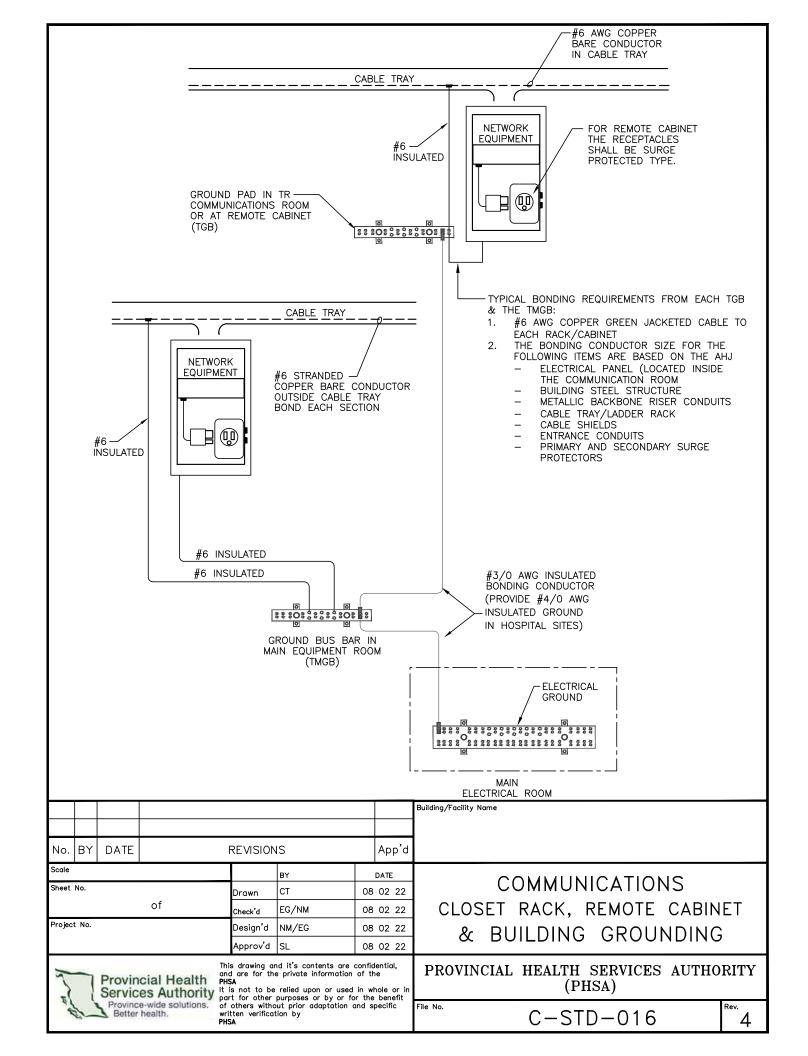
This drawing and it's contents are confidential, and are for the private information of the PHSA

It is not to be relied upon or used in whole or in part for other purposes or by or for the benefit of others without prior adaptation and specific written verification by PHSA

CATIONS ION FOR CES (TYPICAL)

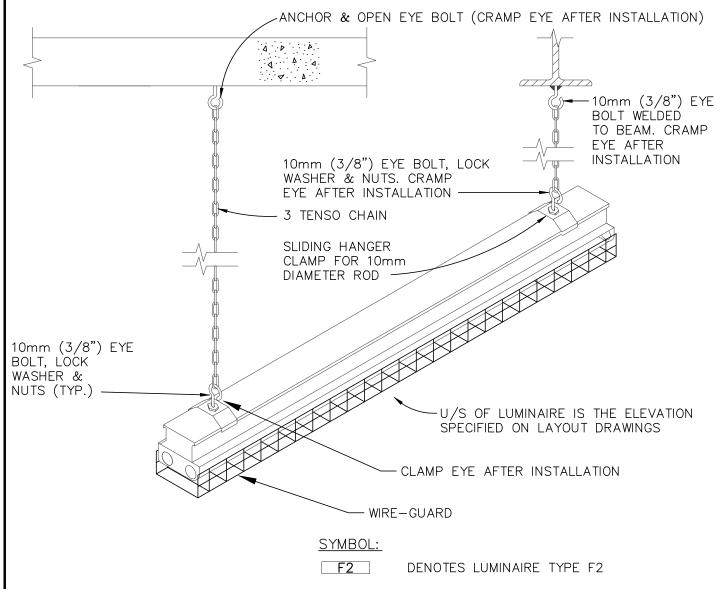
PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)

File No. C-STD-014



## CONCRETE CEILING

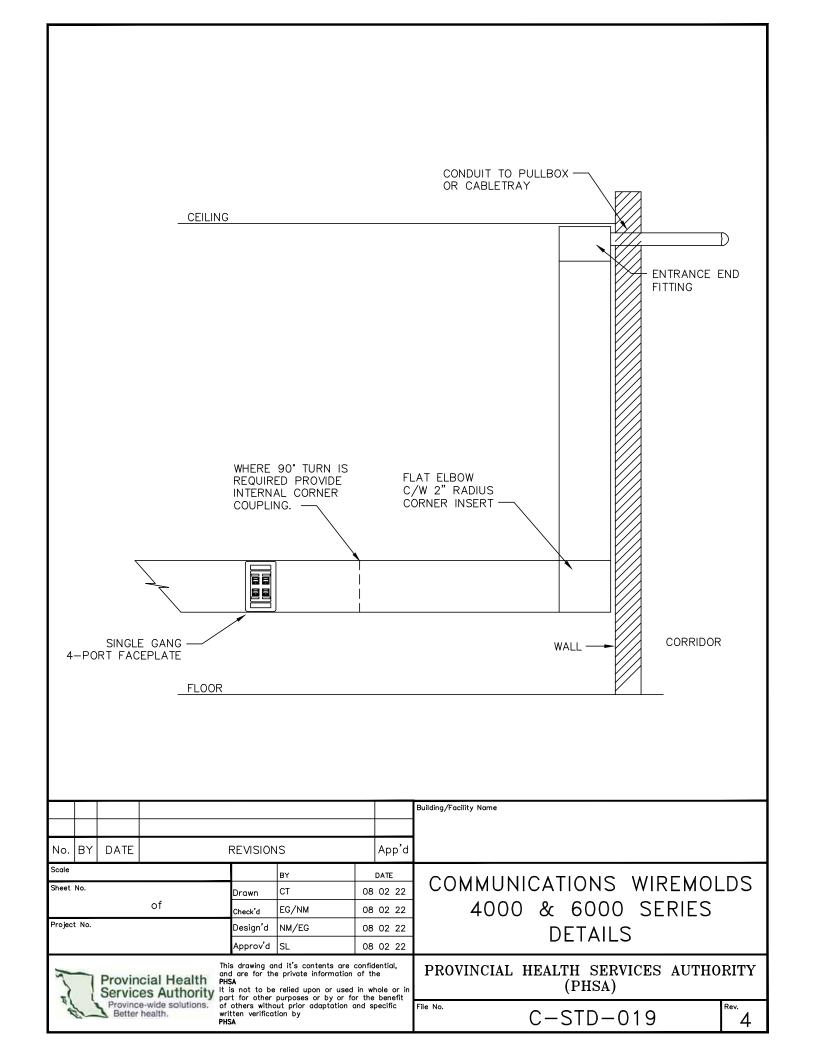
### STEEL BEAM

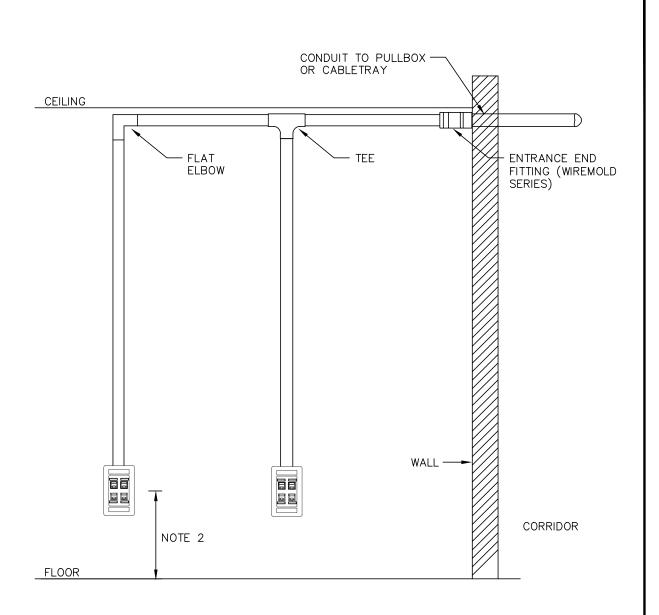


### NOTES:

1. EXACT HANGER DETAIL AT LUMINAIRE MAY VARY DEPENDING ON MAKE AND MODEL OF LUMINAIRE. WHERE MULTIPLE LUMINAIRES ARE REQUIRED IN A ROW (UP TO ONE LUMINAIRE GAP BETWEEN LUMINAIRES) USE 41mm 2 41mm SQUARE RACEWAY MOUNTED ON TOP OF LUMINAIRES. RACEWAY SHALL BE SUPPORTED AS SHOWN AT MAXIMUM 2440mm INTERVALS.

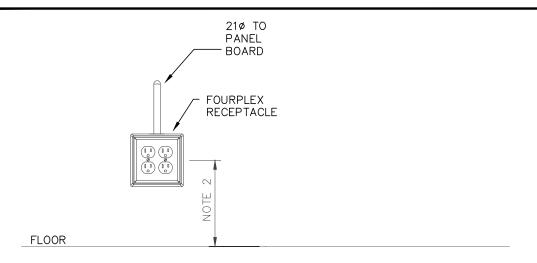
								Building/Facility Name
No.	BY	DATE		REVISION	IS		App'd	
Scale	BY						DATE	COMMUNICATIONS
Sheet	No.			Drawn	ст	08	02 22	COMMUNICATIONS
of			of	Check'd	EG/NM	08	02 22	SUSPENDED FLUORESCENT
Projec	Project No.			Design'd	NM/EG	80	02 22	LUMINAIRE MOUNTING DETAILS
				Approv'd	SL	08	02 22	LOMINAINE MOONTINO DETAILS
15	Provincial Health Services Authority  This drawing and it's contents are confident of the private information of the PHSA  It is not to be relied upon or used in what part for other purposes or by or for the						е	PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)
8	Province-wide solutions.  Better health.  Province-wide solutions.  Better health.  Province-wide solutions.  Better health.						pecific	File No. C-STD-017 Rev. 4



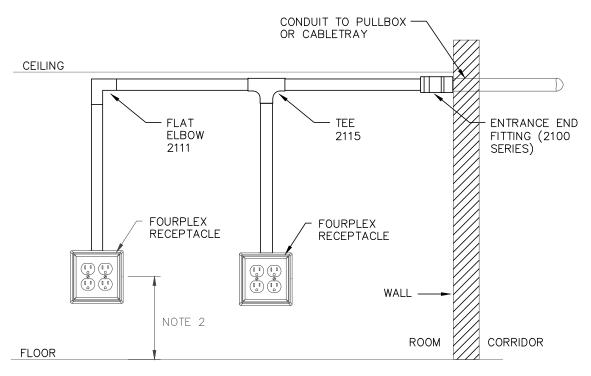


- 1. WHERE 90° TURN IS REQUIRED PROVIDE INTERNAL CORNER COUPLING.
- 2. 305mm OR MOUNTING HEIGHT TO MATCH EXISTING OUTLET MOUNTING HEIGHT IN THE SAME ROOM.

								Building/Facility Name
No.	BY	DATE		REVISION	IS		App'd	
Scale					BY		DATE	COMMUNICATIONS
Sheet	No.			Drawn	СТ	08	02 22	COMMUNICATIONS
of			of	Check'd	EG/NM	08	02 22	WIREMOLD
Projec	t No.			Design'd	NM/EG	08	02 22	DETAILS
				Approv'd	SL	08	02 22	DETAILS
3	Provincial Health Services Authority  This drawing and it's contents are confident and are for the private information of the PHSA  It is not to be relied upon or used in whole part for other purposes or by or for the be							PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)
8	Province-wide solutions.  Better health.  Province-wide solutions of others without prior adaptation and specific written verification by PHSA							File No. C-STD-020 Rev. 4



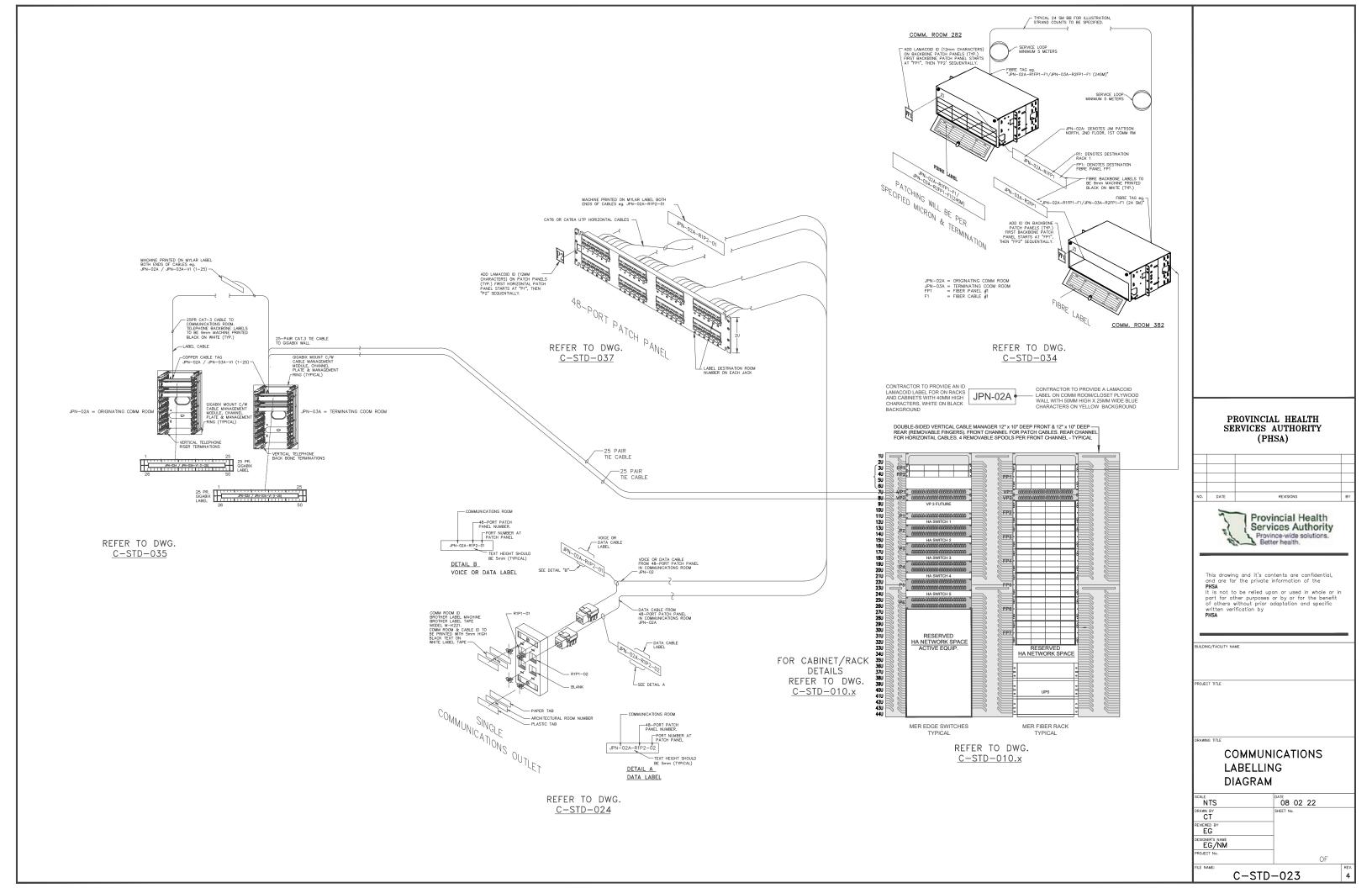
# SURFACE MOUNTED RECEPTACLE OUTLETS (CONDUIT SYSTEM)

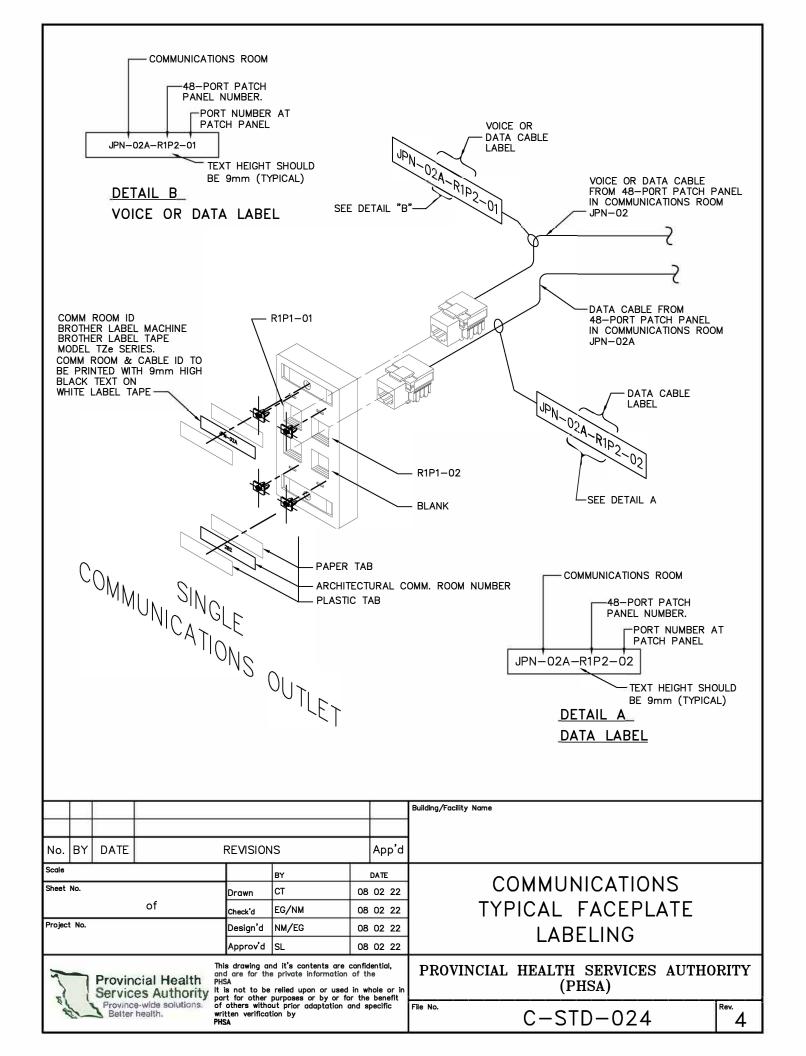


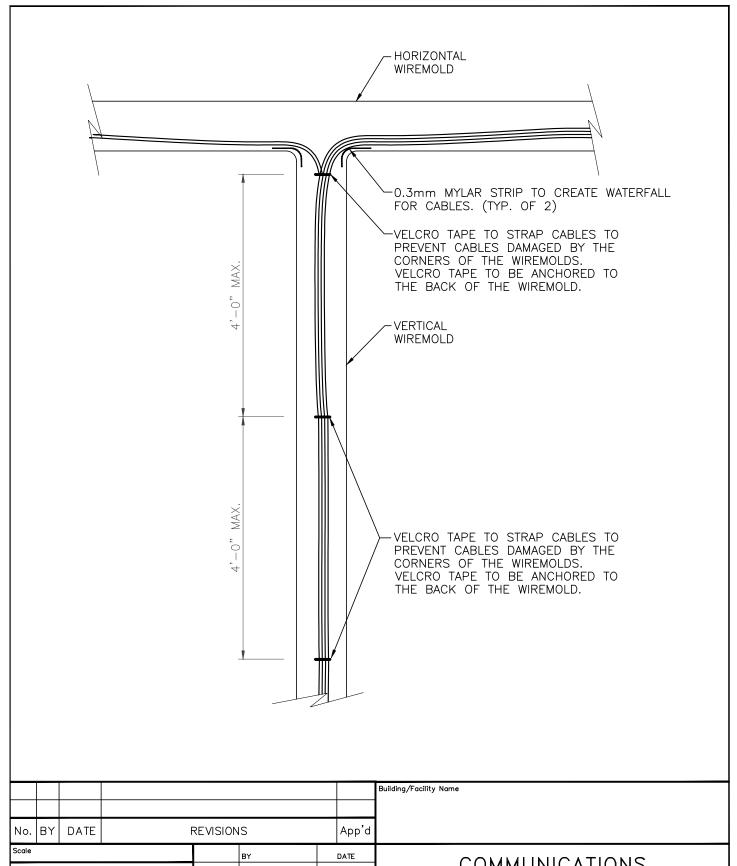
## SURFACE MOUNTED RECEPTACLE OUTLETS (WIREMOLD SYSTEM)

- WHERE 90° TURN IS REQUIRED PROVIDE INTERNAL CORNER COUPLING (2117TC).
- 2. 305mm OR MOUNTING HEIGHT TO MATCH EXISTING OUTLET MOUNTING HEIGHT IN THE SAME ROOM.

								Building/Facility Name		
No.	BY	DATE		REVISION	IS		App'd			
Scale	BY						DATE	00141411104710116		
Sheet	No.			Drawn	СТ	08 02 22		COMMUNICATIONS		
	of				EG/NM	80	02 22	RECEPTACLE		
Projec	t No.			Design'd	NM/EG	80	02 22	DETAILS		
				Approv'd	SL	08	02 22	DETAILS		
3	Provincial Health Services Authority  This drawing and it's contents are confident of the private information of the PHSA  It is not to be relied upon or used in what for other purposes or by or for the							PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)		
4	7	Provinc	e-wide solutions. o health. w	f others without the control of the	out prior adaptation o	and sp	pecific	File No. C-STD-021 Rev. 4		







No.	BY	DATE		App'd			
Scale					BY		DATE
Sheet	No.			Drawn	СТ	08	02 22
			of	Check'd	EG/NM	08	02 22
Projec	t No.		_	Design'd	NM/EG	08	02 22
				Approv'd	SL	08	02 22

Provincial Health
Services Authority
Province-wide solutions.
Better health.

This drawing and it's contents are confidential, and are for the private information of the PHSA

This drawing and it's contents are confidential, and are for the private information of the PHSA

This drawing and it's contents are confidential, and are for the private information of the PHSA

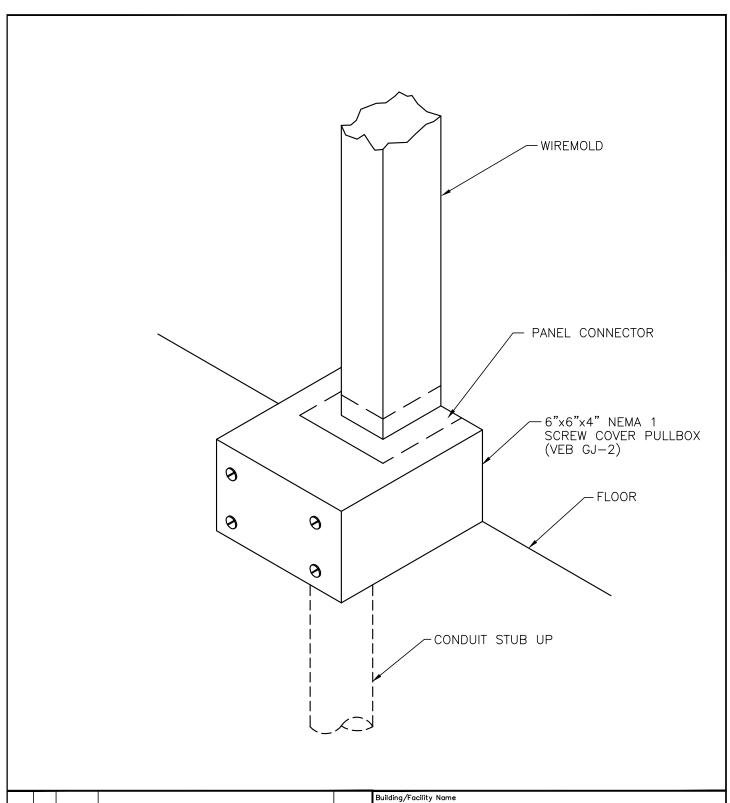
This drawing and it's contents are confidential, and are for the private information of the PHSA

Written verification by PHSA

COMMUNICATIONS CABLE SUPPORT DETAILS FOR 4000 & 6000 WIREMOLD VERTICAL RISER

PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)

C-STD-027



No.	BY	DATE	REVISIONS							
Scale	ale BY DA									
Sheet	No.			Drawn	СТ	08	02 22			
			of	Check'd	EG/NM	08	02 22			
Project	l No.		_	Design'd	NM/EG	08	02 22			
				Approv'd	SL	08	02 22			

COMMUNICATIONS TYPICAL CONNECTION BETWEEN CONDUIT & 4000/6000 WIREMOLD

Provincial Health
Services Authority
Province-wide solutions.
Better health.

This drawing and it's contents are confidential, and are for the private information of the PHSA

This drawing and it's contents are confidential, and are for the private information of the PHSA

This drawing and it's contents are confidential, and are for the private information of the PHSA

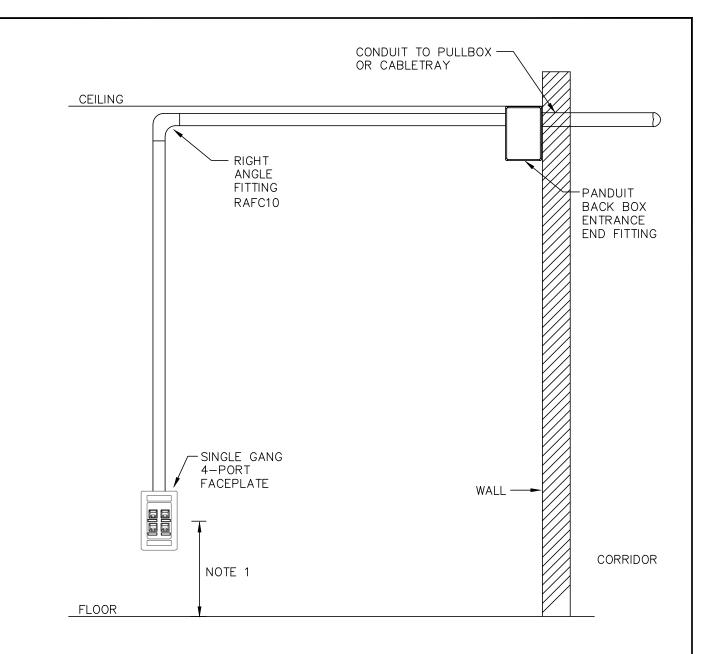
This drawing and it's contents are confidential, and are for the private information of the PHSA

Writer PHSA

This drawing and it's contents are confidential, and are for the private information of the PHSA

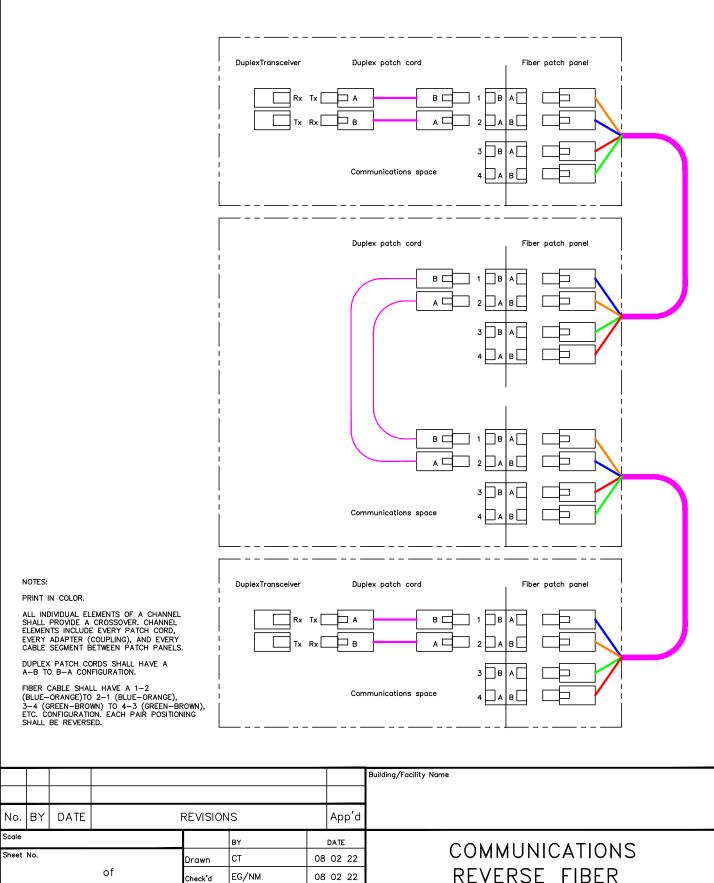
PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)

File No. C-STD-028



- 1. 305mm OR MOUNTING HEIGHT TO MATCH EXISTING OUTLET MOUNTING HEIGHT IN THE SAME ROOM.
- 2. MINIMUM CABLE BENDING RADIUS SHALL BE 1" OR 25mm.

							Building/Facility Name				
No.	BY	DATE		REVISION	NS .	App'd					
Scale BY							COMMUNICATIONS				
. 2.3						08 02 22					
Of Check'd EG/NM OE						08 02 22	PANDUIT LDP-10 SERIES				
Projec	t No.			Design'd	NM/EG	08 02 22	NON METALLIC DETAILS				
				Approv'd	SL	08 02 22	NON METALLIC DETAILS				
15		Provin Servic	cial Health es Authority	and are for th	nd it's contents are e private information e relied upon or used purposes or by or fo out prior adaptation o	of the	PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)				
8	1	Provinc Better	e-wide solutions. health.	of others withouritten verifica PHSA	out prior adaptation of	and specific	C-STD-031 Rev. 4				



Project No.

08 02 22

NM/EG

Design'd

Approv'd

Provincial Health
Services Authority
Province-wide solutions.
Better health.

This drawing and it's contents are confidential, and are for the private information of the PHSA

This drawing and it's contents are confidential, and are for the private information of the PHSA

PHSA

This drawing and it's contents are confidential, and are for the private information of the PHSA

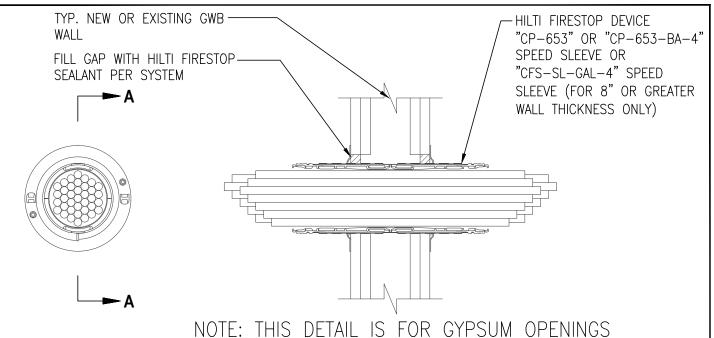
PHSA

This drawing and it's contents are confidential, and are for the private information of the PHSA

REVERSE FIBER PAIR POSITIONING

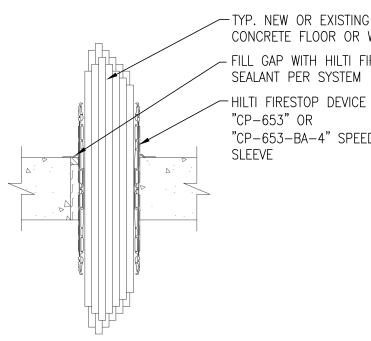
PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)

C-STD-032



NOTE: THIS DETAIL IS FOR GYPSUM OPENINGS INSTALL PER HILTI SYSTEM DRAWING W-L-3334

NOTE: THE FIRESTOP SYSTEM DRAWINGS REFERENCED IN FIRE STOP SECTION 27 05 29 AND THE PHSA C-STD DRAWINGS ARE TO BE USED FOR REFERENCE ONLY. CONTRACTOR IS RESPONSIBLE TO OBTAIN THE MOST CURRENT DRAWINGS AVAILABLE FROM THE FIRE STOP MANUFACTURER FOR ANY PROJECT.

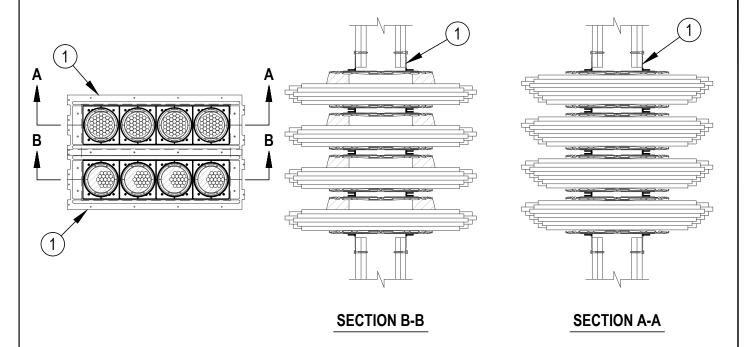


CONCRETE FLOOR OR WALL FILL GAP WITH HILTI FIRESTOP SEALANT PER SYSTEM HILTI FIRESTOP DEVICE "CP-653" OR "CP-653-BA-4" SPEED SLEEVE

NOTE: THIS DETAIL IS FOR CORED OPENINGS INSTALL PER HILTI SYSTEM DRAWING C-AJ-3283 OR C-J-3285

								Building/Facility Name		
No.	BY	DATE		REVISION	IS	Ар	p'd			
Scale					BY	DATE		000444104004710040		
Sheet	No.			Drawn	СТ	08 02 22		COMMUNICATIONS		
			of	Check'd	EG/NM	08 02	22	] TYPICAL FIRESTOPPING		
Proje	ct No.			Design'd	NM/EG	08 02 22		DETAILS		
				Approv'd	SL	08 02	22	DLIAILS		
150	Provincial Health Services Authority Province-wide solutions. Better health.  Province wide solutions.  Province wide solutions.  Province wide solutions.  Better health.							PROVINCIAL HEALTH SERVICES AUTHOR (PHSA)	RITY	
4	g-1	S Province Better	e-wide solutions. health.	f others withouritten verifica HSA	out prior adaptation tion by	and specif	fic	C-STD-033.1	4	

THIS IS AN ILLUSTRATION OF A GANGPLATE FOR THE HILT CP 653-4" I SPEED SLEEVES THE PLATES ARE AVAILABLE FOR EITHER 3 OR 4 SLEEVE PLATES. USE BLANKING CAPS WHEN SOME OF THE OPENINGS ARE NOT BEING USED

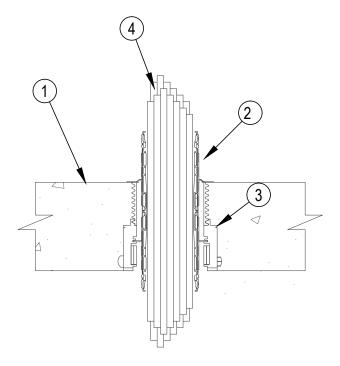


INSTALL PER HILTI SYSTEM DRAWING W-L-3395

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS—SL GP 16" AND 24" FIRESTOP GANGPLATE — CFS—SL GP CAP FIRESTOP GANGPLATE CAP

- 1. FIRESTOP DEVICE\* THE FIRESTOP DEVICE CONSISTS OF A STEEL PLATE SANDWICH CONSTRUCTION WITH THREE (16" DEVICE SIZE) OR FOUR (24" DEVICE SIZE) CIRCULAR OPENING PORTS WHICH ARE EACH NOM 4 IN. (102 MM) DIAM. THE FIRESTOP DEVICE IS INTENDED TO BE ORIENTED VERTICALLY OR HORIZONTALLY AND MOUNTED TO THE FACE OF THE OPENING ON BOTH SIDES OF WALL. THE 16" AND 24" FIRESTOP DEVICES WHEN ORIENTED HORIZONTALLY ARE ATTACHED TO THE 16 IN. (406 MM) AND 24 IN. (610 MM), RESPECTIVELY, CENTER TO CENTER SPACED WALL STUDS AT EACH SIDE OF OPENING, OVER THE GYPSUM BOARD.
- 2. THE FIRESTOP SYSTEM DRAWINGS REFERENCED IN FIRE STOP SECTION 27 05 29 AND THE PHSA C-STD DRAWINGS ARE TO BE USED FOR REFERENCE ONLY. CONTRACTOR IS RESPONSIBLE TO OBTAIN THE MOST CURRENT DRAWINGS AVAILABLE FROM THE FIRE STOP MANUFACTURER FOR ANY PROJECT.

							Building/Facility Name
No.	BY	DATE		REVISION	NS .	App'o	
Scale BY							COMMUNICATIONS (IIII TI)
Sheet	No.			Drawn	СТ	08 02 22	
			of	Check'd	EG/NM	08 02 22	]SPEED SLEEVE GANGING PLATE
Proje	t No.			Design'd	NM/EG	08 02 22	CFS-SL GP 16" AND 24"
				Approv'd	SL	08 02 22	
15/1		Servic	es Authority	and are for th PHSA It is not to be	nd it's contents are e private information e relied upon or used purposes or by or fo	of the	PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)
D.	4	Provinc	e-wide solutions. health.		out prior adaptation of		File No. C-STD-033.2 Rev. 4



## **INSTALL PER HILTI SYSTEM DRAWING F-A-3060**

### COMBINATION CAST-IN-PLACE & SPEED SLEEVE ASSEMBLY

### NOTE:

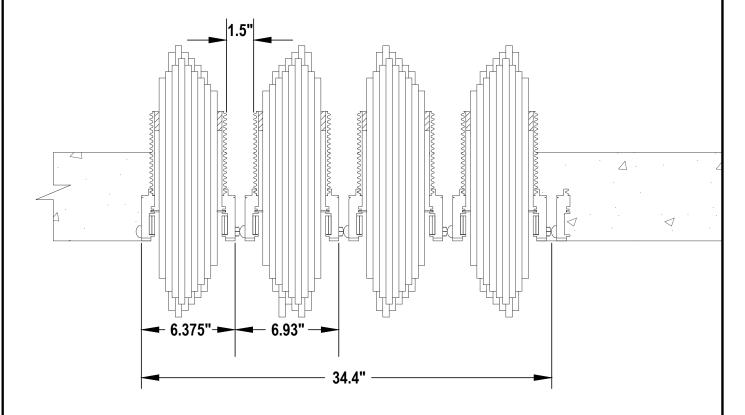
- 1) CONCRETE SLAB
- 2) HILTI SPEED SLEEVE CP 653-4"
- 3) HILTI CAST-IN-PLACE SLEEVE CP 680-P 4"
- 4) COMMUNICATION CABLES

### **GENERAL NOTES:**

- THIS DETAIL IS FOR RISER SLEEVES FOR COMMUNICATION ROOMS USING CAST—IN—PLACE SLEEVES IN COMBINATION WITH SPEED SLEEVES.
- ALL RISER SLEEVES ARE COMMUNICATION CABLES ONLY; DO NOT USE FOR CONDUIT OR POWER CIRCUITS
- CONTRACTOR IS REQUIRED TO OBTAIN THE LATEST SYSTEM DRAWING FROM HILTI.

							Building/Facility Name					
No.	BY	DATE		REVISION	IS	App'						
Scale BY						DATE						
Sheet No.				Drawn	СТ	08 02 22						
			of	Check'd	EG/NM	08 02 22	CAST-IN-PLACE/SPEED SLEEVE					
Projec	t No.			Design'd	NM/EG	08 02 22	•					
				Approv'd	SL	08 02 22	1 A 3000 3131EM DWO					
15		Servic	cial Health	d are for th	nd it's contents are e private information relied upon or used purposes or by or fo	PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)						
24	1	Provinc	e-wide solutions. of health, wr	others without the others without the others werifican series.	out prior adaptation o	File No. C—STD—033.3 Rev. 4						

### HILTI CP-680-P-4" CAST IN PLACE SLEEVES



### **GENERAL NOTES:**

CONTRACTOR IS REQUIRED TO OBTAIN THE LATEST SYSTEM DRAWING FROM HILTI.

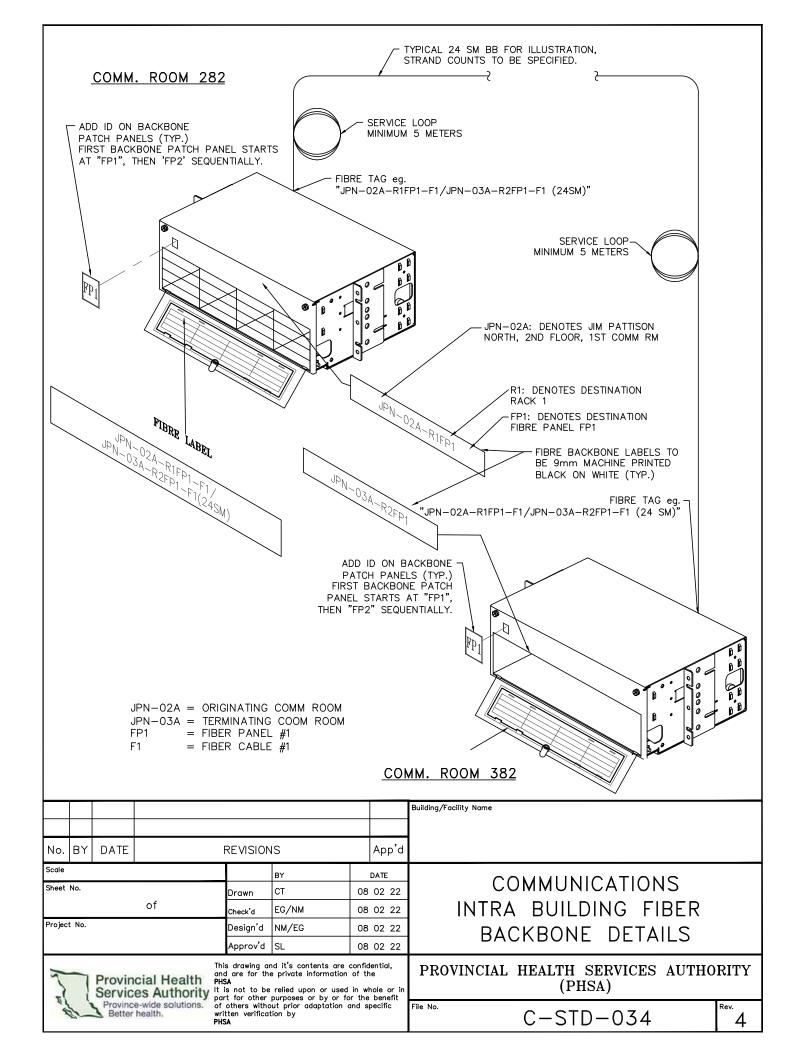
								Building/Facility Name		
No.	BY	DATE		REVISION	1S					
Scale	Scale				BY		DATE			
Sheet	No.			Drawn	СТ	08	02 22	COMMUNICATIONS (HILTI)		
			of	Check'd	EG/NM 08		02 22	CAST-IN-PLACE/SPEED		
Projec	Project No.			Design'd NM/EG 0		08	02 22	SLEEVE SPACING		
				Approv'd	SL	08	02 22	SELEVE SI ACIIVO		
				<b>-</b>	. 4 112		44-1			

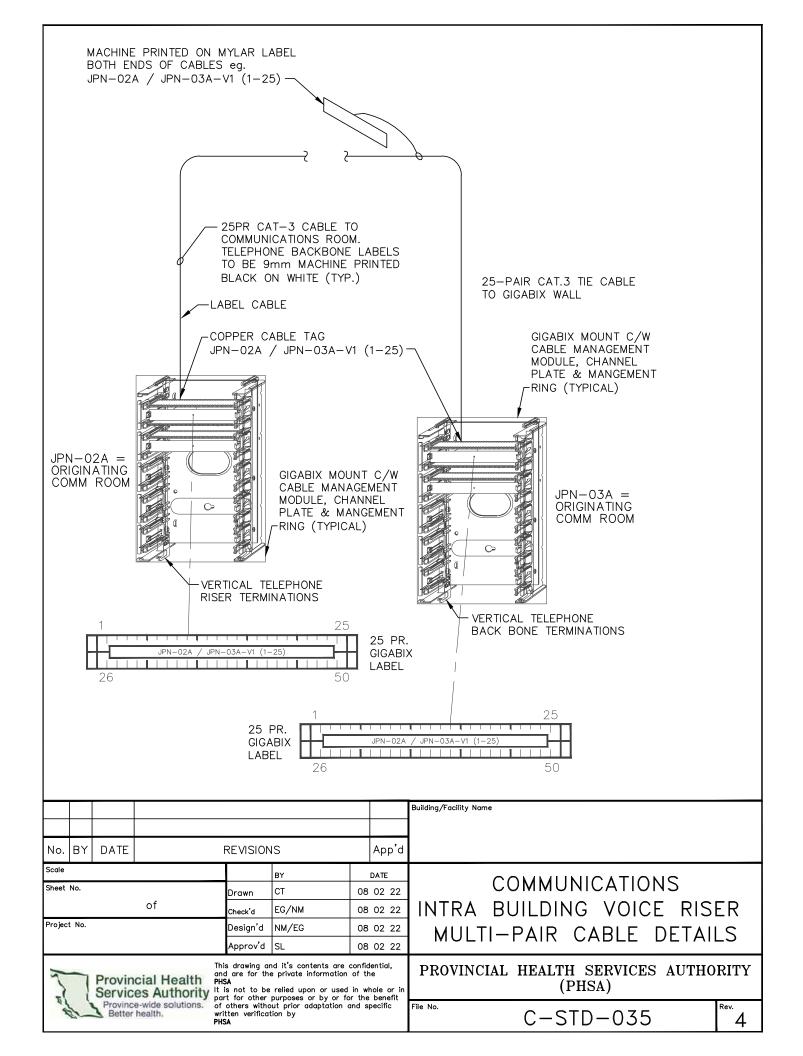
Provincial Health
Services Authority
Province-wide solutions.
Better health.

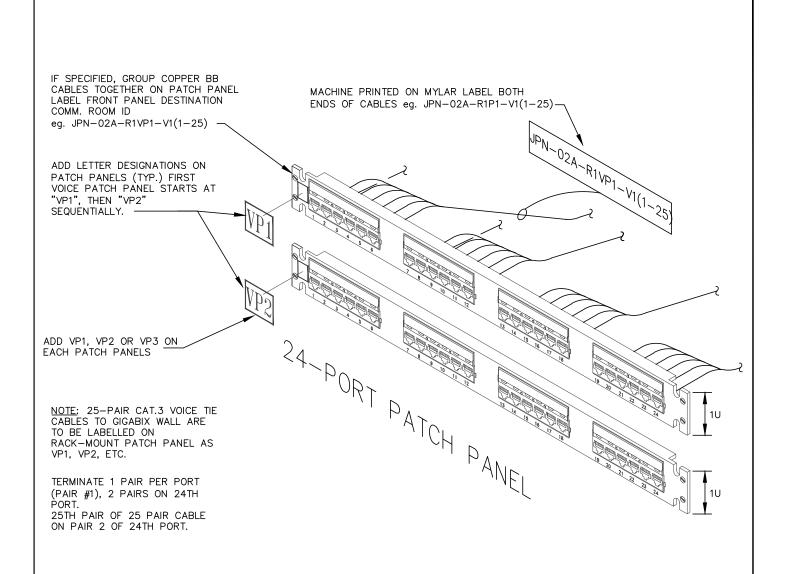
This drawing and it's contents are confidential, and are for the private information of the PHSA
It is not to be relied upon or used in whole or in port for other purposes or by or for the benefit of others without prior adaptation and specific written verification by PHSA

PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)

File No. C-STD-033.4







								Building/Facility Name
No	. BY	DATE		REVISION	NS		App'd	
Scale	•				BY			COMMINICATIONS
Shee	t No.		Drawn CT				02 22	COMMUNICATIONS
			of	Check'd	EG/NM	08	02 22	UTP 24 PORT
Proje	Project No.			Design'd	Design'd NM/EG 08			VOICE (TIE) PATCH PANEL
				Approv'd	SL	08	02 22	VOICE (TIE) TATOIT TANEE

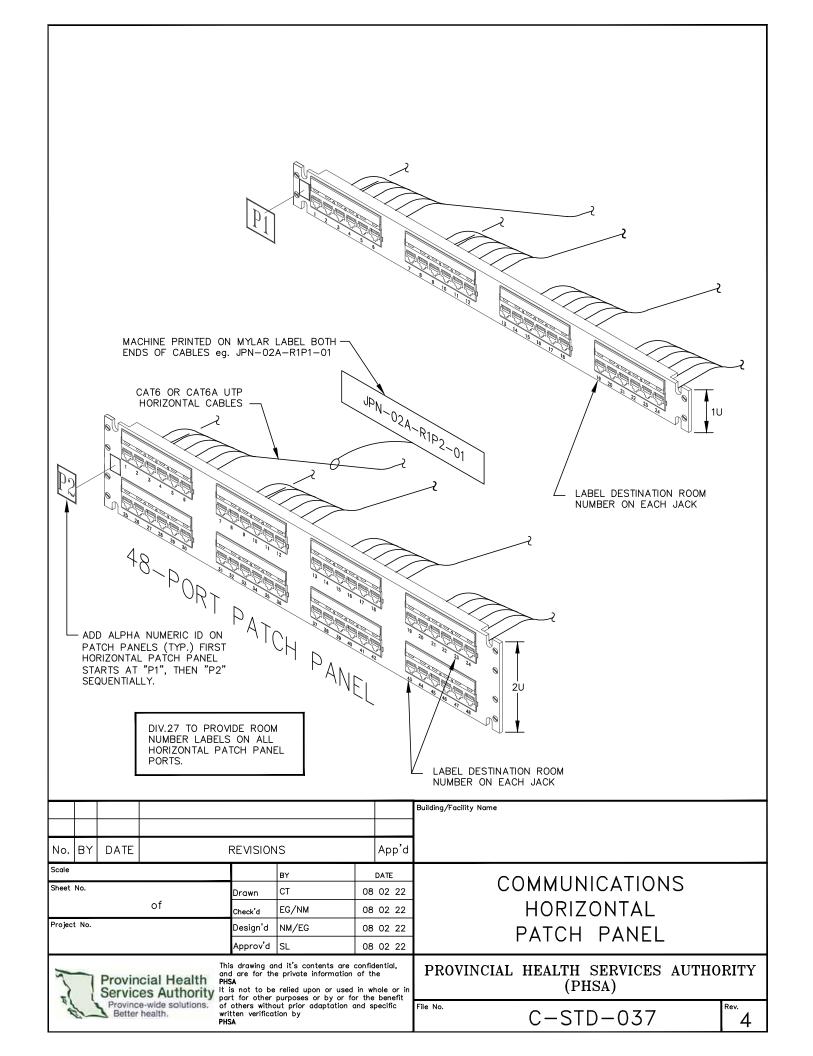
Provincial Health
Services Authority
Province-wide solutions.
Better health.

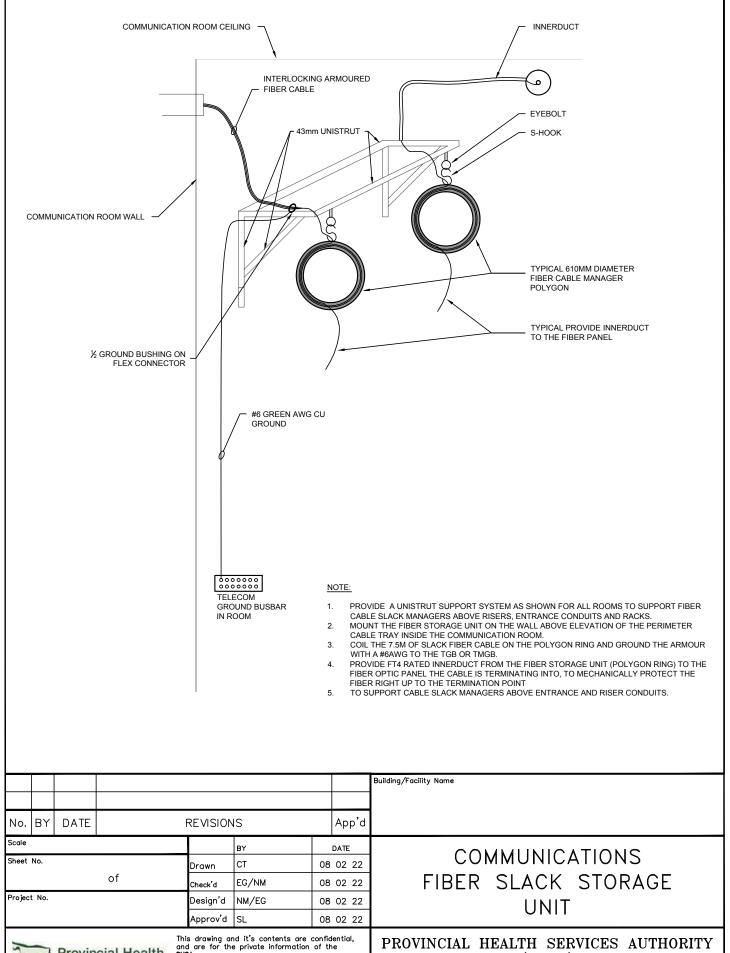
This drawing and it's contents are confidential, and are for the private information of the PHSA

It is not to be relied upon or used in whole or in part for other purposes or by or for the benefit of others without prior adaptation and specific written verification by PHSA

PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)

File No. C-STD-036



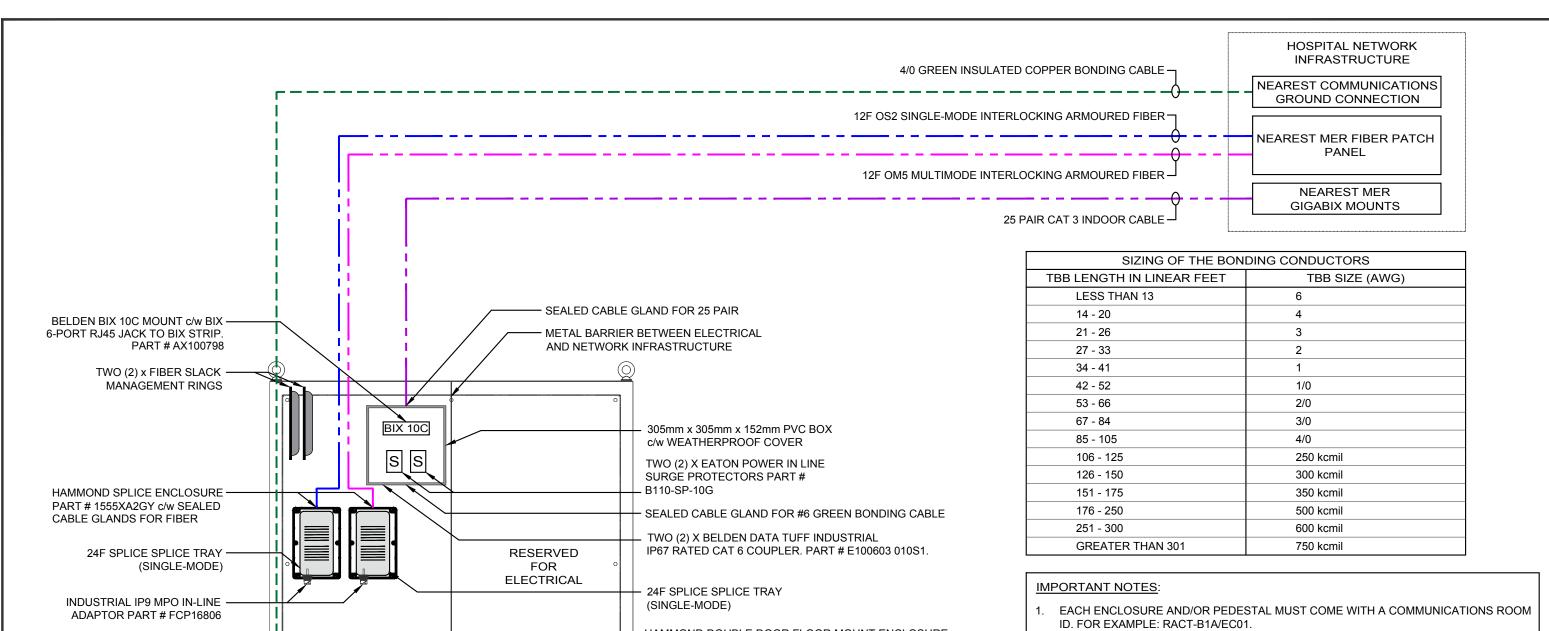


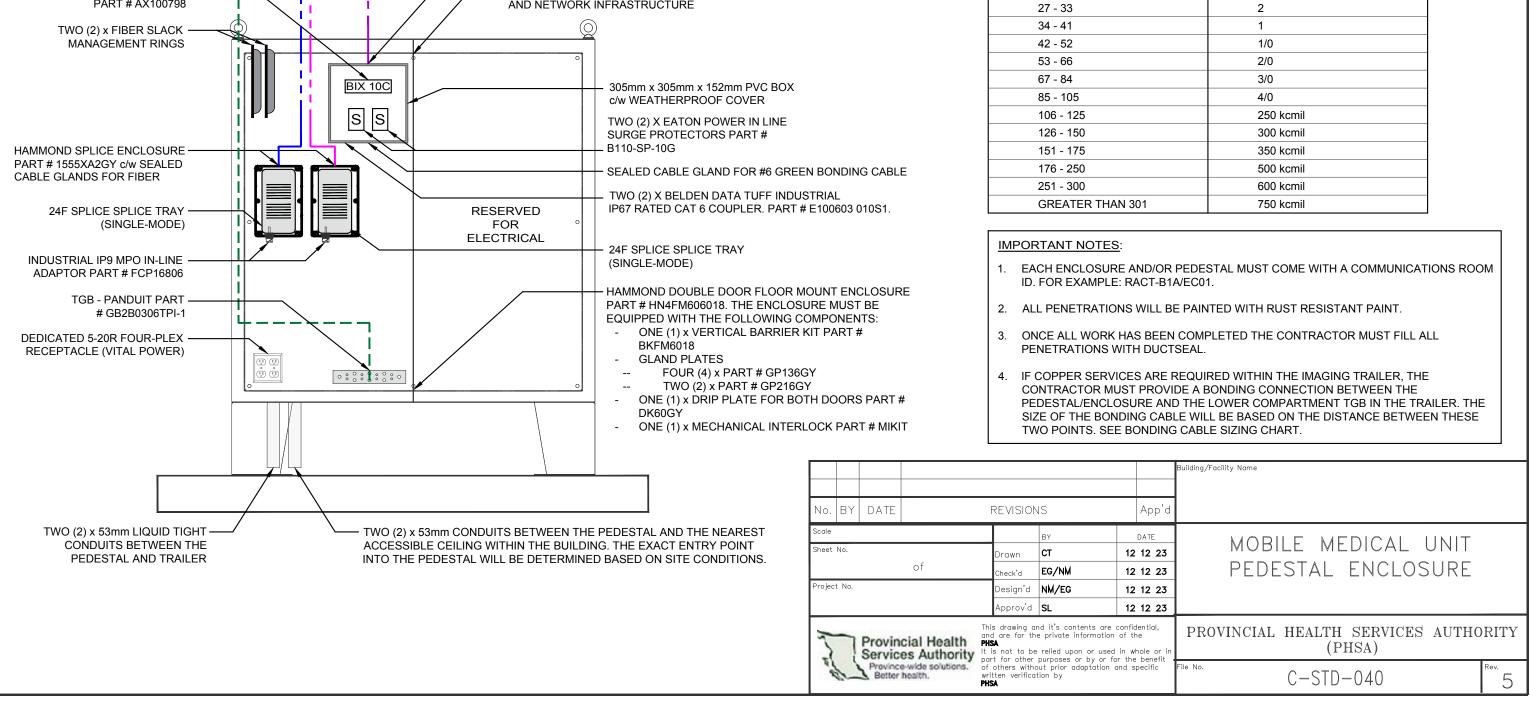
Provincial Health Services Authority Province-wide solutions. Better health.

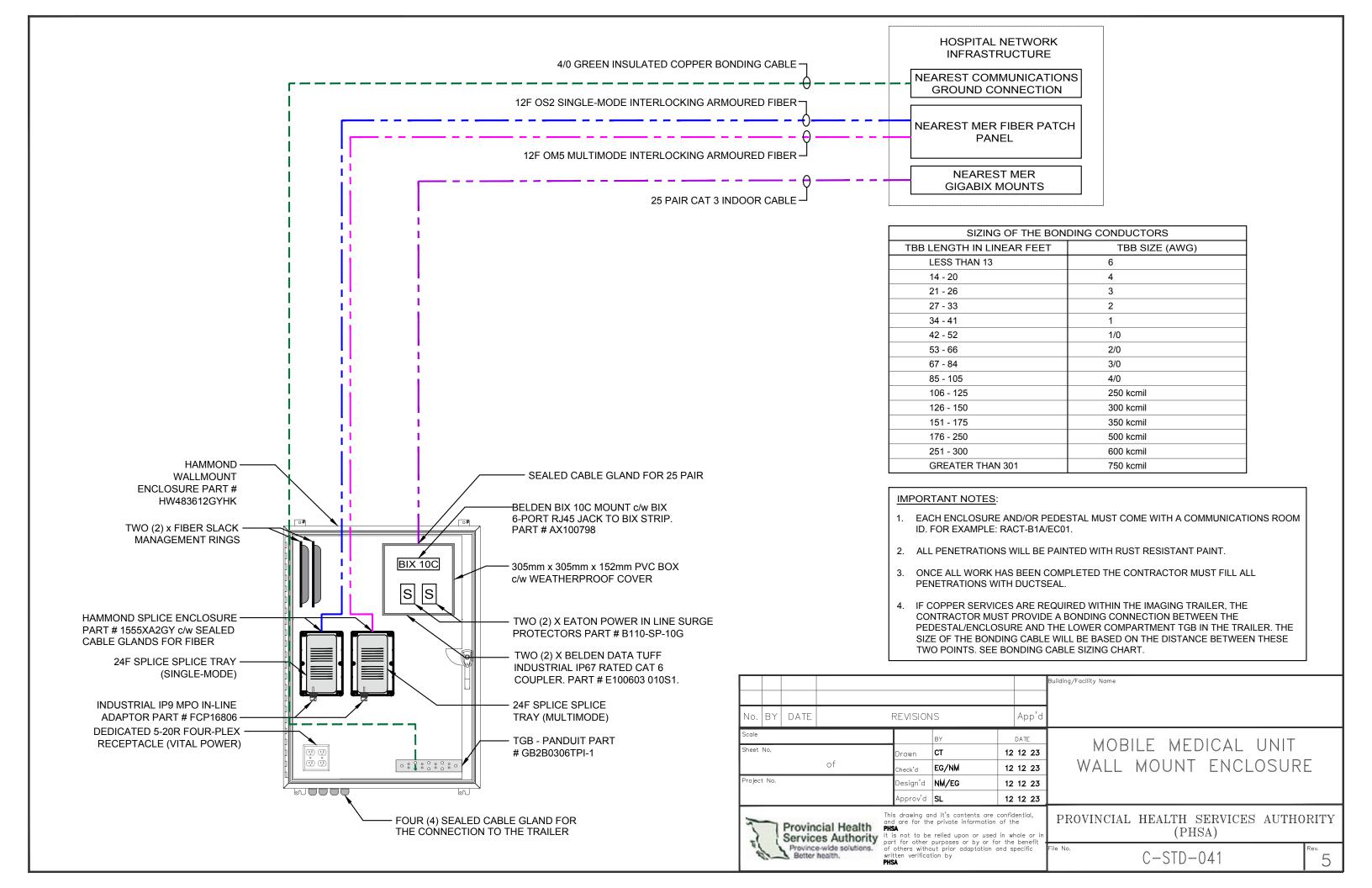
This drawing and it's contents are confidential, and are for the private information of the PHSA It is not to be relied upon or used in whole or in part for other purposes or by or for the benefit of others without prior adaptation and specific written verification by PHSA

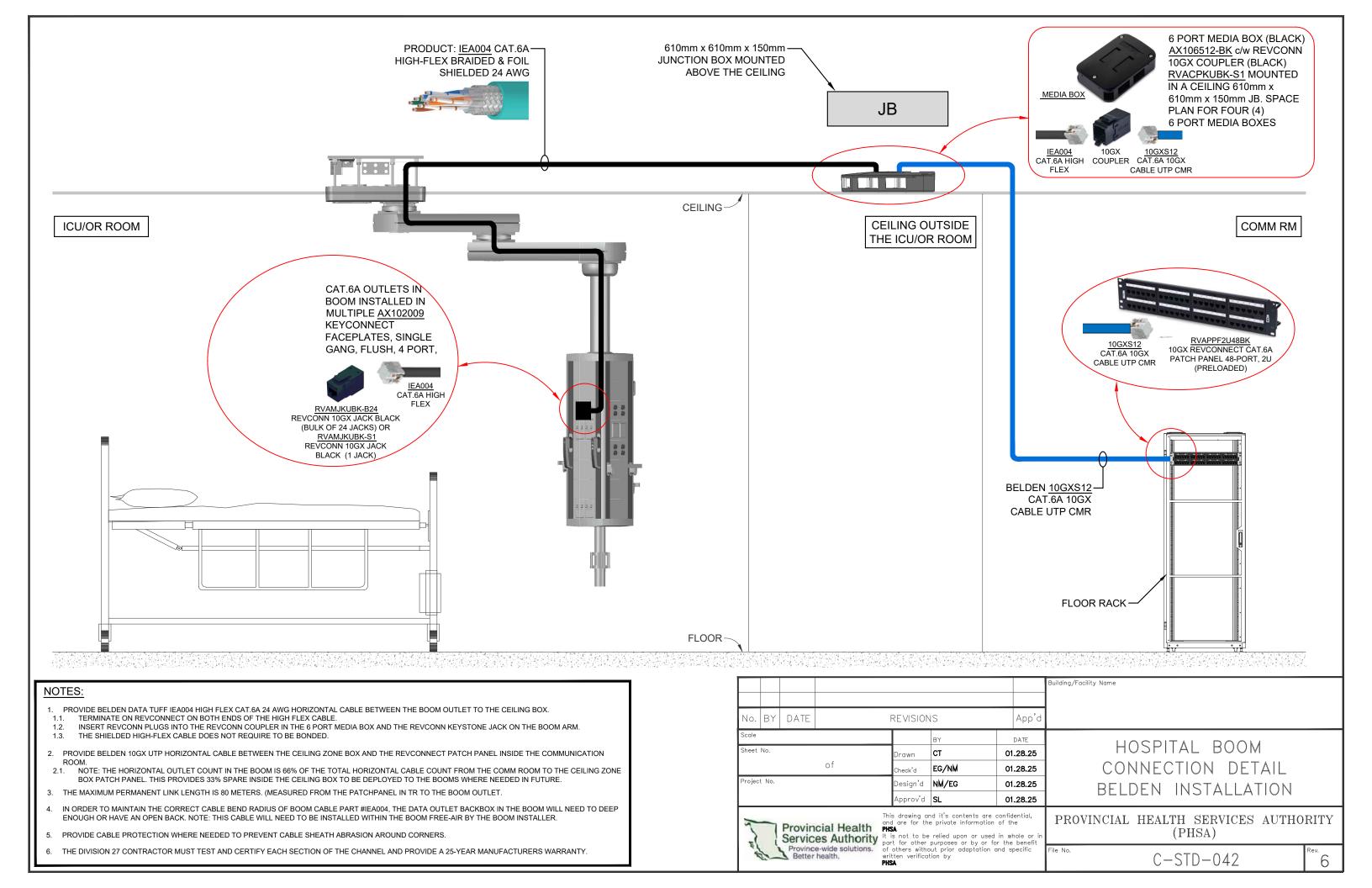
(PHSA)

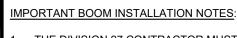
C-STD-038







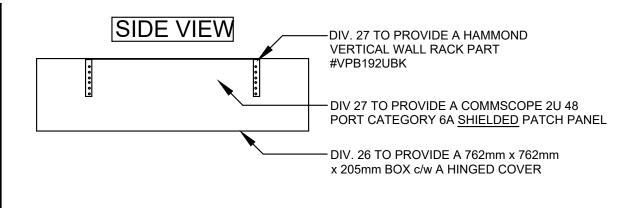




ICU/OR ROOM-

- THE DIVISION 27 CONTRACTOR MUST BOND THE SHIELDED PATCH PANEL ABOVE THE BOOM CEILINGS TO THE COMMUNICATIONS ROOM BUSBAR SBB. THE BONDING CABLE SIZE WILL BE BASED ON THE EIA/TIA 607-D STANDARD. ALL BONDING CONNECTION MUST BE LABELLED AT BOTH ENDS. EXAMPLE LABEL, VJPN-N2C-OR 2-1 BOOM CABLE.
- 2. THE DIVISION 27 CONTRACTOR MUST TEST AND CERTIFY EACH SECTION OF THE CHANNEL AND PROVIDE A 25-YEAR MANUFACTURERS WARRANTY.
- 3. THE DIVISION 27 CONTRACTOR MUST ENSURE EACH BOOM CABLE HAS A DEDICATED CABLE CONNECTED DIRECTLY TO THE NEAREST COMMUNICATION ROOM RACK.
- 4. THE DIVISION 26 CONTRACTOR MUST PLACE THE 762mm x 762mm x 205mm ENCLOSURE IN A LOCATION THAT IS ACCESSIBLE FROM THE ACCESS HATCHES IN THE ICU/OR.

- 5. THE DIVISION 26 CONTRACTOR MUST PROVIDE CONDUIT BETWEEN THE JUNCTION BOX ABOVE THE CEILING AND EACH BOOM ARM.
- 6. THE MAXIMUM PERMANENT LINK LENGTH IS 80 METERS. (MEASURED FROM THE PATCH PANEL IN THE TR TO THE BOOM OUTLET).
- 7. TO MAINTAIN THE CORRECT CABLE BEND RADIUS OF THE BOOM CABLE PART #IEA004, THE DATA OUTLET BACKBOX IN THE BOOM WILL NEED TO DEEP ENOUGH OT HAVE AN OPEN BACK. NOTE: THIS CABLE WILL NEED TO BE INSTALLED WITHIN THE BOOM FREE-AIR BY THE BOOM INSTALLER.
- PROVIDE CABLE PROTECTION WHERE NEEDED TO PREVENT CABLE SHEATH ABRASION AROUND CORNERS



 DIV. 27 TO PROVIDE A DEDICATED #6AWG MINIMUM BONDING CABLE PER THE EIA/TIA 607-D STANDARD

SBB BUSBAR

**COMM ROOM** 

DIV. 27 TO PROVIDE BELDEN HIGH FLEX CATEGORY 6A 24 — AWG CABLES IN EACH BOOM. PART # IEA004. CABLING MUST BE ENCLOSED IN EMT CONDUIT. REFER TO DRAWINGS FOR EXACT CABLE COUNT PER BOOM



DIV. 26 TO PROVIDE A – 762mm x 762mm x 205mm BOX c/w A HINGED COVER

DIV 27 TO PROVIDE A COMMSCOPE 2U 48 PORT CATEGORY 6A SHIELDED PATCH PANEL FRONT VIEW

-DIV. 27 TO PROVIDE FORTY-EIGHT (48) x COMMSCOPE CATEGORY 6A UTP CABLES BETWEEN EACH BOOM JB LOCATION IN CEILING AND THE COMMUNICATION ROOM RACK. THESE CABLES WILL TERMINATE ON PATCH PANELS AT BOTH ENDS

DIV. 27 TO PROVIDE BELDEN 10GX MODULAR PLUGS PART #RVAFPSME-S1. THE HIGH FLEX CABLE AND PLUG WILL CONNECT TO THE NEW SHIELDED COMMSCOPE PATCH PANEL



DIV. 27 TO PROVIDE HAMMOND VERTICAL WALL BRACKET PART #VPB192UBK

DIV. 27 TO PROVIDE SHIELDED CATEGORY 6A-RJ45 JACKS. COMMSCOPE PART # HGS620. THE CABLES MUST TERMINATE ON 4-PORT COVER PLATES

			Approv'd	SL	01	.28,25		/ IVI I\
Project No	) <b>.</b>		Design'd	NM/EG	01	.28.25		MN
		of	Check'd	EG/NM	01	.28.25		CC
Sheet No.			Drawn	СТ	01	.28.25		Г
Scale				BY		DATE		
No. B	Y DATE		REVISION	NS		App'd		
							Building/Facility	Name

HOSPITAL BOOM
CONNECTION DETAIL
COMMSCOPE INSTALLATION

Provincial Health Services Authority Province-wide solutions. Better health,

CEILING OUTSIDE THE ICU/OR ROOM

This drawing and it's contents are confidential, and are for the private information of the

is not to be relied upon or used in whole or in art for other purposes or by or for the benefit others without prior adaptation and specific cities verification by PROVINCIAL HEALTH SERVICES AUTHORITY (PHSA)

C-STD-043

### APPENDIX A - PHSA COMMUNICATIONS STANDARD - SAMPLE DATABASE

	Α	В	С	D	E	F	G	Н	I	J	K	L	М	N	0	Р	Q	R	S
1	1 PHSA - Network Edge																		
2	Horizontal Cable Information										SAMI	PLE D	ATA F	ORMAT ON	ILY - PLEASE DELETE IT	BEFORE	ENTERING	S NEW DATA	
3	Note: .	Submit	Telecom	Room ID to	o Network Edg	ge for a	approv	al upon	award of contract.										
4				Origir	nating End <sub>l</sub>	point	<b>-</b> (Co	mmun	ications Room)			T	ermi	natin	g Endpoi	nt - (User Space)			
5	Use	( ania i	Teleco m Arch Room #	Room ID				Patch Panel Port	I SWITCH/VAICE PA	Switch/Voice Patch ID		Bldg Code			Terminatio n type	Full Cable ID	Coy Name	Install Date	Other Linkage Records
6									Switch ID	Port ID									
7	WP	Cat 6	20	WLD-01A	Patch Panel	R1	VP1	.01	Voice Patch Panel	R1VP1-01		WLD	01	25	RJ45	WLD-01A-R1P1-01(WP)	ABC	1-Feb-18	WLD-B1A/WLD-01A-V1.001
8	WP	Cat 6	20	WLD-01A	Patch Panel	R1	P1	.02	R1-SW01-1	1		WLD	01	25	RJ45	WLD-01A-R1P1-02(WP)	ABC	1-Feb-18	
		Cat 6	20	WLD-01A	Patch Panel	R1	P1	.03	R1-SW01-1	3		WLD	01	25	RJ45	WLD-01A-R1P1-03	ABC	1-Feb-18	
10	Data	Cat 6	20	WLD-01A	Patch Panel	R1	P1	.04	R1-SW01-1	R1-SW01-1 5		WLD	01	25	RJ45	WLD-01A-R1P1-04	ABC	1-Feb-18	
		Cat 6	20	WLD-01A	Patch Panel	R1	P1	.05	R1-SW01-1	7		WLD	01	38	RJ45	WLD-01A-R1P1-05	ABC	1-Feb-18	
12	Data	Cat 6	20	WLD-01A	Patch Panel	R1	P1	.06	R1-SW01-1	9		WLD	01	38	RJ45	WLD-01A-R1P1-06	ABC	1-Feb-18	

#### APPENDIX A - PHSA COMMUNICATIONS STANDARD - SAMPLE DATABASE

	Α	В	С	D	E	F	G	Н	l i	J	K	L -	М	N
1	PHS/	A - Netwo	rk Eda	e	_	·								
2	Intra-Building UTP Riser Cable Information								SAMPI	Ε ΝΔΤΔ Ε	ORMAT ONLY - I	PLEASE DELETE IT BEFORE E	NTERING	NEW DATA
-									OAMI L	LUAIAI	ONL   -	LEAGE BEEFFIT BEFORE E	MILKING	TEN DATA
3														
			Origin	ating En	dnoint- (Main	Equipment Room)		т	orminati					
4			Origin	aung Ei	iupoint- (Main	Equipment (Noom)			emmat	ing Enup	Cocai C	ommunications Room)		
	_		Floor	Telecom	Telecom Room			Floor	Telecom	Telecom	Termination		Cov	<u></u> .
_	Type	Cable	Code	Room #	ID	Termination type		Code	Room #	Room ID	type	Full Cable ID	Name	Install Date
5											-71-			
6 7	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.001	ABC	1-Feb-18
8	UTP	Tel 25 pair	01	123	JPN-01A JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.001	ABC	1-Feb-18
9	UTP	Tel 25 pair	01	123	JPN-01A JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.002	ABC	1-Feb-18
10	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.003	ABC	1-Feb-18
11	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.004	ABC	1-Feb-18
12	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.006	ABC	1-Feb-18
13	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.007	ABC	1-Feb-18
14	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.008	ABC	1-Feb-18
15	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.009	ABC	1-Feb-18
16	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.010	ABC	1-Feb-18
17	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.011	ABC	1-Feb-18
18	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.012	ABC	1-Feb-18
19	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.013	ABC	1-Feb-18
20	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.014	ABC	1-Feb-18
21	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.015	ABC	1-Feb-18
22	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.016	ABC	1-Feb-18
23	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.017	ABC	1-Feb-18
24	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.018	ABC	1-Feb-18
25	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.019	ABC	1-Feb-18
26	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.020	ABC	1-Feb-18
27	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.021	ABC	1-Feb-18
28	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.022	ABC	1-Feb-18
29	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.023	ABC	1-Feb-18
30	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.024	ABC	1-Feb-18
31	UTP	Tel 25 pair	01	123	JPN-01A	GigaBix		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-V1.025	ABC	1-Feb-18
32		2 12		100	1511.011									1 - 1 - 1
33	UTP	Cat6	01	123	JPN-01A	Patch Panel		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-R1P1-BB1	ABC	1-Feb-18
34	UTP	Cat6	01	123	JPN-01A	Patch Panel		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-R1P1-BB2	ABC	1-Feb-18
35	UTP	Cat6	01	123	JPN-01A	Patch Panel		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-R1P1-BB3	ABC	1-Feb-18
36	UTP	Cat6	01	123	JPN-01A	Patch Panel		02	234	JPN-02B	GigaBix	JPN-01A/JPN-02B-R1P1-BB4	ABC	1-Feb-18
37	UTP UTP	Cat6 Cat6	01 01	123 123	JPN-01A JPN-01A	Patch Panel Patch Panel		02	234 234	JPN-02B JPN-02B	GigaBix	JPN-01A/JPN-02B-R1P1-BB5 JPN-01A/JPN-02B-R1P1-BB6	ABC ABC	1-Feb-18 1-Feb-18
38	UIP	Calb	UΙ	123	JPN-UIA	Patch Panel		02	234	JUN-07R	GigaBix	JEN-014/JEN-020-K121-886	ABC	1-Feb-18

	Α	В	С	D	Е	F	G	Н	1	J	K	L	М	N	0
1	PHSA	- Network	Edge												
2	Inter-E	Building UT	P Ris	er Cable	Information				SAI	IPLE DATA	FORMAT ON	ILY - PLEASE DELETE IT BEF	ORE ENTE	RING NEW L	DATA
3															
4			Ori	ginating	Endpoint- (M	lain Equipment Room)		T	ermina	ting End	point- (Ma	in Equipment Room)			
5	Туре	Cable		Telecom Room #	Telecom Room ID	Termination type		Floor Code	Teleco m Room#		Terminatio n type	Full Cable ID	Coy Name	Install Date	Other Linkage Records
6															
7	UTP	Tel 100 pair	01	500	JPN-01A	GigaBix		01	100	JPS-01A	GigaBix	JPN-01/JPS-01B-V1.001	ABC	1-Feb-18	
8	UTP	Tel 100 pair	01	500	JPN-01A	GigaBix		01	100	JPS-01A	GigaBix	JPN-01/JPS-01B-V1.002	ABC	1-Feb-18	
9	UTP	Tel 100 pair	01	500	JPN-01A	GigaBix		01	100	JPS-01A	GigaBix	JPN-01/JPS-01B-V1.003	ABC	1-Feb-18	
10	UTP	Tel 100 pair	01	500	JPN-01A	GigaBix		01	100	JPS-01A	GigaBix	JPN-01/JPS-01B-V1.004	ABC	1-Feb-18	

	Α	В	С	D	E	F	G	Н	П	J K	L	М	N	0	Р	Q	R	S	Т	U	V	W
1	PHSA -	Netw	ork Ed	ae																		
					able Information						SAM		A EODM	ATONIV DIEASE	DEL	 	DE	OPE	EN	TERING NEW DATA		
-	IIIII a-D	unann	gibei	INISEI C	able illioilliation						SAIVII	LE DA	A FURINA	ONLT - PLEASE	DELI	 	DEF	UKE	EN	IERING NEW DATA		
3																						
4			Origina	ting En	<b>dpoint-</b> (Main Eqւ	uipm	ent F	Roor	n)		Ter	minati	ng Endp	oint- (Local Com	mur	icatio	ns F	Roor	n)			
5	Fiber Type	Floor Code	Teleco m Room#	Telecom Room ID		Rack ID	Patch Panel	Вау	Cable	Strand	Floor Code	Teleco m Room #	Telecom Room ID	Termination type	Rack ID	Patch Panel	Bay	Cable ID	Strand	Full Cable ID	Coy Name	Install Date
6																						
	MM OM4	01	123		LC, SC, ST or MTRJ				F1	.1	02	223		LC, SC, ST or MTRJ		FP1	.4	F1	.1	JPN-01A-R1FP1.1-F1.1/JPN-02A-R1FP1.4-F1.1	ABC	1-Feb-18
	MM OM4	01	123		LC, SC, ST or MTRJ				F1	.2	02	223		LC, SC, ST or MTRJ		FP1	.4	F1	.2	JPN-01A-R1FP1.1-F1.2/JPN-02A-R1FP1.4-F1.2	ABC	1-Feb-18
	MM OM4	01	123		LC, SC, ST or MTRJ			.1	F1	.3	02	223		LC, SC, ST or MTRJ		FP1	.4	F1	.3	JPN-01A-R1FP1.1-F1.3/JPN-02A-R1FP1.4-F1.3		1-Feb-18
	MM OM4	01	123		LC, SC, ST or MTRJ				F1	.4	02	223		LC, SC, ST or MTRJ		FP1	.4	F1	.4	JPN-01A-R1FP1.1-F1.4/JPN-02A-R1FP1.4-F1.4	ABC	1-Feb-18
	MM OM4	01	123		LC, SC, ST or MTRJ			.1	F1	.5	02	223		LC, SC, ST or MTRJ		FP1	.4	F1	.5	JPN-01A-R1FP1.1-F1.5/JPN-02A-R1FP1.4-F1.5	ABC	1-Feb-18
	MM OM4	01	123		LC, SC, ST or MTRJ			.1	F1	.6	02	223		LC, SC, ST or MTRJ		FP1	.4	F1	.6	JPN-01A-R1FP1.1-F1.6/JPN-02A-R1FP1.4-F1.6	ABC	1-Feb-18
	MM OM4	01	123		LC, SC, ST or MTRJ				F1	.7	02	223		LC, SC, ST or MTRJ		FP1	.4	F1	.7	JPN-01A-R1FP1.1-F1.7/JPN-02A-R1FP1.4-F1.7		1-Feb-18
	MM OM4	01	123		LC, SC, ST or MTRJ				F1	.8	02	223		LC, SC, ST or MTRJ	R1	FP1	.4	F1	.8	JPN-01A-R1FP1.1-F1.8/JPN-02A-R1FP1.4-F1.8	ABC	1-Feb-18
	MM OM4	01	123		LC, SC, ST or MTRJ				F1	.9	02	223		LC, SC, ST or MTRJ		FP1	.4	F1	.9	JPN-01A-R1FP1.1-F1.9/JPN-02A-R1FP1.4-F1.9	ABC	1-Feb-18
	MM OM4	01	123		LC, SC, ST or MTRJ				F1	.10	02	223		LC, SC, ST or MTRJ		FP1	.4	F1	.10	JPN-01A-R1FP1 1-F1 10/JPN-02A-R1FP1 4-F1 10		1-Feb-18
	MM OM4	01	123		LC, SC, ST or MTRJ				F1	.11	02	223		LC, SC, ST or MTRJ		FP1	.4	F1	.11	JPN-01A-R1FP1.1-F1.11/JPN-02A-R1FP1.4-F1.11	ABC	1-Feb-18
	MM OM4	01	123	JPN-01A	LC, SC, ST or MTRJ	R1	FP1	.1	F1	.12	02	223	JPN-02A	LC, SC, ST or MTRJ	R1	FP1	.4	F1	.12	JPN-01A-R1FP1.1-F1.12/JPN-02A-R1FP1.4-F1.12	ABC	1-Feb-18
	MM OM5																					
	SM OS2																					
21																						

	Α	В	С	D	E	F	G	Н	1	J K	L	М	N	0	Р	Q	R	S	Т	U	V	W
1	PHSA	- Net	work E	dge																		
2	Inter-E	Build	ing Fib	er Riser	Cable Information	on					SAN	IPLE DA	TA FORM	AT ONLY - PLEASE	DEL	ETE.	IT B	EFO	RE	ENTERING NEW DATA		
3																						
4		•	Origina	ting End	<b>dpoint-</b> (Main Equ	ıipm	ent F	₹००	m)		٦	Termina	ting En	<b>dpoint-</b> (Main Eqւ	uipn	nent	Roc	m)				
5	Fiber Type	Floo r Cod e	Teleco m Room #	Teleco m Room ID	Termination type	Rack ID	Patch Panel	Bay	Cable ID	Strand	Floor Code	Teleco m Room#	Telecom Room ID	Termination type	Rack ID	Patch Panel	Bay	Cable ID	Strand	Full Cable ID	Coy Name	Install Date
6	014 000		100	IDNI 044	10 00 0T MTD1	D.4	ED.4		-4		24	400	IDO 044	LO GO OT MEDI	. 54	ED4					100	4.5.1.40
	SM OS2 SM OS2				LC, SC, ST or MTRJ LC, SC, ST or MTRJ				F1	.2	01	100 100								JPN-01A-R1FP1.1-F1.1/JPS-01A-R1FP1.4-F1.1 JPN-01A-R1FP1.1-F1.2/JPS-01A-R1FP1.4-F1.2		1-Feb-18 1-Feb-18
	SM OS2 SM OS2				LC, SC, ST or MTRJ LC, SC, ST or MTRJ					.3	01 01	100 100								JPN-01A-R1FP1.1-F1.3/JPS-01A-R1FP1.4-F1.3 JPN-01A-R1FP1.1-F1.4/JPS-01A-R1FP1.4-F1.4		1-Feb-18 1-Feb-18

PHSA Network Edge

Inter-Building Fiber Riser Cable Circuit Information

																							Comi	nSco	pe Pr	rope	l or B	elden	ı DC)	K Sys	tem							
						Origin	ating I	End																								Ter	minating End					
Connector Type Architectural Room ID			Level	Comm. Room	2	אמנא וט	FiberPanel ID		Tray/Blade		Cassette		Fiber Cable ID	Physical Spa	Building Code		Level	Comm. Room		Rack ID		anel		Tray/Blade	Cassette			Fiber Cable ID		Total Stra	Fiber Type		Full Cable ID	Comments (See explanation notes below)	ype	chitectur	oy Name	Install Date
	ARHCC	_	B1 .	Α -	R	2	FP 1	1 .	T1		C1	- F	1		ARHC		01	Α	- F	2	FP	1		T1 .	. C1		F	1		24 (			ARHCC-B1A-R2FP1.T1.C1-F1 / ARHCC-01A-R2FP1.T1.C1-F1(24 OS2)	One cable with 24 fibers				
	ARHCC	-	B1 .	Α -	R	2	FP 1	1.	T1		C2	- F	2	! /	ARHC	C -	01	Α	- F	₹ 2	FP	1		Π.	. C2	2 -	F	2	(	24 C	M5	)	ARHCC-B1A-R2FP1.T1.C2-F2 / ARHCC-01A-R2FP1.T1.C2-F2(24 OM5)	One cable with 24 fibers				
		-		-	R		FP					- F	=	- /		-			- F	₹	FP					<u> </u>	F	$\sqcup$	(			)						
		-			R		FP					- F		- /		-			- F	₹	FP				.		F	ш	(			)						
		-			R		FP					- F		- /		-			- F	₹	FP					<u> </u>	F	ш	(			)						
		-			R		FP					- F		- /		-			- F	₹	FP					<u> </u>	F	ш	(			)						
		-		-	R		FP					- F	=	- /		-			- F	₹	FP					<u> </u>	F	$\sqcup$	(			)						
		-		-	R		FP					- F	=	- /		-			- F	₹	FP					<u> </u>	F	$\sqcup$	(			)						
		-			R		FP					- F		- /		-			- F	₹	FP					<u> </u>	F	ш	(			)						
	1	-			R	Ш	FP			.		- F		1		1-			- F	₹	FP				.	1-	F	$\vdash$	(			)			$\sqcup$			
	1	-			R	Ш	FP			.		- F		1		1-			- F	₹	FP				.	1-	F	$\vdash$	(			)			$\sqcup$			
	1	-			R	Ш	FP			.		- F		/		1-			- F	₹	FP				.	1-	F	$\vdash$	(			)			$\sqcup$			
$\vdash$	<u> </u>	-			R		FP				_	- F	_	/		1-			- F	₹	FP				-	+-	F	$\vdash$	_(_	_	_	)			$\sqcup$	_		
	1	-			R	Ш	FP			.		- F		- /		1-			- F	₹	FP				.	1-	F	$\vdash$	(			)			$\sqcup$			
		-		-	R		FP					- F	-	/		-			- F	₹	FP					-	F	ш	(			)						

#### **Explanation Notes:**

#### Fiber Cable Label

e.g. XXX-01A-R2FP3.T1.C1-F1/XXX-02B-R1FP1.T3.C1-F1(24 OS2)

XXX Represents building code

01A Represents from 1st Floor Communications Room A

R2 Represents Rack 2

FP3.T1.C1 Represents Fiber Panel 3, Tray/Blade 1, Cassette 1

F1 Represents Fiber Cable 1

/ Represents between the originating and

terminating Communications Rooms

XXX Represents building code

02B Represents to 2nd Floor Communications Room B

R1 Represents Rack 1

FP1.T3.C1 Represents Fiber Panel 1, Tray/Blade 3, Cassette 1

F1 Represents Fiber Cable 1

(24 OM5) Represents 24 strands OS2 Cable

#### Fiber Panel Label

e.g. XXX-01A-R1FP1

XXX-01A Represents MER 1st floor Communications

room A.

R1 Represents Rack 1.

FP1 Represents Fiber Panel 1.

# APPENDIX B - PHSA COMMUNICATIONS STANDARD - POWER DISTRIBUTION FOR ALL COMMUNICATIONS SPACES

Rack Mount UPS Power - Existing A	acute Sites			
Description	Comm. Room serving a wiring zone: 0 - 240 Drops	Comm. Room serving a wiring zone: 241- 480 Drops	Comm. Room serving a wiring zone: 481 - 960 Drops	Comm. Room serving a wiring zone: > 960 Drops
Input Power	Vital/Generator Power for all Acute Sites.	Vital/Generator Power for all Acute Sites.	Vital/Generator Power for all Acute Sites.	Vital/Generator Power for all Acute Sites.
Maintenance Receptacles	5-20RA (on Vital/Generator)-receptacles flush-mounted on the wall (305mm AFF) located every 1.8 m (6 ft) around perimeter walls.	5-20RA (on Vital/Generator) receptacles mounted on the wall (305mm AFF) located every 1.8 m (6 ft) around perimeter walls.	d 5-20RA (on Vital/Generator) receptacles mounted on the wall (305mm AFF) located every 1.8 m (6 ft) around perimeter walls.	5-20RA (on Vital/Generator) receptacles mounted on the wall (305mm AFF) located every 1.8 m (6 ft) around perimeter walls.
mamtenance neceptacies				
Equipment Rack	1 or 2	3	4	7
	One (1) rack scenario:  Provide two (2) L6-30R receptacles, each on dedicated circuits above the rack, one (1) on Vital/Generator and one (1) on Utility Power. The Vital/Generator Power will be used to provide input power into the UPS, and the other will be used for a metered Power Distribution Unit.  Two (2) rack scenario:	Rack 1, 2 & 3 - Provide one (1) L6-30R receptacle per Rack 1, 2, & 3; on Utility Power. Utility Power will be used for a-metered Power Distribution Unit.	Rack 1, 2, 3 & 4 - Provide one (1) L6-30R receptacle per Rack 1, 2, 3 & 4; on Utility Power. The Utility Power will be used for a metered Power Distribution Unit.  Rack 1 - Provide one (1) L6-30R receptacle on Generator Power. The L6-30R will provide input power to the 6000VA UPS.	Rack 1, 2, 3, 4, 5, 6 & 7 - Provide one (1) L6-30R receptacle per Rack 1, 2, 3, 4. 5, 6 & 7; on Utility Power. The Utility Power will be used for a metered Power Distribution Unit.  Rack 1 - Provide one (1) L6-30R receptacle on Vital/Generator Power. The L6-30R will provide input power to the 6000VA UPS.
Equipment Rack Receptacles	Rack 1 - Provide one (1) L6-30R receptacle, on dedicated circuits above the rack on Utility Power. The Utility Power will be used for a metered Power Distribution Unit.  Rack 2 - Provide two (2) L6-30R receptacles, each on dedicated circuits above the rack 2, one (1) on Vital/Generator and one (1) on Utility Power. The Vital/Generator Power will be used to provide input power into the UPS and the other will be used for a metered Power Distribution Unit.			
UPS	Provide a rack mount 6000VA UPS in Rack 2 (refer to Appendix C for appropriate model number) c/w:  - L6-30P input cord (Contractor is expected to provide input feed cord of sufficient length to plug into the UPS input receptacle. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards. Refer to C-STD drawings for receptacle locations)  - 2 x L6-30R and 2 x L6-20R output receptacles  - Four post rack mount kit  - Temperature Probe  - Network Management Card	Provide a rack mount 8000VA UPS in Rack 2 (refer to Appendix C for appropriate model number) c/w  - Direct feed or hardwired connection to the UPS from Vital/Generator Power  - Three (3) L6-30R output receptacles  - Four post rack mount kit  - Temperature Probe  - Network Management Card	Provide a rack mount 11000VA UPS in Rack 3 (refer to Appendix C for appropriate model number) c/w  - Direct feed or hardwired connection to the UPS from Vital/Generator Power  - Three (3) L6-30R output receptacles  - Four post rack mount kit  - Temperature Probe  - Network Management Card  Provide a rack mount 6000VA UPS to distribute 208V UPS Power to third party equipment in Rack 1. Refer to Appendix C for appropriate model number.	Provide a rack mount 11000VA UPS in Rack 3 and Rack 6 (refer to Appendix C for appropriate model number) c/w  - Direct feed or hardwired connection to each 11000VA UPS from Vital/Generator Power  - Three (3) L6-30R output receptacles on each 11000VA UPS  - Four post rack mount kit  - Temperature Probe  - Network Management Card  Provide a rack mount 6000VA UPS to distribute 208V UPS Power to equipment in Rack 1. Refer to Appendix C for appropriate model number.
Extended Battery Modules	If the UPS is unable to support the load by itself for the required runtimes, EBMs are required Runtime when input power is on Vital/Generator power: 10 minutes - Runtime when input power is utility: 30 minutes	If the UPS is unable to support the load by itself for the required runtimes, EBMs are required Runtime when input power is on Vital/Generator power: 10 minutes - Runtime when input power is utility: 30 minutes	If the UPS is unable to support the load by itself for the required runtimes, EBMs are required Runtime when input power is on Vital/Generator power: 10 minutes - Runtime when input power is utility: 30 minutes	If the UPS is unable to support the load by itself for the required runtimes, EBMs are required Runtime when input power is on Vital/Generator power: 10 minutes - Runtime when input power is utility: 30 minutes
PDUs	Provide one basic and one monitored/metered Power Distribution Units per rack (refer to Appendix C for appropriate model number), c/w L6-30P input cords (10 feet).  - Zero U Power Distribution Units - Power Distribution Unit #1 (basic) plugs directly into the 6000VA UPS unit - Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located above the Rack - All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.	Rack 1, 2 & 3 - Provide one basic and one monitored/metered Power Distribution Units per rack, c/w L6-30P input cords (10 feet)  - Zero U Power Distribution Units - Power Distribution Unit #1 (basic) plugs directly into the 8000VA UPS unit - Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located above the Rack - All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.	30P input cords (10 feet) Rack 1, 2, 3 & 4 - Provide one basic Power Distribution Units per rack, c/w L6-30P input cords (10 feet) - Zero U Power Distribution Units - Power Distribution Unit #1 (basic) plugs directly into the Rack 1 to 6000VA UPS	c/w L6-30P input cords (10 feet)  Rack 1, 2, 3, 4, 5, 6 & 7 - Provide one basic Power Distribution Units per rack, c/w L6-30P input cords (10 feet) - Zero U Power Distribution Units - Power Distribution Unit #1 (basic) plugs directly into the Rack 7 to 6000VA UPS unit & Rack 1, 2, 3, 4, 5, & 6 to the 11000VA UPS units - Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located

# APPENDIX B - PHSA COMMUNICATIONS STANDARD - POWER DISTRIBUTION FOR ALL COMMUNICATIONS SPACES

Rack Mount UPS Power - New and E	xisting Community Sites			
Description	Comm. Room serving a wiring zone: 0-144 Drops	Comm. Room serving a wiring zone: 145-240 Drops	Comm. Room serving a wiring zone: 241-480 Drops	Comm. Room serving a wiring zone: 241-480 Drops
Input Power	Vital/Generator Power for all Sites. In sites that are not equipped with generator power, utility power is acceptable.	Vital/Generator Power for all Sites. In sites that are not equipped with generator power, utility power is acceptable.	Vital/Generator Power for all Sites. In sites that are not equipped with generator power, utility power is acceptable.	Vital/Generator Power for all Sites. In sites that are not equipped with generator power, utility power is acceptable.
Maintenance Receptacles	5-20RA utility power receptacles mounted on the wall (305mm AFF) located every 1.8 m (6 ft) around perimeter walls.	5-20RA utility power receptacles mounted on the wall (305mm AFF) located every 1.8 m (6 ft) around perimeter walls.	5-20RA-utility power receptacles mounted on the wall (305mm AFF) located every 1.8 m (6 ft) around perimeter walls.	5-20RA-utility power receptacles mounted on the wall (305mm AFF) located every 1.8 m (6 ft) around perimeter walls.
Equipment Rack	1	2	3	4
Equipment Rack Receptacles	Provide two (2) L5-30R receptacles, each on dedicated circuits above the rack. One L5-30R is on Vital/Generator Power and the second L5-30R is on Utility Power. In sites that are not equipped with Vital/Generator power, Utility power is acceptable. The Vital/Generator Power will be used to provide input power into the UPS, and the other will be used for a metered Power Distribution Unit.	Rack 1 - Provide one (1) L6-30R receptacle on Utility Power.  Rack 2 - Provide two (2) L6-30R receptacles, each on dedicated circuits above the rack, one on Vital/Generator and one on Utility Power. Utility Power is acceptable where Vital/Generator is not available. The Vital/Generator Power will be used to provide input power into the UPS, and the other will be used for a metered Power Distribution Unit.	Rack 1, 2, & 3 - Provide one (1) L6-30R receptacle per Rack 1, 2, & 3; on Utility Power. The other Utility Power will be used for a metered Power Distribution Unit	Rack 1, 2, 3 & 4 - Provide one (1) L6-30R receptacle per Rack 1, 2, 3 & 4 on Utility Power. The other Utility Power will be used for a metered Power Distribution Unit.
	Provide a rack mount 3000VA UPS (refer to Appendix C for appropriate model number) c/w: - L5-30P input cord (Contractor is expected to provide input feed cord of sufficient length to plug into the UPS input receptacle. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards. Refer to C-STD drawings for receptacle locations) - 2 x L5-30R output receptacles	Provide a rack mount 6000VA UPS in Rack 2 (refer to Appendix C for appropriate model number) c/w:  - L6-30P input cord (Contractor is expected to provide input feed cord of sufficient length to plug into the UPS input receptacle. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards. Refer to C-STD drawings for receptacle locations)  - 2 x L6-30R and 2 x L6-20R output receptacles  - Four post rack mount kit	- Direct feed or hardwired connection to the UPS from Vital/Generator Power or Utility power when Vital/Generator Power is not available Three (3) L6-30R output receptacles	model number) c/w  - Direct feed or hardwired connection to the UPS from Vital/Generator Power or Utility power when Vital/Generator Power is not available Three (3) L6-30R output receptacles
UPS	- Four post rack mount kit - Temperature Probe - Network Management Card	- Temperature Probe - Network Management Card  * If 1500VA UPS system is required to distribute 120V UPS -Power to the third party equipment in the rack refer to Appendix C for appropriate model number.	- Four post rack mount kit - Temperature Probe - Network Management Card  * If 3000VA UPS system is required to distribute 120V UPS Power to third party equipment in the rack refer to Appendix C for appropriate model number.	- Four post rack mount kit - Temperature Probe - Network Management Card  * If 3000VA UPS system is required to distribute 120V UPS Power to third party equipment in the rack refer to Appendix C for appropriate model number.
Extended Battery Modules	If the UPS is unable to support the load by itself for the required runtimes, EBMs are required.  - Runtime when input power is on Vital/Generator Power power: 10 minutes  - Runtime when input power is utility: 30 minutes	If the UPS is unable to support the load by itself for the required runtimes, EBMs are required.  - Runtime when input power is on Vital/Generator Power power: 10 minutes  - Runtime when input power is utility: 30 minutes	If the UPS is unable to support the load by itself for the required runtimes, EBMs are required.  - Runtime when input power is on Vital/Generator Power power: 10 minutes  - Runtime when input power is utility: 30 minutes	If the UPS is unable to support the load by itself for the required runtimes, EBMs are required Runtime when input power is on Vital/Generator Power power: 10 minutes - Runtime when input power is utility: 30 minutes
	Provide one basic and one monitored/metered Power Distribution Units (refer to Appendix C for appropriate model number), c/w L5-30P input cords (10 feet)  - Zero U Power Distribution Units	Provide one basic and one monitored/metered Power Distribution Units (refer to Appendix C for appropriate model number), c/w L6-30P input cords (10 feet)  - Zero U Power Distribution Units	Rack 1, 2, & 3 - Provide one metered Power Distribution Units per rack, c/w L6-30l input cords (10 feet) Rack 1, 2 & 3 - Provide one basic Power Distribution Units per rack, c/w L6-30P input cords (10 feet)	P Rack 1, 2, 3 & 4 - Provide one metered Power Distribution Units per rack, c/w L6-30P input cords (10 feet) Rack 2, 3 & 4 - Provide one basic Power Distribution Units per rack, c/w L6-30P input cords (10 feet)
PDUs	<ul> <li>Power Distribution Unit #1 (basic) plugs directly into the 3000VA UPS unit</li> <li>Power Distribution Unit #2 (metered) plugs into the L5-30R receptacle located above the Rack</li> <li>All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.</li> </ul>	<ul> <li>Power Distribution Unit #1 (basic) plugs directly into the 6000VA UPS unit</li> <li>Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located above the Rack</li> <li>All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.</li> </ul>	- Zero U Power Distribution Units - Power Distribution Unit #1 (basic) plugs directly into the 8000VA UPS unit - Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located above the Rack - All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.	- Zero U Power Distribution Units - Power Distribution Unit #1 (basic) plugs directly into the 8000VA UPS unit - Power Distribution Unit #2 (metered) plugs into the L6-30R receptacle located above the Rack - All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.

# APPENDIX B - PHSA COMMUNICATIONS STANDARD - POWER DISTRIBUTION FOR ALL COMMUNICATIONS SPACES

Description	Comm. Room
Input Power	Input 1: Generator Power for maintenance receptacles and back-up power to equipment racks The electrical distribution panel for generator protected power is located inside the Communication Room. Input 2: Centralized Network Dedicated UPS power for equipment racks. The distribution panel for this source is located in the TR/MER/EF room.
Maintenance Receptacles	5-20RA (on gen. protected power) receptacles mounted on the wall (305mm AFF) located every 1.8 m (6 ft) around perimeter walls.
Equipment Rack	4 - 7 (TRs, MERs and MC Rooms)
Equipment Rack Receptacles	Vendor or Third Party Equipment Rack - Provide two (2) L21-30R receptacles, each on dedicated circuits above the rack on one (1) on Centralized Network Dedicated UPS power and one (1) on Vital Power.  Health Authority Equipment Racks - Provide two (2) L21-30R receptacles, each on dedicated circuits above each rack; one (1) on Centralized Network Dedicated UPS power and one (1) on Vital Power Provide the Power Distribution Unit in the centre of line-up with a temperature probe. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards.
UPS	Centralized Network Dedicated N+1 UPS and Distribution System: The Design and Construction of all aspects of the electrical distribution (including IMIT UPS frame sizing) to the Communications rooms EF, TR, AHER & MER will accommodate 8kW per equipment rack and or cabinet.  Based on the PHSA minimum standards for Communications room sizing and rack/cabinet count. This includes all distribution panels, distribution breakers and cables servicing the Comm rooms and the main N+1 UPS distribution frame.  Input power source for a centralized network dedicated UPS is always Generator Power.
External Wrap Around Bypass	Yes
Power Distribution Units	Health Authority Equipment Racks - Provide two monitored/metered Power Distribution Units, c/w L21-30P input cords (10 feet) per rack. Equip onen Power Distribution Unit in the centre of line-up with a temperature probe. All power cords are to be properly dressed and secured as per acceptable cable management practices and standards (refer to Appendix C for appropriate model number).

Rack and Tower fo Part Number	Description	Input	Output 1	Output 2	Battery Runtime	Ext. Bypass	Input Cord	SNMP Web
rai i Nullibei	Description	Прис	Output I	Output 2	approximate. Depends on load power factor	Ext. Bypass	input coru	Card
9PX1500RTN-L	Eaton 9PX lithium Ion 1.5kva / 1.35kw	120V 5-15P	120V (8) 5-15R		5 minutes	Optional	8 foot	Included
9PXEBM48RT-L	Eaton 9PX lithium Ion 1.5kva Battery							
P022-006	Tripp Lite Power Extension						6 foot	
	Cord, NEMA 5-15P to NEMA 5-15R							
9PX2000RTN-L	Eaton 9PX lithium Ion 2kva	120V 5–20P	120V (6) 5-20R	120V (1) L5-20R			8 foot	
9PXEBM72RT-L	/ 1.8kw Eaton 9PX lithium Ion 3kva							
PWC-129-01	Battery L5-20P to 5-20R power						1 foot	+
	cable 12AWG - to permit connection to an L5-20R						1.000	
9PX3000RTN-L	Eaton 9PX lithium Ion 3kva	120V L5-30P	120V (6) 5-15R	120V (1) L5-30R	5 minutes	Optional	8 foot	Included
9PXEBM72RT-L	/ 2.7kw Eaton 9PX lithium Ion 3kva							
P046-010-LL-30A	Battery Tripp Lite Power Extension						10 foot	+
	Cord, NEMA L5-30P to NEMA L5-30R							
9PX6K-L	Eaton 9PX 6kva / 5.4kw	208V L6-30P	208V (2)L6-30R	208V (2)L6-20R	8.7 minutes	Optional	10 foot	Included
9PXEBM192RT-L	Eaton 9PX 5/6kva Battery	200 V LU-307	200 (2)LU-3UK	200 V (2)LU-2UK	G.7 Hilliutes	Ориона	20 1001	included
EBMCBL180	6ft DC EBM extension cable							
P041-008	Tripp Lite Power Extension						8 foot	
<u> </u>	Cord, L6-30P to NEMA L6-30R							
9PX8K	8kva / 7.2kw	208V: Hardwired	208V Hardwired & (3)L6-30R		6 minutes	Included	Hardwire	Included
9PX11K	11kva / 10kw	208V: Hardwired	208V Hardwired & (3)L6-30R		3 minutes	Included	Hardwire	Included
9PXEBM240RT	External Battery				+1 EBM = 16 min +2 EBM = 26 min +3 EBM = 38 min			
EBMCBL240	6ft DC EBM extension cable							
EMPDT1H1C2	Temp&Hum Probe	connects to SNMP card						
	rmat Power Distribution Unit	's (All Cord End		Monitored	la constant de la con	lo		1
Part Number	Description		Basic	Monitorea	Input	Output 1	Output 2	Input Cord
Unmanaged Powe	r Distribution Unit's							
Horizontal PDI PDU1220T	U's EPDU BI 16A	1U	Basic	I	120V L5-20P	120V (13) 5-15R	1	15 foot
PDU1215	EPDU BI 12A	1U	Basic		120V L5-20P	120V (13) 5-15/20R		15 foot
PDU2430	EPDU BI 12A	1U	Basic		120V L5-30P	120V (24) 5-15R		15 foot
PDU1220	EPDU BI 16A	1U	Basic		120V 5-20P	120V (13) 5-15/20R		15 foot
PDU1230 Vertical PDU's	EPDU BI 30A	1U	Basic		208V L6-30P	208V (12) rear C13 (4) front C13		15 foot
PDUV15	EPDU BI 16A	Zero U	Basic		120V 5-20P	120V (14) 5-15/20R		15 foot
PDUV20-60	EPDU BI 16A	Zero U	Basic		120V 5-20P	120V (28) 5-15/20R		15 foot
PDUV30					120V L5-30P	120V (24) 5-15/20R		10 foot
					208V L6-30P	208V (32) C13 (6) C19	1	10 foot
PDUV30HV	EPDU BI 24A	Zero U	Basic		208 ( 10-301	1 (- / (-/		
PDUV30HV Metered Power Di	stribution Unit's	Zero U	Basic		2087 10-301			
PDUV30HV Metered Power Di		Zero U 1U	Basic	Metered	120V 5-15P	120V (8) 5-15R		12 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 PDUMNH20	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A	1U 1U	Basic	Metered	120V 5-15P 120V L5-20P/5-20P	120V (8) 5-15R 120V (8) 5-15/20R		12 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 PDUMNH20 EMIT03-10	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A	1U 1U 1U	Basic	Metered Metered	120V 5-15P 120V L5-20P/5-20P 120V L5-30P	120V (8) 5-15R 120V (8) 5-15/20R 120V (12) 5-20R		12 foot 10 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 PDUMNH20 EMIT03-10 EMIT06-10	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A	1U 1U	Basic	Metered	120V 5-15P 120V L5-20P/5-20P	120V (8) 5-15R 120V (8) 5-15/20R		12 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 PDUMNH20 EMIT03-10 EMIT06-10 Vertical Power	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A r Distribution Unit's	1U 1U 1U 1U	Basic	Metered Metered	120V 5-15P 120V L5-20P/5-20P 120V L5-30P 208V L6-30P	120V (8) 5-15R 120V (8) 5-15/20R 120V (12) 5-20R 208V (18) (10) C13 (4) C19		12 foot 10 foot 10 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 PDUMNH20 EMIT03-10 EMIT06-10 Vertical Powel EMI100-10	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A	1U 1U 1U	Basic	Metered Metered	120V 5-15P 120V L5-20P/5-20P 120V L5-30P	120V (8) 5-15R 120V (8) 5-15/20R 120V (12) 5-20R		12 foot 10 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 PDUMNH20 EMIT03-10 EMIT06-10 Vertical Power EMI100-10 EMI101-10 EMI101-10 EMI102-10	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A C Distribution Unit's EPDU BI 12A EPDU MI 16A EPDU MI 16A EPDU MI 16A EPDU MI 24A	1U 1U 1U 1U 1U Zero U	Basic	Metered Metered Metered	120V 5-15P 120V L5-20P/5-20P 120V L5-30P 208V L6-30P 120V 5-15P 120V L5-20P 120V L5-30P	120V (8) 5-15R 120V (8) 5-15/20R 120V (12) 5-20R 208V (18) (10) C13 (4) C19 120V (12) 5-15R 120V 5-20R (24) 120V 5-20R (30)		12 foot 10 foot 10 foot 10 foot 10 foot 10 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 EMIT03-10 EMIT06-10 Vertical Powe EMI100-10 EMI101-10 EMI102-10 EMI104-10	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A r Distribution Unit's EPDU BI 12A EPDU MI 16A EPDU MI 16A EPDU MI 24A EPDU MI 24A	1U 1U 1U 1U Zero U Zero U Zero U Zero U		Metered Metered Metered Metered Metered Metered Metered Metered	120V 5-15P 120V L5-20P/5-20P 120V L5-30P 208V L6-30P 120V 5-15P 120V L5-20P	120V (8) 5-15R 120V (8) 5-15/20R 120V (12) 5-20R 208V (18) (10) C13 (4) C19 120V (12) 5-15R 120V 5-20R (24)		12 foot 10 foot 10 foot 10 foot 10 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 PDUMNH20 EMIT03-10 EMIT06-10 Vertical Power EMI100-10 EMI101-10 EMI102-10 EMI104-10 Rack Power Distril	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A r Distribution Unit's EPDU BI 12A EPDU MI 16A EPDU MI 24A EPDU MI 24A EPDU MI 24A bution Unit's for Centralized	1U 1U 1U 1U Zero U Zero U Zero U Zero U		Metered Metered Metered Metered Metered Metered Metered Motored Motored	120V 5-15P 120V L5-20P/5-20P 120V L5-30P 208V L6-30P 120V 5-15P 120V L5-20P 120V L5-30P 208V L6-30P	120V (8) 5-15R 120V (8) 5-15/20R 120V (12) 5-20R 208V (18) (10) C13 (4) C19 120V (12) 5-15R 120V 5-20R (24) 120V 5-20R (30) 208V (36) C13 (6) C19		12 foot 10 foot 10 foot 10 foot 10 foot 10 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 PDUMNH20 EMIT03-10 EMIT03-10 EMIT06-10 Vertical Power EMI101-10 EMI102-10 EMI102-10 EMI102-10 Rack Power Distril Part Number	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A r Distribution Unit's EPDU BI 12A EPDU MI 16A EPDU MI 16A EPDU MI 24A EPDU MI 24A bution Unit's for Centralized Description	1U 1U 1U 1U Zero U Zero U Zero U Zero U		Metered Metered Metered Metered Metered Metered Metered Metered	120V 5-15P 120V L5-20P/5-20P 120V L5-30P 208V L6-30P 120V 5-15P 120V L5-20P 120V L5-30P	120V (8) 5-15R 120V (8) 5-15/20R 120V (12) 5-20R 208V (18) (10) C13 (4) C19 120V (12) 5-15R 120V 5-20R (24) 120V 5-20R (30)	Output 2	12 foot 10 foot 10 foot 10 foot 10 foot 10 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 PDUMNH20 EMIT03-10 EMIT03-10 EMIT06-10 Vertical Powe EMI101-10 EMI102-10 EMI102-10 EMI102-10 Rack Power Distril Part Number Vertical Powe	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A T Distribution Unit's EPDU BI 12A EPDU MI 16A EPDU MI 24A EPDU MI 24A EPDU MI 24A EPDU MI 15A EPDU MI 15A EPDU MI 25A EPDU MI 26A EPDU MI	1U 1U 1U 1U 2ero U 2ero H 2ero U		Metered Metered Metered Metered Metered Metered Metered Motered Motered Monitored	120V 5-15P 120V L5-20P/5-20P 120V L5-30P 208V L6-30P 120V 5-15P 120V L5-20P 120V L5-30P 208V L6-30P Input	120V (8) 5-15R 120V (8) 5-15/20R 120V (12) 5-20R 208V (18) (10) C13 (4) C19 120V (12) 5-15R 120V 5-20R (24) 120V 5-20R (30) 208V (36) C13 (6) C19 Output 1	Output 2	12 foot 10 foot 10 foot 10 foot 10 foot 10 foot 10 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMNH15 PDUMNH20 EMIT03-10 EMIT03-10 EMIT06-10 Vertical Powe EMI101-10 EMI102-10 EMI102-10 EMI102-10 Rack Power Distril Part Number Vertical Powe	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A r Distribution Unit's EPDU BI 12A EPDU MI 16A EPDU MI 16A EPDU MI 24A EPDU MI 24A bution Unit's for Centralized Description	1U 1U 1U 1U Zero U Zero U Zero U Zero U		Metered Metered Metered Metered Metered Metered Metered Motored Motored	120V 5-15P 120V L5-20P/5-20P 120V L5-30P 208V L6-30P 120V 5-15P 120V L5-20P 120V L5-30P 208V L6-30P	120V (8) 5-15R 120V (8) 5-15/20R 120V (12) 5-20R 208V (18) (10) C13 (4) C19 120V (12) 5-15R 120V 5-20R (24) 120V 5-20R (30) 208V (36) C13 (6) C19	Output 2	12 foot 10 foot 10 foot 10 foot 10 foot 10 foot
PDUV30HV Metered Power DI Horizontal Poi PDUMNH15 PDUMNH20 EMIT03-10 EMIT06-10 Vertical Power EMI100-10 EMI101-10 EMI102-10 EMI104-10 Rack Power Distril Part Number Vertical Power EMI331-10	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A F Distribution Unit's EPDU BI 12A EPDU MI 16A EPDU MI 24A EPDU MI 24A Dution Unit's for Centralized Description T Distribution Unit's G3 Metered PDU G3 Metered PDU	1U 1U 1U 1U 2ero U Zero U	Cord Ends Must Be	Metered Metered Metered Metered Metered Metered Metered Motered Motored Monitored Metered	120V 5-15P 120V L5-20P/5-20P 120V L5-30P 208V L6-30P 120V 5-15P 120V L5-20P 120V L5-30P 208V L6-30P Input 120-208V L21-30P 3PH	120V (8) 5-15R  120V (8) 5-15/20R  120V (12) 5-20R  208V (18) (10) C13 (4) C19  120V (12) 5-15R  120V 5-20R (24)  120V 5-20R (30)  208V (36) C13 (6) C19  Output 1  120V (6) 5-20R  120/208V C13, (6) C19, (1) 5-20R  VIFI Shaw Modems	Output 2	12 foot 10 foot 10 foot 10 foot 10 foot 10 foot 10 foot 10 foot 10 foot
PDUV30HV Metered Power Di Horizontal Pov PDUMMH15 PDUMMH20 EMIT03-10 EMIT06-10 Vertical Power EMI100-10 EMI102-10 EMI102-10 EMI104-10 Rack Power Distril Part Number Vertical Power EMI331-10	stribution Unit's wer Distribution Unit's EPDU 15A EPDU 16A EPDU MI 30A EPDU MI 30A F Distribution Unit's EPDU BI 12A EPDU MI 16A EPDU MI 24A EPDU MI 24A Dution Unit's for Centralized Description T Distribution Unit's G3 Metered PDU G3 Metered PDU	1U 1U 1U 1U Zero U	Cord Ends Must Be	Metered Metered Metered Metered Metered Metered Metered Motered Motored Monitored Metered	120V 5-15P 120V L5-20P/5-20P 120V L5-30P 208V L6-30P 120V 5-15P 120V L5-20P 120V L5-30P 208V L6-30P Input 120-208V L21-30P 3PH 120-208V L21-30P 3PH	120V (8) 5-15R 120V (8) 5-15/20R 120V (12) 5-20R 208V (18) (10) C13 (4) C19  120V (12) 5-15R 120V 5-20R (24) 120V 5-20R (30) 208V (36) C13 (6) C19  Output 1  120V (6) 5-20R 120/208V C13, (6) C19, (1) 5-20R	Output 2	12 foot 10 foot 10 foot 10 foot 10 foot 10 foot 10 foot 10 foot











Facilities Management – Facilities Systems & Support (FSS) Facilities Space Information & Drawing Services

# FSS Drawing Standards & Requirements

Facilities Management - Facilities Systems & Support (FSS) Facilities Space Information & Drawing Services makes no warranty, either expressed or implied, regarding this document which is provided to external individuals and firms solely on an "as is" basis. In no event shall FSS or the authors of this document be liable to anyone for any collateral, incidental or consequential damages in connection with or arising out of the use of this document. The FSS Space Information & Drawing Services Team reserves the right to revise and improve this document on an as required basis. This edition describes the state of the document at the time of its publication plus any subsequent revisions and may not reflect the content of the document at all times in the future.

Please direct any questions or comments about this document to the address below.

Facilities Management – Facilities Systems and Support (FSS) 400 – 13450 102<sup>nd</sup> Avenue Surrey, BC V3T 0H1

email: FMSupport@fraserhealth.ca

Revised February 2020





# APPENDIX E.1: BELDEN COPPER & FIBER STRUCTURED CABLING SYSTEMS PART NUMBERS

# Version 01

# February 2024

- Belden GXS CAT6A Structured Cabling System: Acute Site New Construction Project and Renovation Project with New MER/TR
- Belden 2400 CAT6 Structured Cabling System:
   Acute Site Renovation Project with Existing CAT6 MER/TR, and
   Community Site New Construction and Renovation Projects
- 3. Belden DCX Fiber Structured Cabling System:
  Acute Site New Construction Project and Renovation Project; and
  Community Site New Construction and Renovation Projects
- 4. Belden Rack, Cabinet and Vertical Cable Manager



# PHSA (Provincial Health Services Authority) - Playbook

Date: 01-Feb-2025

Contact: Carlos Matos (Solutions Consultant - Smart Buildings)

Phone: 514-249-0946

Email: <u>carlos.matos@belden.com</u>

# **COPPER SOLUTIONS**

	Cat 6A UTP solu	tion		
escription		Part Numbers	Tech Data Sheets	Marketing Drawing
Jacks				
	10GX REVConnect Jack	RVAMJKUxx-S1	RVAMJKUxx-S1	BELDEN-503
	10GX KeyConnect Jack	AX102283	AX102283	BELDEN-005
Coupler				
	10GX REVConnect Coupler	RVACPKUBK-S1	RVACPKUBK-S1	BELDEN-579
Plug				
	10GX REVConnect STP Field Mount Plug, Metal	RVAFPSME-S1	RVAFPSME-S1	BELDEN-510
Patch Panel				
	10GX REVConnect Patch Panel, 48-Port, Flat 1U	RVAPPF1U48BK	RVAPPF1U48BK	Belden-633
	10GX REVConnect Patch Panel, 24-Port, Flat 1U (Preloaded Discreet Jacks)	RVAPPF1U24BK-P	RVAPPF1U24BK-P	BELDEN-542
	10GX REVConnect Patch Panel, 48-Port, Flat 2U (Preloaded Discreet Jacks)	RVAPPF2U48BK-P	RVAPPF2U48BK-P	BELDEN-544
Cable				
	CAT6A 10GXS Plenum	10GXS13	<u>10GXS13</u>	n/a
	CAT6A 10GXS Riser	10GXS12	10GXS12	n/a
	CAT6A I/O High Flex CMR-CMX	IEA004	IEA004	n/a
Patch Cord				
	0.30m (1') 28 AWG Small Diameter	CAD1108001	CAD1108001	BELDEN-520
	1.2m (4') 28 AWG Small Diameter	CAD1108004	CAD1108004	BELDEN-520
	2.1m (7') 28 AWG Small Diameter	CAD1108007	CAD1108007	BELDEN-520
	3m (10') 28 AWG Small Diameter	CAD1108010	CAD1108010	BELDEN-520
	3m (10') 24AWG for Workstations	CA21108010	CA21108010	BELDEN-366
	7.6m (25') 24AWG for Wireless Access Point	CA21108025	CA21108025	BELDEN-366
	9.1m (30') 24 AWG for Wireless Access Point	CA21108030	CA21108030	BELDEN-366
Pre-termina	ated solution			
	CAT6A Pre-terminated Cable Assembly	CA211xx000A06	CA211xx000A06	BELDEN-219
	KeyConnect Patch Panel, 48-port, 1U, with 10GX RJ45 Coupler, Black	AX104592	AX104592	BELDEN-475

**Cat 6 UTP solution** 

Belde				
iption		Part Numbers	Tech Data Sheets	Marketing Drawin
Jacks				
	CAT6 REVConnect Jack	RV6MJKUBK	RV6MJKUBK	BELDEN-504
	CAT6 KeyConnect Jack	AX101321	AX101321	BELDEN-026
	CAT6 MDVO Jack	AX101066	AX101066	BELDEN-022
Patch P	anel			
	48-Port, Flat 1U	RV6PPF1U48BK	RV6PPF1U48BK	Belden-633
	24-Port, Flat 1U (Preloaded Discreet Jacks)	RV6PPF1U24BK-P	RV6PPF1U24BK-P	BELDEN-542
	48-Port, Flat 2U (Preloaded Discreet Jacks)	RV6PPF2U48BK-P	RV6PPF2U48BK-P	BELDEN-544
Cable				
	CAT6 Plenum	2413	2413	n/a
	CAT6 Riser	2412	2412	n/a
Patch C	ord			
	0.30m (1') 28 AWG Small Diameter	C6D1108001	C6D1108001	BELDEN-520
	1.2m (4') 28 AWG Small Diameter	C6D1108004	C6D1108004	BELDEN-520
	2.1m (7') 28 AWG Small Diameter	C6D1108007	C6D1108007	BELDEN-520
	3m (10') 28 AWG Small Diameter	C6D1108010	C6D1108010	BELDEN-520
	3m (10') 24AWG for Workstations	C601108010	C601108010	BELDEN-366
	7.6m (25') 24AWG for Wireless Access Point	C601108025	<u>C601108025</u>	BELDEN-366
	9.1m (30') 24 AWG for Wireless Access Point	C601108030	<u>C601108030</u>	BELDEN-366
Pre-teri	minated solution			
	CAT6 Pre-terminated Cable Assembly	C6011xx000A06	C6011xx000A06	BELDEN-219
	KeyConnect Patch Panel, 48-port, 1U, with CAT6+ RJ45 Coupler, Black	AX104591	AX104591	BELDEN-475

	Cat6 Gigabix Soluti	ion		
Description		Part Numbers	Tech Data Sheets	Marketing Drawing
	GigaBIX Termination Kit, 300-pair	AX101471	AX101471	BELDEN-003
	GigaBIX Mount	AX101472	AX101472	BELDEN-001
	GigaBIX Cable Management Module	AX101469	AX101469	BELDEN-077
	GigaBIX Connector, 6-port	AX101447	<u>AX101447</u>	BELDEN-103
	GigaBIX Connector, 25-Pair	AX101448	AX101448	BELDEN-438
	GigaBIX Wire Guard	AX101486	<u>AX101486</u>	BELDEN-101
	GigaBIX Designation Strip	AX101483	AX101483	BELDEN-091
	GigaBIX Management Ring	AX101478	<u>AX101478</u>	BELDEN-095
	GigaBIX Management Ring Spacer	AX102190	<u>AX102190</u>	BELDEN-096
	GigaBIX Termination Bar	AX101719	<u>AX101719</u>	BELDEN-099
	GigaBIX Color-coded Clip (Red)	AX102151	AX102151	BELDEN-098

Cat3 (Multi-pair cable - E	ackbone)		
Description	Part Numbers	Tech Data Sheets	Marketing Drawing
Scorpton	r are rearrisers	Teen Bata Sileets	warketing brawing

<b>Belde</b>	n			
Description		Part Numbers	Tech Data Sheets	Marketing Drawing
	CAT3 25-Pair	DIW25 CMR	DIW25	n/a
	CAT3 25-Pair	DPLN25 CMP	DPLN25	n/a

	Faceplates					
Description		Part Numbers	Tech Data Sheets	Marketing Drawing		
	KeyConnect Faceplates 4-Port w/ID Windows Single-Gang	AX102249	AX102249	BELDEN-220		
	KeyConnect Stainless Steel Faceplates 4-Port w/ID Windows Single-Gang	AX104232	AX104232	BELDEN-324		
	Wall Mount Phone Plate Recessed 1-Port	AX104126	AX104126	BELDEN-241		
	KeyConnect Modular Furniture Faceplate; 4-port, with ID Windows, Single Gang	AX103926	AX103926	BELDEN-239		
	KeyConnect 2-port Side Entry Box without Shutter Door	AX105353-EW	AX105353-EW	BELDEN-441		
	MDVO Interface Plates 4 Port Single Gang Flush	AX101437	AX101437	BELDEN-368		

Copper Boxes				
Description	Part Numbers	Tech Data Sheets	Marketing Drawing	
KeyConnect 6-port Media Box Black	AX106512-BK	<u>AX106512-BK</u>	BELDEN-428	

REVConnect Color-Coded Icon Kits				
Description	Part Numbers	Tech Data Sheets	Marketing Drawing	
Red, pack of 24 icons	RVUICRD-B24	REVConnect-icons-for-jacks		

# **FIBER SOLUTIONS**

FX Fusion Splice-on Connectors				
Description	Part Numbers	Tech Data Sheet (Link)	Marketing Drawing	
FX Fusion Multimode Connectors				
OM5 LC Simplex 900 μm Tight Buffer, 1/Pack – Lime Green	FT5LC900FS01	FT5LC900FS01	BELDEN-530	
OM5 SC Simplex 900 μm Tight Buffer, 1/Pack – Lime Green	FT5SC900FS01	FT5SC900FS01	BELDEN-531	
FX Fusion Singlemode Connectors				
OS2 LC Simplex 900 μm Tight Buffer, 1/Pack - Blue	FTSLC900FS01	FTSLC900FS01	BELDEN-530	
OS2 SC Simplex 900 μm Tight Buffer, 1/Pack - Blue	FTSSC900FS01	FTSSC900FS01	BELDEN-531	

DCX Patch Panel solution				
Description	Part Numbers	Tech Data Sheet (Link)	Marketing Drawing	
Rack-mount panels 144F x Rack Unit				
DCX 1U Patch Panel Housing 72-Port (3 trays), Empty, Black finish	DCX-01RU	DCX-01RU	BELDEN-654	
DCX 2U Patch Panel Housing 144-Port (6 trays), Empty, Black finish	DCX-02RU	DCX-02RU	BELDEN-655	
DCX 4U Patch Panel Housing 288-Port (12 trays), Empty, Black Finish	DCX-04RU	DCX-04RU	BELDEN-656	

# **DCX Splice Cassettes**

🖢 Belden			
escription	Part Numbers	Tech Data Sheet (Link)	Marketing Drawing
Pre-loaded w/250um discreet pigtails			
OM5, 06-port (12-fiber), LC Duplex - Includes 250 μm discreet pigtails, splice tray and heat shrink splice protector sleeves	FC5D06LDFP	FC5D06LDFP	BELDEN-620
OM5, 06-port (12-fiber), LC Duplex (Flipped-pair) - Includes 250 μm discreet pigtails, splice tray and heat shrink splice protector sleeves	FC5D06LDFPXL	FC5D06LDFPXL	BELDEN-620
OM5, 12-port (24-fiber), LC Duplex - Includes 250 μm discreet pigtails, splice tray and heat shrink splice protector sleeves	FC5D12LDFP	FC5D12LDFP	BELDEN-620
OM5, 12-port (24-fiber), LC Duplex (Flipped-pair) - Includes 250 µm discreet pigtails, splice tray and heat shrink splice protector sleeves	FC5D12LDFPXL	FC5D12LDFPXL	BELDEN-620
OS2, 06-port (12-fiber), LC Duplex - Includes 250 µm discreet pigtails, splice tray and heat shrink splice protector sleeves	FCSD06LDFP	FCSD06LDFP	BELDEN-620
OS2, 06-port (12-fiber), LC Duplex (Flipped-pair) - Includes 250 μm discreet pigtails, splice tray and heat shrink splice protector sleeves	FCSD06LDFPXB	FCSD06LDFPXB	BELDEN-620
OS2, 12-port (24-fiber), LC Duplex - Includes 250 µm discreet pigtails, splice tray and heat shrink splice protector sleeves	FCSD12LDFP	FCSD12LDFP	BELDEN-620
OS2, 12-port (24-fiber), LC Duplex (Flipped-pair) - Includes 250 μm discreet pigtails, splice tray and heat shrink splice protector sleeves	FCSD12LDFPXB	FCSD12LDFPXB	BELDEN-620
Pre-loaded w/250um ribbon pigtails			
OM5, 06-port (12-fiber), LC Duplex - Includes 250 μm ribbon pigtails, splice tray and	FC5D06LDFM	FC5D06LDFM	BELDEN-620
heat shrink splice protector sleeves OM5, 06-port (12-fiber), LC Duplex (Flipped-pair) - Includes 250 μm ribbon pigtails,	FC5D06LDFMXL	FC5D06LDFMXL	BELDEN-620
splice tray and heat shrink splice protector sleeves OM5, 12-port (24-fiber), LC Duplex - Includes 250 μm ribbon pigtails, splice tray and	FC5D12LDFM	FC5D12LDFM	BELDEN-620
heat shrink splice protector sleeves OM5, 12-port (24-fiber), LC Duplex (Flipped-pair) - Includes 250 μm ribbon pigtails,	FC5D12LDFMXL	FC5D12LDFMXL	BELDEN-620
splice tray and heat shrink splice protector sleeves OS2, 06-port (12-fiber), LC Duplex - Includes 250 μm ribbon pigtails, splice tray and	FCSD06LDFM	FCSD06LDFM	BELDEN-620
heat shrink splice protector sleeves OS2, 06-port (12-fiber), LC Duplex (Flipped-pair) - Includes 250 µm ribbon pigtails,	FCSD06LDFMXB	FCSD06LDFMXB	BELDEN-620
splice tray and heat shrink splice protector sleeves OS2, 12-port (24-fiber), LC Duplex - Includes 250 μm ribbon pigtails, splice tray and	FCSD12LDFM	FCSD12LDFM	BELDEN-620
heat shrink splice protector sleeves OS2, 12-port (24-fiber), LC Duplex (Flipped-pair) - Includes 250 µm ribbon pigtails,	FCSD12LDFMXB	FCSD12LDFMXB	BELDEN-620
splice tray and heat shrink splice protector sleeves  Splice Cassettes Empty (no pigtails included, to be used with FX Fusion)			
OM5, 06-port (12-fiber), LC Duplex - empty	FC5D06LDFS	FC5D06LDFS	BELDEN-620
OM5, 12-port (24-fiber), LC Duplex - empty	FC5D12LDFS	FC5D12LDFS	BELDEN-620
OS2, 06-port (12-fiber), LC Duplex - empty	FCSD06LDFS	FCSD06LDFS	BELDEN-620
OS2, 12-port (24-fiber), LC Duplex - empty	FCSD12LDFS	FCSD12LDFS	BELDEN-620

DCX Pre-Terminated Adapter Frames				
Description	Part Numbers	Tech Data Sheet (Link)	Marketing Drawing	
Pre-Terminated Adapter MPO(f) to LC				
OM5, 06-port (12-fiber), LC Duplex - MPO (female), Type A	FF5D06LDMFAL	FF5D06LDMFAL	BELDEN-645	
OM5, 06-port (12-fiber), LC Duplex - MPO (female), Type A ALTERNATE	FF5D06LDMF1L	FF5D06LDMF1L	BELDEN-645	
OM5, 04-port (8-fiber), LC Duplex - MPO (female), SR4	FF5D04LD4F4L	FF5D04LD4F4L		
OS2, 06-port (12-fiber), LC Duplex - MPO (female), Type A	FFSD06LDMFAB	FFSD06LDMFAB	BELDEN-645	
OS2, 06-port (12-fiber), LC Duplex - MPO (female), Type A ALTERNATE	FFSD06LDMF1B	FFSD06LDMF1B	BELDEN-645	
OS2, 04-port (8-fiber), LC Duplex - MPO (female), SR4	FFSD04LD4F4B	FFSD04LD4F4B		

MPO TRUNKS for DCX solution					
MPO Trunks Base 12 (fan-out 1m)					
FX MPO TRUNK, OM5, MPO-12(MALE TO MALE), TYPE-B, 1 MPO (12 FIBERS), xxx M,	EN AEN AN ADA sour ANDRAEL	FM5MMB1xxxMPMEL	BELDEN-573		
OFNP, MINI-DISTRIBUTION 4.8 MM (DOUBLE JACKET), FAN-OUT: 1.0M x IN-LINE, LIME	FM5MMB1xxxMPMEL	FINISININIB TXXXINIBINIET	DELDEN-3/3		
FX MPO TRUNK, OM5, MPO-12(MALE TO MALE), TYPE-B, 2 MPO (24 FIBERS), xxx M,	FM5MMB2xxxMPMEL	FM5MMB2xxxMPMEL	BELDEN-573		
OFNP, MINI-DISTRIBUTION 4.8 MM (DOUBLE JACKET), FAN-OUT: 1.0M x IN-LINE, LIME FX MPO TRUNK, OS2, MPO-12(MALE TO MALE), TYPE-B, 1 MPO (12 FIBERS), xxx M,	T WISHVIIVIDEXXXIVII WILL	TWISTONIA DE CANADA DE CAN	DEEDEN 373		
	FMSMMB1xxxMPMEY	FMSMMB1xxxMPMEY	BELDEN-573		
OFNP, MINI-DISTRIBUTION 4.8 MM (DOUBLE JACKET), FAN-OUT: 1.0M x IN-LINE,					

■ Belden			
Description	Part Numbers	Tech Data Sheet (Link)	Marketing Drawing
FX MPO TRUNK, OS2, MPO-12(MALE TO MALE), TYPE-B, 2 MPO (24 FIBERS), xxx M, OFNP, MINI-DISTRIBUTION 4.8 MM (DOUBLE JACKET), FAN-OUT: 1.0M x IN-LINE,	FMSMMB2xxxMPMEY	FMSMMB2xxxMPMEY	BELDEN-573

Patch Cords for DCX solution				
Description	Part Numbers	Tech Data Sheet (Link)	Marketing Drawing	
Duplex 1.6mm patch cords LC duplex to LC duplex				
FX PATCH CORD, OM5, LC DUPLEX - LC DUPLEX, 1 M, OFNR, DUPLEX ZIP 1.6 MM, A-TO- B, LIME GREEN JACKET	FP5LDLD001MR1XL	FP5LDLDxxxMR1XL	BELDEN-651	
FX PATCH CORD, OM5, LC DUPLEX - LC DUPLEX, 1.5 M, OFNR, DUPLEX ZIP 1.6 MM, A- TO-B. LIME GREEN JACKET	FP5LDLD01M5R1XL	FP5LDLDxxxMR1XL	BELDEN-651	
FX PÁTCH CORD, OM5, LC DUPLEX - LC DUPLEX, 2.1 M, OFNR, DUPLEX ZIP 1.6 MM, A- TO-B, LIME GREEN JACKET	FP5LDLD02M1R1XL	FP5LDLDxxxMR1XL	BELDEN-651	
FX PATCH CORD, OM5, LC DUPLEX - LC DUPLEX, 3 M, OFNR, DUPLEX ZIP 1.6 MM, A-TO- B. LIME GREEN JACKET	FP5LDLD003MR1XL	FP5LDLDxxxMR1XL	BELDEN-651	
FX PATCH CORD, OM5, LC DUPLEX - LC DUPLEX, 4.6 M, OFNR, DUPLEX ZIP 1.6 MM, A- TO-B, LIME GREEN JACKET	FP5LDLD04M6R1XL	FP5LDLDxxxMR1XL	BELDEN-651	
FX PATCH CORD, OM5, LC DUPLEX - LC DUPLEX, 6.5 M, OFNR, DUPLEX ZIP 1.6 MM, A- TO-B, LIME GREEN JACKET	FP5LDLD06M5R1XL	FP5LDLDxxxMR1XL	BELDEN-651	
FX PATCH CORD, OS2, LC DUPLEX - LC DUPLEX, 1 M, OFNR, DUPLEX ZIP 1.6 MM, A-TO- B, YELLOW JACKET	FPSLDLD001MR1XY	FPSLDLDxxxMR1XY	BELDEN-651	
FX PATCH CORD, OS2, LC DUPLEX - LC DUPLEX, 1.5 M, OFNR, DUPLEX ZIP 1.6 MM, A-TO- B, YELLOW JACKET	FPSLDLD01M5R1XY	FPSLDLDxxxMR1XY	BELDEN-651	
FX PATCH CORD, OS2, LC DUPLEX - LC DUPLEX, 2.1 M, OFNR, DUPLEX ZIP 1.6 MM, A-TO- B, YELLOW JACKET	FPSLDLD02M1R1XY	FPSLDLDxxxMR1XY	BELDEN-651	
FX PATCH CORD, OS2, LC DUPLEX - LC DUPLEX, 3 M, OFNR, DUPLEX ZIP 1.6 MM, A-TO- B, YELLOW JACKET	FPSLDLD003MR1XY	FPSLDLDxxxMR1XY	BELDEN-651	
FX PATCH CORD, OS2, LC DUPLEX - LC DUPLEX, 4.6 M, OFNR, DUPLEX ZIP 1.6 MM, A-TO- B. YELLOW JACKET	FPSLDLD04M6R1XY	FPSLDLDxxxMR1XY	BELDEN-651	
FX PATCH CORD, OS2, LC DUPLEX - LC DUPLEX, 6.5 M, OFNR, DUPLEX ZIP 1.6 MM, A-TO- B, YELLOW JACKET	FPSLDLD06M5R1XY	FPSLDLDxxxMR1XY	BELDEN-651	

Fiber cable for DCX s	olution		
Mini-Distribution cable INDOOR ARMORED (250um loose fibers)			
FX INDOOR, MINI-DISTRIBUTION, OM5, 12 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, SUB-UNITS 3.0MM (12F), LIME GREEN JACKET	FI5M012A0	FI5M012A0	n/a
FX INDOOR, MINI-DISTRIBUTION, OM5, 24 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, DOUBLE JACKET 4.8MM, LIME GREEN JACKET	FI5M024A0	FI5M024A0	n/a
FX INDOOR, MINI-DISTRIBUTION, OS2, 12 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, SUB-UNITS 3.0MM (12F), YELLOW JACKET	FISM012A0	FISM012A0	n/a
FX INDOOR, MINI-DISTRIBUTION, OS2, 24 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, DOUBLE JACKET 4.8MM, YELLOW JACKET	FISM024A0	FISM024A0	n/a
Mini-Distribution cable INDOOR/OUTDOOR (250um loose fibers)			
FX INDOOR/OUTDOOR, MINI-DISTRIBUTION, OM5, 12 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, SUB-UNITS 3.0MM (12F), LIME GREEN JACKET	FD5M012A0L	FD5M012A0L	n/a
FX INDOOR/OUTDOOR, MINI-DISTRIBUTION, OM5, 24 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, SUB-UNITS 3.0MM (12F), LIME GREEN JACKET	FD5M024A2L	FD5M024A2	n/a
FX INDOOR/OUTDOOR, MINI-DISTRIBUTION, OS2, 12 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, SUB-UNITS 3.0MM (12F), YELLOW JACKET	FDSM012A0Y	FDSM012A0Y	n/a
FX INDOOR/OUTDOOR, MINI-DISTRIBUTION, OS2, 24 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, SUB-UNITS 3.0MM (12F), YELLOW JACKET	FDSM024A2Y	FDSM024A2Y	n/a
Flexible Ribbon cable INDOOR ARMORED (250um fibers)			
FX INDOOR, FLEXIBLE RIBBON, OS2, 12 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, DJ NON UNI, YELLOW JACKET	FISR012A0	FISR012A0	n/a
FX INDOOR, FLEXIBLE RIBBON, OS2, 24 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, DJ. NON. UNI, YELLOW JACKET	FISR024A0	FISR024A0	n/a
FX INDOOR, FLEXIBLE RIBBON, OS2, 288 FIBERS, OFCP ALUMINUM INTERLOCKED ARMOR, SUB-UNITS 3.0MM (24F), YELLOW JACKET	FISR288A5	FISR288A5	n/a

Rack & Bottom Shelf			
Description	Tech Data Sheet (Link)	Marketing Drawing	
4-post Seismic Adjustable Rack (84"H)	XDRS8419-610S02	PHSA Custom - see marketing drawing	XDRS8419-610S02_Rev3
Solid Rack Mount Shelf 9010-1919-S01 PHSA Custom - see marketing drawing		9010-1919-S01	
Heavy-Duty Wall-mount Equipment Rack 20U IXWR2019HD-S01ST		XWR2019HD- S01ST Rev1	

■ Belden			
Cabinet			
Description Part Numbers Tech Data Sheet (Link) Marketing Dr.			Marketing Drawing
Hybrid Series Seismic Cabinet 45U (84"H x 36"W x 42"D)	XHSS453642-S02	PHSA Custom - see marketing drawing	XHSS453642-S02_Rev-0
XHM Seismic Enclosure 45U (84"H X 24"W X 48"D)	XH4MS45-1S0005	PHSA Custom - see marketing drawing	XH4MS45-1S0005_REV- 4
XHM Seismic Enclosure 48U (89.25"H X 24"W X 48"D)	XH4MS48-1S0001	PHSA Custom - see marketing drawing	XH4MS48-1S0001_REV- 2
Heavy Duty Wall-mount Cabinet 24U (48"H x 30"W x 31"D)	XWM243031-S02	PHSA Custom - see marketing drawing	XWM243031-S02_REV-1

Cable Manager			
Description	Part Numbers	Tech Data Sheet (Link)	Marketing Drawing
6" wide Double-sided Vertical Manager	внунно6	<u>BHVHHxx</u>	BHVH - BHVHH SERIES
12" wide Double-sided Vertical Manager	BHVHH12	<u>BHVHHxx</u>	BHVH - BHVHH SERIES
Vertical Manager Back Cover	BHBC12X	<u>внвс</u>	BHBC SERIES
2U Horizontal Cable Manager	BHH192UR	BHH192UR	BHH SERIES
3U Horizontal Cable Manager	BHH193UR	BHH193UR	BHH SERIES





Product: REVConnect 10GX Jacks ☑

**REVConnect 10GX UTP Modular Jack** 

# **Product Description**

REVConnect 10GX Jacks are available in several colors and packaging quantities.

# **Technical Specifications**

# **Product Overview**

Suitable Applications:	10GX System, TIA Category 6A, ISO Class EA, 10GBASE-T

# **Physical Characteristics (Overall)**

Height:	0.94 in
Width:	0.64 in
Depth:	1.337 in
Wiring Scheme:	T568A/B
Packaging:	Individually packaged in a plastic bag.
Weight:	0.016 lbs

# Connectors

#### Materials

Description	Material	Type
Front Connection	Copper Clad Flexible PCB, 50uin Gold plated contacts over Nickel	RJ45
Rear Connection	Copper alloy, Gold plated contacts over Nickel	REVConnect
Connector Body	PBT glass reinforced UL94V-0	

# **Electrical Characteristics**

Dielectric Strength:	1,000V RMS @ 60 Hz for 1 minute (Signals to Ground)
Current Rating:	1.300 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Termination Resistance:	2.5 mOhm

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

# **Mechanical Characteristics**

Footprint/Type:	REVConnect
Tool Compatibility:	REVConnect Termination Tool (p/n RVUTT01)
Plug /Jack Compatibility:	RJ45, RJ11
Termination Front Connection:	Mated Connection
Termination Front Connection Durability:	750 cycles
Termination Rear Connection:	Mated Connection

Termination Rear Connection Durability:	20 cycles
Cable/Connector Retention:	15 lbs.
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

# **Standards**

UL Rating:	UL94V-0
Data Category:	Category 6A
TIA/EIA Compliance:	Category 6A - TIA 568.C.2, Category 6A - ISO/IEC 11801:2002 Ed.2
IEEE Compliance:	Power Over Ethernet (PoE) IEEE 802.3at type 1 and 2 (up to 30W), IEEE802.3bt/D1.7 type 3 and 4 (up to 100W), CISCO UPOE (up to 60W), Power over HDBaseTTM (up to 100W)
Other Standards:	IEC 60603-7

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

UL Flammability:	UL2043 Air Handling Spaces
Safety Listing:	c(UL)us Listed

# **Related Part Numbers**

Related Parts:
----------------

# Variants

Item #	Color	Packaging
RVAMJKUAL-B24	Almond	Bulk Pack (24)
RVAMJKUAL-S1	Almond	Single Pack
RVAMJKUBK-B24	Black	Bulk Pack (24)
RVAMJKUBL-B24	Blue	Bulk Pack (24)
RVAMJKUBL-S1	Blue	Single Pack
RVAMJKUBR-B24	Brown	Bulk Pack (24)
RVAMJKUBR-S1	Brown	Single Pack
RVAMJKUEW-B24	Electric White	Bulk Pack (24)
RVAMJKUEW-S1	Electric White	Single Pack
RVAMJKUGY-B24	Gray	Bulk Pack (24)
RVAMJKUGY-S1	Gray	Single Pack
RVAMJKUGN-B24	Green	Bulk Pack (24)
RVAMJKUGN-S1	Green	Single Pack
RVAMJKUIV-B24	Ivory	Bulk Pack (24)
RVAMJKUIV-S1	Ivory	Single Pack
RVAMJKUOR-B24	Orange	Bulk Pack (24)
RVAMJKUOR-S1	Orange	Single Pack
RVAMJKUPR-B24	Purple	Bulk Pack (24)
RVAMJKUPR-S1	Purple	Single Pack
RVAMJKURD-B24	Red	Bulk Pack (24)
RVAMJKURD-S1	Red	Single Pack
RVAMJKUYL-B24	Yellow	Bulk Pack (24)
RVAMJKUYL-S1	Yellow	Single Pack

# **Product Notes**

Included Parts:	1 Cat 6A REVConnect Jack; 1 REVConnect Cable Manager and Cap; 1 Installation Guide
Notes:	Please see Installation Guide PX106434.

# History

	Revision Number: 0.341 Revision Date: 02-12-2024	Update and Revision:
--	--	----------------------

#### © 2025 Belden, Inc

# All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: 10GX KEYCONNECT JACKS ☑

10GX Modular Jack, Category 6A, RJ45, KeyConnect Style

# **Product Description**

CAT6A KeyConnect Jacks are available in several colors.

# **Technical Specifications**

#### **Product Overview**

Suitable Applications:	IBDN System 10GX, TIA Category 6A, ISO Class EA, 10GBASE-T

# **Physical Characteristics (Overall)**

Height:	0.9 in
Width:	0.675 in
Depth:	1.17 in
Wiring Scheme:	T568A/B
Packaging:	Individually packaged in a plastic bag. Standard pack of 50 units.
Weight:	0.016 lbs

#### Connectors

#### Materials

Description	Material	Type
Front Connection	Flexible PCB with 50 $\mu$ inch Gold over Nickel	Flexible PCB
Rear Connection	Phosphor Bronze with Tin Plating over Nickel	IDC
Connector Body	Plastic - UL94V-0	

# **Electrical Characteristics**

Dielectric Strength:	1,000V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Termination Resistance:	2.5 mOhm

# **Temperature Range**

Installation Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-40°C to +70°C
Operating Temperature Range:	-10°C to +60°C

# **Mechanical Characteristics**

Footprint/Type:	KeyConnect
Tool Compatibility:	Belden 110 Connecting Tool
Plug /Jack Compatibility:	RJ45, RJ11
Termination Front Connection:	Mated Connection
Termination Front Connection Durability:	750 cycles
Termination Rear Connection:	IDC Connection

Termination Rear Connection Durability:	20 terminations
Cable/Connector Retention:	15 lbs.
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

#### **Standards**

Data Category:	Category 6A
TIA/EIA Compliance:	Category 6A - TIA 568.2-D, ISO/IEC 11801:2002 Amendment 2
Other Standards:	FCC Part 68, Subpart F, IEC 60603-7
Third Party Performance Verification:	ETL - Verified Category 6A

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA, c(UL)us Listed

#### **Related Part Numbers**

Related Parts:	Compatible with KeyConnect Faceplates, Adapters, Boxes and Patch Panels
----------------	---

#### Variants

rariants		
Item #	Color	Packaging
AX102281	Almond	Single Pack
AX102283	Black	Single Pack
AX104156	Blue	Single Pack
AX104158	Brown	Single Pack
AX102282	Electric White	Single Pack
AX102280	Gray	Single Pack
AX104155	Green	Single Pack
AX103073	Ivory	Single Pack
AX104152	Orange	Single Pack
AX104157	Purple	Single Pack
AX104232	Stainless Steel	Individually packaged in a plastic bag. Standard pack of 50 units.
AX104233	Stainless Steel	Individually packaged in a plastic bag. Standard pack of 50 units.
AX102288	TIA Blue	Single Pack
AX102290	TIA Brown	Single Pack
AX102287	TIA Green	Single Pack
AX102284	TIA Orange	Single Pack
AX102289	TIA Purple	Single Pack
AX102285	TIA Red	Single Pack
AX102286	TIA Yellow	Single Pack
AX104154	Yellow	Single Pack

#### **Product Notes**

ĺ	Included Parts:	1 X-Bar
Ī	Notes:	Please see Installation Guide PX103771

#### **History**

Update and Revis	on: Revision Nun	nber: 0.304 Revision Date: 05-10-2023

# © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: REVConnect 10GX Coupler ☑

RVACPKUxx-xxx-REVConnect 10GX Coupler, Black or Electric White

# **Product Description**

The REVConnect 10GX Coupler is available in black or electric white, and in single packs (includes 2 cores) or bulk packs of 24 (includes 50 cores)

# **Technical Specifications**

#### **Product Overview**

Suitable Applications:	10GX System, TIA Category 6A, ISO Class EA, 10GBASE-T

# **Physical Characteristics (Overall)**

Height:	0.868 in
Width:	0.634 in
Depth:	1.433 in
Wiring Scheme:	T568A/B
Packaging:	Packaged in single or bulk packs of 24
Weight:	0.360 lbs

#### Connectors

#### Materials

Description	Material	Туре
Front Connection	50uin Gold plated contacts	REVConnect
Rear Connection	50uin Gold plated contacts	REVConnect
Connector Body	Lexan	

# **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Termination Resistance:	2.5 m-Ohm

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C

# **Mechanical Characteristics**

Tool Compatibility:	REVConnect Termination Tool (p/n RVUTT01)
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

# Termination Interface

Termination	Connection	Durabilities
Front	Mated Connection	750 cycles
Rear	Mated Connection	20 cycles

# **Standards**

TIA/EIA Compliance:	Category 6A - TIA 568.C.2, Category 6A - ISO/IEC 11801:2002 Ed.2
IEEE Compliance:	Power Over Ethernet (PoE) IEEE 802.3at type 1 and 2 (up to 30W), IEEE 802.3bt/D1.7 type 3 and 4 (up to 100W), CISCO UPOE (up to 60W), Power over HDBaseTTM (up to 100W)

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

Safety Listing:	c(UL)us Listed

# Plenum/Non-Plenum

#### **Mated Connection**

Frequency (MHz)	Max. Insertion Loss TIA* (dB)	Max. Insertion Loss Belden** (dB)	Min. NEXT TIA* (dB)	Min. NEXT Belden** (dB)	Min. FEXT TIA* (dB)	Min. FEXT Belden** (dB)	Min. Return Loss TIA* (dB)	Min. PSANEXT TIA* (dB)	Min. PSANEXT Belden** (dB)	Min. PSAACRF TIA* (dB)	Min. PSAACRF Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1.000	.100 dB	.050 dB	75.000 dB	77.000 dB	75.000 dB	80.000 dB	30.000 dB	70.500 dB	72.000 dB	67.000 dB	72.000 dB	40.000 dB	45.000 dB
4.000	.100 dB	.050 dB	75.000 dB	77.000 dB	71.100 dB	75.100 dB	30.000 dB	70.500 dB	72.000 dB	67.000 dB	72.000 dB	40.000 dB	45.000 dB
8.000	.100 dB	.050 dB	75.000 dB	77.000 dB	65.000 dB	69.000 dB	30.000 dB	70.500 dB	72.000 dB	67.000 dB	72.000 dB	40.000 dB	45.000 dB
10.000	.100 dB	.050 dB	74.000 dB	77.000 dB	63.100 dB	67.100 dB	30.000 dB	70.500 dB	72.000 dB	67.000 dB	72.000 dB	40.000 dB	45.000 dB
16.000	.100 dB	.060 dB	69.900 dB	72.900 dB	59.000 dB	63.300 dB	30.000 dB	70.500 dB	72.000 dB	67.000 dB	72.000 dB	40.000 dB	45.000 dB
20.000	.100 dB	.070 dB	68.000 dB	71.000 dB	57.100 dB	61.100 dB	30.000 dB	70.500 dB	72.000 dB	67.000 dB	72.000 dB	40.000 dB	45.000 dB
25.000	.100 dB	.080 dB	66.000 dB	69.000 dB	55.100 dB	59.100 dB	30.000 dB	70.500 dB	72.000 dB	67.000 dB	72.000 dB	40.000 dB	45.000 dB
31.250	.110 dB	.090 dB	64.100 dB	67.100 dB	53.200 dB	57.200 dB	30.000 dB	70.500 dB	72.000 dB	67.000 dB	72.000 dB	38.100 dB	45.000 dB
62.500	.160 dB	.140 dB	58.100 dB	61.100 dB	47.200 dB	51.200 dB	30.000 dB	70.500 dB	72.000 dB	67.000 dB	72.000 dB	32.100 dB	39.100 dB
100.000	.200 dB	.180 dB	54.000 dB	57.000 dB	43.100 dB	47.100 dB	28.00 dB	70.500 dB	72.000 dB	67.000 dB	72.000 dB	28.000 dB	35.000 dB
200.000	.280 dB	.260 dB	48.000 dB	51.000 dB	37.100 dB	41.100 dB	22.000 dB	64.500 dB	66.00 dB	61.000 dB	66.000 dB	22.000 dB	29.000 dB
250.000	.320 dB	.300 dB	46.000 dB	49.000 dB	35.100 dB	39.100 dB	20.000 dB	62.500 dB	64.00 dB	59.000 dB	64.000 dB	20.000 dB	27.000 dB
300.000	.350 dB	.330 dB	42.900 dB	46.700 dB	33.600 dB	37.600 dB	18.500 dB	61.000 dB	62.500 dB	57.500 dB	62.500 dB	18.500 dB	25.500 dB
400.000	.400 dB	.380 dB	37.900 dB	42.900 dB	31.100 dB	35.100 dB	16.000 dB	58.500 dB	60.000 dB	55.000 dB	60.000 dB	16.000 dB	23.000 dB
500.000	.450 dB	.430 dB	34.000 dB	40.000 dB	29.100 dB	33.100 dB	14.000 dB	56.500 dB	58.000 dB	53.000 dB	58.000 dB	14.000 dB	21.000 dB
625.000		.480 dB		37.100 dB		31.200 dB			56.100 dB		56.100 dB		19.100 dB

Mated Connection Footnote1: \*TIA/EIA-568-C.2 Category 6A Standard.

Mated Connection Footnote2: \*\*Worst-case performance for a 10GX mated connection using REVConnect Cores.

# **Related Part Numbers**

Related Parts:	Compatible with KeyConnect Faceplates, Adapters, Boxes and Patch Panels

# Variants

Item #	Color	UPC
RVACPKUBK-B24	Black	611589238434
RVACPKUBK-S1	Black	611589238427
RVACPKUEW-B24	Electric White	611589239769
RVACPKUEW-S1	Electric White	611589239776

# **Product Notes**

	DI	
Notes:	Please see Installation Guide PX106434	

# History

Update and Revision:

Revision Number: 0.238 Revision Date: 02-03-2025

#### © 2025 Belden, Inc

# All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





# **Product Description**

REVConnect 10GX Shielded Plugs are available in single packs and 24 bulk packs.

# **Technical Specifications**

#### **Product Overview**

Suitable Applications: 10GX Shielded System, TIA Screened Category 6A , ISO Class EA, 10GBASE-T		
	Suitable Applications:	10GX Shielded System, TIA Screened Category 6A , ISO Class EA, 10GBASE-T

# **Physical Characteristics (Overall)**

Height:	0.73 in
Width:	1.1 in
Depth:	1.81 in
Wiring Scheme:	T568A/B
Packaging:	Individually packaged in a plastic bag.
Weight:	0.048 lbs

# **Electrical Characteristics**

Dielectric Strength:	1,000V RMS @ 60 Hz for 1 minute (Signals to Ground)
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Termination Resistance:	2.5 mOhm

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

# **Mechanical Characteristics**

Footprint/Type:	KeyConnect
Tool Compatibility:	RVUTT01 Termination Tool
Plug /Jack Compatibility:	RJ45
Termination Front Connection:	Mated Connection
Termination Front Connection Durability:	750 cycles
Termination Rear Connection:	Mated Connection
Termination Rear Connection Durability:	200 cycles
Cable/Connector Retention:	15 lbs.
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

# **Standards**

UL Rating:	UL94V-0
-	

Data Category:	Category 6A	
TIA/EIA Compliance:	Category 6A - TIA 568.C.2, Category 6A - ISO/IEC 11801:2002 Ed.2	
IEEE Compliance:	Power Over Ethernet (PoE) IEEE 802.3at type 1 and 2 (up to 30W), IEEE802.3bt/D1.7 type 3 and 4 (up to 100W), CISCO UPOE (up to 60W), Power over HDBaseTTM (up to 100W)	

#### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

#### Flammability, LS0H, Toxicity Testing

UL Flammability:	UL2043 Air Handling Spaces
Safety Listing:	c(UL)us Listed

#### **Related Part Numbers**

Related Parts:	Refer to REVConnect WAP - CAMERA Compatibility Guide

#### Variants

Item #	Color	Packaging	Insulated Wire Diameter
RVAEFPSME-B24	Metal	Bulk Pack of 24	1.3mm up to 1.45mm
RVAFPSME-B24	Metal	Bulk Pack of 24	0.9mm up to 1.3mm
RVAEFPSME-S1	Metal	Single Pack	1.3mm up to 1.45mm
RVAFPSME-S1	Metal	Single Pack	0.9mm up to 1.3mm

#### **Product Notes**

Notes:	Please see Installation Guide PX106435.

#### **History**

Update and Revision:	Revision Number: 0.309 Revision Date: 08-08-2023

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: RVAPPF1U48BK ☑



REVConnect Patch Panel, Cat 6A, Flat, 1U, 48P

# **Product Description**

REVConnect Category 6A Patch Panel, Preloaded, Flat, 48 Port, 1U, Black

# **Technical Specifications**

#### **Product Overview**

Suitable Applications: Ethernet 10GBASE-T, Wi-Fi 6, Wi-Fi 5, In-Building Wireless, In-Building Small Cells, Mobile RAN, Data Center EoR and MoR, PoE++, PoE+, PoE

# **Physical Characteristics (Overall)**

Height:	1.73	
Width:	9	
Depth:	2	
Port Count:	Port	
Front Connection:	Flush	
Packaging:	Individually packaged in a cardboard box.	
Weight:	3.047	

#### Connectors

#### Materials

Description	Material	Color
Panel	Steel	Black
Frame	PC/ABS	Black
Management Bar	Steel	Black
Clear Window	Polycarbonate	Transparent

# **Construction and Dimensions**

Max Capacity:	48 Connectors (Preloaded)	

# **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.300 A
Insulation Resistance:	500 M-Ohm Minimum
Termination Resistance:	2.5 mOhm

# **Temperature Range**

Installation Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-40°C to +70°C
Operating Temperature Range:	-10°C to +60°C

#### **Mechanical Characteristics**

Footprint/Type:	REVConnect
Tool Compatibility:	REVConnect Termination Tool (RVUTT01)
Plug /Jack Compatibility:	RJ45

Termination Front Connection:	Mated Connection
Termination Front Connection Durability:	750 Cycles
Termination Rear Connection:	Mated Connection
Termination Rear Connection Durability:	20 Cycles
Cable/Connector Retention:	15 lbs
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

#### **Standards**

UL Rating:	UL94V-0
Data Category:	Category 6A
TIA/EIA Compliance:	Category 6A - TIA 568.C.2, Category 6A - ISO/IEC 11801:2002 Ed.2
IEEE Compliance:	Power Over Ethernet (PoE) IEEE 802.3at type 1 and 2 (up to 30W), IEEE 802.3bt/D1.7 type 3 and 4 (up to 100W), CISCO UPOE (up to 60W), Power over HDBaseTTM (up to 100W)
Other Standards:	FCC Part 68, Subpart F, IEC 60603-7

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

Safety Listing:	c(UL)us Listed		

#### **Related Part Numbers**

Related Parts:	REVConnect Termination Tool, Cat 6A Modular Cords

#### Variants

Item #	Color	Put-Up Type
RVAPPF1U48BK	Black	1U

# **Product Notes**

Included Parts:	48 10GX REVConnect High Density Jacks, Black, Preloaded; 50 REVConnect Cable Managers and Caps; 4 Clear Windows; 1 Rear Cable Management Bar; 4 Screws (10x32); 4 Screws (12x24); 2 Velcro Straps; 4 Frames; 1 Installation Guide	
Notes:	For proper installation, refer to Installation Guide PX107031.	

# **History**

Update and Revision:	Revision Number: 0.94 Revision Date: 05-31-2024

#### © 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: RVAPPF1U24BK-P ☑



FACEPLATES AND PANELS - 10GX REVCONNECT PATCH PANEL, 1U24-PORT PRINTED

# **Product Description**

10GX REVCONNECT PATCH PANEL, 24-PORT, 1U (PRELOADED - PRINTED)

# **Technical Specifications**

#### **Product Overview**

Suitable Applications:	10GX Systems, TIA Category 6A, ISO Class EA, 10GBASE-T

# **Physical Characteristics (Overall)**

Height:	1.730 in				
Width:	19.000 in				
Depth:	2.000 in				
Port Count:	24 Port				
Front Connection:	Flush				
Packaging:	Individually packaged in a cardboard box.				
Weight:	1.846 lbs				

#### Connectors

#### Materials

Description	Material	Color
Panel	Steel	Black
Frame	PC/ABS	Black
Management Bar	Steel	Black
Clear Window	Polycarbonate	Transparent

# **Construction and Dimensions**

Max Capacity:	24 connectors (patch panel is pre-loaded)

# **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60Hz for 1 minute
Current Rating:	1.300 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Termination Resistance:	2.5 mOhm

# **Mated Connection**

Frequency (MHz)	Max. Insertion Loss TIA* (dB)	Max. Insertion Loss Belden** (dB)	Min. NEXT TIA* (dB)	Min. FEXT TIA* (dB)	Min. FEXT Belden** (dB)	Min. Return Loss TIA* (dB)	Min. Return Loss Belden** (dB)	Min. PSANEXT TIA* (dB)	Min. PSANEXT Belden** (dB)	Min. PSAACRF TIA* (dB)	Min. PSAACRF Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1	0.1 dB	0.05 dB	75 dB	75 dB	80 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
4	0.1 dB	0.05 dB	75 dB	71.1 dB	75.1 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
8	0.1 dB	0.05 dB	75 dB	65 dB	69 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
10	0.1 dB	0.05 dB	74 dB	63.1 dB	67.1 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
16	0.1 dB	0.06 dB	69.9 dB	59 dB	63 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB

20	0.1 dB	0.07 dB	68 dB	57.1 dB	61.1 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
25	0.1 dB	0.08 dB	66 dB	55.1 dB	59.1 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
31.25	0.11 dB	0.09 dB	64.1 dB	53.2 dB	57.2 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	38.1 dB	45 dB
62.5	0.16 dB	0.14 dB	58.1 dB	47.2 dB	51.2 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	32.1 dB	39.1 dB
100	0.2 dB	0.18 dB	54 dB	43.1 dB	47.1 dB	28 dB	30 dB	70.5 dB	72 dB	67 dB	72 dB	28 dB	35 dB
200	0.28 dB	0.26 dB	48 dB	37.1 dB	41.1 dB	22 dB	24 dB	64.5 dB	66 dB	61 dB	66 dB	22 dB	29 dB
250	0.32 dB	0.3 dB	46 dB	35.1 dB	39.1 dB	20 dB	22 dB	62.5 dB	64 dB	59 dB	64 dB	20 dB	27 dB
300	0.35 dB	0.33 dB	42.9 dB	33.6 dB	37.6 dB	18.5 dB	20.5 dB	61 dB	62.5 dB	57.5 dB	62.5 dB	18.5 dB	25.5 dB
400	0.4 dB	0.38 dB	37.9 dB	31.1 dB	35.1 dB	16 dB	18 dB	58.5 dB	60 dB	55 dB	60 dB	16 dB	23 dB
500	0.45 dB	0.43 dB	34 dB	29.1 dB	33.1 dB	14 dB	16 dB	56.5 dB	58 dB	53 dB	58 dB	14 dB	21 dB
625		0.48 dB			31.2 dB		13 dB		56.1 dB		56.1 dB		21 dB

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

# **Mechanical Characteristics**

Footprint/Type:	REVConnect						
Tool Compatibility:	VConnect Termination Tool (RVUTT01)						
Plug /Jack Compatibility:	5						
Termination Front Connection:	Yes						
Termination Rear Connection:	Yes						
Cable/Connector Retention:	15 lbs						
Connector/Hardware Retention:	20 lbs						
Plug/Connector Retention:	11.250 lbs						

# Termination Interface

Connection	Durabilities
Mated Connection	750 cycles
Mated Connection	200 cycles

# **Standards**

UL Rating:	UL94 V-0
Data Category:	Category 6A
TIA/EIA Compliance:	Category 6A - ISO/IEC 11801:2002 Ed.2, TIA 568.2-D
IEEE Compliance:	Power Over Ethernet (PoE) IEEE 802.3at type 1 and 2 (up to 30W), IEEE 802.3bt/D1.7 type 3 and 4 (up to 100W), CISCO UPOE (up to 60W), Power over HDBaseTTM (up to 100W)
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

Safety Listing:	c(UL)us Listed

# **Related Part Numbers**

Related Parts:	10GX REVConnect Modular Couplers, 10GX RevConnect Cords

# **Product Notes**

Included Parts:	24 10GX REVConnect Couplers, Black, 25 REVConnect Cable Managers and Term, 4 Clear Windows, 1 Rear Cable Management Bar, 4 Screws (10x32), 4 Screws (12x24), 2 Velcro Straps, 4 Frames, 1 Installation Guide
Notes:	For proper installation refer to Installation Guide PX106520 included with the product or visit our website at http://www.belden.com Cable Range Min: 24 AWG, Max: Cable 22 AWG Solid and Stranded Insulation Dia. Min: 0.035 in (0.89 mm), Max: 0.053 in (1.34 mm) Outer Jacket Dia Max: 0.366 in (9.3 mm)

# History

Update and Revision:

Revision Number: 0.27 Revision Date: 02-14-2024

#### © 2025 Belden, Inc

# All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: RVAPPF2U48BK-P ☑



# FACEPLATES AND PANELS - 10GX REVCONNECT PATCH PANEL, 2U48-PORT PRINTED

# **Product Description**

10GX REVCONNECT PATCH PANEL, 48-PORT, 2U (PRELOADED - PRINTED)

# **Technical Specifications**

#### **Product Overview**

Suitable Applications:	10GX Systems, TIA Category 6A, ISO Class EA, 10GBASE-T	

# **Physical Characteristics (Overall)**

Height:	3.470 in					
Width:	100 in					
Depth:	2.000 in					
Port Count:	Port					
Front Connection:	lush					
Packaging:	dividually packaged in a cardboard box.					
Weight:	083 lbs					

#### Connectors

#### Materials

Description	Material	Color
Panel	Steel	Black
Frame	PC/ABS	Black
Management Bar	Steel	Black
Clear Window	Polycarbonate	Transparent

# **Construction and Dimensions**

Max Capacity:	48 connectors (patch panel is pre-loaded)

# **Electrical Characteristics**

Dielectric Strength:	00 V RMS @ 60Hz for 1 minute						
Current Rating:	1.300 A						
Insulation Resistance:	500 M-Ohm Minimum						
Max Contact Resistance:	20 mOhm						
Termination Resistance:	2.5 mOhm						

# Mated Connection

Frequency (MHz)	Max. Insertion Loss TIA* (dB)	Max. Insertion Loss Belden** (dB)	Min. NEXT TIA* (dB)	Min. FEXT TIA* (dB)	Min. FEXT Belden** (dB)	Min. Return Loss TIA* (dB)	Min. Return Loss Belden** (dB)	Min. PSANEXT TIA* (dB)	Min. PSANEXT Belden** (dB)	Min. PSAACRF TIA* (dB)	Min. PSAACRF Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1	0.1 dB	0.05 dB	75 dB	75 dB	80 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
4	0.1 dB	0.05 dB	75 dB	71.1 dB	75.1 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
8	0.1 dB	0.05 dB	75 dB	65 dB	69 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
10	0.1 dB	0.05 dB	74 dB	63.1 dB	67.1 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
16	0.1 dB	0.06 dB	69.9 dB	59 dB	63 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB

20	0.1 dB	0.07 dB	68 dB	57.1 dB	61.1 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
25	0.1 dB	0.08 dB	66 dB	55.1 dB	59.1 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	40 dB	45 dB
31.25	0.11 dB	0.09 dB	64.1 dB	53.2 dB	57.2 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	38.1 dB	45 dB
62.5	0.16 dB	0.14 dB	58.1 dB	47.2 dB	51.2 dB	30 dB	34.1 dB	70.5 dB	72 dB	67 dB	72 dB	32.1 dB	39.1 dB
100	0.2 dB	0.18 dB	54 dB	43.1 dB	47.1 dB	28 dB	30 dB	70.5 dB	72 dB	67 dB	72 dB	28 dB	35 dB
200	0.28 dB	0.26 dB	48 dB	37.1 dB	41.1 dB	22 dB	24 dB	64.5 dB	66 dB	61 dB	66 dB	22 dB	29 dB
250	0.32 dB	0.3 dB	46 dB	35.1 dB	39.1 dB	20 dB	22 dB	62.5 dB	64 dB	59 dB	64 dB	20 dB	27 dB
300	0.35 dB	0.33 dB	42.9 dB	33.6 dB	37.6 dB	18.5 dB	20.5 dB	61 dB	62.5 dB	57.5 dB	62.5 dB	18.5 dB	25.5 dB
400	0.4 dB	0.38 dB	37.9 dB	31.1 dB	35.1 dB	16 dB	18 dB	58.5 dB	60 dB	55 dB	60 dB	16 dB	23 dB
500	0.45 dB	0.43 dB	34 dB	29.1 dB	33.1 dB	14 dB	16 dB	56.5 dB	58 dB	53 dB	58 dB	14 dB	21 dB
625		0.48 dB			31.2 dB		13 dB		56.1 dB		56.1 dB		21 dB

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

# **Mechanical Characteristics**

Footprint/Type:	REVConnect						
Tool Compatibility:	REVConnect Termination Tool (RVUTT01)						
Plug /Jack Compatibility:							
Termination Front Connection:	Yes						
Termination Rear Connection:	Yes						
Cable/Connector Retention:	15 lbs						
Connector/Hardware Retention:	20 lbs						
Plug/Connector Retention:	11.250 lbs						

# Termination Interface

Connection	Durabilities
Mated Connection	750 cycles
Mated Connection	200 cycles

# **Standards**

UL Rating:	UL94 V-0
Data Category:	Category 6A
TIA/EIA Compliance:	Category 6A - ISO/IEC 11801:2002 Ed.2, TIA 568.2-D
IEEE Compliance:	Power Over Ethernet (PoE) IEEE 802.3at type 1 and 2 (up to 30W), IEEE 802.3bt/D1.7 type 3 and 4 (up to 100W), CISCO UPOE (up to 60W), Power over HDBaseTTM (up to 100W)
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

Safety Listing:	c(UL)us Listed

# **Related Part Numbers**

Related Parts:	10GX REVConnect Modular Couplers, 10GX RevConnect Cords

# **Product Notes**

Included Parts:	48 10GX REVConnect Couplers, Black, 50 REVConnect Cores, 8 Clear Windows, 2 Rear Cable Management Bar, 4 Screws (10x32), 4 Screws (12x24), 2 Velcro Straps, 4 Frames, 1 Installation Guide
Notes:	For proper installation refer to Installation Guide PX106520 included with the product or visit our website at http://www.belden.com Cable Range Min: 24 AWG, Max: Cable 22 AWG Solid and Stranded Insulation Dia. Min: 0.035 in (0.89 mm), Max: 0.053 in (1.34 mm) Outer Jacket Dia Max: 0.366 in (9.3 mm)

# History

Update and Revision:

Revision Number: 0.25 Revision Date: 02-14-2024

#### © 2025 Belden, Inc

# All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: <u>10GXS13</u> ☑

10GXS Category 6A Enhanced Cable, 4 Pair, U/UTP, CMP

# **Product Description**

10GXS Category 6A Enhanced Premise Horizontal Cable (625MHz), 4 Pair, 23 AWG Solid Bare Copper Conductors, U/UTP, Plenum-CMP, Flamarrest® PVC-LS Jacket

# **Technical Specifications**

# **Product Overview**

Suitable Applications:	Premise Horizontal Cable, Ethernet up to 10GBASE-T, Wi-Fi 6, Wi-Fi 5, PoE++, PoE+, PoE, Noisy Environments, Data Center EoR and MoR, Network Backbone, HDBaseT, HDBaseT 4K UHD
Patent:	This product has one or more applicable patents. More information on patents can be found at https://www.belden.com/patents.

#### **Construction Details**

#### Conductor

Size	Stranding	Material	No. of Pairs
23 AWG	Solid	BC - Bare Copper	4

#### Insulation

Material	Color Code
FEP - Fluorinated Ethylene Propylene	White & Blue, White & Orange, White & Green, White & Brown

# Outer Jacket

	Separator	Material	Material Trade Name	Nom. Diameter	Ripcord
Center Member (Patented	d EquiSpline®), EquiBlock™ Barrier Technology	PVC - Polyvinyl Chloride	Flamarrest®	0.265 in (6.73 mm)	Yes
Overall Cable Diameter (Nominal):	0.265 in (6.73 mm)				

# **Electrical Characteristics**

#### Electricals

Max. Conductor DCR	Max. Capacitance Unbalance
82 Ohm/km (25 Ohm/1000ft)	45 pF/100m

#### Delay

Frequency	Max. Delay	Max. Delay Skew	Nom. Velocity of Prop.	Typical Delay Skew
100 MHz	537.6 ns/100m	45 ns/100m	69%	30 ns/100m

# High Frequency

Frequency [MHz]	Max. Insertion Loss (Attenuation)	Min. PSNEXT [dB]	Min. PSACR [dB]	Min. PSACRF (PSELFEXT) [dB]	Min. RL (Return Loss) [dB]	Max./Min. Input Impedance (unFitted) [Ohm]	Max./Min. Fitted Impedance [Ohm]	Min. PSANEXT [dB]	Min. PSAACRF [dB]	Min. TCL [dB]	Min. ELTCTL [dB]
1	2.1 dB/100m	75.3	73.2	74.8	20.0	100 ± 15	105 ± 10	75.0	77.0	40.0	35.0
4	3.8 dB/100m	66.3	62.5	62.8	23.0	100 ± 15	100 ± 15	75.0	76.2	40.0	23.0
8	5.3 dB/100m	61.8	56.5	56.7	24.5	100 ± 15	100 ± 15	75.0	70.1	40.0	16.9
10	5.9 dB/100m	60.3	54.4	54.8	25.0	100 ± 15	100 ± 15	75.0	68.2	40.0	15.0
16	7.4 dB/100m	57.2	49.8	50.7	25.0	100 ± 15	100 ± 15	75.0	64.1	38.0	10.9
20	8.3 dB/100m	55.8	47.5	48.8	25.0	100 ± 15	100 ± 15	75.0	62.2	37.0	9.0
25	9.3 dB/100m	54.3	45.0	46.8	24.3	100 ± 15	100 ± 15	75.0	60.2	36.0	7.0

31.25	10.4 dB/100m	52.9	42.5	44.9	23.6	100 ± 15	100 ± 10	75.0	58.3	35.1	5.1
62.5	14.8 dB/100m	48.4	33.6	38.9	21.5	100 ± 15	100 ± 10	73.6	52.3	32.0	
100	18.9 dB/100m	45.3	26.4	34.8	20.1	100 ± 15	100 ± 10	70.5	48.2	30.0	
200	27.0 dB/100m	40.8	13.8	28.8	18.0	100 ± 22	100 ± 10	66.0	42.2	27.0	
250	30.4 dB/100m	39.3	9.0	26.8	17.3	100 ± 32	100 ± 10	64.5	40.2	26.0	
300	33.5 dB/100m	38.1	4.6	25.3	16.8	100 ± 32	100 ± 10	63.3	38.7	25.2	
350	36.3 dB/100m	37.1	0.8	23.9	16.3	100 ± 32	100 ± 10	62.3	37.3	24.6	
400	39.0 dB/100m	36.3		22.8	15.9	100 ± 32	100 ± 10	61.5	36.2	24.0	
450	41.5 dB/100m	35.5		21.7	15.5	100 ± 32	100 ± 10	60.7	35.1	23.5	
500	43.9 dB/100m	34.8		20.8	15.2	100 ± 32	100 ± 10	60.0	34.2	23.0	
550	46.2 dB/100m	33.2		20.0	14.9	100 ± 32	100 ± 10	59.4	33.4		
600	48.4 dB/100m	32.6		19.2	14.7	100 ± 32	100 ± 10	58.8	32.6		
625	49.5 dB/100m	32.4		18.9	14.5	100 ± 32	100 ± 10	58.6	32.3		
750	54.7 dB/100m	32.2		17.3	14.0			57.4	30.7		
860	58.9 dB/100m	31.3		16.1	13.6			56.5	29.5		

# Voltage

UL Voltage Rating
300 V (CMP), 300 V (CL3P)

#### **Mechanical Characteristics**

#### Temperature

<b>UL Temperature</b>	Operating	Installation	Storage
105°C	-20°C To +75°C	0°C To +50°C	-20°C To +75°C

#### Bend Radius

Stationary Min.	Installation Min.
1.25 in (31.8 mm)	2.75 in (69.9 mm)
Max. Pull Tension:	25 lbs (11
Bulk Cable Weight	:: 37 lbs/100

# **Standards and Compliance**

Environmental Suitability:	Plenum, Indoor
Sustainability:	Product Lens™, Environmental Product Declaration (EPD) Available
Flammability / Reaction to Fire:	NFPA 262, UL 910 (Plenum), FT6, IEC 60332-1-2
CPR Compliance:	CPR Euroclass: Eca; CPR UKCA Class: Eca
NEC / UL Compliance:	Article 800, CMP, CMP-LP (0.7A), CL3P-LP (0.7A)
CEC / C(UL) Compliance:	CMP
ICEA Compliance:	S-116-732
IEEE Compliance:	IEEE 802.3bt Type 1, Type 2, Type 3, Type 4
NEMA Compliance:	ANSI/NEMA WC-66
Data Category:	Category 6A
TIA/EIA Compliance:	ANSI/TIA-568.2-D Category 6A
ISO/IEC Compliance:	ISO/IEC 11801-1, IEC 61156-5
CENELEC Compliance:	Segregation class according EN50174-2 = a
European Directive Compliance:	EU CE Mark, EU Directive 2015/863/EU (RoHS 2 amendment), REACH, EU Directive 2011/65/EU (RoHS 2), EU Directive 2012/19/EU (WEEE), REACH: 2020-01-16
UK Regulation Compliance:	UKCA Mark
APAC Compliance:	China RoHS II (GB/T 26572-2011)
Non-Plenum Number:	10GXS12

# **Product Notes**

Notes: Electrical values are expected performance based on cable testing and representative performance within a typical Belden system. Values above 625 MHz are for Engineering Information Only. Print Includes Descending Footage/Meter Markings from Max. Put-Up Length to 0.

# History

Update and Revision: Revision Number: 0.302 Revision Date: 02-03-2025

#### **Part Numbers**

#### **Variants**

variants				
Item #	Color	Putup Type	Length	UPC
10GXS13 0101000	Black	Reel	1,000 ft	612825004035
10GXS13010A1000	Black	Reel-in-Box	1,000 ft	612825004134
10GXS13010U1000	Black	Unreel	1,000 ft	
10GXS13010Z1000	Black	ReelTuff Box	1,000 ft	
10GXS13 D151000	Blue	Reel	1,000 ft	612825004042
10GXS13D15A1000	Blue	Reel-in-Box	1,000 ft	612825004059
10GXS13D15U1000	Blue	Unreel	1,000 ft	
10GXS13D15Z1000	Blue	ReelTuff Box	1,000 ft	
10GXS13 0081000	Gray	Reel	1,000 ft	612825004011
10GXS13008A1000	Gray	Reel-in-Box	1,000 ft	612825004110
10GXS13008U1000	Gray	Unreel	1,000 ft	
10GXS13 0051000	Green	Reel	1,000 ft	612825003991
10GXS13005A1000	Green	Reel-in-Box	1,000 ft	612825004097
10GXS13005U1000	Green	Unreel	1,000 ft	
10GXS13 0031000	Orange	Reel	1,000 ft	612825003977
10GXS13003A1000	Orange	Reel-in-Box	1,000 ft	612825004073
10GXS13003U1000	Orange	Unreel	1,000 ft	
10GXS13 0071000	Purple	Reel	1,000 ft	612825004004
10GXS13007A1000	Purple	Reel-in-Box	1,000 ft	612825004103
10GXS13007U1000	Purple	Unreel	1,000 ft	
10GXS13 0021000	Red	Reel	1,000 ft	612825003960
10GXS13002A1000	Red	Reel-in-Box	1,000 ft	612825004066
10GXS13002U1000	Red	Unreel	1,000 ft	
10GXS13 0091000	White	Reel	1,000 ft	612825004028
10GXS13009A1000	White	Reel-in-Box	1,000 ft	612825004127
10GXS13009U1000	White	Unreel	1,000 ft	
10GXS13 0041000	Yellow	Reel	1,000 ft	612825003984
10GXS13004A1000	Yellow	Reel-in-Box	1,000 ft	612825004080
10GXS13004U1000	Yellow	Unreel	1,000 ft	

## © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: <u>10GXS12</u> ☑

10GXS Category 6A Enhanced Cable, 4 Pair, U/UTP, CMR

## **Product Description**

10GXS Category 6A Enhanced Premise Horizontal Cable (625MHz), 4 Pair, 23 AWG Solid Bare Copper Conductors, U/UTP, Riser-CMR, PVC Jacket

## **Technical Specifications**

### **Product Overview**

Suitable Applications:	Premise Horizontal Cable, Ethernet up to 10GBASE-T, Wi-Fi 6, Wi-Fi 5, PoE++, PoE+, PoE, Noisy Environments, Data Center EoR and MoR, Network Backbone, HDBaseT, HDBaseT 4K UHD
Patent:	This product has one or more applicable patents. More information on patents can be found at https://www.belden.com/patents.

### **Construction Details**

#### Conductor

Size	Stranding	Material	No. of Pairs
23 AWG	Solid	BC - Bare Copper	4

#### Insulation

Material	Color Code	
PO - Polyolefin	White & Blue, White & Orange, White & Green, White & Brown	ĺ

#### **Outer Jacket**

	Separator	Material	Nom. Diameter	Ripcord
Center Member (Patented	EquiSpline®), EquiBlock™ Barrier Technology	PVC - Polyvinyl Chloride	0.275 in (6.99 mm)	Yes
Overall Cable Diameter (Nominal):	0.275 in (6.99 mm)			

### **Electrical Characteristics**

### Electricals

Max. Conductor DCR	Max. Capacitance Unbalance
82 Ohm/km (25 Ohm/1000ft)	45 pF/100m

# Delay

Frequency	Max. Delay	Max. Delay Skew	Nom. Velocity of Prop.	Typical Delay Skew
100 MHz	537.6 ns/100m	45 ns/100m	65%	30 ns/100m

## High Frequency

Frequency [MHz]	Max. Insertion Loss (Attenuation)	Min. PSNEXT [dB]	Min. PSACR [dB]	Min. PSACRF (PSELFEXT) [dB]	Min. RL (Return Loss) [dB]	Max./Min. Input Impedance (unFitted) [Ohm]	Max./Min. Fitted Impedance [Ohm]	Min. PSANEXT [dB]	Min. PSAACRF [dB]	Min. TCL [dB]	Min. ELTCTL [dB]
1	2.1 dB/100m	75.3	73.2	74.8	20.0	100 ± 15	105 ± 10	75.0	77.0	40.0	35.0
4	3.8 dB/100m	66.3	62.5	62.8	23.0	100 ± 15	100 ± 15	75.0	76.2	40.0	23.0
8	5.3 dB/100m	61.8	56.5	56.7	24.5	100 ± 15	100 ± 15	75.0	70.1	40.0	16.9
10	5.9 dB/100m	60.3	54.4	54.8	25.0	100 ± 15	100 ± 15	75.0	68.2	40.0	15.0
16	7.4 dB/100m	57.2	49.8	50.7	25.0	100 ± 15	100 ± 15	75.0	64.1	38.0	10.9
20	8.3 dB/100m	55.8	47.5	48.8	25.0	100 ± 15	100 ± 15	75.0	62.2	37.0	9.0
25	9.3 dB/100m	54.3	45.0	46.8	24.3	100 ± 15	100 ± 15	75.0	60.2	36.0	7.0
31.25	10.4 dB/100m	52.9	42.5	44.9	23.6	100 ± 15	100 ± 10	75.0	58.3	35.1	5.1

62.5	14.8 dB/100m	48.4	33.6	38.9	21.5	100 ± 15	100 ± 10	73.6	52.3	32.0	
100	18.9 dB/100m	45.3	26.4	34.8	20.1	100 ± 15	100 ± 10	70.5	48.2	30.0	
200	27.0 dB/100m	40.8	13.8	28.8	18.0	100 ± 22	100 ± 10	66.0	42.2	27.0	
250	30.4 dB/100m	39.3	9.0	26.8	17.3	100 ± 32	100 ± 10	64.5	40.2	26.0	
300	33.5 dB/100m	38.1	4.6	25.3	16.8	100 ± 32	100 ± 10	63.3	38.7	25.2	
350	36.3 dB/100m	37.1	0.8	23.9	16.3	100 ± 32	100 ± 10	62.3	37.3	24.6	
400	39.0 dB/100m	36.3		22.8	15.9	100 ± 32	100 ± 10	61.5	36.2	24.0	
450	41.5 dB/100m	35.5		21.7	15.5	100 ± 32	100 ± 10	60.7	35.1	23.5	
500	43.9 dB/100m	34.8		20.8	15.2	100 ± 32	100 ± 10	60.0	34.2	23.0	
550	46.2 dB/100m	33.2		20.0	14.9	100 ± 32	100 ± 10	59.4	33.4		
600	48.4 dB/100m	32.6		19.2	14.7	100 ± 32	100 ± 10	58.8	32.6		
625	49.5 dB/100m	32.4		18.9	14.5	100 ± 32	100 ± 10	58.6	32.3		
750	54.7 dB/100m	32.2		17.3	14.0			57.4	30.7		
860	58.9 dB/100m	31.3		16.1	13.6			56.5	29.5		

## Voltage

UL Voltage Rating
300 V (CMR), 300 V (CL3R)

## **Mechanical Characteristics**

### Temperature

<b>UL Temperature</b>	Operating	Installation	Storage
90°C	-20°C To +75°C	0°C To +50°C	-20°C To +75°C

#### Bend Radius

Max. Pull Tension: 25 lbs (11 kg)

# **Standards and Compliance**

Environmental Suitability:	Riser, Indoor
Sustainability:	Product Lens™, Environmental Product Declaration (EPD) Available
Flammability / Reaction to Fire:	UL 1666 Riser, FT4, IEC 60332-1-2
CPR Compliance:	CPR Euroclass: Eca; CPR UKCA Class: Eca
NEC / UL Compliance:	Article 800, CMR, CMR-LP (0.6A), CL3R-LP (0.6A)
CEC / C(UL) Compliance:	CMR
ICEA Compliance:	S-116-732
IEEE Compliance:	IEEE 802.3bt Type 1, Type 2, Type 3, Type 4
NEMA Compliance:	ANSI/NEMA WC-66
Data Category:	Category 6A
TIA/EIA Compliance:	ANSI/TIA-568.2-D Category 6A
ISO/IEC Compliance:	ISO/IEC 11801-1, IEC 61156-5
CENELEC Compliance:	Segregation class according EN50174-2 = a
European Directive Compliance:	EU CE Mark, EU Directive 2015/863/EU (RoHS 2 amendment), REACH, EU Directive 2011/65/EU (RoHS 2), EU Directive 2012/19/EU (WEEE), REACH: 2020-01-16
UK Regulation Compliance:	UKCA Mark
APAC Compliance:	China RoHS II (GB/T 26572-2011)
Plenum Number:	10GXS13

# **Product Notes**

Notes:	Electrical values are expected performance based on cable testing and representative performance within a typical Belden system. Values above 625 MHz are for Engineering Information Only. Print Includes Descending Footage/Meter Markings from Max. Put-Up Length to 0.	
--------	--	--

# History

Update and Revision:	Revision Number: 0.364 Revision Date: 02-03-2025

## **Part Numbers**

#### Variants

Item #	Color	Putup Type	Length	UPC
10GXS12 0101000	Black	Reel	1,000 ft	612825004226
10GXS12010A1000	Black	Reel-in-Box	1,000 ft	612825004318
10GXS12 0061000	Blue, Light	Reel	1,000 ft	612825004189
10GXS12006A1000	Blue, Light	Reel-in-Box	1,000 ft	612825004271
10GXS12 0081000	Gray	Reel	1,000 ft	612825004202
10GXS12008A1000	Gray	Reel-in-Box	1,000 ft	612825004295
10GXS12 0051000	Green	Reel	1,000 ft	612825004172
10GXS12005A1000	Green	Reel-in-Box	1,000 ft	612825004264
10GXS12 0031000	Orange	Reel	1,000 ft	612825004158
10GXS12003A1000	Orange	Reel-in-Box	1,000 ft	612825004240
10GXS12 0071000	Purple	Reel	1,000 ft	612825004196
10GXS12007A1000	Purple	Reel-in-Box	1,000 ft	612825004288
10GXS12 0021000	Red	Reel	1,000 ft	612825004141
10GXS12002A1000	Red	Reel-in-Box	1,000 ft	612825004233
10GXS12 0091000	White	Reel	1,000 ft	612825004219
10GXS12009A1000	White	Reel-in-Box	1,000 ft	612825004301
10GXS12 0041000	Yellow	Reel	1,000 ft	612825004165
10GXS12004A1000	Yellow	Reel-in-Box	1,000 ft	612825004257

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: <u>IEA004</u> ☑

DataTuff® 6A, High Flex, 4 Pr #24 Str TC, PO Ins, OS, TPE Jkt, CMR, CMX

Request Sample

## **Product Description**

Industrial Ethernet Cat 6A, 4 Pair 24AWG (Stranded 7X32) Tinned Copper, PO Insulation, X-Spline, Beldfoil Shield, TPE Outer Jacket, UL CMR, CMX Outdoor, OIL RES II, SUN RES, AWM 600V

### **Technical Specifications**

#### **Product Overview**

Suitable Applications: High Flex, Automation, Robotics, exposure to oil and gasoline, harsh environment, IIoT, factory or process automation, IP cameras and devices, data communication, etc.

#### **Construction Details**

#### Conductor

Element	Size	Stranding	Material	No. of Pairs
Pair(s)	24 AWG	7x32	TC - Tinned Copper	4

#### Insulation

Element	Material	Nom. Insulation Diameter	Color Code
Pair(s)	PE - Polyethylene	0.045 in (1.1 mm)	Blue & White/Blue, Orange & White/Orange, Green & White/Green, Brown & White/Brown

#### Outer Shield

Shield Type	Material	Coverage
Таре	Bi-Laminate (Alum+Poly)	100%
Braid	Tinned Copper (TC)	75%

## Outer Jacket

Material	Nom. Diameter
TPE - Thermoplastic Elastomer	0.322 in (8.18 mm)
Overall Cable Diameter (Nomin	al): 0.322 in (8.18

### **Electrical Characteristics**

#### Electricals

Max. Conductor DCR 28.8 Ohm/1000ft

## Delay

Max. Delay	Max. Delay Skew	Nom. Velocity of Prop.
540 ns/100m	45 ns/100m	67%

#### High Frequency

Frequency [MHz]	Max. Insertion Loss (Attenuation)	Min. NEXT [dB]	Min. PSNEXT [dB]	Min. ACRF (ELFEXT) [dB]	Min. PSACRF (PSELFEXT) [dB]	Min. RL (Return Loss) [dB]	Max./Min. Input Impedance (unFitted) [Ohm]	Max./Min. Fitted Impedance [Ohm]	Min. TCL [dB]	Min. ELTCTL [dB]	Max. Surface Transfer Impedance [mOhm/m]	Min. Coupling Attenuation [dB]
1	2.5 dB/100m	74.3 dB	72.3 dB	67.8	64.8	20.0	100 ± 15	100 +/- 10	40.0	35.0	50.0	
4	4.6 dB/100m	65.3	63.3	55.8	52.8	23.0	100 ± 15	100 ± 15	40.0	23.0	75.9	
8	6.4 dB/100m	60.8	58.8	49.7	46.7	24.5	100 ± 15	100 ± 15	40.0	16.9	93.5	
10	7.1 dB/100m	59.3	57.3	47.8	44.8	25.0	100 ± 15	100 ± 15	40.0	15.0	100.0	

16	9.0 dB/100m	56.2	54.2	43.7	40.7	25.0	100 ± 15	100 ± 15	38.0	10.9	135.3	
20	10.1 dB/100m	54.8	52.8	41.8	38.8	25.0	100 ± 15	100 ± 15	37.0	9.0	155.8	
25	11.3 dB/100m	53.3	51.3	39.8	36.8	24.2	100 ± 15	100 ± 15	36.0	7.0	179.5	
31.25	12.6 dB/100m	51.9	49.9	7.9	34.9	23.3	100 ± 15	100 ± 10	35.1	5.5		85
62.5	18.0 dB/100m	47.4	45.4	31.9	28.9	20.7	100 ± 15	100 ± 10	32			85
100	23.0 dB/100m	44.3	42.3	27.8	24.8	19.0	100 ± 15	100 ± 10	30.0			85
200	33.1 dB/100	39.8	37.8	21.8	18.8	19.0	100 ± 15	100 ± 10	27.0			78.9
250	37.3 dB/100m	38.3	36.3	19.8	16.8	15.6	100 ± 32	100 ± 10	26.0			77
300	41.1 dB/100m	37.1	35.1	18.3	15.3	14.9	100 ± 32	100 ± 10	25.2			75.5
400	48.1 dB/100m	35.3	33.3	15.8	12.8	13.8	100 ± 32	100 ± 10	24.0			72.9
500	54.3 dB/100m	33.8	31.8	13.8	10.8	13.0	100 ± 32	100 ± 10	23.0			71.0

#### Voltage

UL Voltage Rating 600 V (UL 2463)

#### **Mechanical Characteristics**

#### Temperature

UL Temperature	Operating	Installation	Storage
75°C	-40°C To +75°C	-20°C To +80°C	-40°C To +80°C

#### **Bend Radius**

Stationary Min.	Installation Min.	Flexing Min.
2.58 in (65.5 mm)	2.58 in (65.5 mm)	2.58 in (65.5 mm)
Max. Pull Tension	:	44 lbs (20 kg)
Bulk Cable Weigh	t:	48 lbs/1000ft

### **Standards and Compliance**

Environmental Suitability:	Indoor/Outdoor, Indoor, Outdoor, Sunlight Resistance, UV Resistance Oil Resistance
Flammability / Reaction to Fire:	UL 1666 - Riser, VW-1
NEC / UL Compliance:	Article 800, CMX-Outdoor, CMR
AWM Compliance:	AWM 2463
CEC / C(UL) Compliance:	CMR-CMX OUTDOOR
Data Category:	Category 6A
TIA/EIA Compliance:	ANSI/TIA-568.2-D Category 6A
European Directive Compliance:	EU CE Mark, EU Directive 2015/863/EU (RoHS 2 amendment), EU Directive 2011/65/EU (RoHS 2)
APAC Compliance:	China RoHS II (GB/T 26572-2011)

## **History**

Update and Revision:	Revision Number: 0.189 Revision Date: 05-15-2024

#### © 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: CAD1108001 ☑

Cable Assemblies - CAT6A Performance Modular Cord, 1 ft. (0.3 m)

## **Product Description**

CAT6A Performance Patch Cord UTP, 4-Pair, 28 AWG Stranded, CMR, T568A/B-T568A/B, Gray, 1 ft. (0.3 m)

## **Technical Specifications**

#### **Product Overview**

Suitable Applications: TIA Category 6A, ISO Class EA, 10GBASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)

#### **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
28	Stranded	TC - Tinned Copper	4

#### Insulation



### Outer Jacket

Material		
PVC - Polyvinyl Chloride		
Overall Nominal Diameter:	inal Diameter: 0.186 in	
Material:	PVC - Polyvinyl Chloride	
Wiring Scheme:	T568A/B-T568A/B	
Packaging:	Individually packaged in a clear plastic bag	

#### **Connectors**

#### Materials

Description	Material	Туре
Plug	Polycarbonate - UL94V-0	
Boot	Polycarbonate - UL94V-0	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute	
Current Rating:	1.500 A	
Insulation Resistance:	500 M-Ohm Minimum	
Max Contact Resistance:	20 mOhm	

## Voltage



#### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

#### **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	0.744 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

#### **Standards**

UL Rating:	Riser	
TIA/EIA Compliance:	Category 6A - TIA-568.2-D ISO/IEC 11801-1	
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)	

#### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

## Suitability

uitability - Indoor: Yes	
--------------------------	--

#### Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

### **Related Part Numbers**

Related Parts:	10GX Modular Jacks, 10GX RJ45 Couplers, 10GX Patch Panels

### **Product Notes**

Notes:	Insulation Material: High Density Polyethylene Cable Weight: 0.0152 lbs/ft. This product may be protected by one or more patents. For further information, please visit: https://www.belden.com/patents.
Labeling:	Labeling: Belden Part Number and Cord Length

### History

Update and Revision:	Revision Number: 0.12 Revision Date: 02-08-2024

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: CAD1108004 ☑

Cable Assemblies - CAT6A Performance Modular Cord, 4 ft. (1.2 m)

## **Product Description**

CAT6A Performance Patch Cord UTP, 4-Pair, 28 AWG Stranded, CMR, T568A/B-T568A/B, Gray, 4 ft. (1.2 m)

## **Technical Specifications**

#### **Product Overview**

Suitable Applications: TIA Category 6A, ISO Class EA, 10GBASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)

#### **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
28	Stranded	TC - Tinned Copper	4

#### Insulation



### Outer Jacket

Material PVC - Polyvinyl Chloride	
Overall Nominal Diameter:	0.186 in
Material:	PVC - Polyvinyl Chloride
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag

#### **Connectors**

#### Materials

Description	Material	Туре
Plug	Polycarbonate - UL94V-0	RJ45
Boot Polycarbonate - UL94V-0		
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm

## Voltage



#### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

#### **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	0.744 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

#### **Standards**

UL Rating:	Riser	
TIA/EIA Compliance:	Category 6A - TIA-568.2-D ISO/IEC 11801-1	
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)	

#### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

#### Suitability

Suitability - Indoor:
-----------------------

#### Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

### **Related Part Numbers**

Related Parts: 10GX Modular Jacks, 10GX RJ45 Couplers, 10GX Patch Panels	
--	--

### **Product Notes**

Notes:	Insulation Material: High Density Polyethylene Cable Weight: 0.0152 lbs/ft. This product may be protected by one or more patents. For further information, please visit: https://www.belden.com/patents.	
Labeling:	Labeling: Belden Part Number and Cord Length	

### History

Update and Revision:	Revision Number: 0.168 Revision Date: 02-08-2024

#### © 2025 Belden, Inc

### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: CAD1108007 ☑

Cable Assemblies - CAT6A Performance Modular Cord, 7 ft. (2.1 m)

## **Product Description**

CAT6A Performance Patch Cord UTP, 4-Pair, 28 AWG Stranded, CMR, T568A/B-T568A/B, Gray, 7 ft. (2.1 m)

## **Technical Specifications**

#### **Product Overview**

Suitable Applications: TIA Category 6A, ISO Class EA, 10GBASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)

### **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
28	Stranded	TC - Tinned Copper	4

#### Insulation



### Outer Jacket

Material PVC - Polyvinyl Chloride	
Overall Nominal Diameter:	0.186 in
Material:	PVC - Polyvinyl Chloride
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag

#### **Connectors**

#### Materials

Description	Material	Туре
Plug	Polycarbonate - UL94V-0	RJ45
Boot	Polycarbonate - UL94V-0	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm

## Voltage



#### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

#### **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	0.744 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

#### **Standards**

UL Rating:	Riser	
TIA/EIA Compliance:	Category 6A - TIA-568.2-D ISO/IEC 11801-1	
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)	

#### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

#### Suitability

Suitability - Indoor:
-----------------------

#### Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

### **Related Part Numbers**

Related Parts: 10GX Modular Jacks, 10GX RJ45 Couplers, 10GX Patch Panels	
--	--

### **Product Notes**

Notes:	Insulation Material: High Density Polyethylene Cable Weight: 0.0152 lbs/ft. This product may be protected by one or more patents. For further information, please visit: https://www.belden.com/patents.	
Labeling:	Labeling: Belden Part Number and Cord Length	

### History

Update and Revision:	Revision Number: 0.168 Revision Date: 02-08-2024

#### © 2025 Belden, Inc

### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: CAD1108010 ☑

Cable Assemblies - CAT6A Performance Modular Cord, 10 ft. (3.0 m)

## **Product Description**

CAT6A Performance Patch Cord UTP, 4-Pair, 28 AWG Stranded, CMR, T568A/B-T568A/B, Gray, 10 ft. (3.0 m)

## **Technical Specifications**

#### **Product Overview**

Suitable Applications: TIA Category 6A, ISO Class EA, 10GBASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)

#### **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
28	Stranded	TC - Tinned Copper	4

#### Insulation



### Outer Jacket

PVC - Polyvinyl Chloride	
Overall Nominal Diameter:	0.186 in
Material:	PVC - Polyvinyl Chloride
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag

## Connectors

#### Materials

Description	Material	Туре
Plug	Polycarbonate - UL94V-0	RJ45
Boot	Polycarbonate - UL94V-0	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm

## Voltage



#### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

#### **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	0.744 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

#### **Standards**

UL Rating:	Riser	
TIA/EIA Compliance:	EIA Compliance: Category 6A - TIA-568.2-D ISO/IEC 11801-1	
Other Standards: IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)		

#### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

#### Suitability

Suitability - Indoor:	Yes

#### Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

### **Related Part Numbers**

Related Parts:	10GX Modular Jacks, 10GX RJ45 Couplers, 10GX Patch Panels

### **Product Notes**

Notes:	Insulation Material: High Density Polyethylene Cable Weight: 0.0152 lbs/ft. This product may be protected by one or more patents. For further information, please visit: https://www.belden.com/patents.	
Labeling: Labeling: Belden Part Number and Cord Length		

### History

Update and Revision:	Revision Number: 0.173 Revision Date: 02-08-2024

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>CA21108010</u> ☑

Cable Assemblies - 10GX Modular Cord, 10 ft. (3.0 m)

## **Product Description**

10GX Patch Cord UTP, Bonded-Pair, 4-Pair, 24 AWG Solid, CMR, T568A/B-T568A/B, Gray, 10 ft. (3.0 m)

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	IBDN System 10GX, TIA Category 6A, ISO Class EA, 10GBASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)
------------------------	---

## **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
24	Solid	BC - Bare Copper	4

### Insulation



#### **Outer Jacket**

PVC - Polyvinyl Chloride	
Overall Nominal Diameter:	0.265 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag.

## Connectors

#### Materials

Description	Material	Type
Plug	Polycarbonate	RJ45
Boot	Elastomer	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

#### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Table Notes:	100 meter Cable Specifications - * TIA/EIA-568.2-D Category 6 Standard

### Voltage



### **Mated Connection**

Frequency (MHz)	Max. Insertion Loss Belden** (dB)	Min. Return Loss Belden** (dB)	Min. PSANEXT TIA* (dB)	Min. PSANEXT Belden** (dB)	Min. PSAACRF TIA* (dB)	Min. PSAACRF Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1 MHz	2.4 dB	20 dB	67 dB	87 dB	67 dB	75 dB	40 dB	48 dB
4 MHz	4.5 dB	23 dB	67 dB	87 dB	66.2 dB	75 dB	40 dB	48 dB
8 MHz	6.3 dB	24.5 dB	67 dB	87 dB	60.1 dB	75 dB	40 dB	48 dB
10 MHz	7 dB	25 dB	67 dB	87 dB	58.2 dB	75 dB	40 dB	48 dB
16 MHz	8.9 dB	25 dB	67 dB	87 dB	54.1 dB	70.9 dB	38 dB	46 dB
20 MHz	10 dB	25 dB	67 dB	87 dB	52.2 dB	69 dB	37 dB	45 dB
25 MHz	11.1 dB	25 dB	67 dB	87 dB	50.2 dB	67 dB	36 dB	44 dB
31.25 MHz	12.5 dB	25 dB	67 dB	87 dB	48.3 dB	65.1 dB	35.1 dB	43.1 dB
62.5 MHz	17.9 dB	25 dB	65.6 dB	85.6 dB	42.3 dB	59.1 dB	32 dB	40 dB
100 MHz	22.8 dB	25 dB	62.5 dB	82.5 dB	38.2 dB	55 dB	30 dB	38 dB
200 MHz	33 dB	21 dB	58 dB	78 dB	32.2 dB	49 dB	27 dB	35 dB
250 MHz	37.2 dB	20.5 dB	56.5 dB	76.5 dB	30.2 dB	47 dB	26 dB	34 dB
300 MHz	41 dB	20.1 dB	55.3 dB	75.3 dB	28.7 dB	43.8 dB	25.2 dB	33.2 dB
400 MHz	48 dB	19.5 dB	53.5 dB	73.5 dB	26.2 dB	38.8 dB	24 dB	32 dB
500 MHz	54.3 dB	18.4 dB	52 dB	72 dB	24.2 dB	35 dB	23 dB	31 dB
625 MHz	61.5 dB	17.4 dB		65 dB		31.1 dB		

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	1.040 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

## **Standards**

UL Rating:	Riser
TIA/EIA Compliance:	Category 6A - ISO/IEC 11801-1, TIA 568.2-D
IEEE Compliance:	IEEE 802.3at type 1 and 2 (PoE) up to 30W, IEEE 802.3bt type 3 and 4 (PoE) up to 100W, CISCO (UPOE) up to 60W, Power over HDBaseTTM (POH) up to 100W
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Suitability

Suitability - Indoor:	Yes

# Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

## **Related Part Numbers**

Related Parts:	10GX Modular Jacks, 10GX Patch Panels

## **Product Notes**

Notes:	Weight: 0.029 lbs/ft. Cable with EquiBlock™ Barrier Technology
Labeling:	Labeling: Belden Part Number, Performance Acronym, Wiring Scheme and Cord Length

# History

|--|

#### © 2025 Belden, Inc

### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>CA21108025</u> ☑

Cable Assemblies - 10GX Modular Cord, 25 ft. (7.6 m)

## **Product Description**

10GX Patch Cord UTP, Bonded-Pair, 4-Pair, 24 AWG Solid, CMR, T568A/B-T568A/B, Gray, 25 ft. (7.6 m)

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	IBDN System 10GX, TIA Category 6A, ISO Class EA, 10GBASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)
------------------------	---

## **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
24	Solid	BC - Bare Copper	4

#### Insulation



#### **Outer Jacket**

PVC - Polyvinyl Chloride	
Overall Nominal Diameter:	0.265 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag.

#### Connectors

#### Materials

Description	Material		
Plug	Polycarbonate	RJ45	
Boot	Elastomer		
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating		

#### **Electrical Characteristics**

Dielectric Strength:	000 V RMS @ 60 Hz for 1 minute	
Current Rating:	1.500 A	
Insulation Resistance:	500 M-Ohm Minimum	
Max Contact Resistance:	20 mOhm	
Table Notes:	100 meter Cable Specifications - * TIA/EIA-568.2-D Category 6 Standard	

### Voltage



### **Mated Connection**

Frequency (MHz)	Max. Insertion Loss Belden** (dB)	Min. Return Loss Belden** (dB)	Min. PSANEXT TIA* (dB)	Min. PSANEXT Belden** (dB)	Min. PSAACRF TIA* (dB)	Min. PSAACRF Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1 MHz	2.4 dB	20 dB	67 dB	87 dB	67 dB	75 dB	40 dB	48 dB
4 MHz	4.5 dB	23 dB	67 dB	87 dB	66.2 dB	75 dB	40 dB	48 dB
8 MHz	6.3 dB	24.5 dB	67 dB	87 dB	60.1 dB	75 dB	40 dB	48 dB
10 MHz	7 dB	25 dB	67 dB	87 dB	58.2 dB	75 dB	40 dB	48 dB
16 MHz	8.9 dB	25 dB	67 dB	87 dB	54.1 dB	70.9 dB	38 dB	46 dB
20 MHz	10 dB	25 dB	67 dB	87 dB	52.2 dB	69 dB	37 dB	45 dB
25 MHz	11.1 dB	25 dB	67 dB	87 dB	50.2 dB	67 dB	36 dB	44 dB
31.25 MHz	12.5 dB	25 dB	67 dB	87 dB	48.3 dB	65.1 dB	35.1 dB	43.1 dB
62.5 MHz	17.9 dB	25 dB	65.6 dB	85.6 dB	42.3 dB	59.1 dB	32 dB	40 dB
100 MHz	22.8 dB	25 dB	62.5 dB	82.5 dB	38.2 dB	55 dB	30 dB	38 dB
200 MHz	33 dB	21 dB	58 dB	78 dB	32.2 dB	49 dB	27 dB	35 dB
250 MHz	37.2 dB	20.5 dB	56.5 dB	76.5 dB	30.2 dB	47 dB	26 dB	34 dB
300 MHz	41 dB	20.1 dB	55.3 dB	75.3 dB	28.7 dB	43.8 dB	25.2 dB	33.2 dB
400 MHz	48 dB	19.5 dB	53.5 dB	73.5 dB	26.2 dB	38.8 dB	24 dB	32 dB
500 MHz	54.3 dB	18.4 dB	52 dB	72 dB	24.2 dB	35 dB	23 dB	31 dB
625 MHz	61.5 dB	17.4 dB		65 dB		31.1 dB		

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	1.040 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

## **Standards**

UL Rating:	Riser
TIA/EIA Compliance:	Category 6A - ISO/IEC 11801-1, TIA 568.2-D
IEEE Compliance:	IEEE 802.3at type 1 and 2 (PoE) up to 30W, IEEE 802.3bt type 3 and 4 (PoE) up to 100W, CISCO (UPOE) up to 60W, Power over HDBaseTTM (POH) up to 100W
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Suitability

Suitability - Indoor:	Yes

# Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

## **Related Part Numbers**

Related Parts:	10GX Modular Jacks, 10GX Patch Panels

## **Product Notes**

Notes:	Weight: 0.029 lbs/ft. Cable with EquiBlock™ Barrier Technology
Labeling:	Labeling: Belden Part Number, Performance Acronym, Wiring Scheme and Cord Length

# History

|--|

#### © 2025 Belden, Inc

### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>CA21108030</u> ☑

Cable Assemblies - 10GX Modular Cord, 30 ft. (9.0m)

## **Product Description**

10GX Patch Cord UTP, Bonded-Pair, 4-Pair, 24 AWG Solid, CMR, T568A/B-T568A/B, Gray, 30 ft. (9.0 m)

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	IBDN System 10GX, TIA Category 6A, ISO Class EA, 10GBASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)
------------------------	---

## **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs	
24	Solid	BC - Bare Copper	4	

#### Insulation



#### **Outer Jacket**

PVC - Polyvinyl Chloride	
Overall Nominal Diameter:	0.265 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag.

#### Connectors

#### Materials

Description	Material	Type
Plug	Polycarbonate	RJ45
Boot	Elastomer	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

#### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Table Notes:	100 meter Cable Specifications - * TIA/EIA-568.2-D Category 6 Standard

### Voltage



### **Mated Connection**

Frequency (MHz)	Max. Insertion Loss Belden** (dB)	Min. Return Loss Belden** (dB)	Min. PSANEXT TIA* (dB)	Min. PSANEXT Belden** (dB)	Min. PSAACRF TIA* (dB)	Min. PSAACRF Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1 MHz	2.4 dB	20 dB	67 dB	87 dB	67 dB	75 dB	40 dB	48 dB
4 MHz	4.5 dB	23 dB	67 dB	87 dB	66.2 dB	75 dB	40 dB	48 dB
8 MHz	6.3 dB	24.5 dB	67 dB	87 dB	60.1 dB	75 dB	40 dB	48 dB
10 MHz	7 dB	25 dB	67 dB	87 dB	58.2 dB	75 dB	40 dB	48 dB
16 MHz	8.9 dB	25 dB	67 dB	87 dB	54.1 dB	70.9 dB	38 dB	46 dB
20 MHz	10 dB	25 dB	67 dB	87 dB	52.2 dB	69 dB	37 dB	45 dB
25 MHz	11.1 dB	25 dB	67 dB	87 dB	50.2 dB	67 dB	36 dB	44 dB
31.25 MHz	12.5 dB	25 dB	67 dB	87 dB	48.3 dB	65.1 dB	35.1 dB	43.1 dB
62.5 MHz	17.9 dB	25 dB	65.6 dB	85.6 dB	42.3 dB	59.1 dB	32 dB	40 dB
100 MHz	22.8 dB	25 dB	62.5 dB	82.5 dB	38.2 dB	55 dB	30 dB	38 dB
200 MHz	33 dB	21 dB	58 dB	78 dB	32.2 dB	49 dB	27 dB	35 dB
250 MHz	37.2 dB	20.5 dB	56.5 dB	76.5 dB	30.2 dB	47 dB	26 dB	34 dB
300 MHz	41 dB	20.1 dB	55.3 dB	75.3 dB	28.7 dB	43.8 dB	25.2 dB	33.2 dB
400 MHz	48 dB	19.5 dB	53.5 dB	73.5 dB	26.2 dB	38.8 dB	24 dB	32 dB
500 MHz	54.3 dB	18.4 dB	52 dB	72 dB	24.2 dB	35 dB	23 dB	31 dB
625 MHz	61.5 dB	17.4 dB		65 dB		31.1 dB		

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	1.040 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

## **Standards**

UL Rating:	Riser	
TIA/EIA Compliance:	Category 6A - ISO/IEC 11801-1, TIA 568.2-D	
IEEE Compliance:	IEEE 802.3at type 1 and 2 (PoE) up to 30W, IEEE 802.3bt type 3 and 4 (PoE) up to 100W, CISCO (UPOE) up to 60W, Power over HDBaseTTM (POH) up to 100W	
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)	

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Suitability

Suitability - Indoor:	Yes

# Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

## **Related Part Numbers**

Related Parts:	10GX Modular Jacks, 10GX Patch Panels

## **Product Notes**

Notes:	Weight: 0.029 lbs/ft. Cable with EquiBlock™ Barrier Technology
Labeling:	Labeling: Belden Part Number, Performance Acronym, Wiring Scheme and Cord Length

# History

|--|

#### © 2025 Belden, Inc

### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: CA211xx000A06 ☐

Cable Assemblies - 10GX Pre-Terminated Cable Assembly



## **Product Description**

10GX Pre-Terminated Cable Assembly, Bonded-Pair, 4-Pair, 24 AWG Solid, T568A/B-T568A/B, 6 Cables, CMR, (See Product Family for colors & lengths)

## **Technical Specifications**

#### **Product Overview**

Suitable Applications: IBDN System 10GX, TIA Category 6A, 10GBASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)

#### **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
24	Solid	BC - Bare Copper	4

#### Insulation



## Inner Jacket



#### **Outer Jacket**

PVC - Polyvinyl Chlor	ide
Overall Nominal Diameter:	0.85 in
Material:	PVC - Polyvinyl Chloride
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a box

#### Connectors

#### Materials

Description	Material	Type
Plug	Polycarbonate	RJ45
Boot	Elastomer	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades
Sleeve	Engineered Polymer Riser Rated	

## **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm

Table Notes: 100 meter Cable Specifications - \* TIA/EIA-568.2-D Category 6 Standard

# Voltage

UL Voltage Rating 300 V RMS

#### **Mated Connection**

Frequency (MHz)	Max. Insertion Loss Belden** (dB)	Min. Return Loss Belden** (dB)	Min. PSANEXT TIA* (dB)	Min. PSANEXT Belden** (dB)	Min. PSAACRF TIA* (dB)	Min. PSAACRF Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1 MHz	2.4 dB	20 dB	67 dB	87 dB	67 dB	75 dB	40 dB	48 dB
4 MHz	4.5 dB	23 dB	67 dB	87 dB	66.2 dB	75 dB	40 dB	48 dB
8 MHz	6.3 dB	24.5 dB	67 dB	87 dB	60.1 dB	75 dB	40 dB	48 dB
10 MHz	7 dB	25 dB	67 dB	87 dB	58.2 dB	75 dB	40 dB	48 dB
16 MHz	8.9 dB	25 dB	67 dB	87 dB	54.1 dB	70.9 dB	38 dB	46 dB
20 MHz	10 dB	25 dB	67 dB	87 dB	52.2 dB	69 dB	37 dB	45 dB
25 MHz	11.1 dB	25 dB	67 dB	87 dB	50.2 dB	67 dB	36 dB	44 dB
31.25 MHz	12.5 dB	25 dB	67 dB	87 dB	48.3 dB	65.1 dB	35.1 dB	43.1 dB
62.5 MHz	17.9 dB	25 dB	65.6 dB	85.6 dB	42.3 dB	59.1 dB	32 dB	40 dB
100 MHz	22.8 dB	25 dB	62.5 dB	82.5 dB	38.2 dB	55 dB	30 dB	38 dB
200 MHz	33 dB	21 dB	58 dB	78 dB	32.2 dB	49 dB	27 dB	35 dB
250 MHz	37.2 dB	20.5 dB	56.5 dB	76.5 dB	30.2 dB	47 dB	26 dB	34 dB
300 MHz	41 dB	20.1 dB	55.3 dB	75.3 dB	28.7 dB	43.8 dB	25.2 dB	33.2 dB
400 MHz	48 dB	19.5 dB	53.5 dB	73.5 dB	26.2 dB	38.8 dB	24 dB	32 dB
500 MHz	54.3 dB	18.4 dB	52 dB	72 dB	24.2 dB	35 dB	23 dB	31 dB
625 MHz	61.5 dB	17.4 dB		65 dB		31.1 dB		

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	1.040 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

### **Standards**

UL Rating:	Riser
TIA/EIA Compliance:	Category 6A - TIA-568.2-D ISO/IEC 11801-1
IEEE Compliance:	IEEE 802.3at type 1 and 2 (PoE) up to 30W, IEEE 802.3bt type 3 and 4 (PoE) up to 100W, CISCO (UPOE) up to 60W, Power over HDBaseTTM (POH) up to 100W
Other Standards:	ANSI/TIA 1096-A (formerly FCC Part 68-F), IEC 60603-7

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

## Suitability

Suitability - Indoor: Yes

## Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

#### **Related Part Numbers**

Related Parts:
----------------

#### **Product Notes**

Notes:	CA21xyyzzzA06 is subdivided as following CA-21-x-yy-zzz-A-06 where CA stands for performance, 21 stands for jacket type, x stands for termination type, yy stands for color, zzz stands for length, A stands for assembly, and 06 stands for number of cables Use "zzz" part of the code to specify length in feet - 006-100 ft in increments of 1 ft - 105-265 ft in increments of 5 ft. Cable Weight: 0.029 lbs/ft. x 6 cables. Cable with EquiBlock™ Barrier Technology.
Labeling:	Labeled at both ends: Part Number, Serial Number, Termination Scheme, Length, Individual cable identification. Customized Labeling for cable assemblies optional upon request.

#### History

Update and Revision:	: Revision Number: 0.18 Revision Date: 02-09-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: 10GX KCONN Coupler PP 48 1U ☑



10GX KeyConnect Coupler Patch Panel 48 Port 1U, UTP



## **Product Description**

KeyConnect Patch Panel, 48-port, 1U, with 10GX RJ45 Coupler

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Compatible with a variety of modules that are suitable for use with Belden IBDN Systems 10GX.

## **Physical Characteristics (Overall)**

Height:	44.450 mm
Width:	482.600 mm
Depth:	33.020 mm
Port Count:	48 Port
Front Connection:	Flush
Packaging:	Individually packaged in a cardboard box.
Weight:	0.454 kg

### **Connectors**

#### Materials

Description	Material
Panel	Steel

### **Construction and Dimensions**

Max Capacity:	48 connectors	

### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

### **Mechanical Characteristics**

Footprint/Type:	KeyConnect	

## **Standards**

Data Category:	Category 6A

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA, Bi-national Standard Listed
-----------------	----------------------------------

#### **Related Part Numbers**

Related Parts:	Compatible with 10GX Patch Cord and 10GX Pre-Terminated Cable Assemblies.

#### Variants

Item #	Color	UPC
AX104592	Black	611589006859

#### **Product Notes**

Included Parts:	4 Screws (10x32); 4 Screws (12x24); 1 Printable LabelFlex Half-Sheet; 2 Velcro Straps; 2 Rear Cable Management Bracket; 1 Installation Guide
Notes:	For proper installation refer to Installation Guide PX104691 included with the product. Refer to AX104024 for the Specifications of the 10GX Couplers.

#### **History**

Update and Revision:	Revision Number: 0.258 Revision Date: 11-19-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: REVConnect CAT6+ Jacks ☑

REVConnect CAT6+ UTP Modular Jack, T568 A/B

## **Product Description**

REVConnect CAT6+ Jacks are available in several colors and packaging quantities.

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	2400, 3600, 4800 Systems, TIA Category 6, ISO Class E, 1GBASE-T

## **Physical Characteristics (Overall)**

Height:	0.94 in
Width:	0.64 in
Depth:	1.337 in
Wiring Scheme:	T568A/B
Packaging:	Individually packaged in a plastic bag.
Weight:	0.016 lbs

### Connectors

#### Materials

Description	Material	Type
Front Connection	Copper Clad Flexible PCB, 50uin Gold plated contacts over Nickel	RJ45
Rear Connection	Copper alloy, Gold plated contacts over Nickel	REVConnect
Connector Body	PBT glass reinforced UL94V-0	

### **Electrical Characteristics**

Dielectric Strength:	1,000V RMS @ 60 Hz for 1 minute (Signals to Ground)
Current Rating:	1.300 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Termination Resistance:	2.5 mOhm

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Footprint/Type:	REVConnect
Tool Compatibility:	REVConnect Termination Tool (p/n RVUTT01)
Plug /Jack Compatibility:	RJ45, RJ11
Termination Front Connection:	Mated Connection
Termination Front Connection Durability:	750 cycles
Termination Rear Connection:	Mated Connection

Termination Rear Connection Durability:	20 cycles
Cable/Connector Retention:	15 lbs.
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

## **Standards**

UL Rating:	UL94V-0
Data Category:	Category 6
TIA/EIA Compliance:	Category 6 - TIA 568.2-D, ISO/IEC 11801-1, TIA TSB-5021
IEEE Compliance:	Power Over Ethernet (PoE) IEEE 802.3at type 1 and 2 (up to 30W), IEEE802.3bt/D1.7 type 3 and 4 (up to 100W), CISCO UPOE (up to 60W), Power over HDBaseTTM (up to 100W)
Other Standards:	IEC 60603-7

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

UL Flammability:	UL2043 Air Handling Spaces
Safety Listing:	c(UL)us Listed

## **Related Part Numbers**

Related Parts:	Compatible with KeyConnect Faceplates, Adapters, Boxes and Patch Panels
----------------	---

### Variants

Item #	Color	Packaging
RV6MJKUAL-B24	Almond	Bulk Pack (24)
RV6MJKUAL-S1	Almond	Single Pack
RV6MJKUBK-S1	Black	Single Pack
RV6MJKUBK-B24	Black	Bulk Pack (24)
RV6MJKUBL-B24	Blue	Bulk Pack (24)
RV6MJKUBL-S1	Blue	Single Pack
RV6MJKUBR-B24	Brown	Bulk Pack (24)
RV6MJKUBR-S1	Brown	Single Pack
RV6MJKUGY-B24	Gray	Bulk Pack (24)
RV6MJKUGY-S1	Gray	Single Pack
RV6MJKUGN-B24	Green	Bulk Pack (24)
RV6MJKUGN-S1	Green	Single Pack
RV6MJKUIV-B24	Ivory	Bulk Pack (24)
RV6MJKUIV-S1	Ivory	Single Pack
RV6MJKUOR-B24	Orange	Bulk Pack (24)
RV6MJKUOR-S1	Orange	Single Pack
RV6MJKUPR-B24	Purple	Bulk Pack (24)
RV6MJKUPR-S1	Purple	Single Pack
RV6MJKURD-B24	Red	Bulk Pack (24)
RV6MJKURD-S1	Red	Single Pack
RV6MJKUTB-B24	TIA Blue	Bulk Pack (24)
RV6MJKUTB-S1	TIA Blue	Single Pack
RV6MJKUTN-B24	TIA Brown	Bulk Pack (24)
RV6MJKUTN-S1	TIA Brown	Single Pack
RV6MJKUTG-B24	TIA Green	Bulk Pack (24)
RV6MJKUTG-S1	TIA Green	Single Pack
RV6MJKUTO-B24	TIA Orange	Bulk Pack (24)
RV6MJKUTO-S1	TIA Orange	Single Pack
RV6MJKUTP-B24	TIA Purple	Bulk Pack (24)
RV6MJKUTP-S1	TIA Purple	Single Pack
RV6MJKUTR-B24	TIA Red	Bulk Pack (24)
RV6MJKUTR-S1	TIA Red	Single Pack
RV6MJKUTY-B24	TIA Yellow	Bulk Pack (24)

RV6MJKUTY-S1	TIA Yellow	Single Pack
RV6MJKUEW-B24	White	Bulk Pack (24)
RV6MJKUEW-S1	White	Single Pack
RV6MJKUYL-B24	Yellow	Bulk Pack (24)
RV6MJKUYL-S1	Yellow	Single Pack

#### **Product Notes**

Included Parts:	1 Cat 6+ REVConnect Jack; 1 REVConnect Cable Manager and Cap; 1 Installation Guide
Notes:	Please see Installation Guide PX106434.

### History

Update and Revision:	Revision Number: 0.346 Revision Date: 02-12-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: CAT6+ KEYCONNECT JACKS ☑

CAT6+ Modular Jack, RJ45, KeyConnect Style

## **Product Description**

CAT6+ KeyConnect Jacks are available in several colors.

## **Technical Specifications**

### **Product Overview**

Suitable Applications:	IBDN System 2400, 3600 and 4800, TIA Category 6+, ISO Class E, 1000 BASE-T

## **Physical Characteristics (Overall)**

Height:	0.88 in
Width:	0.64 in
Depth:	1.29 in
Wiring Scheme:	T568A/B
Packaging:	Individually packaged in a plastic bag. Standard pack of 50 units.
Weight:	0.014 lbs

### Connectors

#### Materials

Description	Material	Туре
Front Connection	Copper Alloy with 50 $\mu$ inch Gold over Nickel	Lead Frame
Rear Connection	Copper Alloy with Nickel Plating	IDC
Connector Body	Plastic - UL940V-0	

## **Electrical Characteristics**

Dielectric Strength:	1,000V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Termination Resistance:	2.5 mOhm

## **Temperature Range**

Installation Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-40°C to +70°C
Operating Temperature Range:	-10°C to +60°C

## **Mechanical Characteristics**

Footprint/Type:	KeyConnect
Tool Compatibility:	Belden 110 Connecting Tool, MediaFlex Termination Station
Plug /Jack Compatibility:	RJ45, RJ11
Termination Front Connection:	Mated Connection
Termination Front Connection Durability:	1,000 cycles
Termination Rear Connection:	Gas Tight IDC Connection

Termination Rear Connection Durability:	20 terminations
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

# Standards

Data Category:	Category 6
TIA/EIA Compliance:	Category 6 - TIA 568.2-D, ISO/IEC 11801:2002 Ed.2
Other Standards:	FCC Part 68, Subpart F, IEC 60603-7
Third Party Performance Verification:	ETL - Verified Category 6

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

## Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA, c(UL)us Listed

## **Related Part Numbers**

Related Parts:	Compatible with KeyConnect Faceplates, Adapters, Boxes and Patch Panels

## Variants

Item #	Color	Packaging
AX101319	Almond	Single Pack
AX101319-B24	Almond	Bulk Pack (24)
AX101321-B24	Black	Bulk Pack (24)
AX104193-B24	Blue	Bulk Pack (24)
AX104195	Brown	Single Pack
AX104195-B24	Brown	Bulk Pack (24)
AX101320	Electric White	Single Pack
AX101320-B24	Electric White	Bulk Pack (24)
AX101318	Gray	Single Pack
AX101318-B24	Gray	Bulk Pack (24)
AX104192	Green	Single Pack
AX104192-B24	Green	Bulk Pack (24)
AX103076-B24	lvory	Bulk Pack (24)
AX103076	lvory	Single Pack
AX104189	Orange	Single Pack
AX104189-B24	Orange	Bulk Pack (24)
AX104194	Purple	Single Pack
AX104194-B24	Purple	Bulk Pack (24)
AX104190	Red	Single Pack
AX104190-B24	Red	Bulk Pack (24)
AX101326	TIA Blue	Single Pack
AX101328	TIA Brown	Single Pack
AX101325	TIA Green	Single Pack
AX101322	TIA Orange	Single Pack
AX101327	TIA Purple	Single Pack
AX101323	TIA Red	Single Pack
AX101324	TIA Yellow	Single Pack
AX104191	Yellow	Single Pack
AX104191-B24	Yellow	Bulk Pack (24)

# **Product Notes**

Included Parts:	1 T-Bar
Notes:	Please see Installation Guide PX103329

## **History**

#### © 2025 Belden, Inc

### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: CAT6+ MDVO JACKS ☑

CAT6+ Modular Jack, RJ45, MDVO Style

# **Product Description**

CAT6+ MDVO Jacks are available in several colors.

## **Technical Specifications**

### **Product Overview**

Suitable Applications:	IBDN System 2400 and 4800, TIA Category 6+, ISO Class E, 1000 BASE-T

## **Physical Characteristics (Overall)**

Height:	0.765 in
Width:	0.77 in
Depth:	1.29 in
Wiring Scheme:	T568A/B
Packaging:	Individually packaged in a plastic bag. Standard pack of 50 units.
Weight:	0.014 lbs

### Connectors

#### Materials

Description	Material	Туре
Front Connection	Copper Alloy with 50 $\mu$ inch Gold over Nickel	Lead Frame
Rear Connection	Copper Alloy with Nickel Plating	IDC
Connector Body	Plastic - UL940V-0	

## **Electrical Characteristics**

Dielectric Strength:	1,000V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Termination Resistance:	2.5 mOhm

## **Temperature Range**

Installation Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-40°C to +70°C
Operating Temperature Range:	-10°C to +60°C

## **Mechanical Characteristics**

Footprint/Type:	MDVO
Tool Compatibility:	Belden 110 Connecting Tool, MediaFlex Termination Station
Plug /Jack Compatibility:	RJ45, RJ11
Termination Front Connection:	Mated Connection
Termination Front Connection Durability:	1,000 cycles
Termination Rear Connection:	Gas Tight IDC Connection

Termination Rear Connection Durability:	20 terminations
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

#### **Standards**

Data Category:	Category 6
TIA/EIA Compliance:	Category 6 - TIA 568.2-D, ISO/IEC 11801:2002 Ed.2
Other Standards:	FCC Part 68, Subpart F, IEC 60603-7
Third Party Performance Verification:	ETL - Verified Category 6

#### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

#### Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA, c(UL)us Listed

### **Related Part Numbers**

Related Parts:	Compatible with Interface and MDVO Style Faceplates, Adapters, Boxes and Patch Panels	

#### Variants

Item #	Color	Packaging
AX101064	Almond	Single Pack
AX101066	Black	Single Pack
AX101063	Gray	Single Pack
AX102563	Ivory	Single Pack
AX101071	TIA Blue	Single Pack
AX101073	TIA Brown	Single Pack
AX101067	TIA Orange	Single Pack
AX101072	TIA Purple	Single Pack
AX101068	TIA Red	Single Pack
AX101069	TIA Yellow	Single Pack
AX101065	White	Single Pack

## **Product Notes**

Included Parts:	1 T-Bar +1 Dust Cap
Notes:	Please see Installation Guide PX103329

## **History**

Update and Revision:	Revision Number: 0.376 Revision Date: 02-06-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: RV6PPF1U48BK ☑



REVConnect Patch Panel, Cat 6+, Flat, 1U, 48P

# **Product Description**

REVConnect Category 6+ Patch Panel, Preloaded, Flat, 48 Port, 1U, Black

# **Technical Specifications**

## **Product Overview**

Suitable Applications:	REVConnect 2400 & 3600 Systems, Ethernet 1000BASE-T, Ethernet 100BASE-TX, Ethernet 10BASE-T, PoE++, PoE+, PoE

## **Physical Characteristics (Overall)**

Height:	1.73
Width:	19
Depth:	2
Port Count:	48 Port
Front Connection:	Flush
Packaging:	Individually packaged in a cardboard box.
Weight:	3.047

#### Connectors

### Materials

Description	Material	Color
Panel	Steel	Black
Frame	PC/ABS	Black
Management Bar	Steel	Black
Clear Window	Polycarbonate	Transparent

## **Construction and Dimensions**

Max Capacity:	48 Connectors (Preloaded)	

## **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.300 A
Insulation Resistance:	500 M-Ohm Minimum
Termination Resistance:	2.5 mOhm

## **Temperature Range**

Installation Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-40°C to +70°C
Operating Temperature Range:	-10°C to +60°C

## **Mechanical Characteristics**

Footprint/Type:	REVConnect
Tool Compatibility:	REVConnect Termination Tool (RVUTT01)
Plug /Jack Compatibility:	RJ45

Termination Front Connection:	Mated Connection
Termination Front Connection Durability:	750 Cycles
Termination Rear Connection:	Mated Connection
Termination Rear Connection Durability:	20 Cycles
Cable/Connector Retention:	15 lbs
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

#### **Standards**

UL Rating:	UL94V-0
Data Category:	Category 6
TIA/EIA Compliance:	Category 6 - TIA 568-C.2, ISO/IEC 11801-1, TIA TSB-5021
IEEE Compliance:	Power Over Ethernet (PoE) IEEE 802.3at type 1 and 2 (up to 30W), IEEE 802.3bt/D1.7 type 3 and 4 (up to 100W), CISCO UPOE (up to 60W), Power over HDBaseTTM (up to 100W)

### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

Safety Listing:	c(UL)us Listed			
-----------------	----------------	--	--	--

#### **Related Part Numbers**

ed Parts: REVConnect Termination Tool, Cat 6 Modular Cords
--

#### Variants

Item #	Color	Put-Up Type
RV6PPF1U48BK	Black	1U

#### **Product Notes**

Included Parts:	48 Cat 6 REVConnect High Density Jacks, Black, Preloaded; 50 REVConnect Cable Managers and Caps; 4 Clear Windows; 1 Rear Cable Management Bar; 4 Screws (10x32); 4 Screws (12x24); 2 Velcro Straps; 4 Frames; 1 Installation Guide	
Notes:	For proper installation, refer to Installation Guide PX107031.	

# History

Update and Revision:	Revision Number: 0.28 Revision Date: 05-31-2024

### © 2025 Belden, Inc

#### All Rights Reserved

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: RV6PPF1U24BK-P ☑



RV6PPF1U24BK-P FACEPLATES AND PANELS - CAT6+ REVCONNECT PATCH PANEL, FLAT 1U24-PORT PRINTED

# **Product Description**

CAT6+ REVCONNECT PATCH PANEL, FLAT, 24-PORT, 1U, BLACK (PRELOADED - PRINTED)

# **Technical Specifications**

### **Product Overview**

Suitable Applications:	2400, 3600, 4800 Systems, TIA Category 6, ISO Class E, 1GBASE-T	

## **Physical Characteristics (Overall)**

Height:	1.730 in
Width:	19.000 in
Depth:	2.000 in
Port Count:	24 Port
Front Connection:	Flush
Packaging:	Individually packaged in a cardboard box.
Weight:	1.840 lbs

#### **Connectors**

### Materials

Description	Material	Color
Panel	Steel	Black
Frame	PC/ABS	Black
Management Bar	Steel	Black
Clear Window	Polycarbonate	Transparent

## **Construction and Dimensions**

Max Capacity:	24 connectors (patch panel is pre-loaded)		

## **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute (Signals to Ground)
Current Rating:	1.300 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Termination Resistance:	2.5 m-Ohm

### Mated Connection

Frequency (MHz)	Max. Insertion Loss TIA* (dB)	Max. Insertion Loss Belden** (dB)	Min. NEXT TIA* (dB)	Min. FEXT TIA* (dB)	Min. FEXT Belden** (dB)	Min. Return Loss TIA* (dB)	Min. Return Loss Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1	0.1 dB	0.1 dB	75 dB	75 dB	77 dB	30 dB	34.1 dB	40 dB	42 dB
4	0.1 dB	0.1 dB	75 dB	71.1 dB	75.1 dB	30 dB	34.1 dB	40 dB	42 dB
8	0.1 dB	0.1 dB	75 dB	65 dB	69 dB	30 dB	34.1 dB	40 dB	42 dB
10	0.1 dB	0.1 dB	74 dB	63.1 dB	67.1 dB	30 dB	34.1 dB	40 dB	42 dB
16	0.1 dB	0.1 dB	69.9 dB	59 dB	63 dB	30 dB	34.1 dB	40 dB	42 dB
20	0.1 dB	0.1 dB	68 dB	57.1 dB	61.1 dB	30 dB	34.1 dB	40 dB	42 dB

25	0.1 dB	0.1 dB	66 dB	55.1 dB	59.1 dB	30 dB	34.1 dB	40 dB	42 dB
31.25	0.11 dB	0.1 dB	64.1 dB	53.2 dB	57.2 dB	30 dB	34.1 dB	38.1 dB	42 dB
62.5	0.16 dB	0.12 dB	58.1 dB	47.2 dB	51.2 dB	30 dB	34.1 dB	32.1 dB	36.1 dB
100	0.2 dB	0.16 dB	54 dB	43.1 dB	47.1 dB	28 dB	30 dB	28 dB	32 dB
200	0.28 dB	0.24 dB	48 dB	37.1 dB	41.1 dB	22 dB	24 dB	22 dB	26 dB
250	0.32 dB	0.28 dB	46 dB	35.1 dB	39.1 dB	20 dB	22 dB	20 dB	24 dB
300		0.31 dB			37.6 dB	18.5 dB	20.5 dB		22.5 dB

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

# **Mechanical Characteristics**

Footprint/Type:	KeyConnect
Tool Compatibility:	REVConnect Termination Tool (RVUTT01)
Plug /Jack Compatibility:	RJ45
Termination Front Connection:	Yes
Termination Rear Connection:	Yes
Cable/Connector Retention:	15 lbs
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

# Termination Interface

Connection	Durabilities
Mated Connection	750 cycles
Mated Connection	200 cycles

## **Standards**

UL Rating:	UL94V-0
Data Category:	Category 6
TIA/EIA Compliance:	Category 6A - ISO/IEC 11801:2002 Ed.2, TIA 568.2-D
IEEE Compliance:	Power Over Ethernet (PoE) IEEE 802.3at type 1 and 2 (up to 30W), IEEE 802.3bt/D1.7 type 3 and 4 (up to 100W), CISCO UPOE (up to 60W), Power over HDBaseTTM (up to 100W)

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/96/EC (WEEE):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

Safety Listing:	c(UL)us Listed		

# **Related Part Numbers**

Related Parts:	CAT6+ REVConnect Jacks, CAT6+ Modular Cords		
----------------	---	--	--

# **Product Notes**

Included Parts:	24 Cat6+ REVConnect Jacks Black preloaded, 4 Screws (10x32), 4 Screws (12x24), 2 Velcro Straps, 4 Clear Windows, 1 Rear Cable Management Bar, 1 Installation Guide
Notes:	"For proper installation refer to Installation Guide PX106520 included with the product or visit our website at http://www.belden.com Cable Range Min: 24 AWG, Max: Cable 22 AWG Solid and Stranded Insulation Dia. Min: 0.035 in (0.89 mm), Max: 0.053 in (1.34 mm) Outer Jacket Dia Max: 0.366 in (9.3 mm)"

# History

Update and Revision: Revision Number: 0.62 Revision Date: 11-19-2024	Update and Revision:	Revision Number: 0.62 Revision Date: 11-19-2024
--	----------------------	---

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: RV6PPF2U48BK-P ☑

FACEPLATES AND PANELS - CAT6+ REVCONNECT PATCH PANEL, FLAT

2U48-PORT PRINTED



# **Product Description**

CAT6+ REVCONNECT PATCH PANEL, FLAT, 48-PORT, 2U, (PRELOADED - PRINTED)

# **Technical Specifications**

### **Product Overview**

Suitable Applications: 2400, 3600, 4800 Systems, TIA Category 6, ISO Class E, 1GBASE-T

## **Physical Characteristics (Overall)**

Height:	3.470 in
Width:	19.000 in
Depth:	2.000 in
Port Count:	48 Port
Front Connection:	Flush
Packaging:	Individually packaged in a cardboard box.
Weight:	3.083 lbs

### Connectors

### Materials

Description	Material	Color
Panel	Steel	Black
Frame	PC/ABS	Black
Management Bar	Steel	Black
Clear Window	Polycarbonate	Transparent

### **Construction and Dimensions**

Max Capacity: 48 connectors (patch panel is pre-loaded)

## **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute (Signals to Ground)
Current Rating:	1.300 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Termination Resistance:	2.5 m-Ohm

### Mated Connection

Frequency (MHz)	Max. Insertion Loss TIA* (dB)	Max. Insertion Loss Belden** (dB)	Min. NEXT TIA* (dB)	Min. FEXT TIA* (dB)	Min. FEXT Belden** (dB)	Min. Return Loss TIA* (dB)	Min. Return Loss Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1	0.1 dB	0.1 dB	75 dB	75 dB	77 dB	30 dB	34.1 dB	40 dB	42 dB
4	0.1 dB	0.1 dB	75 dB	71.1 dB	75.1 dB	30 dB	34.1 dB	40 dB	42 dB
8	0.1 dB	0.1 dB	75 dB	65 dB	69 dB	30 dB	34.1 dB	40 dB	42 dB
10	0.1 dB	0.1 dB	74 dB	63.1 dB	67.1 dB	30 dB	34.1 dB	40 dB	42 dB
16	0.1 dB	0.1 dB	69.9 dB	59 dB	63 dB	30 dB	34.1 dB	40 dB	42 dB
20	0.1 dB	0.1 dB	68 dB	57.1 dB	61.1 dB	30 dB	34.1 dB	40 dB	42 dB

25	0.1 dB	0.1 dB	66 dB	55.1 dB	59.1 dB	30 dB	34.1 dB	40 dB	42 dB
31.25	0.11 dB	0.1 dB	64.1 dB	53.2 dB	57.2 dB	30 dB	34.1 dB	38.1 dB	42 dB
62.5	0.16 dB	0.12 dB	58.1 dB	47.2 dB	51.2 dB	30 dB	34.1 dB	32.1 dB	36.1 dB
100	0.2 dB	0.16 dB	54 dB	43.1 dB	47.1 dB	28 dB	30 dB	28 dB	32 dB
200	0.28 dB	0.24 dB	48 dB	37.1 dB	41.1 dB	22 dB	24 dB	22 dB	26 dB
250	0.32 dB	0.28 dB	46 dB	35.1 dB	39.1 dB	20 dB	22 dB	20 dB	24 dB
300		0.31 dB			37.6 dB	18.5 dB	20.5 dB		22.5 dB

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

# **Mechanical Characteristics**

Footprint/Type:	KeyConnect
Tool Compatibility:	REVConnect Termination Tool (RVUTT01)
Plug /Jack Compatibility:	RJ45
Termination Front Connection:	Yes
Termination Rear Connection:	Yes
Cable/Connector Retention:	15 lbs
Connector/Hardware Retention:	20 lbs
Plug/Connector Retention:	11.250 lbs

# Termination Interface

Connection	Durabilities
Mated Connection	750 cycles
Mated Connection	200 cycles

## **Standards**

UL Rating:	UL94V-0		
Data Category:	Category 6		
TIA/EIA Compliance:	nce: Category 6A - ISO/IEC 11801:2002 Ed.2, TIA 568.2-D		
Power Over Ethernet (PoE) IEEE 802.3at type 1 and 2 (up to 30W), IEEE 802.3bt/D1.7 type 3 and 4 (up to 100W), CISCO UPOE (up to 60W), Power over HDBaseTTM (up to 100W)			

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/96/EC (WEEE):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

Safety Listing:	c(UL)us Listed		

# **Related Part Numbers**

Related Parts:	CAT6+ REVConnect Jacks, CAT6+ Modular Cords	
----------------	---	--

# **Product Notes**

Included Parts:	Parts: 48 Cat6+ REVConnect Jacks Black preloaded, 50 REVConnnect Cores, 4 Screws (10x32), 4 Screws (12x24), 2 Velcro Straps, 8 Clear Windows, 2 Rear Cable Manage Installation Guide	
Notes: "For proper installation refer to Installation Guide PX106520 included with the product or visit our website at http://www.belden.com Cable Range Min: 24 AWG, Max: Cable 22 AWG Solid and Stranded Insulation Dia. Min: 0.035 in (0.89 mm), Max: 0.053 in (1.34 mm) Outer Jacket Dia Max: 0.366 in (9.3 mm)"		

# History

Update and Revision:	Revision Number: 0.13 Revision Date: 02-14-2024	
----------------------	---	--

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product: 2413** ☑

Category 6+ Enhanced Cable, 4 Pair, U/UTP, CMP

# **Product Description**

Category 6+ Enhanced Premise Horizontal Cable (350MHz), 4 Pair, 23 AWG Solid Bare Copper Conductors, U/UTP, Plenum-CMP, Flamarrest® PVC-LS Jacket

# **Technical Specifications**

## **Product Overview**

Suitable Applications:	Premise Horizontal Cable, Ethernet 1000BASE-T, Ethernet 100BASE-TX, Ethernet 10BASE-T, PoE++, PoE+, PoE	
Patent: This product has one or more applicable patents. More information on patents can be found at https://www.belden.com/patents.		

#### **Construction Details**

#### Conductor

Size	Stranding	Material	No. of Pairs
23 AWG	Solid	BC - Bare Copper	4

#### Insulation

Material	Color Code
PO+FEP - Polyolefin + Fluorinated Ethylene Propylene	White/Blue Stripe & Blue, White/Orange Stripe & Orange, White/Green Stripe & Green, White/Brown Stripe & Brown

# Outer Jacket

Separator	Material	Material Trade Name	Nom. Diameter	Ripcord
Dielectric Tape (Patented)	PVC - Polyvinyl Chloride	Flamarrest®	0.224 in (5.69 mm)	Yes
Overall Cable Diameter (Nominal):	0.224 in (5.69 mm)			

# **Electrical Characteristics**

### Electricals

Max. Conductor DCR	Max. Capacitance Unbalance
78 Ohm/km (24 Ohm/1000ft)	330 pF/100m

#### Delay

Frequency	Max. Delay	Max. Delay Skew	Nom. Velocity of Prop.
100 MHz	537.6 ns/100m	35 ns/100m	72%

# High Frequency

Frequency [MHz]	Max. Insertion Loss (Attenuation)	Min. NEXT [dB]	Min. PSNEXT [dB]	Min. ACR [dB]	Min. PSACR [dB]	Min. ACRF (ELFEXT) [dB]	Min. PSACRF (PSELFEXT) [dB]	Min. RL (Return Loss) [dB]	Max./Min. Input Impedance (unFitted) [Ohm]	Max./Min. Fitted Impedance [Ohm]
1	2.0 dB/100m	79.3	77.3	77.3	75.3	70.8	67.8	20.0	100 ± 15	102 ± 15
4	3.7 dB/100m	70.3	68.3	66.5	64.5	58.8	55.8	23.6	100 ± 15	100 ± 15
8	5.3 dB/100m	65.8	63.8	60.5	58.5	52.7	49.7	25.3	100 ± 15	100 ± 15
10	5.9 dB/100m	64.3	62.3	58.4	56.4	50.8	47.8	26.0	100 ± 15	100 ± 15
16	7.4 dB/100m	61.2	59.2	53.8	51.8	46.7	43.7	26.0	100 ± 15	100 ± 15
20	8.3 dB/100m	59.8	57.8	51.4	49.4	44.8	41.8	26.0	100 ± 15	100 ± 15
25	9.4 dB/100m	58.3	56.3	49.0	47.0	42.8	39.8	25.5	100 ± 15	100 ± 15
31.25	10.5 dB/100m	56.9	54.9	46.4	44.4	40.9	37.9	25.0	100 ± 15	100 ± 15

62.5	15.1 dB/100m	52.4	50.4	37.3	35.3	34.9	31.9	23.5	100 ± 15	100 ± 15
100	19.3 dB/100m	49.3	47.3	30.0	28.0	30.8	27.8	22.5	100 ± 15	100 ± 15
155	24.5 dB/100m	46.4	44.4	21.9	19.9	27.0	24.0	21.6	100 ± 22	100 ± 15
200	28.2 dB/100m	44.8	42.8	16.6	14.6	24.8	21.8	21.0	100 ± 22	100 ± 15
250	31.8 dB/100m	43.3	41.3	11.5	9.5	22.8	19.8	20.5	100 ± 32	100 ± 15
300	35.2 dB/100m	42.1	40.1	6.9	4.9	21.3	18.3	20.1	100 ± 32	100 ± 15
350	38.4 dB/100m	41.1	39.1	2.7	0.7	19.9	16.9	19.8	100 ± 32	100 ± 15
400	41.5 dB/100m	40.3	38.3			18.8	15.8	19.5	100 ± 32	100 ± 15
450	44.3 dB/100m	39.5	37.5			17.7	14.7	19.2	100 ± 32	100 ± 15
500	47.1 dB/100m	38.8	36.8			16.8	13.8	19.0	100 ± 32	100 ± 15
550	49.7 dB/100m	38.2	36.2			16.0	13.0	18.8	100 ± 32	100 ± 15

### Voltage

UL Voltage Rating
300 V (CMP), 300 V (CL3P)

# **Mechanical Characteristics**

## Temperature

<b>UL Temperature</b>	Operating	Installation	Storage
90°C	-20°C To +75°C	0°C To +50°C	-20°C To +75°C

## Bend Radius

Stationary Min.	Installation Min.
1.0 in (25 mm)	2.25 in (57.2 mm)

Max. Pull Tension:	25 lbs (11 kg)
Bulk Cable Weight:	26 lbs/1000ft

# **Standards and Compliance**

Environmental Suitability:	Plenum, Indoor
Sustainability:	Product Lens™, Environmental Product Declaration (EPD) Available
Flammability / Reaction to Fire:	NFPA 262, UL 910 (Plenum), FT6, IEC 60332-1-2
CPR Compliance:	CPR Euroclass: Eca; CPR UKCA Class: Eca
NEC / UL Compliance:	Article 800, CMP, CMP-LP (0.5A), CL3P-LP (0.5A)
CEC / C(UL) Compliance:	CMP
ICEA Compliance:	S-116-732
IEEE Compliance:	IEEE 802.3bt Type 1, Type 2, Type 3, Type 4
NEMA Compliance:	ANSI/NEMA WC-66
Data Category:	Category 6
TIA/EIA Compliance:	ANSI/TIA-568.2-D Category 6
Third Party Performance Verification:	Category 6
ISO/IEC Compliance:	ISO/IEC 11801-1, IEC 61156-5
European Directive Compliance:	EU CE Mark, EU Directive 2015/863/EU (RoHS 2 amendment), REACH, EU Directive 2011/65/EU (RoHS 2), EU Directive 2012/19/EU (WEEE), REACH: 2020-01-16
UK Regulation Compliance:	UKCA Mark
APAC Compliance:	China RoHS II (GB/T 26572-2011)
Non-Plenum Number:	2412

## **Product Notes**

Notes:	Electrical values are expected performance based on cable testing and representative performance within a typical Belden system. Values above 350 MHz are for Engineering Information Only. Print Includes Descending Footage/Meter Markings from Max. Put-Up Length to 0.
--------	--

# History

Update and Revision:	Revision Number: 0.602 Revision Date: 12-12-2023

# **Part Numbers**

## Variants

Item #	Color	Putup Type	Length	UPC
2413 0101000	Black	Reel	1,000 ft	612825061762

2413 010A1000	Black	Reel-in-Box	1,000 ft	612825061755
2413 010U1000	Black	UnReel	1,000 ft	612825131502
2413 0102500	Black	Reel	2,500 ft	612825061748
2413 D151000	Blue	Reel	1,000 ft	612825061601
2413 D15A1000	Blue	Reel-in-Box	1,000 ft	612825061618
2413 D15U1000	Blue	UnReel	1,000 ft	612825061793
2413 D152500	Blue	Reel	2,500 ft	612825061625
2413 0081000	Gray	Reel	1,000 ft	612825061717
2413 008A1000	Gray	Reel-in-Box	1,000 ft	612825061724
2413 008U1000	Gray	UnReel	1,000 ft	612825061809
2413 0051000	Green	Reel	1,000 ft	612825061663
2413 005A1000	Green	Reel-in-Box	1,000 ft	612825061687
2413 005U1000	Green	UnReel	1,000 ft	612825062226
2413 0052500	Green	Reel	2,500 ft	612825061670
2413 0035000	Orange			612825381068
2413 0035000	Orange			612825381068
2413 0031000	Orange	Reel	1,000 ft	612825061694
2413 003A1000	Orange	Reel-in-Box	1,000 ft	612825061700
2413 003U1000	Orange	UnReel	1,000 ft	612825062202
2413 012A1000	Pink	Reel-in-Box	1,000 ft	612825061786
2413 007A1000	Purple	Reel-in-Box	1,000 ft	612825061779
2413 002A1000	Red	Reel-in-Box	1,000 ft	612825061731
2413 0091000	White	Reel	1,000 ft	612825061571
2413 009A1000	White	Reel-in-Box	1,000 ft	612825061588
2413 009U1000	White	UnReel	1,000 ft	612825061816
2413 0092500	White	Reel	2,500 ft	612825061595
2413 0041000	Yellow	Reel	1,000 ft	612825061632
2413 004A1000	Yellow	Reel-in-Box	1,000 ft	612825061649
2413 004U1000	Yellow	UnReel	1,000 ft	612825062219
2413 0042500	Yellow	Reel	2,500 ft	612825061656

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product: 2412** ☑

Category 6+ Enhanced Cable, 4 Pair, U/UTP, CMR

# **Product Description**

Category 6+ Enhanced Premise Horizontal Cable (350MHz), 4 Pair, 23 AWG Solid Bare Copper Conductors, U/UTP, Riser-CMR, PVC Jacket

# **Technical Specifications**

## **Product Overview**

Suitable Applications:	Premise Horizontal Cable, Ethernet 1000BASE-T, Ethernet 100BASE-TX, Ethernet 10BASE-T, PoE++, PoE+, PoE
Patent:	This product has one or more applicable patents. More information on patents can be found at https://www.belden.com/patents.

## **Construction Details**

### Conductor

Size	Stranding	Material	No. of Pairs
23 AWG	Solid	BC - Bare Copper	4

### Insulation

Material	Color Code
PO - Polyolefin	White/Blue Stripe & Blue, White/Orange Stripe & Orange, White/Green Stripe & Green, White/Brown Stripe & Brown

## Outer Jacket

Separator	Material	Nom. Diameter	Ripcord
Dielectric Tape (Patented)	PVC - Polyvinyl Chloride	0.224 in (5.69 mm)	Yes
Overall Cable Diameter (Nominal):	0.224 in (5.69 mm)		

# **Electrical Characteristics**

### Electricals

Max. Conductor DCR	Max. Capacitance Unbalance
78 Ohm/km (24 Ohm/1000ft)	330 pF/100m

#### Delay

Frequency	Max. Delay	Max. Delay Skew	Nom. Velocity of Prop.
100 MHz	537.6 ns/100m	35 ns/100m	70%

## High Frequency

Frequency [MHz]	Max. Insertion Loss (Attenuation)	Min. NEXT [dB]	Min. PSNEXT [dB]	Min. ACR [dB]	Min. PSACR [dB]	Min. ACRF (ELFEXT) [dB]	Min. PSACRF (PSELFEXT) [dB]	Min. RL (Return Loss) [dB]	Max./Min. Input Impedance (unFitted) [Ohm]	Max./Min. Fitted Impedance [Ohm]
1	2.0 dB/100m	79.3	77.3	77.3	75.3	70.8	67.8	20.0	100 ± 15	102 ± 15
4	3.7 dB/100m	70.3	68.3	66.5	64.5	58.8	55.8	23.6	100 ± 15	100 ± 15
8	5.3 dB/100m	65.8	63.8	60.5	58.5	52.7	49.7	25.3	100 ± 15	100 ± 15
10	5.9 dB/100m	64.3	62.3	58.4	56.4	50.8	47.8	26.0	100 ± 15	100 ± 15
16	7.4 dB/100m	61.2	59.2	53.8	51.8	46.7	43.7	26.0	100 ± 15	100 ± 15
20	8.3 dB/100m	59.8	57.8	51.4	49.4	44.8	41.8	26.0	100 ± 15	100 ± 15
25	9.4 dB/100m	58.3	56.3	49.0	47.0	42.8	39.8	25.5	100 ± 15	100 ± 15
31.25	10.5 dB/100m	56.9	54.9	46.4	44.4	40.9	37.9	25.0	100 ± 15	100 ± 15

62.5	15.1 dB/100m	52.4	50.4	37.3	35.3	34.9	31.9	23.5	100 ± 15	100 ± 15
100	19.3 dB/100m	49.3	47.3	30.0	28.0	30.8	27.8	22.5	100 ± 15	100 ± 15
155	24.5 dB/100m	46.4	44.4	21.9	19.9	27.0	24.0	21.6	100 ± 22	100 ± 15
200	28.3 dB/100m	44.8	42.8	16.6	14.6	24.8	21.8	21.0	100 ± 22	100 ± 15
250	31.8 dB/100m	43.3	41.3	11.5	9.5	22.8	19.8	20.5	100 ± 32	100 ± 15
300	35.2 dB/100m	42.1	40.1	6.9	4.9	21.3	18.3	20.1	100 ± 32	100 ± 15
350	38.4 dB/100m	41.1	39.1	2.7	0.7	19.9	16.9	19.8	100 ± 32	100 ± 15
400	41.5 dB/100m	40.3	38.3			18.8	15.8	19.5	100 ± 32	100 ± 15
450	44.3 dB/100m	39.5	37.5			17.7	14.7	19.2	100 ± 32	100 ± 15
500	47.1 dB/100m	38.8	36.8			16.8	13.8	19.0	100 ± 32	100 ± 15
550	49.7 dB/100m	38.2	36.2			16.0	13.0	18.8	100 ± 32	100 ± 15

# Voltage

UL Voltage Rating 300 V (CMR)

# **Mechanical Characteristics**

## Temperature

<b>UL Temperature</b>	Operating	Installation	Storage
75°C	-20°C To +75°C	0°C To +50°C	-20°C To +75°C

## Bend Radius

Stationary Min.	Installation Min.
1.0 in (25 mm)	2.25 in (57.2 mm)

Max. Pull Tension:	25 lbs (11 kg)
Bulk Cable Weight:	22 lbs/1000ft

# **Standards and Compliance**

Environmental Suitability:	Riser, Indoor
Sustainability:	Product Lens™, Environmental Product Declaration (EPD) Available
Flammability / Reaction to Fire:	UL 1666 Riser, FT4, IEC 60332-1-2
CPR Compliance:	CPR Euroclass: Eca; CPR UKCA Class: Eca
NEC / UL Compliance:	Article 800, CMR
CEC / C(UL) Compliance:	CMR
ICEA Compliance:	S-116-732
IEEE Compliance:	IEEE 802.3bt Type 1, Type 2, Type 3, Type 4
NEMA Compliance:	ANSI/NEMA WC-66
Data Category:	Category 6
TIA/EIA Compliance:	ANSI/TIA-568.2-D Category 6
Third Party Performance Verification:	Category 6
ISO/IEC Compliance:	ISO/IEC 11801-1, IEC 61156-5
European Directive Compliance:	EU CE Mark, EU Directive 2015/863/EU (RoHS 2 amendment), REACH, EU Directive 2011/65/EU (RoHS 2), EU Directive 2012/19/EU (WEEE), REACH: 2020-01-16
UK Regulation Compliance:	UKCA Mark
APAC Compliance:	China RoHS II (GB/T 26572-2011)
Plenum Number:	2413

## **Product Notes**

Notes:	Electrical values are expected performance based on cable testing and representative performance within a typical Belden system. Values above 350 MHz are for Engineering Information Only. Print Includes Descending Footage/Meter Markings from Max. Put-Up Length to 0.
--------	--

# History

Update and Revision:	Revision Number: 0.641 Revision Date: 12-12-2023

# **Part Numbers**

## Variants

Item #	Color	Putup Type	Length	UPC	Footnote
2412 0101000	Black	Reel	1,000 ft	612825061199	

2412 010A1000	Black	Reel-in-Box	1,000 ft	612825061205	
2412 010U1000	Black	UnReel	1,000 ft	612825062165	
2412 0061000	Blue	Reel	1,000 ft	612825061045	
2412 006A1000	Blue	Reel-in-Box	1,000 ft	612825061052	
2412 006U1000	Blue	UnReel	1,000 ft	612825061236	
2412 0061400	Blue	Reel	1,400 ft	612825061076	
2412 0062500	Blue	Reel	2,500 ft	612825061069	
2412 0065000	Blue	Reel	5,000 ft	612825062134	С
2412 0081000	Gray	Reel	1,000 ft	612825061168	
2412 008A1000	Gray	Reel-in-Box	1,000 ft	612825061175	
2412 008U1000	Gray	UnReel	1,000 ft	612825061243	
2412 0051000	Green	Reel	1,000 ft	612825061083	
2412 005A1000	Green	Reel-in-Box	1,000 ft	612825061090	
2412 005U1000	Green	UnReel	1,000 ft	612825062127	
2412 003A1000	Orange	Reel-in-Box	1,000 ft	612825061212	
2412 003U1000	Orange	UnReel	1,000 ft	612825062103	
2412 007A1000	Purple	Reel-in-Box	1,000 ft	612825061182	
2412 007U1000	Purple	UnReel	1,000 ft	612825062141	
2412 002A1000	Red	Reel-in-Box	1,000 ft	612825061229	С
2412 0091000	White	Reel	1,000 ft	612825061106	
2412 009A1000	White	Reel-in-Box	1,000 ft	612825061113	
2412 009U1000	White	UnReel	1,000 ft	612825061250	
2412 0092500	White	Reel	2,500 ft	612825061120	
2412 0095000	White	Reel	5,000 ft	612825062158	С
2412 0041000	Yellow	Reel	1,000 ft	612825061137	
2412 004A1000	Yellow	Reel-in-Box	1,000 ft	612825061151	
2412 004U1000	Yellow	UnReel	1,000 ft	612825062110	
2412 0042500	Yellow	Reel	2,500 ft	612825061144	

### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>C6D1108001</u> ☑

Cable Assemblies - CAT6 Performance Modular Cord, 1 ft. (0.3 m)

# **Product Description**

CAT6 Performance Patch Cord UTP, 4 Pair, 28 AWG Stranded, CMR, T568A/B-T568A/B, Gray, 1 ft. (0.3 m)

## **Technical Specifications**

### **Product Overview**

Suitable Applications: TIA Category 6, ISO Class E, 1000BASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)

### **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
28	Stranded	TC - Tinned Copper	4

#### Insulation



# Outer Jacket

Material	
PVC - Polyvinyl Chloride	
Overall Nominal Diameter:	0.15 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag

# Connectors

#### Materials

Description	Material	Туре
Plug	Polycarbonate - UL94V-0	RJ45
Boot	Polycarbonate - UL94V-0	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

#### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm

## Voltage



### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

### **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	0.580 in
Plug /Jack Compatibility:	RJ45

### Termination Interface

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

### **Standards**

UL Rating:	Riser
TIA/EIA Compliance:	Category 6 - TIA-568.2-D ISO/IEC 11801-1
IEEE Compliance:	IEEE 802.3at type 1 and 2 (PoE) up to 30W, IEEE 802.3bt type 3 and 4 (PoE) up to 100W, CISCO (UPOE) up to 60W, Power over HDBaseTTM (POH) up to 100W
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

### Suitability

Suitability - Indoor:
-----------------------

# Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

### **Related Part Numbers**

Related Parts:	CAT6+ Modular Jacks, CAT6+ RJ45 Couplers, CAT6+ Patch Panels	
----------------	--	--

### **Product Notes**

Notes:	Belden 28 AWG cords meet TIA performance standards at reduced lengths with an attenuation de-rating value of 1.95. For guidelines and limitations on using 28 AWG cord for power delivery, see TIA-TSB-184-A-1. Cable weight: 0.012 Lbs/ft. This product may be protected by one or more patents. For further information, please visit: https://www.belden.com/patents.
Labeling:	Labeling: Belden Part Number and Cord Length

### **History**

Update and Revision:	Revision Number: 0.14 Revision Date: 02-08-2024

### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>C6D1108004</u> ☑

Cable Assemblies - CAT6 Performance Modular Cord, 4 ft. (1.2 m)

# **Product Description**

CAT6 Performance Patch Cord UTP, 4 Pair, 28 AWG Stranded, CMR, T568A/B-T568A/B, Gray, 4 ft. (1.2 m)

## **Technical Specifications**

### **Product Overview**

Suitable Applications: TIA Category 6, ISO Class E, 1000BASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)

### **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
28	Stranded	TC - Tinned Copper	4

#### Insulation



### Outer Jacket

Material PVC - Polyvinyl Chloride	е
Overall Nominal Diameter:	0.15 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag

# Connectors

#### Materials

Description	Material	Type
Plug	Polycarbonate - UL94V-0	RJ45
Boot	Polycarbonate - UL94V-0	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

#### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm

## Voltage



### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

### **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	0.580 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

	Termination	Connection	Durabilities	
ľ	RJ45	Mated Connection	750 Cycles	

### **Standards**

UL Rating:	Riser
TIA/EIA Compliance:	Category 6 - TIA-568.2-D ISO/IEC 11801-1
IEEE Compliance:	IEEE 802.3at type 1 and 2 (PoE) up to 30W, IEEE 802.3bt type 3 and 4 (PoE) up to 100W, CISCO (UPOE) up to 60W, Power over HDBaseTTM (POH) up to 100W
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)

## **Applicable Environmental and Other Programs**

Environmental Space:	e: Indoor	
EU Directive 2002/95/EC (RoHS):	Yes	
MII Order #39 (China RoHS):	EUP 50	

### Suitability

Suitability - Indoor:
-----------------------

# Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

### **Related Part Numbers**

Related Parts:	CAT6+ Modular Jacks, CAT6+ RJ45 Couplers, CAT6+ Patch Panels	
----------------	--	--

### **Product Notes**

Notes:	Belden 28 AWG cords meet TIA performance standards at reduced lengths with an attenuation de-rating value of 1.95. For guidelines and limitations on using 28 AWG cord for power delivery, see TIA-TSB-184-A-1. Cable weight: 0.012 Lbs/ft. This product may be protected by one or more patents. For further information, please visit: https://www.belden.com/patents.
Labeling:	Labeling: Belden Part Number and Cord Length

### **History**

Update and Revision:	Revision Number: 0.175 Revision Date: 02-08-2024

### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>C6D1108007</u> ☑

Cable Assemblies - CAT6 Performance Modular Cord, 7 ft. (2.1 m)

# **Product Description**

CAT6 Performance Patch Cord UTP, 4 Pair, 28 AWG Stranded, CMR, T568A/B-T568A/B, Gray, 7 ft. (2.1 m)

## **Technical Specifications**

### **Product Overview**

Suitable Applications: TIA Category 6, ISO Class E, 1000BASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)

### **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
28	Stranded	TC - Tinned Copper	4

#### Insulation



### Outer Jacket

Material PVC - Polyvinyl Chloride	е
Overall Nominal Diameter:	0.15 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag

# Connectors

#### Materials

Description	Material	Туре
Plug	Polycarbonate - UL94V-0	RJ45
Boot	Polycarbonate - UL94V-0	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

#### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm

## Voltage



### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

### **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	0.580 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

### **Standards**

UL Rating: Riser	
TIA/EIA Compliance:	Category 6 - TIA-568.2-D ISO/IEC 11801-1
IEEE Compliance:	IEEE 802.3at type 1 and 2 (PoE) up to 30W, IEEE 802.3bt type 3 and 4 (PoE) up to 100W, CISCO (UPOE) up to 60W, Power over HDBaseTTM (POH) up to 100W
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

### Suitability

Suitability - Indoor:
-----------------------

# Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

### **Related Part Numbers**

Related Parts:
----------------

### **Product Notes**

Notes:	Belden 28 AWG cords meet TIA performance standards at reduced lengths with an attenuation de-rating value of 1.95. For guidelines and limitations on using 28 AWG cord for power delivery, see TIA-TSB-184-A-1. Cable weight: 0.012 Lbs/ft. This product may be protected by one or more patents. For further information, please visit: https://www.belden.com/patents.	
Labeling:	Labeling: Belden Part Number and Cord Length	

### **History**

Update and Revision:	Revision Number: 0.168 Revision Date: 02-08-2024

### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>C6D1108010</u> ☑

Cable Assemblies - CAT6 Performance Modular Cord, 10 ft. (3.0 m)

# **Product Description**

CAT6 Performance Patch Cord UTP, 4 Pair, 28 AWG Stranded, CMR, T568A/B-T568A/B, Gray, 10 ft. (3.0 m)

## **Technical Specifications**

### **Product Overview**

Suitable Applications: TIA Category 6, ISO Class E, 1000BASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)

### **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
28	Stranded	TC - Tinned Copper	4

#### Insulation



### Outer Jacket

Material PVC - Polyvinyl Chloride	е
Overall Nominal Diameter:	0.15 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag

# Connectors

#### Materials

Description	Material	Туре
Plug	Polycarbonate - UL94V-0	RJ45
Boot	Polycarbonate - UL94V-0	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

#### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm

## Voltage



### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

### **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	0.580 in
Plug /Jack Compatibility:	RJ45

#### **Termination Interface**

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

### **Standards**

UL Rating:	Riser
TIA/EIA Compliance:	Category 6 - TIA-568.2-D ISO/IEC 11801-1
IEEE Compliance:	IEEE 802.3at type 1 and 2 (PoE) up to 30W, IEEE 802.3bt type 3 and 4 (PoE) up to 100W, CISCO (UPOE) up to 60W, Power over HDBaseTTM (POH) up to 100W
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)

### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

### Suitability

Suitability - Indoor:
-----------------------

# Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

### **Related Part Numbers**

Related Parts:
----------------

### **Product Notes**

Notes:	Belden 28 AWG cords meet TIA performance standards at reduced lengths with an attenuation de-rating value of 1.95. For guidelines and limitations on using 28 AWG cord for power delivery, see TIA-TSB-184-A-1. Cable weight: 0.012 Lbs/ft. This product may be protected by one or more patents. For further information, please visit: https://www.belden.com/patents.
Labeling:	Labeling: Belden Part Number and Cord Length

### **History**

Update and Revision:	Revision Number: 0.128 Revision Date: 02-08-2024

### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product**: <u>C601108010</u> ☑

Cable Assemblies - CAT6+ Modular Cord, 10ft (3.0 m)

# **Product Description**

CAT6+ Patch Cord, UTP, Bonded-Pair, 4 Pair, 24 AWG Solid, CMR, T568A/B-T568A/B, Gray, 10 ft (3.0 m)

# **Technical Specifications**

### **Product Overview**

Suitable Applications:	IBDN Shielded System 4800, IBDN System 3600, IBDN System 2400, TIA Category 6, ISO Class E, 1000BASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up
Sultable Applications.	to 60W) and Power over HDBase-T (up to 100W)

# **Physical Characteristics (Overall)**

### Conductor

AWG	Stranding	Material	No. of Pairs
24	Solid	BC - Bare Copper	4

### Insulation



## Outer Shield



### Outer Jacket

Material	
PVC - Polyvinyl Chloride	
Overall Nominal Diameter:	0.225 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag.

## **Connectors**

### Materials

Description	Material	Type
Plug	Polycarbonate	RJ45
Boot	Elastomer	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

## **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute	
Current Rating:	1.500 A	
Insulation Resistance:	500 M-Ohm Minimum	
Max Contact Resistance:	20 mOhm	
Table Notes:	100 meter Cable Specifications - * TIA/EIA-568.2-D Category 6 Standard PSACRF is formally PSELFEXT	

### Voltage

# UL Voltage Rating 300 V RMS

## **Mated Connection**

Frequency (MHz)	Max. Insertion Loss Belden** (dB)	Min. Return Loss Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1 MHz	2 dB	20 dB	40 dB	40 dB
4 MHz	3.7 dB	23 dB	40 dB	40 dB
8 MHz	5.2 dB	24.5 dB	40 dB	40 dB
10 MHz	5.9 dB	25 dB	40 dB	40 dB
16 MHz	7.4 dB	25 dB	38 dB	38 dB
20 MHz	8.3 dB	25 dB	37 dB	37 dB
25 MHz	9.3 dB	24.3 dB	36 dB	36 dB
31.25 MHz	10.4 dB	23.6 dB	35.1 dB	35.1 dB
62.5 MHz	14.9 dB	21.5 dB	32 dB	32 dB
100 MHz	19 dB	20.8 dB	30 dB	30 dB
200 MHz	27.5 dB	18.7 dB	27 dB	27 dB
250 MHz	31 dB	18 dB	26 dB	26 dB
300 MHz	34.2 dB	17.5 dB		

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

# **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	1.040 in
Plug /Jack Compatibility:	RJ45

## Termination Interface

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

# **Standards**

UL Rating:	Riser	
TIA/EIA Compliance:	Category 6 - TIA 568-C.2, Class E - ISO/IEC 11801:2002 Ed.2 Amendment 2	
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)	

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Suitability

Suitability - Indoor:	Yes		

# Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

# **Related Part Numbers**

Related Parts:	CAT6+ Modular Jacks, CAT6+ RJ45 Couplers, CAT6+ Coupler Patch Panels	
----------------	--	--

# **Product Notes**

Notes:	Weight: 0.027 lbs/ft. Cable with EquiBlock™ Barrier Technology
Labeling:	Belden Part Number, Performance Acronym, Wiring Scheme and Cord Length

# History

Update and Revision:

Revision Number: 0.8 Revision Date: 02-09-2024

#### © 2025 Belden, Inc

# All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>C601108025</u> ☑

Cable Assemblies - CAT6+ Modular Cord, 25ft (7.6 m)

# **Product Description**

CAT6+ Patch Cord, UTP, Bonded-Pair, 4 Pair, 24 AWG Solid, CMR, T568A/B-T568A/B, Gray, 25 ft (7.6 m)

# **Technical Specifications**

### **Product Overview**

Suitable Applications:	IBDN Shielded System 4800, IBDN System 3600, IBDN System 2400, TIA Category 6, ISO Class E, 1000BASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up
	to 60W) and Power over HDBase-T (up to 100W)

# **Physical Characteristics (Overall)**

### Conductor

AWG	Stranding	Material	No. of Pairs
24	Solid	BC - Bare Copper	4

### Insulation



## Outer Shield



### Outer Jacket

Material	
PVC - Polyvinyl Chloride	
Overall Nominal Diameter:	0.225 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag.

## **Connectors**

### Materials

Description	Material	Type
Plug	Polycarbonate	RJ45
Boot	Elastomer	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

## **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Table Notes:	100 meter Cable Specifications - * TIA/EIA-568.2-D Category 6 Standard PSACRF is formally PSELFEXT

### Voltage

# UL Voltage Rating 300 V RMS

## **Mated Connection**

Frequency (MHz)	Max. Insertion Loss Belden** (dB)	Min. Return Loss Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1 MHz	2 dB	20 dB	40 dB	40 dB
4 MHz	3.7 dB	23 dB	40 dB	40 dB
8 MHz	5.2 dB	24.5 dB	40 dB	40 dB
10 MHz	5.9 dB	25 dB	40 dB	40 dB
16 MHz	7.4 dB	25 dB	38 dB	38 dB
20 MHz	8.3 dB	25 dB	37 dB	37 dB
25 MHz	9.3 dB	24.3 dB	36 dB	36 dB
31.25 MHz	10.4 dB	23.6 dB	35.1 dB	35.1 dB
62.5 MHz	14.9 dB	21.5 dB	32 dB	32 dB
100 MHz	19 dB	20.8 dB	30 dB	30 dB
200 MHz	27.5 dB	18.7 dB	27 dB	27 dB
250 MHz	31 dB	18 dB	26 dB	26 dB
300 MHz	34.2 dB	17.5 dB		

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

# **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	1.040 in
Plug /Jack Compatibility:	RJ45

## Termination Interface

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

# **Standards**

UL Rating:	Riser
TIA/EIA Compliance:	Category 6 - TIA 568-C.2, Class E - ISO/IEC 11801:2002 Ed.2 Amendment 2
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Suitability

Suitability - Indoor:	Yes		

# Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

# **Related Part Numbers**

Related Parts:	CAT6+ Modular Jacks, CAT6+ RJ45 Couplers, CAT6+ Coupler Patch Panels	
----------------	--	--

# **Product Notes**

Notes:	Weight: 0.027 lbs/ft. Cable with EquiBlock™ Barrier Technology
Labeling:	Belden Part Number, Performance Acronym, Wiring Scheme and Cord Length

# History

Update and Revision:

Revision Number: 0.8 Revision Date: 02-09-2024

#### © 2025 Belden, Inc

# All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>C601108030</u> ☑

Cable Assemblies - CAT6+ Modular Cord, 30ft (9.0 m)

# **Product Description**

CAT6+ Patch Cord, UTP, Bonded-Pair, 4 Pair, 24 AWG Solid, CMR, T568A/B-T568A/B, Gray, 30 ft (9.0 m)

# **Technical Specifications**

### **Product Overview**

Suitable Applications:	IBDN Shielded System 4800, IBDN System 3600, IBDN System 2400, TIA Category 6, ISO Class E, 1000BASE-T, Support Power over Ethernet (up to 100W), Cisco UPOE (up
	to 60W) and Power over HDBase-T (up to 100W)

# **Physical Characteristics (Overall)**

### Conductor

AWG	Stranding	Material	No. of Pairs
24	Solid	BC - Bare Copper	4

### Insulation



## Outer Shield



### Outer Jacket

Material	
PVC - Polyvinyl Chloride	
Overall Nominal Diameter:	0.225 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a clear plastic bag.

## **Connectors**

### Materials

Description	Material	Type
Plug	Polycarbonate	RJ45
Boot	Elastomer	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades

## **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	20 mOhm
Table Notes:	100 meter Cable Specifications - * TIA/EIA-568.2-D Category 6 Standard PSACRF is formally PSELFEXT

### Voltage

# UL Voltage Rating 300 V RMS

## **Mated Connection**

Frequency (MHz)	Max. Insertion Loss Belden** (dB)	Min. Return Loss Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1 MHz	2 dB	20 dB	40 dB	40 dB
4 MHz	3.7 dB	23 dB	40 dB	40 dB
8 MHz	5.2 dB	24.5 dB	40 dB	40 dB
10 MHz	5.9 dB	25 dB	40 dB	40 dB
16 MHz	7.4 dB	25 dB	38 dB	38 dB
20 MHz	8.3 dB	25 dB	37 dB	37 dB
25 MHz	9.3 dB	24.3 dB	36 dB	36 dB
31.25 MHz	10.4 dB	23.6 dB	35.1 dB	35.1 dB
62.5 MHz	14.9 dB	21.5 dB	32 dB	32 dB
100 MHz	19 dB	20.8 dB	30 dB	30 dB
200 MHz	27.5 dB	18.7 dB	27 dB	27 dB
250 MHz	31 dB	18 dB	26 dB	26 dB
300 MHz	34.2 dB	17.5 dB		

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

# **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	1.040 in
Plug /Jack Compatibility:	RJ45

## Termination Interface

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

# **Standards**

UL Rating:	Riser	
TIA/EIA Compliance:	Category 6 - TIA 568-C.2, Class E - ISO/IEC 11801:2002 Ed.2 Amendment 2	
Other Standards:	IEC 60603-7, ANSI/TIA 1096-A (formerly FCC Part 68-F)	

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Suitability

Suitability - Indoor:	Yes		

# Flammability, LS0H, Toxicity Testing

UL voltage rating:	300 V RMS
Safety Listing:	c(UL)us Listed

# **Related Part Numbers**

Related Parts:	CAT6+ Modular Jacks, CAT6+ RJ45 Couplers, CAT6+ Coupler Patch Panels	
----------------	--	--

# **Product Notes**

Notes:	Weight: 0.027 lbs/ft. Cable with EquiBlock™ Barrier Technology
Labeling:	Belden Part Number, Performance Acronym, Wiring Scheme and Cord Length

# History

Update and Revision:

Revision Number: 0.8 Revision Date: 02-09-2024

#### © 2025 Belden, Inc

# All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



**Product:** <u>C6011xx000A06</u> ☑

Cable Assemblies - 3600 Pre-Terminated Cable Assembly



# **Product Description**

3600 Pre-Terminated Cable Assembly, Bonded-Pair, 4-Pair, 23 AWG Solid, T568A/B-T568A/B, 6 Cables, CMR (See Product Family for colors & lengths)

## **Technical Specifications**

### **Product Overview**

Suitable Applications: IBDN System 3600, TIA Category 6, Support Power over Ethernet (up to 100W), Cisco UPOE (up to 60W) and Power over HDBase-T (up to 100W)

### **Physical Characteristics (Overall)**

#### Conductor

AWG	Stranding	Material	No. of Pairs
23	Solid	BC - Bare Copper	4

#### Insulation



### Outer Jacket

Material PVC - Polyvinyl Chloric	de
Overall Nominal Diameter:	0.75 in
Wiring Scheme:	T568A/B-T568A/B
Packaging:	Individually packaged in a box

#### Connectors

#### Materials

Description	Material	Туре
Plug	Polycarbonate	RJ45
Boot	Elastomer	
Front Connection	Phosphor Bronze with 50u inch Gold over Nickel Plating	Blades
Sleeve	Engineered Polymer Riser Rated	

### **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60 Hz for 1 minute	
Current Rating:	1.500 A	
Insulation Resistance:	500 M-Ohm Minimum	
Max Contact Resistance:	20 mOhm	
Table Notes:	100 meter Cable Specifications - * TIA/EIA-568.2-D Category 6 Standard	

#### Voltage

UL Voltage Rating 300 V RMS

### **Mated Connection**

Frequency (MHz)	Max. Insertion Loss Belden** (dB)	Min. Return Loss Belden** (dB)	Min. Balanced TCL TIA* (dB)	Min. Balanced TCL Belden** (dB)
1 MHz	2 dB	20 dB	40 dB	42 dB
4 MHz	3.7 dB	23 dB	40 dB	42 dB
8 MHz	5.2 dB	24.5 dB	40 dB	42 dB
10 MHz	5.8 dB	25 dB	40 dB	42 dB
16 MHz	7.4 dB	25 dB	38 dB	40 dB
20 MHz	8.3 dB	25 dB	37 dB	39 dB
25 MHz	9.3 dB	25 dB	36 dB	38 dB
31.25 MHz	10.4 dB	25 dB	35.1 dB	37.1 dB
62.5 MHz	15 dB	25 dB	32 dB	34 dB
100 MHz	19.3 dB	25 dB	30 dB	32 dB
200 MHz	28.3 dB	21.6 dB	27 dB	29 dB
250 MHz	32.1 dB	20.5 dB	26 dB	28 dB
300 MHz	35.6 dB	20.1 dB		

# **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Max. Pull Tension:	11.250 lbs
Min Bend Radius (Overall Cable):	1.040 in
Plug /Jack Compatibility:	RJ45

## Termination Interface

Termination	Connection	Durabilities
RJ45	Mated Connection	750 Cycles

### **Standards**

UL Rating:	Riser
TIA/EIA Compliance:	Category 6 - TIA-568.2-D ISO/IEC 11801-1
IEEE Compliance:	IEEE 802.3at type 1 and 2 (PoE) up to 30W, IEEE 802.3bt type 3 and 4 (PoE) up to 100W, CISCO (UPOE) up to 60W, Power over HDBaseTTM (POH) up to 100W
Other Standards:	ANSI/TIA 1096-A (formerly FCC Part 68-F), IEC 60603-7

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

# Suitability

Suitability - Indoor: Yes

# Flammability, LS0H, Toxicity Testing

Safety Listing: c(UL)us Listed

### **Related Part Numbers**

Related Parts: CAT6+ RJ45 Couplers, CAT6+ Coupler Patch Panels

# **Product Notes**

Notes:	C601xyyzzzA06 is subdivided as following C6-01-x-yy-zzz-A-06 where C6 stands for performance, 01 stands for jacket type, x stands for termination type, yy stands for color, zzz stands for length, A stands for assembly, and 06 stands for number of cables Use "zzz" part of the code to specify length in feet - 006-050 ft in increments of 1 ft - 055-295 ft in increments of 5 ft. Cable Weight: 0.028 lbs/ft. x 6 cables.
Labeling:	Labeled at both ends: Part Number, Serial Number, Termination Scheme, Length, Individual cable identification. Customized Labeling for cable assemblies optional upon request.

### History

Update and Revision: Revision Number: 0.16 Revision Date: 02-09-2024

© 2025 Belden, Inc

#### All Rights Reserved

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: CAT 6 KCONN Coupler PP 48 1U ☑



AX104591-CAT 6 KeyConect Coupler Patch Panel, 48 Port, 1U, UTP

# **Product Description**

KeyConnect Patch Panel, 48-port, 1U, with CAT6+ RJ45 Coupler

# **Technical Specifications**

### **Product Overview**

Suitable Applications:	Compatible with a variety of modules that are suitable for use with Belden IBDN Systems 10GX.

## **Physical Characteristics (Overall)**

Height:	1.75 in
Width:	19.000 in
Depth:	1.3 in
Port Count:	48 Port
Front Connection:	Flush
Packaging:	Individually packaged in a cardboard box.
Weight:	1.00 lbs

### Connectors

#### Materials



### **Construction and Dimensions**

Max Capacity:	48 connectors

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

### **Mechanical Characteristics**

Footprint/Type:	KeyConnect		

## **Standards**

Data Categor	

# **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

# Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA, Bi-national Standard Listed
-----------------	----------------------------------

### **Related Part Numbers**

Related Parts:	Compatible with CAT6+ Patch Cord and CAT6+ Pre-Terminated Cable Assemblies.

#### Variants

Item #	Color	UPC
AX104591	Black	611589006842

### **Product Notes**

Included Parts:	4 Screws (10x32); 4 Screws (12x24); 1 Printable LabelFlex Half-Sheet; 2 Velcro Straps; 2 Rear Cable Management Bracket, 1 Installation Guide
Notes:	For proper installation refer to Installation Guide PX104691 included with the product. Refer to AX104215 for the Specifications of the Couplers

### **History**

Update and Revision:	Revision Number: 0.259 Revision Date: 11-19-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: AX101471 ☐

FACEPLATES AND PANEL - 300-PAIR GIGABIX TERMINATION KIT, BLACK

## **Product Description**

FACEPLATES AND PANEL - 300-PAIR GIGABIX TERMINATION KIT, BLACK

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	IBDN System 1200, TIA Category 5E, ISO Class D, 1000 BASE-T

## **Physical Characteristics (Overall)**

Height:	15.281 in
Width:	7.639 in
Depth:	4.527 in
Front Connection:	Flush
Packaging:	Individually packaged in a cardboard box.
Weight:	15.400 lbs

#### **Connectors**

#### Materials

Description	Material
Panel	Steel

#### **Construction and Dimensions**

Max Capacity:	300 Pairs (12 connectors, 25 pairs/connector AX101448 included)
---------------	---

## **Electrical Characteristics**

Dielectric Strength:	1,000 V RMS @ 60Hz for 1 minute
Current Rating:	1.500 A
Insulation Resistance:	500 M-Ohm Minimum
Max Contact Resistance:	1 mOhm

## **Mated Connection**

Frequency (MHz	) Max. Insertion Loss TIA* (dB)	Min. FEXT TIA* (dB)	Min. NEXT TIA* (dB)	Min. FEXT Belden** (dB)	Min. Return Loss TIA* (dB)
100.000	0.200 dB	35.100 dB	43.000 dB	46.800 dB	20.000 dB

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Footprint/Type:	GigaBIX
Tool Compatibility:	BIX Connecting Tool (A0270165)
Termination Front Connection:	Yes

Termination Rear Connection: Yes

#### **Termination Interface**

Connection	Durabilities
IDC Connection	200 Insertion
IDC Connection	200 Insertion

#### **Standards**

TIA/EIA Compliance:	Category 5e - TIA 568.C.2
Third Party Performance Verification:	ETL - Verified Category 6

#### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes

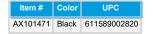
## Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA, Bi-national Standard Listed

#### **Related Part Numbers**

Related Parts:	GigaBIX Connectors, Managament Ring, Managament Module, Patchcord Organizer, Horizontal channel plate, GigaBIX Patchcord, GigaBIX/MediaFlex Adapter

#### Variants



#### **Product Notes**

Included Parts:	12 GigaBIX Connectors 25PR, 2 Wood Screws, 6 Designation strips, 12 Wire Guards, French and English Installation Guide, 2 Velcro Ties.
Notes:	For proper installation refer to Installation Guide PX101820 (French) or PX101821 (English) included with the product or visit our website at http://www.belden.com

#### **History**

Update and Revision:	Revision Number: 0.64 Revision Date: 07-03-2024	
,		

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: AX101472 ☐

FACEPLATES AND PANEL - 12-CONNECTOR GIGABIX MOUNT (EMPTY), BLACK

## **Product Description**

FACEPLATES AND PANEL - 12-CONNECTOR GIGABIX MOUNT (EMPTY), BLACK

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	IBDN System 4800, 3600, 2400, TIA Category 6, ISO Class E, 1000BASE-T
Physical Characteristics (Overall)	

Height:	15.281 in
Width:	7.639 in
Depth:	4.527 in
Front Connection:	Flush
Packaging:	Individually packaged in a cardboard box.
Weight:	10.900 lbs

#### Connectors

#### Materials

Description	Material
Panel	Steel

## **Construction and Dimensions**

Max Capacity:	12 GigaBIX Connectors to be ordered separately

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Termination Front Connection:	Yes
Termination Rear Connection:	Yes

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes

## Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA Bi-national Standard Listed
Safety Listing.	AOA, DETIRIUTIES CHINICAL ESICO

#### **Related Part Numbers**

Related Parts:	GigaBIX Connectors, Managament Ring, Managament Module, Patchcord Organizer, Horizontal channel plate, GigaBIX Patchcord, GigaBIX/MediaFlex Adapter

#### **Product Notes**

Included Parts:	2 Wood Screws
Notes:	Refer to Installation Guide PX101814 (English) and PX101813 (French) or visit our website at http://www.belden.com

#### History

	B N . L
Update and Revision:	Revision Number: 0.27 Revision Date: 02-07-2024

#### © 2024 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product**: <u>AX101469</u> ☐

FACEPLATES AND PANEL - GIGABIX CABLE MANAGEMENT MODULE, BLACK

## **Product Description**

FACEPLATES AND PANEL - GIGABIX CABLE MANAGEMENT MODULE, BLACK

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	IBDN System 4800, 3600, 2400, TIA Categor	pry 6, ISO Class E, 1000 BASE-T	
Physical Characteristics (Overall)			
Height:	15 250 in		

Height:	15.250 in
Width:	8.110 in
Depth:	3.000 in
Packaging:	Individually packaged in a cardboard box.
Weight:	7.600 lbs

#### **Connectors**

## Materials



## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes

## Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA, Bi-national Standard Listed

## **Related Part Numbers**

## **Product Notes**

Included Parts:	2 Wood Screws, 2 Velcro Ties, 4 Machine Screws, French and English Installation Guide
Notes:	For proper installation refer to Installation Guide PX101798 (French or English) included with the product or visit our website at http://www.belden.com

## History

Update and Revision:	Revision Number: 0.26 Revision Date: 02-08-2024

#### © 2024 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



**Product:** <u>AX101447</u> ☑

## **GIGABIX CONNECTOR 6-PORT**



## **Product Description**

**GIGABIX CONNECTOR 6-PORT** 

## **Technical Specifications**

## **Product Overview**

Suitable Applications:	IBDN System 4800, 3600, 2400, TIA Category 6, ISO Class E, 1000BASE-T

## **Physical Characteristics (Overall)**

#### Insulation

# Nominal Diameter 0.14 mm

Packaging:	packaged in carton; Standard pack of 12 units
Weight:	0.11 g

## Connectors

#### Materials

Description	Material	Type
Front Connection	Copper Allow with Nickel Plating	IDC
Rear Connection	Copper Allow with Nickel Plating	IDC
Connector Body	Plastic - UL940V-0	

## **Electrical Characteristics**

Dielectric Strength:	1,000V RMS @ 60 Hz for 1 minute kV DC
Current Rating:	1.5 A
Insulation Resistance:	100 MOhm*km
Max Contact Resistance:	1 mOhm

#### Inductance

Nominal Inductance
0.14 μH/m
0.14 µH/ft

## High Frequency

Max. Insertion Loss (Attenuation)
0.128 dB/100m

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Footprint/Type:	GigaBIX
Tool Compatibility:	BIX Connecting Tool (A0270165)

#### Termination Interface

Termination	Connection	Durabilities
Front	Gas Tight IDC Connection	200 terminations
Rear	Gas Tight IDC Connection	200 terminations

#### Dimensions (WxHxD)

Width	Height	Depth
6.63	0.31	1.28

#### **Standards**

ISO/IEC Compliance:	ISO/IEC 11801:2002
Data Category:	Category 6
TIA/EIA Compliance:	ANSI/TIA/EIA 568 C.2 Category 6
Third Party Performance Verification:	ETL - Verified Category 6

#### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive Compliance:	EU Directive 2002/95/EC (RoHS)

#### Suitability

Suitability - Indoor:	Yes

## Flammability, LS0H, Toxicity Testing

Safety Listing:
-----------------

#### **Related Part Numbers**

Related Parts:	Compatible with GigaBIX patch cord, GigaBIX termination kit, GigaBIX rack mount panel, designation strips, wire guard

Item #	Color	UPC
AX101447	White	611589002776

#### **Product Notes**

Notes:	For proper installation refer to Installation Guide PX101813 (French) or PX101814 (English) included with the product or visit our web site at http://www.belden.co		
History			
Update and Revision:	Revision Number: 0.101 Revision Date: 07-08-2024		

## © 2025 Belden, Inc

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



**Product:** <u>AX101448</u> ☐

## **GIGABIX CONNECTOR 25-PAIR**



## **Product Description**

**GIGABIX CONNECTOR 25-PAIR** 

## **Technical Specifications**

## **Product Overview**

Suitable Applications:	IBDN System 4800, 3600, 2400, TIA Category 6, ISO Class E, 1000BASE-T

## **Physical Characteristics (Overall)**

#### Insulation

Nominal Diameter
0.146 mm

Packaging:	packaged in carton; Standard pack of 12 units
Weight:	0.11 g

## Connectors

#### Materials

Description	Material	Type
Front Connection	Copper Allow with Nickel Plating	IDC
Rear Connection	Copper Allow with Nickel Plating	IDC
Connector Body	Plastic - UL940V-0	

## **Construction and Dimensions**

OuterJacket1, Nom Thick Twisted Section: 0.147 mm

## **Electrical Characteristics**

Dielectric Strength:	1,000V RMS @ 60 Hz for 1 minute kV DC
Current Rating:	1.5 A
Insulation Resistance:	100 MOhm*km
Max Contact Resistance:	1 mOhm

#### Inductance

Nominal Inductance

## **Mated Connection**

Frequency (MHz)	Max. Insertion Loss TIA* (dB)	Min. NEXT TIA* (dB)	Min. FEXT TIA* (dB)	Min. FEXT Belden** (dB)	Min. Return Loss TIA* (dB)
100	0.2 dB	54 dB	43.1 dB	58.8 dB	24 dB

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

#### **Mechanical Characteristics**

Footprint/Type:	GigaBIX
Tool Compatibility:	BIX Connecting Tool (A0270165)

#### **Termination Interface**

Termination	Connection	Durabilities
Front	Gas Tight IDC Connection	200 terminations
Rear	Gas Tight IDC Connection	200 terminations

#### Dimensions (WxHxD)

Width	Height	Depth
6.63	0.31	1.28

#### **Standards**

ISO/IEC Compliance:	ISO/IEC 11801:2002
Data Category:	Category 6
TIA/EIA Compliance:	ANSI/TIA/EIA 568 C.2 Category 6
Third Party Performance Verification:	ETL - Verified Category 6

#### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive Compliance:	EU Directive 2002/95/EC (RoHS)

#### Suitability

Suitability - Indoor:	Yes

#### Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA,UL 1863 and CSA-C22.2

#### **Related Part Numbers**

Related Parts: Compatible with GigaBIX patch core	d, GigaBIX termination kit, GigaBIX rack mount panel, designation strips, wire guard
---	--

#### Variants

Item #	Color	UPC
AX101448	White	611589002783

## **Product Notes**

Notes:	For proper installation refer to Installation Guide PX101813 (French) or PX101814 (English) included with the product or visit our web site at http://www.belden.com
--------	--

## **History**

Update and Revision:	Revision Number: 0.97 Revision Date: 07-03-2024
----------------------	---

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



**Product:** <u>AX101486</u> □



## CONNECTIVITY ACCESSORIES - CABLE MANAGEMENT ACCESSORIES

## **Product Description**

GIGABIX WIRE GUARD, BLACK

#### **Technical Specifications**

## **Physical Characteristics (Overall)**

# Color Chart Color Black Height: 0.390 in Width: 6.200 in Depth: 0.320 in Packaging: Individually packaged in a clear plastic bag Weight: 0.010 lbs

#### **Connectors**

## Materials

Description	Material	Color
Wire Guard	Thermo-Plastic	Black

#### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor

## Flammability, LS0H, Toxicity Testing

Safety Listing: Bi-national Standard Listed	rd Listed
---	-----------

## **Related Part Numbers**

Related Parts:	GigaBIX Connectors
History	

Update and Revision: Revision Number: 0.28 Revision Date: 02-08-2024

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.

Belden believes this product to be in compliance with all applicable environmental programs as listed in the data sheet. The information provided is correct to the best of Belden's knowledge, information and belief at the date of its publication. This information is designed only as a general guide for the safe handling, storage, and any other operation of the product itself or the one that it becomes a part of. The Product



**Product:** <u>AX101483</u> ☑



REPLACEMENT DESIGNATION STRIP FOR GIGABIX MOUNT (KIT OF 50),

**BLACK** 

## **Product Description**

REPLACEMENT DESIGNATION STRIP FOR GIGABIX MOUNT (KIT OF 50), BLACK

## **Technical Specifications**

## **Physical Characteristics (Overall)**

Height:	0.750 in	
Depth:	0.180 in	
Packaging:	50 per package in a clear plastic bag	
Weight:	1 lbs	

#### Connectors

#### Materials

Description	Material
Strip	Plastic - UL94V-0

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

#### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Related Parts:	Compatible with GigaBIX Mount, Designation Labels to be ordered separately

## **Product Notes**

Included Parts:	50 Strips
Notes:	Refer to Installation Guide PX101814 (English) and PX101813 (French), or visit our website at http://www.belden.com

## History

Update and Revision:	Revision Number: 0.26 Revision Date: 02-07-2024

#### © 2024 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>AX101478</u> □

## CONNECTIVITY ACCESSORIES - MANAGEMENT -D- RING

## **Product Description**

CONNECTIVITY ACCESSORIES - MANAGEMENT -D- RING

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	IBDN System 4800, 3600, 2400, Telecom Room

#### **Physical Characteristics (Overall)**

Height:	6.000 in
Width:	6.850 in
Depth:	1.210 in
Packaging:	Individually packaged in a clear plastic bag.
Weight:	0.220 lbs

#### Connectors

## Materials

Description	Material
D- Ring	Plastic - UL94V-0

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes

## Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA, Bi-national Standard Listed

## **Related Part Numbers**

Related Parts:	GigaBIX Termination Kit
----------------	-------------------------

## History

Update and Revision:	Revision Number: 0.26 Revision Date: 02-07-2024

© 2024 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.

Belden believes this product to be in compliance with all applicable environmental programs as listed in the data sheet. The information provided is correct to the best of Belden's knowledge, information and belief



**Product:** <u>AX102190</u> ☑

IBDN System 4800, 3600, 2400, TIA Category 6, ISO Class E, 1000 BASE-T



# FACEPLATES AND PANELS - GIGABIX CABLE MANAGEMENT RING SPACER

## **Product Description**

FACEPLATES AND PANELS - GIGABIX CABLE MANAGEMENT RING SPACER

## **Technical Specifications**

# Product Overview Suitable Applications:

Physical Characteristics (Overall)	
Height:	3.000 in
Width:	5.000 in
Depth:	2.400 in
Packaging:	Individually packaged in a clear plastic bag.
Weight:	0.018 lbs

#### **Connectors**

## Materials

Description	Material
Ring	Steel

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes

## Flammability, LS0H, Toxicity Testing

Safety Listing:	c(UL)us Listed

## **Related Part Numbers**

Related Parts: Patch Cord Organizer, Patch Cord Organizer Cover, Horizontal Channel Plate,	Gigabix Connectors, Management Ring, Gigabix Patch Cord, Gigabix/Mediaflex Adapter
--	--

## **Product Notes**

Included Parts:	2 Wood Screws, 4 Machine Screws, French and English Installation Guide
Notes:	For proper installation refer to Installation Guide PX103648 (French or English) included with the product or visit our website at http://www.belden.com

## History

Update and Revision:	Revision Number: 0.23 Revision Date: 02-08-2024

#### © 2024 Belden, Inc

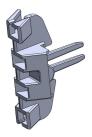
#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product**: <u>AX101719</u> ☐

## MODULAR CONNECTORS - GIGABIX TERMINATION BAR KIT

## **Product Description**

MODULAR CONNECTORS - GIGABIX TERMINATION BAR KIT

## **Technical Specifications**

## **Physical Characteristics (Overall)**

Height:	0.625 in
Width:	0.374 in
Depth:	0.900 in
Packaging:	Packaged 100 units per bag
Weight:	0.010 lbs

## Connectors

#### Materials

Description	Material
T-Bar	Polycarbonate - UL94V-0

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Tool Compatibility: Belden 110 Connecting Tool
--

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

## **Related Part Numbers**

Related Parts:	Compatible with GigaBIX Connectors	
----------------	------------------------------------	--

## **Product Notes**

Included Parts:	100 T-Bars
Notes:	Refer to Installation Guide PX103843, or visit our website at http://www.belden.com

## History

Update and Revision:	Revision Number: 0.26 Revision Date: 02-08-2024

#### © 2024 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





**Product:** <u>AX102151</u> ☑

CONNECTIVITY ACCESSORIES - GIGABIX SPECIAL SERVICE GUARD, RED TIA 606

## **Product Description**

CONNECTIVITY ACCESSORIES - GIGABIX SPECIAL SERVICE GUARD, RED TIA 606

#### **Technical Specifications**

#### **Product Overview**

Suitable Applications:	IBDN System 4800, 3600, 2400, 1200, Telecom Room

#### **Physical Characteristics (Overall)**

Height:	0.350 in
Width:	0.165 in
Depth:	0.240 in
Packaging:	50 per package in a clear plastic bag
Weight:	0.010 lbs

#### Connectors

#### Materials

Description	Material
DESIGNATION STRIP	Plastic - UL94V-0

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor

#### **Related Part Numbers**

Related Parts:	GigaBIX Connector

## History

Update and Revision:	Revision Number: 0.17 Revision Date: 02-08-2024

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: DIW25 ☐

Category 3 Backbone Cable, 25 Pair, U/UTP, CMR

## **Product Description**

Category 3 Premise Backbone Cable (16MHz), DIW 25 Pair, 24 AWG Solid Bare Copper Conductors, U/UTP, Riser-CMR, PVC jacket

## **Technical Specifications**

## **Product Overview**

Suitable Applications:	Premise Backbone Cable, Ethernet 10BASE-T, Analog Phone, FAX

#### **Construction Details**

#### Conductor

Size	Stranding	Material	No. of Pairs
24 AWG	Solid	BC - Bare Copper	25

#### Insulation

Material	Color Code
PVC - Polyvinyl Chloride	Western Electric

## Outer Jacket

Material	Nom. Diameter	Ripcord
PVC - Polyvinyl Chloride	0.380 in (9.65 mm)	Yes

## **Electrical Characteristics**

## Electricals

Max. Conductor DCR	Max. Capacitance Unbalance
93.8 Ohm/km (28.6 Ohm/1000ft)	330 pF/100m

## Delay

Frequency	Max. Delay	Max. Delay Skew	Nom. Velocity of Prop.	
16 MHz	543 ns/100m	45 ns/100m	68%	

## High Frequency

Frequency [MHz]	Max. Insertion Loss (Attenuation)	Min. NEXT [dB]	Min. PSNEXT [dB]	Min. ACR [dB]	Min. PSACR [dB]	Min. RL (Return Loss) [dB]	Max./Min. Fitted Impedance [Ohm]
0.772	2.2 dB/100m	47.0	43.0	50.1	46.1		
1	2.6 dB/100m	45.0	41.0	47.8	43.8	12.0	100 ± 15
4	5.6 dB/100m	36.0	32.0	36.0	32.0	12.0	100 ± 15
8	8.5 dB/100m	31.0	28.0	28.3	24.3	12.0	100 ± 15
10	9.7 dB/100m	30.0	26.0	26.2	22.3	12.0	100 ± 15
16	13.1 dB/100m	27.0	23.0	20.1	16.1	10.0	100 ± 15

## Voltage



## **Mechanical Characteristics**

#### Temperature

UL Temperature	Operating	Installation	Storage
60°C	-30°C To +60°C	-30°C To +60°C	-30°C To +60°C

#### **Bend Radius**

Stationary Min.	Installation Min.
4.0 in (100 mm)	7.75 in (197 mm)

Max. Pull Tension:	150 lbs (68 kg)
Bulk Cable Weight:	100 lbs/1000ft

#### **Standards and Compliance**

Environmental Suitability:	Riser, Indoor
Flammability / Reaction to Fire:	UL 1666 Riser, FT4, IEC 60332-1-2
CPR Compliance:	CPR Euroclass: Eca; CPR UKCA Class: Eca
NEC / UL Compliance:	CMR
CEC / C(UL) Compliance:	CMR
ICEA Compliance:	S-90-661
NEMA Compliance:	NEMA WC-63.1
Data Category:	Category 3
TIA/EIA Compliance:	ANSI/TIA-568.2-D Category 3
European Directive Compliance:	EU CE Mark, EU Directive 2015/863/EU (RoHS 2 amendment), REACH, EU Directive 2011/65/EU (RoHS 2), EU Directive 2012/19/EU (WEEE), REACH: 2020-01-16
UK Regulation Compliance:	UKCA Mark
APAC Compliance:	China RoHS II (GB/T 26572-2011)
Plenum Number:	DPLN25

#### **Product Notes**

#### **History**

L	Jpdate and Revision:	Revision Number: 0.464 Revision Date: 02-03-2025	

## **Part Numbers**

## Variants

Item #	Color	Putup Type	Length	UPC
DIW25 732CUT	Olive	Cut to Length		612825060611
DIW25 732CUT	Olive	Cut to Length	1 ft	612825060611
DIW25 732500	Olive	Reel	500 ft	612825060628
DIW25 732500	Olive	Reel	500 ft	612825060628
DIW25 7321000	Olive	Reel	1,000 ft	612825060635
DIW25 7321000	Olive	Reel	1,000 ft	612825060635
DIW25 732500B	Olive	Reel	1,500 ft	612825285533
DIW25 7325000	Olive	Reel	5,000 ft	612825060642
DIW25 7325000	Olive	Reel	5,000 ft	612825060642

## © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: DPLN25 ☑

Category 3 Backbone Cable, 25 Pair, U/UTP, CMP

## **Product Description**

Category 3 Premise Backbone Cable (16MHz), DIW 25 Pair, 24 AWG Solid Bare Copper Conductors, U/UTP, Plenum-CMP, PVC-LS Jacket

## **Technical Specifications**

## **Product Overview**

Suitable Applications:	Premise Backbone Cable, Ethernet 10BASE-T, Analog Phone, FAX

#### **Construction Details**

#### Conductor

Size	Stranding	Material	No. of Pairs
24 AWG	Solid	BC - Bare Copper	25

#### Insulation

Material	Color Code
PVC - Polyvinyl Chloride	Western Electric (Non-Striped)

## Outer Jacket

Material	Material Trade Name	Nom. Diameter	Ripcord
PVC - Polyvinyl Chloride	Flamarrest®	0.380 in (9.65 mm)	Yes

## **Electrical Characteristics**

## Electricals

Max. Conductor DCR	Max. Capacitance Unbalance
93.8 Ohm/km (28.6 Ohm/1000ft)	330 pF/100m

## Delay

Frequency	Max. Delay	Max. Delay Skew	Nom. Velocity of Prop.
16 MHz	543 ns/100m	45 ns/100m	61%

## High Frequency

Frequency [MHz]	Max. Insertion Loss (Attenuation)	Min. NEXT [dB]	Min. PSNEXT [dB]	Min. ACR [dB]	Min. PSACR [dB]	Min. RL (Return Loss) [dB]	Max./Min. Fitted Impedance [Ohm]
0.772	2.2 dB/100m	47.0	43.0	50.1	46.1		
1	2.6 dB/100m	45.0	41.0	47.8	43.8	12.0	100 ± 15
4	5.6 dB/100m	36.0	32.0	36.0	32.0	12.0	100 ± 15
8	8.5 dB/100m	31.0	28.0	28.3	24.3	12.0	100 ± 15
10	9.7 dB/100m	30.0	26.0	26.2	22.3	12.0	100 ± 15
16	13.1 dB/100m	27.0	23.0	20.1	16.1	10.0	100 ± 15

## Voltage

UL Voltage Rating 300 V (CMP)

**Mechanical Characteristics** 

#### Temperature

UL Temperature	Operating	Installation	Storage
60°C	-30°C To +60°C	0°C To +50°C	-30°C To +60°C

#### **Bend Radius**

Stationary Min.	Installation Min.
4.0 in (100 mm)	7.75 in (197 mm)

Max. Pull Tension:	150 lbs (68 kg)
Bulk Cable Weight:	103 lbs/1000ft

#### **Standards and Compliance**

Environmental Suitability:	Plenum, Indoor
Flammability / Reaction to Fire:	NFPA 262, UL 910 (Plenum), FT6, IEC 60332-1-2
CPR Compliance:	CPR Euroclass: Eca; CPR UKCA Class: Eca
NEC / UL Compliance:	CMP
CEC / C(UL) Compliance:	CMP
ICEA Compliance:	S-90-661
NEMA Compliance:	NEMA WC-63.1
Data Category:	Category 3
TIA/EIA Compliance:	ANSI/TIA-568.2-D Category 3
European Directive Compliance:	EU CE Mark, EU Directive 2015/863/EU (RoHS 2 amendment), REACH, EU Directive 2011/65/EU (RoHS 2), EU Directive 2012/19/EU (WEEE), REACH: 2020-01-16
UK Regulation Compliance:	UKCA Mark
APAC Compliance:	China RoHS II (GB/T 26572-2011)
Non-Plenum Number:	DIW25

#### **Product Notes**

#### **History**

Update and Revision:	Revision Number: 0.465 Revision Date: 02-03-2025

## **Part Numbers**

## Variants

Item #	Color	Putup Type	Length	UPC
DPLN25 732S1007	Gray			
DPLN25 732CUT	Olive	Cut to Length		612825060987
DPLN25 732CUT	Olive	Cut to Length	1 ft	612825060987
DPLN25 7321000	Olive	Reel	1,000 ft	612825060994
DPLN25 7321000	Olive	Reel	1,000 ft	612825060994

## © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





## **Product:** KEYCONNECT SG FACEPLATES ☑

# KeyConnect Single-Gang Faceplate

## **Product Description**

KeyConnect Faceplate, Single Gang, Flush, Compatible with KeyConnect style modular jacks

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Compatible with a variety of modules that are suitable for use with Belden IBDN Systems 10GX, 4800, 3600, 2400, 1200, fiber and coa
------------------------	---

## **Physical Characteristics (Overall)**

Height:	4.5 m
Width:	2.75
Depth:	0.26
Front Connection:	Flush
Packaging:	Individually packaged in a plastic bag.
Weight:	0.06 kg

#### Connectors

#### Materials



#### **Temperature Range**

Installation Temperature Range:	-10 to 60°C
Storage Temperature Range:	-40 to 70°C
Operating Temperature Range:	-10 to 60°C

## **Mechanical Characteristics**

Footprint/Type:	KeyConnect
Connector/Hardware Retention:	20 lbs

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

## Flammability, LS0H, Toxicity Testing

Safety Listing:	Bi-national Standard Listed

## **Related Part Numbers**

		4
Related Parts:	Compatible with KeyConnect-style Modular Jacks 10GX, CAT6+, CAT5E and KeyConnect-style Fiber and Coax Connectors	

## Variants

ltem #	Color	Port Count

AX102248	Almond	4 Port
AX102250	Almond	6 Port
AX103922	Almond	1 Port
AX103923	Almond	2 Port
AX103924	Almond	3 Port
AX104160	Black	1 Port
AX104161	Black	2 Port
AX104162	Black	3 Port
AX104163	Black	4 Port
AX104164	Black	6 Port
AX104464	Dark Gray	4 Port
AX102249	Electric White	4 Port
AX102251	Electric White	6 Port
AX102660	Electric White	1 Port
AX102661	Electric White	3 Port
AX104197	Ivory	2 Port
AX104198	Ivory	4 Port
AX104199	Ivory	6 Port
AX104565	Ivory	1 Port

#### **Product Notes**

Included Parts:	6-32 screw, carton label, clear window
Notes:	For proper installation refer to Installation Guide PX103826. Visit our web site at http://www.belden.com

Update and Revision:	Revision Number: 0.196 Revision Date: 03-04-2023	

#### © 2025 Belden, Inc

**History** 

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





## Product: KEYCONNECT STAINLESS SG FP ☑

KeyConnect Stainless Steel, Single-Gang Faceplate

## **Product Description**

KeyConnect Stainless Steel, Single-Gang Faceplate, Compatible with KeyConnect style modular jacks

## **Technical Specifications**

#### **Product Overview**

osinpanion man a variety of mediate that are calculate for use man potential resolution.	Suitable Applications:	Compatible with a variety of modules that are suitable for use with Belden IBDN Systems 10GX, 4800, 3600, 2400, 1200, fiber and coax
--	------------------------	--

## **Physical Characteristics (Overall)**

Height:	4.5
Width:	2.75
Depth:	0.26
Front Connection:	Flush
Packaging:	Individually packaged in a plastic bag.
Weight:	0.06 kg

#### Connectors

#### Materials



#### **Temperature Range**

Installation Temperature Range:	-10 to 60°C
Storage Temperature Range:	-40 to 70°C
Operating Temperature Range:	-10 to 60°C

## **Mechanical Characteristics**

Footprint/Type:	KeyConnect
Connector/Hardware Retention:	20 lbs

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

## Flammability, LS0H, Toxicity Testing

Safety Listing:	c(UL)us Listed

## **Related Part Numbers**

Related Parts:	Compatible with 10GX, CAT6+ and CAT5E KeyConnect Modular Jacks and KeyConnect Multimedia Modules

## Variants

Item #	Color	Port Count

AX102006	Stainless Steel	1 Port
AX102007	Stainless Steel	2 Port
AX102008	Stainless Steel	3 Port
AX102009	Stainless Steel	4 Port
AX102010	Stainless Steel	6 Port
AX104230	Stainless Steel	1-Port with ID Windows
AX104231	Stainless Steel	2-Port with ID Windows

#### **Product Notes**

Included Parts:	6-32 screw
Notes:	For proper installation refer to Installation Guide PX103826. Visit our web site at http://www.belden.com

#### History

Update and Revision:	Revision Number: 0.274 Revision Date: 03-04-2023

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.







FACEPLATES AND PANELS - WALL MOUNT PHONE PLATES PLATES RECESSED 1-PORT

## **Product Description**

FACEPLATES AND PANELS - WALL MOUNT PHONE PLATES PLATES RECESSED 1-PORT

## **Technical Specifications**

#### **Product Overview**

Physical Characteristics	(Overall)
Suitable Applications:	Compatible with a variety of modules that are suitable for use with Belden IBDN Systems 10GX, 4800, 3600, 2400, fiber and coax

Height:	4.500 in
Width:	2.750 in
Depth:	0.260 in
Front Connection:	Flush, Recessed
Packaging:	Individually packaged in a plastic bag.
Weight:	0.010 lbs

#### Connectors

#### Materials

Description	Material
Plate	Stainless Steel

## **Construction and Dimensions**

Max Capacity:
---------------

## **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

## **Mechanical Characteristics**

Connector/Hardware Retention:	20 lbs

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	Yes

## Flammability, LS0H, Toxicity Testing

Safety Listing: Bi-national Standard Listed	
---	--

#### **Related Part Numbers**

Related Parts:	Compatible with KeyConnect-Style Modular Jacks 10GX, CAT6+, CAT5E and KeyConnect-Style Fiber and Coax Connectors

#### **Product Notes**

Included Parts:	6-32 Screw
Notes:	For proper installation refer to Installation Guide PX103826. Visit our website at http://www.belden.com

#### History

Update and Revision:	Revision Number: 0.26 Revision Date: 02-08-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



## Product: KEYCONNECT MODULAR FURNITURE ☑





## **Product Description**

KeyConnect Modular Furniture Adapter, Compatible with Keyconnect UTP and Multimedia Modules

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Compatible with a variety of modules that are suitable for use with Belden IBDN Systems 10GX, 4800, 3600, 2400 and 1200.

## **Physical Characteristics (Overall)**

Height:	1.84 m
Width:	3.12
Depth:	0.19
Front Connection:	Flush
Packaging:	Individually packaged in a plastic bag

#### Connectors

## Materials



## **Temperature Range**

Installation Temperature Range:	-10 to 60°C
Storage Temperature Range:	-10 to 75°C
Operating Temperature Range:	-10 to 60°C

## **Mechanical Characteristics**

Footprint/Type: KeyConnect		
	Footprint/Type:	

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes

## Flammability, LS0H, Toxicity Testing

Safety Listing:	Bi-national Standard Listed

## **Related Part Numbers**

Related Parts:	Compatible with 10GX, CAT6+ and CAT5E KeyConnect UTP and Multimedia Modules

#### Variants

Item #	Color	Port Count
AX103925	Almond	3 Port
AX103926	Almond	4 Port

AX102292	Black	3 Port
AX102901	Black	4 Port
AX104457	Dark Gray	3 Port
AX102291	Electric White	3 Port
AX102900	Electric White	4 Port

#### **Product Notes**

Included Parts:	installation sheet, blank
Notes:	For proper installation refer to installation guide included with the product or visit our web site at http://www.belden.com. Wall opening: Minimum 2.67 X 1.35 in., Maximum 2.75 X 1.38 in. Wall thickness: Maximum 0.075 in.

#### **History**

,	
Update and Revision:	Revision Number: 0.167 Revision Date: 03-04-2023

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: <u>KEYCONNECT SIDE ENTRY BOXES</u> ☑

KeyConnect Side-Entry Box, 6, 4, 2, or 1-Port

## **Product Description**

KeyConnect Side-Entry Box. Available in several colors and port counts.

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Compatible with a variety of modules that are suitable for use with Belden IBDN Systems 10GX, 4800, 3600, 2400 and 1200.
------------------------	--

## **Physical Characteristics (Overall)**

Height:	1.8 m	
Width:	2.56	
Depth:	1.2	
Front Connection:	Flush	
Packaging:	Individually packaged in a plastic bag.	
Weight:	0.07 kg	

#### Connectors

#### Materials



#### **Temperature Range**

Installation Temperature Range:	-10 to 60°C
Storage Temperature Range:	-40 to 70°C
Operating Temperature Range:	-10 to 60°C

## **Mechanical Characteristics**

Footprint/Type:	KeyConnect

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

## Flammability, LS0H, Toxicity Testing

UL Flammability:	UL2043 Air Handling Spaces
Safety Listing:	Bi-national Standard Listed

## **Related Part Numbers**

Related Parts:	Recommended to be used with REVConnect and KeyConnect Modular Jacks

## Variants

Item #	Color	Port Count

AX104132	Almond	1 Port
AX104133	Almond	2 Port
AX104134	Almond	4 Port
AX104135	Almond	6 Port
AX105352-AL	Almond	1 Port
AX105353-AL	Almond	2 Port
AX105354-AL	Almond	4 Port
AX105355-AL	Almond	6 Port
AX105352-BK	Black	1 Port
AX105353-BK	Black	2 Port
AX105352-GS	Dark Gray	1 Port
AX102651	Electric White	1 Port
AX102652	Electric White	2 Port
AX102653	Electric White	4 Port
AX102654	Electric White	6 Port
AX105352-EW	Electric White	1 Port
AX105354-EW	Electric White	4 Port
AX105355-EW	Electric White	6 Port

#### **Product Notes**

Included Parts: clear window, label, screws, cable tie, adhesive foam pad, color icon, instruction sheet

## History

Update and Revision: Revision Number: 0.186 Revision Date: 03-04-2023

© 2025 Belden, Inc.

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: INTERFACE FACEPLATES (MDVO) ☑

Interface Faceplate, MDVO

## **Product Description**

MDVO Interface Faceplates are available in a variety of port counts and colors.

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Compatible with Belden IBDN Systems 10GX, 4800,3600, 2400 and 1200
Physical Characteristics (Overall)	

# Height: 4.49 m

Width:	3
Depth:	0.46
Front Connection:	Flush
Packaging:	Individually packaged in a plastic bag.
Weight:	0.11 kg

#### **Connectors**

#### Materials

Description	Material
Faceplate	Plastic - UL94V-0

## **Temperature Range**

Installation Temperature Range:	-10 to 60°C
Storage Temperature Range:	-40 to 70°C
Operating Temperature Range:	-10 to 60°C

## **Mechanical Characteristics**

Footprint/Type:	MDVO
Connector/Hardware Retention:	20 lbs

## **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

## Flammability, LS0H, Toxicity Testing

Safety Listing:	ACA, Bi-national Standard Listed

## **Related Part Numbers**

Related Parts:	Compatible with 10GX, CAT6+ and CAT5E MDVO-style Modular Jacks and MDVO Multimedia Modules

## Variants

ltem #	Color	Port Count

AX101432	Almond	2 Port
AX101436	Almond	4 Port
AX101440	Almond	6 Port
AX101434	Black	2 Port
AX101438	Black	4 Port
AX101442	Black	6 Port
AX102777	Electric White	2 Port
AX102778	Electric White	4 Port
AX102779	Electric White	6 Port
AX101435	Gray	4 Port
AX101439	Gray	6 Port
AX102583	Ivory	4 Port
AX102584	Ivory	6 Port
AX101433	White	2 Port
AX101437	White	4 Port
AX101441	White	6 Port

#### **Product Notes**

Included Parts:	blank, 6-32 screw, carton label, clear window, installation sheet
Notes:	For proper installation refer to Installation Guide PX101806 available on our web site at http://www.belden.com

#### History

	Update and Revision:	Revision Number: 0.209 Revision Date: 01-11-2024

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





## Product: KEYCONNECT 6-PORT MEDIA BOX ☑

## 6-Port KeyConnect Termination Media Box

## **Product Description**

KeyConnect 6 Port Media Box is available in several colors.

## **Technical Specifications**

## **Physical Characteristics (Overall)**

Height:	1.06 m
Width:	3.32
Depth:	4.87
Front Connection:	Flush
Packaging:	Individually packaged in a box.
Weight:	0.2 kg

#### Connectors

## Materials



## **Temperature Range**

Installation Temperature Range:	-10 to 60°C
Storage Temperature Range:	-10 to 75°C

## **Mechanical Characteristics**

Footprint/Type:	KeyConnect	

## **Applicable Environmental and Other Programs**

	Environmental Space:	Indoor
ľ	EU Directive 2002/95/EC (RoHS):	Yes

## Flammability, LS0H, Toxicity Testing

UL Flammability:	UL2043 Air Handling Spaces

## **Related Part Numbers**

Related P	arts:	Compatible with KeyConnect-style Modular jacks10GX, CAT6+ and CAT5E.
-----------	-------	--

## Variants

Item #	Color	Port Count
AX106512-BK	Black	6 Port
AX105816	Brown	6 Port
AX106512-EW	Electric White	6 Port

## **Product Notes**

Included Parts:	(4) #6-32 mounting screws, (2) #4-40 cover std screws, (1) zip tie, (2) label, (2) label, window, (2) 2 sided adhesive	
-----------------	--	--

Notes:	suitable for installation in Plenum/Air Handling Spaces per UL 2043
History	

Update and Revision: Revision Number: 0.67 Revision Date: 03-04-2023

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: REVConnect Icons for Jacks ☑



REVConnect Colored Icons for Jacks

### **Product Description**

REVConnect Icons for Jacks are available in several colors.

### **Technical Specifications**

# **Physical Characteristics (Overall)**

Height:	0.163 in
Width:	0.571 in
Depth:	0.112 in
Weight:	0.010 lbs

### **Connectors**

### Materials



### **Temperature Range**

Installation Temperature Range:	-10°C To +60°C
Storage Temperature Range:	-40°C To +70°C
Operating Temperature Range:	-10°C To +60°C

### **Mechanical Characteristics**

Footprint/Type:	REVConnect	

### **Applicable Environmental and Other Programs**

Environmental Space:	Indoor
EU Directive 2002/95/EC (RoHS):	Yes
MII Order #39 (China RoHS):	EUP 50

### **Related Part Numbers**

Related Parts:	Compatible with Belden's REVConnect jacks

### Variants

Item #	Color	Packaging	UPC
RVUICBK-B24	Black	Bulk Pack (24)	611589205191
RVUICBL-B24	Blue	Bulk Pack (24)	611589205269
RVUICBR-B24	Brown	Bulk Pack (24)	611589205214
RVUICGY-B24	Gray	Bulk Pack (24)	611589205160
RVUICGN-B24	Green	Bulk Pack (24)	611589205252
RVUICIV-B24	Ivory	Bulk Pack (24)	611589205207
RVUICOR-B24	Orange	Bulk Pack (24)	611589205238
RVUICPR-B24	Purple	Bulk Pack (24)	611589205276
RVUICRD-B24	Red	Bulk Pack (24)	611589205221
RVUICEW-B24	White	Bulk Pack (24)	611589205184

RVUICYL-B24 | Yellow | Bulk Pack (24) | 611589205245

### **History**

Update and Revision: Revision Number: 0.173 Revision Date: 03-04-2023

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FT5LC900FS01 ☑

Modular Connectors - FX FUSION LC CONNECTOR

### **Product Description**

FX FUSION SPLICE-ON CONNECTOR, OM5, LC SIMPLEX, 900UM TIGHT BUFFER/250UM, LIME GREEN HOUSING, 1/PACK

### **Technical Specifications**

### **Product Overview**

Suitable Applications:	Field-termination of fiber optic cables within Patch Panels, Distribution Frames, Workstation Outlets for FTTD (Fiber to the Desk), drops for FTTH (Fiber to the home) and MDU
Sultable Applications.	(Multiple Dwelling Units).

### Construction

### Fiber Cable Construction



Weight: 0.046 lbs

### **Mechanical Characteristics**

### **Mechanical Specifications**

Test	TIA 568.3-D
Operating Temp Range	-40° to 75°C
Storage Temp Range	-40° to 85°C
Maximum Insertion Loss	s: 0.2 c
Minimum Reflectance @ 1550nm:	-25 (
Termination Style:	Splid

### **Temperature Range**

Operating Temperature Range:	-40° to 75°C
Storage Temperature Range:	-40° to 85°C

### **Product Material**

### Materials

Description	Material	Color
Boot	Rubber	Black
Protective Ferrule Cap	Plastic	Opaque
Connector Front Housing	Plastic	Lime Green
Connector Rear Housing	Nickel plated zinc alloy diecast	
Ferrule	Zirconia-Ceramic	White

### **Standards**

TIA/EIA Compliance:	TIA 568-3
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Included Parts:	900 μm boot, protective ferrule cap, splice protection sleeve
Related Parts:	FX Splice-On Installation Kit, FX Pigtails. Not to be used with Breakout kits.

### **Product Notes**

Packaging:	One (1) connector per pack, each in a dust and moisture resistant clam-shell package
------------	--

### History

Update and Revision:	Revision Number: 0.18 Revision Date: 07-12-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: <u>FT5SC900FS01</u> ☑

Modular Connectors - FX FUSION SC CONNECTOR

### **Product Description**

FX FUSION SPLICE-ON CONNECTOR, OM5, SC SIMPLEX, 900UM TIGHT BUFFER/250UM, LIME GREEN HOUSING, 1/PACK

### **Technical Specifications**

### **Product Overview**

Suitable Applications:	Field-termination of fiber optic cables within Patch Panels, Distribution Frames, Workstation Outlets for FTTD (Fiber to the Desk), drops for FTTH (Fiber to the home) and MDU
Sultable Applications.	(Multiple Dwelling Units).

### Construction

### Fiber Cable Construction



Weight: 0.047 lbs

### **Mechanical Characteristics**

### **Mechanical Specifications**

Test	TIA 56	68.3-D (MM)
Operating Temp Rang	ge -40° to	75°C
Storage Temp Range	-40° to	85°C
Maximum Insertion Lo	oss:	0.2 dB
Minimum Reflectance 1550nm:	@	-25 dB

### **Temperature Range**

Operating Temperature Range:	-40° to 75°C
Storage Temperature Range:	-40° to 85°C

### **Product Material**

### Materials

Description	Material	Color
Boot	Rubber	Black
Protective Ferrule Cap	Plastic	Opaque
Connector Front Housing	Plastic	Lime Green
Connector Rear Housing	Nickel plated zinc alloy diecast	
Ferrule	Zirconia-Ceramic	White

### **Standards**

TIA/EIA Compliance:	TIA 568-3
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

### **Related Part Numbers**

Included Parts:	900 μm boot, protective ferrule cap, splice protection sleeve
Related Parts:	FX Splice-On Installation Kit, FX Pigtails. Not to be used with Breakout kits.

### **Product Notes**

Packaging:	One (1) connector per pack, each in a dust and moisture resistant clam-shell package
------------	--

### History

Update and Revision:	Revision Number: 0.13 Revision Date: 02-14-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FTSLC900FS01 ☑

Modular Connectors - FX FUSION LC CONNECTOR

### **Product Description**

FX FUSION SPLICE-ON CONNECTOR, OS2, LC SIMPLEX, 900UM TIGHT BUFFER/250UM, BLUE HOUSING, 1/PACK

### **Technical Specifications**

### **Product Overview**

	Field-termination of fiber optic cables within Patch Panels, Distribution Frames, Workstation Outlets for FTTD (Fiber to the Desk), drops for FTTH (Fiber to the home) and
Suitable Applications:	
''	MDU (Multiple Dwelling Units).

### Construction

# Fiber Cable Construction



Weight:	0.046 lbs
Width:	0.240 in

### **Mechanical Characteristics**

### **Mechanical Specifications**

Test	GR-326-CORE/1081-CORE (SM)	
Intermateability Requirement	FOCIS compliant with latest revision of TIA-604-10 (LC)	
Operating Temp Range	-40° to 75°C	
Storage Temp Range	-40° to 85°C	
Durability	200 cycles at 3 ft.	
Cable retention, straight pull	0.51 kg	
Cable retention, 90 degree pull	0.20 kg	

Maximum Insertion Loss:	0.3 dB
Minimum Reflectance @ 1550nm:	-55 dB
Durabilities@Termination1:	200 cycles at 3 ft.

### **Temperature Range**

Operating Temperature Range:	-40° to 75°C
Storage Temperature Range:	-40° to 85°C

### **Product Material**

### Materials

Description	Material	Color
Boot	Rubber	Black
Protective Ferrule Cap	Plastic	Opaque
Connector Front Housing	Plastic	Blue
Connector Rear Housing	Nickel plated zinc alloy diecast	
Ferrule	Zirconia-Ceramic	White

### **Standards**

TIA/EIA Compliance:	TIA 568-3
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Included Parts:	900 μm boot, protective ferrule cap, splice protection sleeve
Related Parts:	FX Splice-On Installation Kit, FX Pigtails. Not to be used with Breakout kits.

#### Variants

Item #	Color	Packaging	UPC
FTSLC900FS01	Blue	One (1) connector per pack, each in a dust and moisture resistant clam-shell package	611589217217

#### **Product Notes**

Packaging:	One (1) connector per pack, each in a dust and moisture resistant clam-shell package

### History

Update and Revision:	Revision Number: 0.11 Revision Date: 02-20-2024	

### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FX Fusion OS2 SC Simplex 900 ☑

FX Fusion Splice-On Connector OS2 SC Simplex  $900\mu m$ 

# **Product Description**

FX Fusion Splice-On Connector, OS2, SC Simplex, 900µm Tight Buffer, Blue Housing

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor, Outdoor
Suitable Applications:	Field-termination of fiber optic cables within Patch Panels, Distribution Frames, Workstation Outlets for FTTD (Fiber to the Desk), drops for FTTH (Fiber to the home) and MDU (Multiple Dwelling Units).

### Construction

### Fiber Cable Construction

Fiber Type	ı
OS2	l

Weight:	0.021 kg
Height:	9.652 mm
Width:	6.096 mm
Length:	79.756 mm

### **Mechanical Characteristics**

### **Mechanical Specifications**

Test	GR-326-CORE/1081-CORE (SM)
Intermateability Requirement	FOCIS compliant with latest revision of TIA-604-3 (SC)
Operating Temp Range	-40° to 85°C
Storage Temp Range	-40° to 75°C
Durability	500 Insertions
Cable retention, straight pull	0.51 kg
Cable retention, 90 degree pull	0.2 kg
Flex	0.20 kg
Twist	0.20 kg
Transmission with Applied Load	0.7 kgf (0° & 90°), 0.25kgf (135°)

Maximum Insertion Loss:	0.3 dB
Minimum Reflectance @ 1550nm:	-55 dB
Termination Style:	Splice-On
Durabilities@Termination1:	500 Insertions

### **Temperature Range**

Operating Temperature Range:	-40° to 85°C
Storage Temperature Range:	-40° to 75°C

### **Product Material**

#### Materials

Description	Material	Color
Boot	Rubber	Black
Protective Ferrule Cap	Plastic	Opaque
Connector Front Housing	Plastic	Blue
Connector Rear Housing	Nickel plated zinc alloy diecast	
Ferrule	Zirconia-Ceramic	White

### **Standards**

TIA/EIA Compliance:	TIA 568.3
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

### **Related Part Numbers**

Included Parts:	900 µm boot, protective ferrule cap, splice protection sleeve
Related Parts:	FX Splice-On Installation Kit, FX Pigtails.

#### Variants

Item #	Color	Packaging	UPC
FTSSC900FS01	Blue	Single Pack	611589217521

#### **Product Notes**

Packaging:	Single Pack

# History

Update and Revision:	Revision Number: 0.228 Revision Date: 02-13-2024	
· ·		

© 2025 Belden, Inc

All Rights Reserved.

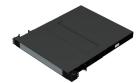
Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: DCX-01RU ☑



# DCX RACKMOUNT 144F 1U PATCH PANEL HIGH DENSITY

### **Product Description**

DCX RACKMOUNT 144F 1U PATCH PANEL HIGH DENSITY

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	Optical Solutions, Backbone, Telecommunications Room, Main Distribution Room, Data Centers

### Construction

Weight:	7.5 lbs
Height:	1.75 in
Width:	19.55 in
Length:	21.96 in

### **Physical Specifications**

Max Capacity: 144 Terminations (LC): 12 Cassettes, Base - 12/ 18 Cassettes, Base - 8	
--	--

### **Mechanical Characteristics**

Termination Type:	Front Sliding Drawer
Termination Type:	Tolk Situlity Drawel

### **Temperature Range**

Operating Temperature Range:	-10 to 60°C
Storage Temperature Range:	-10 to 75°C

### **Product Material**

### Materials

Description	Material
Housing	Steel
Cable Tray	PC/ABS & Steel
Label Holder	Polycarbonate

### **Standards**

MII Order #39 (China RoHS):	EUP 50

### **Related Part Numbers**

Related Parts:	DCX Cassettes, Adapter Frames, MPO Trunks, Patch Cord

### **Product Notes**

Packaging:	Individually packaged in a cardboard box.
Notes:	1. Hardware Kit contains: Screws (12-24); Screws (10-32); 2 Velcro cable tie; Tie Wraps. 2. DCX-01RU is recommended for top-of-rack applications. As a best practice of installation, stacking of multiple DCX-01RU should be avoided. Usage of DCX-02RU and DCX-04RU is recommended to faciliate higher number of fiber terminations.

### History

Update and Revision: Revision Number: 0.72 Revision Date: 11-14-2024

#### © 2025 Belden, Inc

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





# Product: DCX-02RU ☑

# DCX RACKMOUNT 288F 2U PATCH PANEL HIGH DENSITY

### **Product Description**

DCX RACKMOUNT 288F 2U PATCH PANEL HIGH DENSITY

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	Optical Solutions, Backbone, Telecommunications Room, Main Distribution Room, Data Centers

### Construction

Weight:	15 lbs
Height:	3.50 in
Width:	19.55 in
Length:	21.98 in

### **Physical Specifications**

Max Capacity:	288 Terminations (LC): 24 Cassettes, Base - 12/36 Cassettes, Base - 8	
---------------	---	--

### **Mechanical Characteristics**

Termination Type:	Front Sliding Drawer
-------------------	----------------------

### **Temperature Range**

Operating Temperature Range:	-10 to 60°C
Storage Temperature Range:	-10 to 75°C

### **Product Material**

### Materials

Description	Material
Housing	Steel
Cable Tray	PC/ABS & Steel
Label Holder	Polycarbonate

### **Standards**

MII Order #39 (China RoHS):	EUP 50

### **Related Part Numbers**

Related Parts: DCX Cassettes, Adapter Frames, MPO Trunks, Patch Cord	
--	--

### **Product Notes**

Packaging:	Individually packaged in a cardboard box.
Notes:	Hardware Kit contains: Screws (12-24); Screws (10-32); 4 Velcro cable tie; Tie Wraps.

### History

Update and Revision:

Revision Number: 0.30 Revision Date: 09-12-2024

#### © 2025 Belden, Inc

### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: DCX-04RU ☑

# DCX RACKMOUNT 576F 4U PATCH PANEL HIGH DENSITY

### **Product Description**

DCX RACKMOUNT 576F 4U PATCH PANEL HIGH DENSITY

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	Optical Solutions, Backbone, Telecommunications Room, Main Distribution Room, Data Centers

### Construction

Weight:	30 lbs
Height:	7 in
Width:	19.55 in
Length:	22.01 in

### **Physical Specifications**

Max Capacity:	576 Terminations (LC): 48 Cassettes, Base - 12/72 Cassettes, Base - 8

### **Mechanical Characteristics**

Termination Type:	Front Sliding Drawer	
-------------------	----------------------	--

### **Temperature Range**

Operating Temperature Range:	-10 to 60°C
Storage Temperature Range:	-10 to 75°C

#### **Product Material**

### Materials

Description	Material
Housing	Steel
Cable Tray	PC/ABS & Steel
Label Holder	Polycarbonate

### **Standards**

MII Order #39 (China RoHS):	EUP 50

### **Related Part Numbers**

Related Parts: DCX Cassettes, Adapter Frames, MPO Trunks, Patch Cord	Related Parts:
--	----------------

### **Product Notes**

Packaging:	Individually packaged in a cardboard box.
Notes:	Hardware Kit contains: Screws (12-24); Screws (10-32); 8 Velcro cable tie; Tie Wraps.

### History

Update and Revision:

Revision Number: 0.28 Revision Date: 09-12-2024

#### © 2025 Belden, Inc

### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FC5D06LDFP ☑

FX DCX Splice Cassette, OM5, 06 Ports, LC Duplex With 250µm Pigtails

### **Product Description**

FX DCX Splice Cassette, OM5, 06 Ports, LC Duplex With 250µm Pigtails, Lime Green Adapters

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

### Construction

### Fiber Cable Construction

Fiber Type	
OM5	ĺ

Weight:	0.189 lbs
Height:	0.500 in
Width:	3.410 in
Length:	7.200 in

# **Physical Specifications**

Max Capacity:	12 Fibers

### **Mechanical Characteristics**

### **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

### **Product Material**

### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

### **Transmission-Characteristics**

#### Fiber Connector Performance

Connector Type	Max. Insertion Loss	Min. Return Loss
LC Duplex with Shutters	0.15 dB	-25 dB

### **Standards**

EU Directive 2011/65/EU (RoHS 2): Yes

MII Order #39 (China RoHS):	EUP 50
Related Part Numbers	
Included Parts:	250µm color coded pigtails, splice chip, splice protection sleeve, micro splice protection sleeve, cable retention rubber: 2mm & 3mm
Related Parts:	DCX Frames, Modules, and Patch Panels

### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box

### History

	Update and Revision:	Revision Number: 0.103 Revision Date: 08-12-2024

#### © 2025 Belden, Inc.

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FC5D06LDFPXL ☑

Faceplates and Panels - DCX Splice Cassette LC Duplex

### **Product Description**

FX DCX SPLICE CASSETTE, OM5, 06 PORTS, LC DUPLEX (FLIPPED PAIR) WITH 250µm PIGTAILS, LIME GREEN ADAPTERS

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

### Construction

### Fiber Cable Construction

Weight:	0.139 lbs
Height:	0.500 in
Width:	3.400 in
Length:	7.190 in

# **Physical Specifications**

Max Capacity: 12Fibers, 6 LC Duplex Ports
---

### **Temperature Range**

Operating Temperature Range:	-10°C to 60°C
Storage Temperature Range:	-10°C to 75°C

### **Product Material**

### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

# **Transmission-Characteristics**

### Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.15 dB	-30 dB

### **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

### **Related Part Numbers**

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box	
Notes:	For more information, please refer to our web site at http://www.belden.com.	

### **History**

Update and Revision:	Revision Number: 0.10 Revision Date: 02-15-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: FC5D12LDFP ☑



FX DCX Splice Cassette, OM5, 12 Ports, LC Duplex With 250µm Pigtails

# **Product Description**

FX DCX Splice Cassette, OM5, 12 Ports, LC Duplex With 250µm Pigtails, Lime Green Adapters

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

### Construction

### Fiber Cable Construction



Weight:	0.460 lbs
Height:	0.500 in
Width:	6.830 in
Length:	7.200 in

# **Physical Specifications**

Max Capacity:	24 Fibers

### **Mechanical Characteristics**

### **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

### **Product Material**

### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

### **Transmission-Characteristics**

#### Fiber Connector Performance

Connector Type	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.15 dB	-25 dB

### **Standards**

EU Directive 2011/65/EU (RoHS 2): Yes

MII Order #39 (China RoHS):	EUP 50
Related Part Numbers	
Included Parts:	250µm color coded pigtails, splice chip, splice protection sleeve, micro splice protection sleeve, cable retention rubber: 2mm & 3mm

### **Product Notes**

Related Parts:

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box

### History

Update and Revision:	Revision Number: 0.20 Revision Date: 08-09-2024

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.

DCX,Frames Modules & Patch Panels





Product: FC5D12LDFPXL ☑

FX DCX Splice Cassette, OM5, 12 Ports LC Duplex with 250µm Pigtails, Pair Wise Flip

### **Product Description**

FX DCX Splice Cassette, OM5, 12 Ports LC Duplex with 250µm Pigtails, Pair Wise Flip, Lime Green Adapters

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor	
Suitable Applications:	DCX, Data Centers, Central Equipment Room	

### Construction

### Fiber Cable Construction

Fiber Type
OM5

Weight:	0.460 lbs
Height:	0.500 in
Width:	6.830 in
Length:	7.200 in

# **Physical Specifications**

Max Capacity:	24 Fibers	

### **Mechanical Characteristics**

Front Connection:	Static			
-------------------	--------	--	--	--

### **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

### **Product Material**

### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex
Adapter Sleeve	Zirconia-Ceramic		

### **Transmission-Characteristics**

#### Fiber Connector Performance

Connector Type	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.15 dB	-25 dB

### **Standards**

EU Directive 2011/65/EU (RoHS 2): Yes

MII Order #39 (China RoHS):	EUP 50
Related Part Numbers	
Included Parts:	250um color coded pigtails, splice chip, splice protection sleeve, micro splice protection sleeve, cable retention rubber; 2mm & 3mm

### **Product Notes**

Related Parts:

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box

### History

Update and Revision:	Revision Number: 0.13 Revision Date: 09-30-2024

© 2025 Belden, Inc.

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.

DCX,Frames Modules & Patch Panels





Product: FCSD06LDFP ☑

FX DCX Splice Cassette, OS2, 06 Ports LC Duplex with 250µm Pigtails

### **Product Description**

FX DCX Splice Cassette, OS2, 06 Ports LC Duplex with 250 $\mu$ m Pigtails, Blue Adapters

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

### Construction

### Fiber Cable Construction

Fiber Type
OS2

Weight:	0.189 lbs
Height:	0.500 in
Width:	3.410 in
Length:	7.200 in

# **Physical Specifications**

Max Capacity:	12 Fibers

### **Mechanical Characteristics**

### **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

### **Product Material**

### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex
Cassette Assembly	Zirconia-Ceramic		

### **Transmission-Characteristics**

#### Fiber Connector Performance

Connector Type	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.25 dB	-55 dB

### **Standards**

EU Directive 2011/65/EU (RoHS 2): Yes

MII Order #39 (China RoHS): EUP 50

#### **Related Part Numbers**

Included Parts:	250μm color coded pigtails, splice chip, splice protection sleeve, micro splice protection sleeve, cable retention rubber: 2mm & 3mm
Related Parts:	DCX,Frames Modules & Patch Panels

#### Variants

Item #	Connector Type
FCSD06LDFP	LC Duplex

### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box

#### History

Update and Revision:	Revision Number: 0.236 Revision Date: 08-12-2024

#### © 2025 Belden, Inc.

#### All Rights Reserved

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: FCSD06LDFPXB ☑



FX DCX CASS OS2 06P W/250-PT, LC\_DX BL\_ADP PAIR\_FLIP

# **Product Description**

FX DCX SPLICE CASSETTE, OS2, 06 PORTS, LC DUPLEX (FLIPPED PAIR) WITH 250µm PIGTAILS, BLUE ADAPTERS

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

### Construction

### Fiber Cable Construction

OS2 OS2		
Weight:	0.189 lbs	
Height:	0.500 in	
Width:	3.410 in	
Length:	7.190 in	

# **Physical Specifications**

Max Capacity:	12Fibers, 6 LC Duplex Ports

### **Temperature Range**

Operating Temperature Range:	-10°C to 60°C
Storage Temperature Range:	-10°C to 75°C

### **Product Material**

### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

### **Transmission-Characteristics**

### Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.25 dB	-55 dB

### **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

### **Related Part Numbers**

Included Parts:	250μm color coded pigtails, splice chip, splice protectors (12-single and 1-ribbon), cable rubber retention (2mm, 3mm)
Related Parts:	DCX,Frames Modules & Patch Panels

### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box
Notes:	Splice chip and protector sleeve are included. Splice chip is compatible with Belden splice sleeve FXFUHSRIBEB12 (Oval x 40mm long) Post-Shrink Diameter. For more information, please refer to our web site at http://www.belden.com.This product image is for representation only. The product will have flipped-pair labelling.

#### **History**

Update and Revision:	Revision Number: 0.15 Revision Date: 07-17-2024

### © 2025 Belden, Inc

### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FCSD12LDFP ☑

FX DCX Splice Cassette, OS2, 12 Ports LC Duplex with 250µm Pigtails

# **Product Description**

FX DCX Splice Cassette, OS2, 12 Ports LC Duplex with 250µm Pigtails, Blue Adapters

### **Technical Specifications**

### **Product Overview**

Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### **Fiber Cable Construction**

Fiber Type	
OS2	ĺ

Weight:	0.460 lbs
Height:	0.500 in
Width:	6.830 in
Length:	7.200 in

### **Physical Specifications**

Max Capacity:
---------------

### **Mechanical Characteristics**

### **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

#### **Product Material**

#### Materials

Description	Material	Color	Type
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex
Adapter Sleeve	Zirconia-Ceramic		

### **Transmission-Characteristics**

### Fiber Connector Performance

Connector Type	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.25 dB	-55 dB

### **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

### **Related Part Numbers**

Included Parts:	250μm color coded pigtails, splice chip, splice protection sleeve, micro splice protection sleeve, cable retention rubber: 2mm & 3mm
Related Parts:	DCX,Frames Modules & Patch Panels

#### Variants

Item #	Connector Type
FCSD12LDFP	LC Duplex

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box

### History

333	
Update and Revision:	Revision Number: 0.109 Revision Date: 08-12-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FCSD12LDFPXB ☑

FX DCX Splice Cassette, OS2, 12 Ports LC Duplex with 250µm Pigtails, Pair Wise Flip

### **Product Description**

FX DCX Splice Cassette, OS2, 12 Ports LC Duplex with 250µm Pigtails, Pair Wise Flip, Blue Adapters

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

### Construction

### Fiber Cable Construction

Fiber Type
OS2

Weight:	0.460 lbs
Height:	0.500 in
Width:	6.830 in
Length:	7.200 in

# **Physical Specifications**

Max Capacity:	24 Fibers	

### **Mechanical Characteristics**

### **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

### **Product Material**

### Materials

Description	Material	Color	Type
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex
Adapter Sleeve	Zirconia-Ceramic		

### **Transmission-Characteristics**

#### Fiber Connector Performance

Connector Type	Max. Insertion Loss	Min. Return Loss	
LC Duplex	0.25 dB	-55 dB	

### **Standards**

EU Directive 2011/65/EU (RoHS 2): Yes

MII Order #39 (China RoHS): EUP 50	
Related Part Numbers	
Included Parts:	250µm color coded pigtails, splice chip, splice protection sleeve, micro splice protection sleeve, cable retention rubber: 2mm & 3mm

### **Product Notes**

Related Parts:

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box

### History

Update and Revision:	Revision Number: 0.17 Revision Date: 08-29-2024

© 2025 Belden, Inc.

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.

DCX,Frames Modules & Patch Panels



Product: FC5D06LDFM ☑



FX DCX Splice Cassette, OM5, 06 Ports, LC Duplex With 250µm Pigtail

Ribbon

### **Product Description**

FX DCX Splice Cassette, OM5, 06 Ports, LC Duplex With 250µm Pigtail Ribbon, Lime Green Adapters

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

### Construction

### Fiber Cable Construction



Weight:	0.189 lbs
Height:	0.500 in
Width:	3.410 in
Length:	7.200 in

# **Physical Specifications**

Max Capacity:	12 Fibers

### **Mechanical Characteristics**

Front Connection:	Static
-------------------	--------

### **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

### **Product Material**

### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

### **Transmission-Characteristics**

#### Fiber Connector Performance

Connector Type	Max. Insertion Loss	Min. Return Loss
LC Duplex with Shutters	0.15 dB	-25 dB

### **Standards**

EU Directive 2011/65/EU (RoHS 2): Yes

MII Order #39 (China RoHS):	EUP 50
Related Part Numbers	

250µm mass fusion pigtails, splice chip, splice protection sleeve, cable retention rubber: 2mm & 3mm

# Related Parts: Product Notes

Included Parts:

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box

DCX Frames, Modules, and Patch Panels

### History

Update and Revision:	Revision Number: 0.26 Revision Date: 08-12-2024	

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FC5D06LDFMXL ☑

Faceplates and Panels - DCX Splice Cassette LC Duplex

# **Product Description**

FX DCX SPLICE CASSETTE, OM5, 06 PORTS, LC DUPLEX (FLIPPED PAIR) WITH 250µm RIBBON PIGTAIL, LIME GREEN ADAPTERS

### **Technical Specifications**

### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

### Construction

### Fiber Cable Construction

OM5		
OM5		
Weight:	0.189 lbs	
Height:	0.500 in	
Width:	3.400 in	
Length:	7.190 in	

# **Physical Specifications**

Max Capacity:	12Fibers, 6 LC Duplex Ports

### **Temperature Range**

Operating Temperature Range:	-10°C to 60°C
Storage Temperature Range:	-10°C to 75°C

### **Product Material**

### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

# **Transmission-Characteristics**

### Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.15 dB	-30 dB

### **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

### **Related Part Numbers**

Related Parts:	DCX,Frames Modules & Patch Panels

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box
Notes:	For more information, please refer to our web site at http://www.belden.com. This product image is for representation only.

### **History**

Update and Revision:	Revision Number: 0.8 Revision Date: 02-06-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FC5D12LDFM ☑

FX DCX Splice Cassette, OM5, 12 Ports, LC Duplex With 250µm Ribbon Pigtails

## **Product Description**

FX DCX Splice Cassette, OM5, 12 Ports, LC Duplex With 250µm Ribbon Pigtails, Lime Green Adapters

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction



Weight:	0.460 lbs
Height:	0.500 in
Width:	6.830 in
Length:	7.200 in

## **Physical Specifications**

Max Capacity:	24 Fibers

#### **Mechanical Characteristics**

Front Connection:	Static			
-------------------	--------	--	--	--

## **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

## **Product Material**

#### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

#### **Transmission-Characteristics**

#### Fiber Connector Performance

Connector Type	Max. Insertion Loss	Min. Return Loss
LC Duplex with Shutters	0.15 dB	-25 dB

## Standards

EU Directive 2011/65/EU (RoHS 2): Yes

MII Order #39 (China RoHS):	EUP 50
Related Part Numbers	

250µm mass fusion pigtails, splice chip, splice protection sleeve, cable retention rubber: 2mm & 3mm

# Related Parts: Product Notes

Included Parts:

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box

DCX,Frames Modules & Patch Panels

#### **History**

Update and Revision:	Revision Number: 0.22 Revision Date: 08-09-2024

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FC5D12LDFMXL ☑

Faceplates and Panels - DCX Splice Cassette LC Duplex

## **Product Description**

FX DCX SPLICE CASSETTE, OM5, 12 PORTS, LC DUPLEX (FLIPPED PAIR) WITH 250µm RIBBON PIGTAIL, LIME GREEN ADAPTERS

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction

Fiber Type	
OM5	
Weight:	0.437 lbs
Height:	0.500 in
Width:	6.830 in

7.190 in

## **Physical Specifications**

Max Capacity:	24Fibers, 12 LC Duplex Ports

#### **Temperature Range**

Operating Temperature Range:	-10°C to 60°C
Storage Temperature Range:	-10°C to 75°C

### **Product Material**

#### Materials

Length:

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

## **Transmission-Characteristics**

## Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.15 dB	-30 dB

## **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

## **Related Part Numbers**

Related Parts:	DCX,Frames Modules & Patch Panels

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box
Notes:	For more information, please refer to our web site at http://www.belden.com. This product image is for representation only.

#### **History**

Update and Revision:	Revision Number: 0.8 Revision Date: 02-06-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FCSD06LDFM ☑

FX DCX Splice Cassette, OS2, 06 Ports LC Duplex with 250µm Pigtail Ribbon

## **Product Description**

FX DCX Splice Cassette, OS2, 06 Ports LC Duplex with 250µm Pigtail Ribbon, Blue Adapters

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	DCX, Data Centers, Central Equipment Room	
Construction		
Fiber Cable Construction		
Fiber Type		
OS2		

Fiber Type	
OS2	l

Weight:	0.189 lbs
Height:	0.500 in
Width:	3.410 in
Length:	7.200 in

## **Physical Specifications**

Max Capacity:
---------------

## **Mechanical Characteristics**

Front Connection:	Static	
Front Connection:	Glatic	

## **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

## **Product Material**

#### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex
Adapter Sleeve	Zirconia-Ceramic		

#### **Transmission-Characteristics**

#### **Fiber Connector Performance**

Connector Type	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.25 dB	-55 dB

#### **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Included Parts:	$250\mu m$ mass fusion pigtails, splice chip, splice protection sleeve, cable retention rubber: 2mm & 3mm	
Related Parts:	DCX,Frames Modules & Patch Panels	

#### Variants

Item #	Connector Type
FCSD06LDFM	LC Duplex

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box	

#### **History**

Update and Revision:	Revision Number: 0.173 Revision Date: 08-12-2024

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FCSD06LDFMXB ☑

Faceplates and Panels - DCX Splice Cassette LC Duplex

## **Product Description**

FX DCX SPLICE CASSETTE, OS2, 06 PORTS, LC DUPLEX (FLIPPED PAIR) WITH 250µm RIBBON PIGTAIL, BLUE ADAPTERS

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction

OS2	
Weight:	0.189 lbs
Height:	0.500 in
Width:	3.400 in
Length:	7.190 in

## **Physical Specifications**

Max Capacity:	12Fibers, 6 LC Duplex Ports

#### **Temperature Range**

Operating Temperature Range:	-10°C to 60°C
Storage Temperature Range:	-10°C to 75°C

#### **Product Material**

#### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

#### **Transmission-Characteristics**

#### Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.25 dB	-55 dB

#### **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Included Parts:	250μm mass fusion pigtails, splice chip, splice protectors
Related Parts:	DCX,Frames Modules & Patch Panels

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box
Notes:	Splice chip and protector sleeve are included. Splice chip is compatible with Belden splice sleeve FXFUHSRIBEB12 (Oval x 40mm long) Post-Shrink Diameter. For more information, please refer to our web site at http://www.belden.com

#### **History**

Update and Revision:	Revision Number: 0.8 Revision Date: 02-06-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FCSD12LDFM ☑

FX DCX Splice Cassette, OS2, 12 Ports LC Duplex with 250µm Pigtail Ribbon

## **Product Description**

FX DCX Splice Cassette, OS2, 12 Ports LC Duplex with 250µm Pigtail Ribbon, Blue Adapters

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	DCX, Data Centers, Central Equipment Room
Construction	
Fiber Cable Construction Fiber Type OS2	
Weight:	0.460 lbs
Height:	0.500 in

## **Physical Specifications**

Max Capacity:	24 Fibers	

## **Mechanical Characteristics**

Front Connection:	Static
Front Connection:	Static

## **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

## **Product Material**

#### Materials

Width:

Length:

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex
Adapter Sleeve	Zirconia-Ceramic		

6.830 in

7.200 in

#### **Transmission-Characteristics**

#### Fiber Connector Performance

Connector Type	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.25 dB	-55 dB

#### **Standards**

		í
EU Directive 2011/65/EU (RoHS 2):	Yes	
MII Order #39 (China RoHS):	EUP 50	

#### **Related Part Numbers**

Included Parts:	$250\mu m$ mass fusion pigtails, splice chip, splice protection sleeve, cable retention rubber: 2mm & 3mm	
Related Parts:	DCX,Frames Modules & Patch Panels	

#### Variants

Item #	Connector Type
FCSD12LDFM	LC Duplex

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box	

#### **History**

Update and Revision:	Revision Number: 0.176 Revision Date: 08-12-2024

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FCSD12LDFMXB ☑

Faceplates and Panels - DCX Splice Cassette LC Duplex

## **Product Description**

FX DCX SPLICE CASSETTE, OS2, 12 PORTS, LC DUPLEX (FLIPPED PAIR) WITH 250µm RIBBON PIGTAIL, BLUE ADAPTERS

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction

Fiber Type		
OS2		
Weight:	0.437 lbs	
Height:	0.500 in	
Width:	6.830 in	
Length:	7.190 in	

## **Physical Specifications**

Max Capacity: 24Fibers, 12 LC Duplex Ports	
--	--

#### **Temperature Range**

Operating Temperature Range:	-10°C to 60°C
Storage Temperature Range:	-10°C to 75°C

### **Product Material**

#### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

## **Transmission-Characteristics**

#### Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.25 dB	-55 dB

## **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Included Parts:	250µm ribbon pigtails, splice chip, splice protectors
Related Parts:	DCX,Frames Modules & Patch Panels

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box
Notes:	For more information, please refer to our web site at http://www.belden.com

#### **History**

Update and Revision:	Revision Number: 0.8 Revision Date: 02-06-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FC5D06LDFS ☑

Faceplates and Panels - DCX Splice Cassette LC Duplex

## **Product Description**

FX DCX SPLICE CASSETTE, OM5, 06 PORTS, LC DUPLEX, LIME GREEN ADAPTERS

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction

Fiber Type OM5	
Weight:	0.137 lbs
Height:	0.500 in
Width:	3.400 in
Length:	7.190 in

## **Physical Specifications**

	1000
Max Capacity:	12Fibers, 6 LC Duplex Ports

#### **Temperature Range**

Operating Temperature Range:	-10°C to 60°C
Storage Temperature Range:	-10°C to 75°C

### **Product Material**

#### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

## **Transmission-Characteristics**

#### Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.15 dB	-30 dB

## **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

## **Related Part Numbers**

Related Parts:	DCX,Frames Modules & Patch Panels
riolatou r arto.	201, rames medales a rater rames

#### **Product Notes**

	Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box	
Î	Notes:	For more information, please refer to our web site at http://www.belden.com	

#### **History**

Update and Revision:	Revision Number: 0.14 Revision Date: 02-06-2024		

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





## Product: FC5D12LDFS ☑

Faceplates and Panels - DCX Splice Cassette LC Duplex

## **Product Description**

FX DCX SPLICE CASSETTE, OM5, 12 PORTS, LC DUPLEX, LIME GREEN ADAPTERS

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction

OM5	
Weight:	0.360 lbs
Height:	0.500 in
Width:	6.830 in
Length:	7.190 in

## **Physical Specifications**

Max Capacity:	24Fibers, 12 LC Duplex Ports

#### **Temperature Range**

Operating Temperature Range:	-10°C to 60°C
Storage Temperature Range:	-10°C to 75°C

### **Product Material**

#### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex w/ Internal Shutters
Adapter Sleeve	Zirconia-Ceramic		

## **Transmission-Characteristics**

#### Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.15 dB	-30 dB

## **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

## **Related Part Numbers**

Related Parts:	DCX,Frames Modules & Patch Panels

#### **Product Notes**

	Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box	
Î	Notes:	For more information, please refer to our web site at http://www.belden.com	

#### **History**

Update and Revision:	Revision Number: 0.8 Revision Date: 02-06-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FCSD06LDFS ☑

FX DCX Splice Cassette, OS2, 06 Ports LC Duplex

## **Product Description**

FX DCX Splice Cassette, OS2, 06 Ports LC Duplex, Blue Adapters

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	Optical Distribution Frame, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction

Fiber Type	
OS2	
Weight:	0.137 lbs
Height:	0.448 in
Width:	3 30 in

#### **Mechanical Characteristics**

Front Connection:	Static

#### **Temperature Range**

Operating Temperature Range:	-10 to 60°C
Storage Temperature Range:	-10 to 75°C

### **Product Material**

#### Materials

Length:

Element	Description	Color
Zirconia-Ceramic	Adapter Sleve Material	
Plastic - UL94V-0	Front Connector Body	Blue
Plastic - UL94V-0	Cassette Assembly	Black

## **Related Part Numbers**

Related Parts:	DCX Frame Module & Patch Pannel

#### Variants

Item #	Color	Connector Type
FCSD06LDFS	Blue	LC Duplex

### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box	l

## History

Update and Revision:

Revision Number: 0.96 Revision Date: 12-12-2022

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FCSD12LDFS ☑

FX DCX Splice Cassette, OS2, 12 Ports LC Duplex

## **Product Description**

FX DCX Splice Cassette, OS2, 12 Ports LC Duplex, Blue Adapters

## **Technical Specifications**

#### **Product Overview**

Construction	Suitable Applications:	DCX, Data Centers, Central Equipment Room
	Construction	

Weight:	0.360 lbs
Height:	0.500 in
Width:	6.830 in
Depth:	7.190 in

## **Physical Specifications**

Max Capacity:	24 Fibers

## **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

#### **Product Material**

#### Materials

Description	Material	Color	Туре
Cassette Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex
Adapter Sleeve	Zirconia-Ceramic		

## **Standards**

## **Related Part Numbers**

Included Parts:	Cable rubber retention (2mm, 3mm)
Related Parts:	DCX Frames, Modules, and Patch Panels

#### Variants

Item #	Connector Type
FCSD12LDFS	LC Duplex

#### **Product Notes**

individually publicaged in a placed offer, offipped in caraboard box	Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box
--	------------	--

## History

Update and Revision:	Revision Number: 0.53 Revision Date: 12-12-2022

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: <u>FF5D06LDMFAL</u> ☑

Faceplates and Panels - DCX Preterm Adapter Frame

## **Product Description**

FX DCX FRAME, OM5, 06 PORTS, LC DUPLEX, MPO-12 (FEMALE), TYPE-A, LIME GREEN ADAPTERS

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction

Tiber Type	
OM5	
Weight:	0.156 lbs
Height:	0.500 in
Width:	3.400 in
Length:	6.800 in

6.800 in

## **Physical Specifications**

Max Capacity: 12Fibers, 6 LC Duplex Ports	
---	--

## **Temperature Range**

Operating Temperature Range:	-10°C to 60°C
Storage Temperature Range:	-10°C to 75°C

#### **Product Material**

#### Materials

Depth:

Description	Material	Color	Туре
Adapter Frame Assembly	Polycarbonate	Black (Frame), Lime Green (Front Block)	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex
Rear Connector/ Adapter	Plastic - UL94V-0	Lime Green	MPO Female
Fan-Out Routing Plate	Polypropylene	Black	

#### **Transmission-Characteristics**

#### Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.15 dB	-30 dB
MPO-Female	0.20 dB	-30 dB

## **Standards**

EU Directive 2011/65/EU (RoHS 2): Yes

MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Related Parts:	DCX,Frames Modules & Patch Panels	

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box
Notes:	For more information, please refer to our web site at http://www.belden.com

#### History

Update and Revision:	Revision Number: 0.13 Revision Date: 02-06-2024

#### © 2025 Belden, Inc.

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: <u>FF5D06LDMF1L</u> ☑

Faceplates and Panels - DCX Preterm Adapter Frame

## **Product Description**

FX DCX FRAME, OM5, 06 PORTS, LC DUPLEX, MPO-12 (FEMALE), TYPE-A ALTERNATE, LIME GREEN ADAPTERS

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction

Fiber Type	
OM5	
Weight:	0.156 lbs
Height:	0.500 in

Length:	6.800 in

3.400 in

Max Capacity:	12Fibers, 6 LC Duplex Ports

#### **Temperature Range**

**Physical Specifications** 

Operating Temperature Range:	-10°C to 60°C
Storage Temperature Range:	-10°C to 75°C

### **Product Material**

#### Materials

Width:

Description	Material	Color	Type
Adapter Frame Assembly	Polycarbonate	Black (Frame), Lime Green (Front Block)	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex
Rear Connector/ Adapter	Plastic - UL94V-0	Lime Green	MPO Female
Fan-Out Routing Plate	Polypropylene	Black	

## **Transmission-Characteristics**

## Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC Duplex	0.15 dB	-30 dB
MPO-Female	0.20 dB	-30 dB

## Standards

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Related Parts:	DCX,Frames Modules & Patch Panels

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box
Notes:	For more information, please refer to our web site at http://www.belden.com

#### History

Update and Revision:	Revision Number: 0.12 Revision Date: 02-06-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: <u>FF5D04LD4F4L</u> ☑

Faceplates and Panels - DCX Frame LC Duplex

## **Product Description**

FX DCX FRAME, OM5, 04 PORTS, LC DUPLEX, MPO-8 (FEMALE), SR4, LIME GREEN ADAPTERS

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction

Fiber Type
OM5

Weight:	0.120 lbs	
Height:	0.500 in	
Width:	2.260 in	
Length:	6.800 in	

## **Physical Specifications**

		п
Max Capacity:	8 Fibers	

### **Mechanical Characteristics**

Front Connection:
-------------------

## **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

## **Product Material**

#### Materials

Description	Material	Color	Туре
Adapter Frame Assembly	Polycarbonate	Black	
Front Connector Body	Plastic - UL94V-0	Lime Green	LC Duplex
Rear Connector/ Adapter	Plastic - UL94V-0	Lime Green	MPO female
Fan-Out Routing Plate	Polypropylene	Black	

#### **Transmission-Characteristics**

#### Fiber Connector Performance

Description	Total Insertion Loss	Total Return Loss
OM5	0.60 dB	-55 dB

#### **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Related Parts:	DCX,Frames Modules & Patch Panels

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box
Notes:	For more information, please refer to our web site at http://www.belden.com

#### History

Update and Revision:	Revision Number: 0.15 Revision Date: 08-08-2024
----------------------	---

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FFSD06LDMFAB ☑

FX DCX FRAME OS2 06P MPO12(F)LC\_DX TYPE-A NON-FLIP BL\_ADP

## **Product Description**

FX DCX FRAME, OS2, 06 PORTS, LC DUPLEX, MPO-12 (FEMALE), TYPE-A, NON-FLIP, BLUE ADAPTERS

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	DCX, Data Centers, Central Equipment Room
Construction	

#### Fiber Cable Construction

## Fiber Type OS2

Weight:	0.156 lbs
Height:	0.500 in
Width:	3.400 in
Depth:	6.800 in

## **Physical Specifications**

|--|

#### **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

## **Product Material**

### Materials

Description	Material	Color	Туре
Adapter Frame Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex
Adapter Sleeve	Zirconia-Ceramic		

## **Transmission-Characteristics**

## Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC- Keyed	0.25 dB	-65 dB
MPO-Female	0.35 dB	-60 dB

## **Standards**

MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Related Parts:	DCX Frames, Modules, and Patch Panels

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box

#### **History**

Update and Revision:	Revision Number: 0.61 Revision Date: 10-03-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FFSD06LDMF1B ☑

FX DCX FRAME OS2 06P MPO12(F)LC\_DX TYPE-A ALT BL\_ADP

## **Product Description**

FX DCX FRAME, OS2, 06 PORTS, LC DUPLEX, MPO-12 (FEMALE), TYPE-A ALTERNATE, NON-FLIP, BLUE ADAPTERS

## **Technical Specifications**

### **Product Overview**

Suitable Applications:	DCX, Data Centers, Central Equipment Room

## Construction

#### **Fiber Cable Construction**

Fiber Type	
OS2	ĺ

Weight:	0.156 lbs
Height:	0.500 in
Width:	3.400 in
Depth:	6.800 in

## **Physical Specifications**

Max Capacity:	12 Fibers
---------------	-----------

#### **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

## **Product Material**

## Materials

Description	Material	Color	Туре
Adapter Frame Assembly	Plastic - UL94V-0	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex
Adapter Sleeve	Zirconia-Ceramic		

## **Transmission-Characteristics**

#### Fiber Connector Performance

Description	Max. Insertion Loss	Min. Return Loss
LC- Keyed	0.25 dB	-65 dB
MPO-Female	0.35 dB	-60 dB

## **Standards**

MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Related Parts:	DCX Frames, Modules, and Patch Panels

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box

#### **History**

Update and Revision:	Revision Number: 0.61 Revision Date: 10-03-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FFSD04LD4F4B ☑

Faceplates and Panels - DCX Frame LC Duplex

## **Product Description**

FX DCX FRAME, OS2, 04 PORTS, LC DUPLEX, MPO-8 (FEMALE), SR4, BLUE ADAPTERS

## **Technical Specifications**

#### **Product Overview**

Environmental Space:	Indoor
Suitable Applications:	DCX, Data Centers, Central Equipment Room

#### Construction

#### Fiber Cable Construction

Fiber	Туре
OS2	

Weight:	0.120 lbs	
Height:	0.500 in	
Width:	2.260 in	
Length:	6.800 in	

## **Physical Specifications**

Max Capacity:	8 Fibers

#### **Mechanical Characteristics**

Front Connection:
-------------------

## **Temperature Range**

Operating Temperature Range:	-10°C to +60°C
Storage Temperature Range:	-10°C to +75°C

## **Product Material**

#### Materials

Description	Material	Color	Туре
Adapter Frame Assembly	Polycarbonate	Black	
Front Connector Body	Plastic - UL94V-0	Blue	LC Duplex
Rear Connector/ Adapter	Plastic - UL94V-0	Blue	MPO female
Fan-Out Routing Plate	Polypropylene	Black	

#### **Transmission-Characteristics**

#### Fiber Connector Performance

Description	Total Insertion Loss	Total Return Loss
OS2	0.60 dB	-60 dB

#### **Standards**

EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50

#### **Related Part Numbers**

Related Parts:	DCX,Frames Modules & Patch Panels

#### **Product Notes**

Packaging:	Individually packaged in a plastic shell, Shipped in cardboard box
Notes:	For more information, please refer to our web site at http://www.belden.com

#### History

Update and Revision:	Revision Number: 0.15 Revision Date: 08-08-2024
----------------------	---

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FM5MMB1xxxMPMEL ☑

FMT OM5 MPO12(M-M) B 12F xxxM OFNP MD\_4.8 1.0xINLINE LG

## **Product Description**

 ${\sf FX\ MPO\ TRUNK,\ OM5,\ MPO-12(MALE\ TO\ MALE),\ TYPE-B,\ 1\ MPO\ (12\ FIBERS),\ xxx\ M,\ OFNP,\ MINI-DISTRIBUTION\ 4.8\ MM\ (DOUBLE\ JACKET),\ FAN-OUT:\ 1.0M\ x\ IN-LINE,\ LIME\ GREEN\ JACKET }$ 

### **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Data Center, LAN, Equipment Room, Telecommunication room, Workstation Area
Fiber Specifications	

Fiber Type:	OM5
Fiber Core Diameter:	50/125 μm
Fiber Count:	12
Fiber Color Coding:	TIA-598-D

## **Physical Specifications**

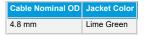
## Connectors

Description	Туре	Housing Material	<b>Housing Color</b>	<b>Boot Material</b>	<b>Boot Color</b>
Connector A (Inside End)	MPO-12 Male	Plastic	Lime Green	Rubber	Black
Connector B (Outside End)	MPO-12 Male	Plastic	Lime Green	Rubber	Black

#### Fan-out (Legs)

Description	Transition	Length (m)	Diameter	Geometry
Connector A (Inside End)	LPM	1.0 m	3.0 mm	In-Line
Connector B (Outside End)	LPM	1.0 m	3.0 mm	In-Line

#### Assembly Cable



#### Measurement



## Overall Length Tolerances

Range	Tolerance
0 to 2 meters	+0.2 / -0 meter
2.1 to 4.9 meters	+0.3 / -0 meter
5 to 40 meters	+0.4 / -0 meter
over 40 meters	+1.0% / -0%

## **Armor Specifications**

Armor Type and Material:	No Armor
--------------------------	----------

#### **Optical Characteristics**

#### Fiber Connector Performance

Description	Connector Type	Max. Insertion Loss	Min. Return Loss
Connector A (Inside End)	MPO-12 Male	0.20 dB	30 dB
Connector B (Outside End)	MPO-12 Male	0.20 dB	30 dB

#### **Mechanical Characteristics**

Pulling Eye Type:	FX Pulling Eye
Pulling Eye Location:	Outside End
Pulling Eye Tension:	100 lbs
Min. Bend Radius During Installation:	15x Cable OD
Min. Bend Radius During Operation:	10x Cable OD

## **Temperature Range**

	Operating Temperature Range:	-10C to +60C	
ı	Storage Temperature Range:	-10C to +60C	

#### **Standards and Compliance**

Environmental Suitability:	Indoor
Flammability / Reaction to Fire:	OFNP
UL Rating:	Plenum
TIA/EIA Compliance:	TIA/EIA 568.3
European Directive Compliance:	EU Directive 2011/65/EU (RoHS 2)
MII Order #39 (China RoHS):	EUP 50
Other Standard Compliance(s):	ACMA

#### **Product Notes**

#### History

Update and Revision:	Revision Number: 0.12 Revision Date: 05-31-2024	

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FM5MMB2xxxMPMEL ☑

FMT OM5 MPO12(M-M) B 24F xxxM OFNP MD\_4.8 1.0xINLINE LG

## **Product Description**

 $\begin{tabular}{ll} FX MPO TRUNK, OM5, MPO-12 (MALE TO MALE), TYPE-B, 2 MPO (24 FIBERS), xxx M, OFNP, MINI-DISTRIBUTION 4.8 MM (DOUBLE JACKET), FAN-OUT: 1.0M x IN-LINE, LIME GREEN JACKET \\ \end{tabular}$ 

## **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Data Center, LAN, Equipment Room, Telecommunication room, Workstation Area
Fiber Specifications	

Fiber Type:	OM5
Fiber Core Diameter:	50/125 μm
Fiber Count:	24
Fiber Color Coding:	TIA-598-D

## **Physical Specifications**

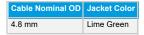
## Connectors

Description	Туре	Housing Material	<b>Housing Color</b>	<b>Boot Material</b>	<b>Boot Color</b>
Connector A (Inside End)	MPO-12 Male	Plastic	Lime Green	Rubber	Black
Connector B (Outside End)	MPO-12 Male	Plastic	Lime Green	Rubber	Black

#### Fan-out (Legs)

Description	Transition	Length (m)	Diameter	Geometry
Connector A (Inside End)	LPM	1.0 m	3.0 mm	In-Line
Connector B (Outside End)	LPM	1.0 m	3.0 mm	In-Line

#### Assembly Cable



#### Measurement



## Overall Length Tolerances

Range	Tolerance
0 to 2 meters	+0.2 / -0 meter
2.1 to 4.9 meters	+0.3 / -0 meter
5 to 40 meters	+0.4 / -0 meter
over 40 meters	+1.0% / -0%

## **Armor Specifications**

Armor Type and Material:	No Armor
--------------------------	----------

#### **Optical Characteristics**

#### Fiber Connector Performance

Description	Connector Type	Max. Insertion Loss	Min. Return Loss
Connector A (Inside End)	MPO-12 Male	0.20 dB	30 dB
Connector B (Outside End)	MPO-12 Male	0.20 dB	30 dB

#### **Mechanical Characteristics**

Pulling Eye Type:	FX Pulling Eye
Pulling Eye Location:	Outside End
Pulling Eye Tension:	100 lbs
Min. Bend Radius During Installation:	15x Cable OD
Min. Bend Radius During Operation:	10x Cable OD

## **Temperature Range**

	Operating Temperature Range:	-10C to +60C	
ı	Storage Temperature Range:	-10C to +60C	

#### **Standards and Compliance**

Environmental Suitability:	Indoor
Flammability / Reaction to Fire:	OFNP
UL Rating:	Plenum
TIA/EIA Compliance:	TIA/EIA 568.3
European Directive Compliance:	EU Directive 2011/65/EU (RoHS 2)
MII Order #39 (China RoHS):	EUP 50
Other Standard Compliance(s):	ACMA

#### **Product Notes**

#### History

Update and Revision:	Revision Number: 0.12 Revision Date: 05-31-2024	

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: <u>FMSMMB1xxxMPMEY</u> ☐

FMT OS2 MPO12(M-M) B 12F xxxM OFNP MD\_4.8 1.0xINLINE YL

# **Product Description**

FX MPO TRUNK, OS2, MPO-12(MALE TO MALE), TYPE-B, 1 MPO (12 FIBERS), xxx M (LENGTH IN METERS), OFNP, MINI-DISTRIBUTION 4.8 MM (DOUBLE JACKET), FAN-OUT: 1.0M x IN-LINE, YELLOW JACKET

## **Technical Specifications**

## **Product Overview**

Suitable Applications:	Data Center, LAN, Equipment Room, Telecommunication room, Workstation Area
Fiber Specifications	

Fiber Type:	OS2
Fiber Core Diameter:	8.2/125 µm
Fiber Count:	12
Fiber Color Coding:	TIA-598-D

# **Physical Specifications**

# Connectors

Description	Туре	Housing Material	<b>Housing Color</b>	<b>Boot Material</b>	<b>Boot Color</b>
Connector A (Inside End)	MPO-12 Male	Plastic	Green	Rubber	Black
Connector B (Outside End)	MPO-12 Male	Plastic	Green	Rubber	Black

### Fan-out (Legs)

Description	Transition	Length (m)	Diameter	Geometry
Connector A (Inside End)	LPM	1.0 m	3.0 mm	In-Line
Connector B (Outside End)	LPM	1.0 m	3.0 mm	In-Line

#### Assembly Cable



#### Measurement



# Overall Length Tolerances

Range	Tolerance
0 to 2 meters	+0.2 / -0 meter
2.1 to 4.9 meters	+0.3 / -0 meter
5 to 40 meters	+0.4 / -0 meter
over 40 meters	+1.0% / -0%

# **Armor Specifications**

Armor Type and Material:	No Armor
--------------------------	----------

### **Optical Characteristics**

#### Fiber Connector Performance

Description	Connector Type	Max. Insertion Loss	Min. Return Loss
Connector A (Inside End)	MPO-12 Male	0.35 dB	60 dB
Connector B (Outside End)	MPO-12 Male	0.35 dB	60 dB

## **Mechanical Characteristics**

Pulling Eye Type:	FX Pulling Eye
Pulling Eye Location:	Outside End
Pulling Eye Tension:	100 lbs
Min. Bend Radius During Installation:	15x Cable OD
Min. Bend Radius During Operation:	10x Cable OD

## **Temperature Range**

	Operating Temperature Range:	-10C to +60C	
ı	Storage Temperature Range:	-10C to +60C	

## **Standards and Compliance**

Environmental Suitability:	Indoor
Flammability / Reaction to Fire:	OFNP
UL Rating:	Plenum
TIA/EIA Compliance:	TIA/EIA 568.3
European Directive Compliance:	EU Directive 2011/65/EU (RoHS 2)
MII Order #39 (China RoHS):	EUP 50
Other Standard Compliance(s):	ACMA

#### **Product Notes**

#### History

Update and Revision:	Revision Number: 0.13 R	Revision Date: 05-31-2024

#### © 2025 Belden, Inc

# All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: <u>FMSMMB2xxxMPMEY</u> ☑

FMT OS2 MPO12(M-M) B 24F VARIOUS LENGTH OFNP MD\_4.8 1.0xINLINE YL

# **Product Description**

FX MPO TRUNK, OS2, MPO-12(MALE TO MALE), TYPE-B, 2 MPO (24 FIBERS), VARIOUS LENGTH, OFNP, MINI-DISTRIBUTION  $4.8\,$  MM (DOUBLE JACKET), FAN-OUT:  $1.0M\,$ x IN-LINE, YELLOW JACKET

# **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Data Center, LAN, Equipment Room, Telecommunication room, Workstation Area	
Fiber Specifications		
Fiber Type:	OS2	
Fiber Color Coding:	TIA-598-D	
Armor Specifications		
Armor Type and Material:	No Armor	

## **Physical Specifications**

### Connectors

Description	Туре	Boot Material	<b>Boot Color</b>
Connector A (Inside End)	MPO-12 Male	Rubber	Black
Connector B (Outside End)	MPO-12 Male	Rubber	Black

## Fan-out (Legs)

Description	Transition	Length (m)	Geometry
Connector A (Inside End)	LPM	1.0 m	In-Line
Connector B (Outside End)	LPM	1.0 m	In-Line

# Assembly Cable



#### Measurement



#### **Overall Length Tolerances**

Range	Tolerance
0 to 2 meters	+0.2 / -0 meter
2.1 to 4.9 meters	+0.3 / -0 meter
5 to 40 meters	+0.4 / -0 meter
over 40 meters	+1.0% / -0%

# **Optical Characteristics**

Polarity Identification: Type-B	Polarity Identification:	Туре-В
---------------------------------	--------------------------	--------

Description	Connector Type	Max. Insertion Loss	Min. Return Loss
Connector A (Inside End)	MPO-12 Male	0.35 dB	60 dB
Connector B (Outside End)	MPO-12 Male	0.35 dB	60 dB

#### **Mechanical Characteristics**

Min. Bend Radius During Installation:	15x Cable OD
Min. Bend Radius During Operation:	10x Cable OD

#### **Mechanical Tests**

Description	Requirement/Value
Cable Min. Bend Radius Installation (Short Term)	15x Cable OD
Cable Min. Bend Radius Operation (Long Term)	10x Cable OD

#### **Temperature Range**

Operating Temperature Range:	-10C to +60C
Storage Temperature Range:	-10C to +60C

#### **Standards and Compliance**

UL Flammability:	OFNP
UL Rating:	Plenum
TIA/EIA Compliance:	TIA/EIA 568.3
EU Directive 2011/65/EU (RoHS 2):	Yes
MII Order #39 (China RoHS):	EUP 50
Safety Listing:	ACMA

#### **Product Notes**

Related Parts:	DCX system, FX UHD Patch Panels, ECX Patch Panels, FX Patch cords, FX MPO Trunks, FX Multi-fiber Trunks	

#### **History**

Update and Revision:	Revision Number: 0.19 Revision Date: 01-27-2025	
· ·		

© 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: <u>FP5LDLDxxxMR1XL</u> ☑

FXPC OM5 LC\_DX LC\_DX xxxM OFNR DX\_1.6 A-B LG\_JKT



# **Product Description**

FX PATCH CORD, OM5, LC DUPLEX - LC DUPLEX, xxx M, OFNR, DUPLEX ZIP 1.6 MM, A-TO-B, LIME GREEN JACKET

# **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Data Center, LAN, Equipment Room, Telecommunication room, Workstation Area

### **Fiber Specifications**

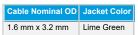
Fiber Type:	OM5
Fiber Core Diameter:	50/125 μm
Fiber Count:	2
Fiber Color Coding:	TIA-598-D

# **Physical Specifications**

#### Connectors

Description	Туре	Housing Material	<b>Housing Color</b>	Ferrule	<b>Boot Material</b>	<b>Boot Color</b>
Connector A (Inside End)	LC Duplex	Plastic	Lime Green	Zirconia Ceramic	Rubber	Lime Green
Connector B (Outside End)	LC Duplex	Plastic	Lime Green	Zirconia Ceramic	Rubber	Lime Green

#### **Assembly Cable**



## Measurement

Overall Assembly Length	Packaging
xxx meters	Individually packaged in a plastic bag

#### Overall Length Tolerances

Range	Tolerance
0 to 2 meters	+0.2 / -0 meter
2.1 to 4.9 meters	+0.3 / -0 meter
5 to 40 meters	+0.4 / -0 meter
over 40 meters	+1.0% / -0%

# **Armor Specifications**

Armor Type and Material:	No Armor

# **Optical Characteristics**

Polarity Identification: A-to-B / B-to-A

## Fiber Connector Performance

Description	Connector Type	Max. Insertion Loss	Min. Return Loss
Connector A (Inside End)	LC Duplex	0.15 dB	30 dB
Connector B (Outside End)	LC Duplex	0.15 dB	30 dB

#### **Mechanical Characteristics**

Min. Bend Radius During Installation:	15x Cable OD	
Min. Bend Radius During Operation:	10x Cable OD	

#### **Temperature Range**

Operating Temperature Range:	-40C to +75C	
Storage Temperature Range:	-40C to +75C	

#### **Standards and Compliance**

Environmental Suitability:	Indoor
Flammability / Reaction to Fire:	OFNR
UL Rating:	Riser
TIA/EIA Compliance:	TIA/EIA 568.3
European Directive Compliance:	EU Directive 2011/65/EU (RoHS 2)
MII Order #39 (China RoHS):	EUP 50
Other Standard Compliance(s):	ACMA

#### **Product Notes**

Related Parts:	${\tt DCX\ system, FX\ UHD\ Patch\ Panels, ECX\ Patch\ Panels, FX\ Patch\ cords, FX\ MPO\ Trunks, FX\ Multi-fiber\ Trunks}$	

#### History

Update and Revision:	Revision Number: 0.14 Revision Date: 07-20-2023

#### © 2025 Belden, Inc

#### All Rights Reserved

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: <u>FPSLDLDxxxMR1XY</u> ☑





# **Product Description**

FX PATCH CORD, OS2, LC DUPLEX - LC DUPLEX, xxxx M (LENGTH IN METERS), OFNR, DUPLEX ZIP 1.6 MM, A-TO-B, YELLOW JACKET

# **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Data Center, LAN, Equipment Room, Telecommunication room, Workstation Area

#### **Fiber Specifications**

Fiber Type:	OS2
Fiber Core Diameter:	8.2/125 μm
Fiber Count:	2
Fiber Color Coding:	TIA-598-D

# **Physical Specifications**

#### Connectors

Description	Туре	Housing Material	<b>Housing Color</b>	Ferrule	<b>Boot Material</b>	<b>Boot Color</b>
Connector A (Inside End)	LC Duplex	Plastic	Blue	Zirconia Ceramic	Rubber	Blue
Connector B (Outside End)	LC Duplex	Plastic	Blue	Zirconia Ceramic	Rubber	Blue

#### **Assembly Cable**



## Measurement

	Overall Assembly Length	Packaging
ľ	xxx meters	Individually packaged in a plastic bag

#### Overall Length Tolerances

Range	Tolerance
0 to 2 meters	+0.2 / -0 meter
2.1 to 4.9 meters	+0.3 / -0 meter
5 to 40 meters	+0.4 / -0 meter
over 40 meters	+1.0% / -0%

# **Armor Specifications**

Armor Type and Material: No Armor

# **Optical Characteristics**

Polarity Identification: A-to-B / B-to-A

# Fiber Connector Performance

Description	Connector Type	Max. Insertion Loss	Min. Return Loss
Connector A (Inside End)	LC Duplex	0.25 dB	55 dB
Connector B (Outside End)	LC Duplex	0.25 dB	55 dB

#### **Mechanical Characteristics**

Min. Bend Radius During Installation:	15x Cable OD	
Min. Bend Radius During Operation:	10x Cable OD	

#### **Temperature Range**

Operating Temperature Range:	-40C to +75C
Storage Temperature Range:	-40C to +75C

#### **Standards and Compliance**

Environmental Suitability:	Indoor
Flammability / Reaction to Fire:	OFNR
UL Rating:	Riser
TIA/EIA Compliance:	TIA/EIA 568.3
European Directive Compliance:	EU Directive 2011/65/EU (RoHS 2)
MII Order #39 (China RoHS):	EUP 50
Other Standard Compliance(s):	ACMA

# **Product Notes**

Related Parts:	DCX system, FX UHD Patch Panels, ECX Patch Panels, FX Patch cords, FX MPO Trunks, FX Multi-fiber Trunks

#### History

Update and Revision:	Revision Number: 0.15 Revision Date: 07-21-2023

#### © 2025 Belden, Inc

#### All Rights Reserved

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FI5M012A0 ☑

Indoor, Plenum, OM5, Mini-Distribution, 12 Fibers, Aluminum Interlocked, Lime Green Jacket

# **Product Description**

FX Indoor, OM5, Mini-Distribution, 12 Fibers, OFCP, Aluminum Interlocked Armor, 4.8mm (Double Jacket), Lime Green Jacket

# **Technical Specifications**

#### **Product Overview**

Product Category:	Fiber Mini Distribution Cable
Suitable Applications:	Indoor, data center, patching, inside cabinets, workstation equipment connections

## **Fiber Specifications**

Fiber Type:	OM5
Fiber Core Diameter:	50/125 μm
Fiber Diameter:	250 μm
Fiber Count:	12
Fiber Color Coding:	TIA-598-D

#### **Cable Construction**

Subunit Diameter:	0.118 in (3.0 mm)
Subunit Color:	Lime Green
Subunit Strength Members:	Aramid Yarns

## **Inner Jacket Specifications**

Strength Member:	Aramid Yarns
Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.189 in (4.8 mm)
Color:	Lime Green
Number of Ripcords:	1

# **Armor Specifications**

Armor Type and Material:	AIA - Aluminum Interlock Armor
--------------------------	--------------------------------

# **Outer Jacket Specifications**

Jacket Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.480 in (12.2 mm)
Color:	Lime Green

#### **Optical Characteristics**

Wavelength	850 nm	1300 nm
Max. Attenuation	3.0 dB/km	1.0 dB/km
10 Gigabit Ethernet Performance	550 m	1100 m
Min. Effective Modal Bandwidth (EMB)	4700 MHz.km	-
Min. Overfilled Launch (OFL) Bandwidth	3500 MHz.km	500 MHz.km

# **Mechanical Characteristics**

Min. Bend Radius During Installation:	20 x Cable OD
Min. Bend Radius During Operation:	10 x Cable OD
Max. Tensile Strength During Installation:	660 N (150 lbf)
Max. Tensile Strength During Operation:	200 N (45 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	90.6 lbs/kft ( 134.7 kg/km)

#### **Temperature Range**

Installation Temperature Range:	0°C to +60°C
Operating Temperature Range:	0°C to +70°C
Storage Temperature Range:	-40°C to +70°C

#### **Standards and Compliance**

Environmental Suitability:	Indoor
Flammability / Reaction to Fire:	NFPA 262
NEC / UL Compliance:	OFCP
CEC / C(UL) Compliance:	FT6
ICEA Compliance:	S-83-596
TIA/EIA Compliance:	598-D
Telcordia Compliance:	GR-409
European Directive Compliance:	EU Directive 2015/863/EU (RoHS 2 amendment)

### **History**

Update and Revision:	Revision Number: 0.4 Revision Date: 01-28-2025

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FI5M024A0 ☑

Indoor, Plenum, OM5, Mini-Distribution, 24 Fibers, Aluminum Interlocked, Lime Green Jacket

# **Product Description**

FX Indoor, OM5, Mini-Distribution, 24 Fibers, OFCP, Aluminum Interlocked Armor, 4.8mm (Double Jacket), Lime Green Jacket

# **Technical Specifications**

#### **Product Overview**

Product Category:	Fiber Mini Distribution Cable
Suitable Applications:	Indoor, data center, patching, inside cabinets, workstation equipment connections

## **Fiber Specifications**

Fiber Type:	OM5
Fiber Core Diameter:	50/125 μm
Fiber Diameter:	250 μm
Fiber Count:	24
Fiber Color Coding:	TIA-598-D

#### **Cable Construction**

Subunit Diameter:	0.118 in (3.0 mm)
Subunit Color:	Lime Green
Subunit Strength Members:	Aramid Yarns

# **Inner Jacket Specifications**

Strength Member:	Aramid Yarns
Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.189 in (4.8 mm)
Color:	Lime Green
Number of Ripcords:	1

# **Armor Specifications**

Armor Type and Material:
--------------------------

# **Outer Jacket Specifications**

Jacket Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.480 in (12.2 mm)
Color:	Lime Green

#### **Optical Characteristics**

Wavelength	850 nm	1300 nm
Max. Attenuation	3.0 dB/km	1.0 dB/km
10 Gigabit Ethernet Performance	550 m	1100 m
Min. Effective Modal Bandwidth (EMB)	4700 MHz.km	-
Min. Overfilled Launch (OFL) Bandwidth	3500 MHz.km	500 MHz.km

# **Mechanical Characteristics**

Min. Bend Radius During Installation:	20 x Cable OD
Min. Bend Radius During Operation:	10 x Cable OD
Max. Tensile Strength During Installation:	660 N (150 lbf)
Max. Tensile Strength During Operation:	200 N (45 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	90.6 lbs/1000ft (134.8 kg/km)

#### **Temperature Range**

Installation Temperature Range:	0°C to +60°C
Operating Temperature Range:	0°C to +70°C
Storage Temperature Range:	-40°C to +70°C

#### **Standards and Compliance**

Environmental Suitability:	Indoor
Flammability / Reaction to Fire:	NFPA 262
NEC / UL Compliance:	OFCP
CEC / C(UL) Compliance:	FT6
ICEA Compliance:	S-83-596
TIA/EIA Compliance:	598-D
Telcordia Compliance:	GR-409
European Directive Compliance:	EU Directive 2015/863/EU (RoHS 2 amendment)

### **History**

Update and Revision:	Revision Number: 0.8 Revision Date: 01-09-2025

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FISM012A0 ☑

Indoor, Plenum, OS2, Mini-Distribution, 12 Fibers, Aluminum Interlocked, Yellow Jacket

# **Product Description**

FX Indoor, OS2, Mini-Distribution, 12 Fibers, OFCP, Aluminum Interlocked Armor, 4.8mm (Double Jacket), Yellow Jacket

# **Technical Specifications**

## **Product Overview**

Product Category:	Fiber Mini Distribution Cable
Suitable Applications:	Indoor, data center, patching, inside cabinets, workstation equipment connections

## **Fiber Specifications**

Fiber Type:	OS2
Fiber Core Diameter:	8.2/125 μm
Fiber Diameter:	250 μm
Fiber Count:	12
Fiber Color Coding:	TIA-598-D

## **Cable Construction**

Subunit Diameter:	0.120 in (3.0 mm)
Subunit Color:	Yellow
Subunit Strength Members:	Aramid Yarns

## **Inner Jacket Specifications**

Strength Member:	Aramid Yarns
Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.189 in (4.8 mm)
Color:	Yellow
Number of Ripcords:	1

# **Armor Specifications**

A T 184 1 1 1	Ala al control de la control d
Armor Type and Material:	AIA - Aluminum Interlock Armor

# **Outer Jacket Specifications**

Jacket Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.480 in (12.2 mm)
Color:	Yellow

#### **Optical Characteristics**

Wavelength	1310 nm	1550 nm
Max. Attenuation	0.5 dB/km	0.5 dB/km
Mode Field Diameter	9.2 µm	10.4 µm
1 Gigabit Ethernet Performance	5000 m	-
10 Gigabit Ethernet Performance	10000 m	50000 m

# **Mechanical Characteristics**

Min. Bend Radius During Installation:	20 x Cable OD
Min. Bend Radius During Operation:	10 x Cable OD
Max. Tensile Strength During Installation:	660 N (150 lbf)
Max. Tensile Strength During Operation:	200 N (45 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	90.6 lbs/1000ft (134.8 kg/km)

#### **Temperature Range**

Installation Temperature Range:	0°C to +60°C
Operating Temperature Range:	0°C to +70°C
Storage Temperature Range:	-40°C to +70°C

#### **Standards and Compliance**

Environmental Suitability:	Indoor
Flammability / Reaction to Fire:	NFPA 262
NEC / UL Compliance:	OFCP
CEC / C(UL) Compliance:	FT6
ICEA Compliance:	S-83-596
TIA/EIA Compliance:	598-D
Telcordia Compliance:	GR-409
European Directive Compliance:	EU Directive 2015/863/EU (RoHS 2 amendment), EU Directive 2011/65/EU (RoHS 2), EU Directive 2012/19/EU (WEEE)

### History

Update and Revision:	Revision Number: 0.5 Revision Date: 01-28-2025

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FISM024A0 ☑

Indoor, Plenum, OS2, Mini-Distribution, 24 Fibers, Aluminum Interlocked, Yellow Jacket

# **Product Description**

FX Indoor, OS2, Mini-Distribution, 24 Fibers, OFCP, Aluminum Interlocked Armor, 4.8mm (Double Jacket), Yellow Jacket

# **Technical Specifications**

#### **Product Overview**

Product Category:	Fiber Mini Distribution Cable
Suitable Applications:	Indoor, data center, patching, inside cabinets, workstation equipment connections

## **Fiber Specifications**

Fiber Type:	OS2
Fiber Core Diameter:	8.2/125 µm
Fiber Diameter:	250 µm
Fiber Count:	24
Fiber Color Coding:	TIA-598-D

## **Cable Construction**

Subunit Diameter:	0.118 in (3.0 mm)
Subunit Color:	Yellow
Subunit Strength Members:	Aramid Yarns

# **Inner Jacket Specifications**

Strength Member:	Aramid Yarns
Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.189 in (4.8 mm)
Color:	Yellow
Number of Ripcords:	1

# **Armor Specifications**

A T 184 1 1 1	Ala al control de la control d
Armor Type and Material:	AIA - Aluminum Interlock Armor

# **Outer Jacket Specifications**

Jacket Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.480 in (12.2 mm)
Color:	Yellow

#### **Optical Characteristics**

Wavelength	1310 nm	1550 nm
Max. Attenuation	0.5 dB/km	0.5 dB/km
Mode Field Diameter	9.2 µm	10.4 µm
1 Gigabit Ethernet Performance	5000 m	-
10 Gigabit Ethernet Performance	10000 m	50000 m

# **Mechanical Characteristics**

Min. Bend Radius During Installation:	20 x Cable OD
Min. Bend Radius During Operation:	10 x Cable OD
Max. Tensile Strength During Installation:	660 N (150 lbf)
Max. Tensile Strength During Operation:	200 N (45 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	90.6 lbs/1000ft (134.8 kg/km)

#### **Temperature Range**

Installation Temperature Range:	0°C to +60°C
Operating Temperature Range:	0°C to +70°C
Storage Temperature Range:	-40°C to +70°C

#### **Standards and Compliance**

Environmental Suitability:	Indoor
Flammability / Reaction to Fire:	NFPA 262
NEC / UL Compliance:	OFCP
CEC / C(UL) Compliance:	FT6
ICEA Compliance:	S-83-596
TIA/EIA Compliance:	598-D
Telcordia Compliance:	GR-409
European Directive Compliance:	EU Directive 2015/863/EU (RoHS 2 amendment), EU Directive 2011/65/EU (RoHS 2), EU Directive 2012/19/EU (WEEE)

### History

Update and Revision:	Revision Number: 0.6 Revision Date: 01-09-2025

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FD5M012A0L ☑

Indoor/Outdoor Plenum OM5 Mini-Distribution 12 Fibers Aluminum Interlocked

# **Product Description**

FX Indoor/Outdoor, OM5, Mini-Distribution, 12 Fibers, OFCP, Aluminum Interlocked Armor, 4.8mm (Double Jacket), Lime Jacket

# **Technical Specifications**

## **Product Overview**

Product Category:	Fiber Mini Distribution Cable
Suitable Applications:	Data Center, RAN, Horizontal Backbone, Premise Backbone, Patching, Trunking

## **Fiber Specifications**

Fiber Type:	OM5
Fiber Core Diameter:	50/125 μm
Fiber Diameter:	250 μm
Fiber Count:	12
Fiber Color Coding:	TIA-598-D

## **Cable Construction**

Number of Active Subunits:	1
Fibers Per Subunit:	12
Subunit Diameter:	0.130 in (3.3 mm)
Subunit Color:	Lime Green
Subunit Strength Members:	Waterblocking Aramid Yarns

# **Inner Jacket Specifications**

Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.265 in (6.7 mm)
Color:	Lime Green

# **Armor Specifications**

Armor Type and Material:	AIA - Aluminum Interlock Armor
· ·	

# **Outer Jacket Specifications**

Jacket Material:	PVDF - Polyvinylidene Fluoride
Nom. Diameter:	0.555 in (14.1 mm)
Color:	Lime Green

#### **Optical Characteristics**

Wavelength	850 nm	953 nm	1300 nm
Max. Attenuation	3.0 dB/km	1.0 dB/km	1.0 dB/km
10 Gigabit Ethernet Performance	550 m	1100 m	1100 m
Min. Effective Modal Bandwidth (EMB)	4700 MHz.km	2470 MHz.km	-
Min. Overfilled Launch (OFL) Bandwidth	3500 MHz.km	1850 MHz.km	500 MHz.km

# **Mechanical Characteristics**

Min. Bend Radius During Installation:	20x Cable OD
Min. Bend Radius During Operation:	10x Cable OD
Max. Tensile Strength During Installation:	660 N (150 lbf)
Max. Tensile Strength During Operation:	200 N (45 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	186 lbs/kft (277 kg/km)

#### **Temperature Range**

Installation Temperature Range:	0°C to +60°C
Operating Temperature Range:	-20°C to +70°C
Storage Temperature Range:	-40°C to +70°C

#### **Standards and Compliance**

Environmental Suitability:	Indoor/Outdoor, Sunlight Resistance
Flammability / Reaction to Fire:	NFPA 262
NEC / UL Compliance:	OFCP
CEC / C(UL) Compliance:	FT6
ICEA Compliance:	S-83-596
TIA/EIA Compliance:	598-D
European Directive Compliance:	EU Directive 2015/863/EU (RoHS 2 amendment)

## **History**

Update and Revision:	Revision Number: 0.4 Revision Date: 01-28-2025

#### **Part Numbers**

#### Variants

Item #	Color
FDSM024A2A	Aqua
FDSM024A2E	Erika Violet
FDSM024A2L	Lime Green
FDSM024A2O	Orange
FDSM024A2Y	Yellow

# © 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FD5M024A2 ☑

Indoor/Outdoor Plenum OM5 Mini-Distribution 24 Fibers Aluminum Interlocked 3mm SubUnit

# **Product Description**

FX Indoor/Outdoor, OM5, Mini-Distribution, 24 Fibers, OFCP, Aluminum Interlocked Armor, 12F/Sub-Unit (3.0mm), Black Jacket

# **Technical Specifications**

## **Product Overview**

Product Category:	Fiber Mini Distribution Cable
Suitable Applications:	Premise Backbone

## **Fiber Specifications**

Fiber Type:	OM5
Fiber Core Diameter:	50/125 μm
Fiber Diameter:	250 μm
Fiber Count:	24
Fiber Color Coding:	TIA-598-D

## **Cable Construction**

Number of Active Subunits:	2
Number of Fillers:	2
Fibers Per Subunit:	12
Subunit Diameter:	0.120 in (3.0 mm)
Subunit Color:	Lime Green
Subunit Strength Members:	Waterblocking Aramid Yarns
Central Strength Member:	GRP
Cable Core Waterblocking:	Waterblock Tape

# **Inner Jacket Specifications**

Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.421 in (10.7 mm)
Color:	Black

#### **Armor Specifications**

Armor Type and Material:	AIA - Aluminum Interlock Armor
--------------------------	--------------------------------

# **Outer Jacket Specifications**

Jacket Material:	PVDF - Polyvinylidene Fluoride
Nom. Diameter:	0.715 in (18.2 mm)
Color:	Black

### Optical Characteristics

Wavelength	850 nm	953 nm	1300 nm
Max. Attenuation	3.0 dB/km	1.0 dB/km	1.0 dB/km
10 Gigabit Ethernet Performance	550 m	1100 m	-
Min. Effective Modal Bandwidth (EMB)	4700 MHz.km	2470 MHz.km	

Min. Overfilled Launch (OFL) Bandwidth	3500 MHz.km	1850 MHz.km	500 MHz.km
--	-------------	-------------	------------

## **Mechanical Characteristics**

Min. Bend Radius During Installation:	20x Cable OD
Min. Bend Radius During Operation:	10x Cable OD
Max. Tensile Strength During Installation:	1800 N (405 lbf)
Max. Tensile Strength During Operation:	540 N (121 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	186 lbs/kft (277 kg/km)

#### **Temperature Range**

Installation Temperature Range:	0°C to +60°C
Operating Temperature Range:	-20°C to +70°C
Storage Temperature Range:	-40°C to +70°C

#### **Standards and Compliance**

Environmental Suitability:	Indoor/Outdoor, Sunlight Resistance
Flammability / Reaction to Fire:	NFPA 262
NEC / UL Compliance:	OFCP
CEC / C(UL) Compliance:	FT6
ICEA Compliance:	S-83-596
TIA/EIA Compliance:	598-D
European Directive Compliance:	EU Directive 2015/863/EU (RoHS 2 amendment)

# History

#### **Part Numbers**

#### Variants

Item #	Color
FD5M024A2A	Aqua
FD5M024A2E	Erika Violet
FD5M024A2L	Lime Green
FD5M024A2O	Orange
FD5M024A2Y	Yellow

#### © 2025 Belden, Inc

All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FDSM012A0Y ☑

Indoor/Outdoor Mini-Distribution OS2 12 Fibers OFCP Aluminum Interlocked Amor 4.8 mm (Double Jacket)

# **Product Description**

FX Indoor/Outdoor, Mini-Distribution, OS2, 12 Fibers, OFCP, Aluminum Interlocked Armor, 4.8 mm (Double Jacket), Yellow Jacket

# **Technical Specifications**

#### **Product Overview**

Product Category:	Fiber Mini Distribution Cable
Suitable Applications:	Data Center, RAN, Horizontal Backbone, Premise Backbone, Patching, Trunking

## **Fiber Specifications**

Fiber Type:	OS2, G.657.A1, G.652.D
Fiber Diameter:	250 μm
Fiber Count:	12
Fiber Color Coding:	TIA-598-D

### **Cable Construction**

Number of Active Subunits:	1
Fibers Per Subunit:	12
Subunit Diameter:	0.130 in (3.3 mm)
Subunit Color:	Yellow
Subunit Strength Members:	Waterblocking Aramid Yarn

# **Inner Jacket Specifications**

Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.265 IN (6.7 mm)
Color:	Yellow
Number of Ripcords:	1

# **Armor Specifications**

Armor Type and Material:	AIA - Aluminum Interlock Armor
--------------------------	--------------------------------

# **Outer Jacket Specifications**

Jacket Material:	PVDF - Polyvinylidene Fluoride
Nom. Diameter:	0.551 in (14.1 mm)
Color:	Yellow

#### **Optical Characteristics**

Wavelength	1310 nm	1550 nm
Max. Attenuation	0.5 dB/km	0.5 dB/km
10 Gigabit Ethernet Performance	10,000 m	50,000 m

# **Mechanical Characteristics**

Min. Bend Radius During Installation:	20x Cable OD
Min. Bend Radius During Operation:	10x Cable OD

Max. Tensile Strength During Installation:	660 N (150 lbf)
Max. Tensile Strength During Operation:	200 N (45 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	158 lbs/kft (236 kg/km)

#### **Temperature Range**

Installation Temperature Range:	0°C to +60°C
Operating Temperature Range:	-20°C to +70°C
Storage Temperature Range:	-40°C to +70°C

# **Standards and Compliance**

Environmental Suitability:	Indoor/Outdoor, Sunlight Resistance
Flammability / Reaction to Fire:	NFPA 262, FT6
NEC / UL Compliance:	OFCP
CEC / C(UL) Compliance:	OFCP
ICEA Compliance:	S-104-696
TIA/EIA Compliance:	598-D
European Directive Compliance:	EU Directive 2015/863/EU (RoHS 2 amendment)

# **History**

Update and Revision:	Revision Number: 0.6 Revision Date: 02-21-2025

#### **Part Numbers**

#### Variants

Item #	Color
FDSM024A0A	Aqua
FDSM024A0E	Erika Violet
FDSM024A0L	Lime Green
FDSM024A0O	Orange
FDSM024A0Y	Yellow

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FDSM024A2Y ☑

Indoor/Outdoor Plenum OS2 Mini-Distribution 24 Fibers Aluminum Interlocked 3mm Sub-Units Yellow Jacket

# **Product Description**

FX Indoor/Outdoor, OS2, Mini-Distribution, 24 Fibers, OFCP Aluminum Interlocked Armor, 12F/Sub-Units (3.0MM), Yellow Jacket

# **Technical Specifications**

#### **Product Overview**

Product Category:	Fiber Mini Distribution Cable
Suitable Applications:	Data Center, RAN, Horizontal Backbone, Premise Backbone, Patching, Trunking

## **Fiber Specifications**

Fiber Type:	OS2
Fiber Core Diameter:	8.2/125 µm
Fiber Diameter:	250 μm
Fiber Count:	24
Fiber Color Coding:	TIA-598-D

## **Cable Construction**

Number of Active Subunits:	2
Number of Fillers:	2
Fibers Per Subunit:	12
Subunit Diameter:	0.118 in (3.0 mm)
Subunit Color:	Yellow
Subunit Strength Members:	Waterblocking Aramid Yarns
Central Strength Member:	GRP
Cable Core Waterblocking:	Waterblock Tape

# **Inner Jacket Specifications**

Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.318 in (8.1 mm)
Color:	Yellow

#### **Armor Specifications**

Armor Type and Material:	AIA - Aluminum Interlock Armor
--------------------------	--------------------------------

# **Outer Jacket Specifications**

Jacket Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.608 in (15.4 mm)
Color:	Yellow

### Optical Characteristics

Wavelength	1310 nm	1550 nm
Max. Attenuation	0.50 dB/km	0.50 dB/km
Mode Field Diameter	9.2 µm	10.4 μm
1 Gigabit Ethernet Performance	5,000 m	

10 Gigabit Ethernet Performance	10,000 m	50,000 m
---------------------------------	----------	----------

## **Mechanical Characteristics**

Min. Bend Radius During Installation:	20x Cable OD
Min. Bend Radius During Operation:	15x Cable OD
Max. Tensile Strength During Installation:	1800 N (405 lbf)
Max. Tensile Strength During Operation:	540 N (121 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	284 lbs/kft (426 kg/km)

#### **Temperature Range**

Installation Temperature Range:	-10°C to +60°C
Operating Temperature Range:	-20°C to +70°C
Storage Temperature Range:	-40°C to +70°C

# **Standards and Compliance**

Environmental Suitability:	Indoor/Outdoor, Sunlight Resistance, UV Resistance
Sustainability:	CA Prop 65
NEC / UL Compliance:	OFCP
CEC / C(UL) Compliance:	FT6
ICEA Compliance:	S-104-696
TIA/EIA Compliance:	598-D
Telcordia Compliance:	GR-409
European Directive Compliance:	EU Directive 2015/863/EU (RoHS 2 amendment)

#### **History**

Update and Revision:	Revision Number: 0.7 Revision Date: 12-04-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FISR012A0 ☑

Indoor OFCP OS2 Flexible Ribbon 12 Fibers Non-unitized

# **Product Description**

Indoor, Plenum, Aluminum Interlocked Armor, OS2, Flexible Ribbon, 12 Fibers, Non-unitized, Yellow Jacket

# **Technical Specifications**

## **Product Overview**

Product Category:	Fiber Ribbon Cable
Suitable Applications:	Data Center, RAN, Horizontal Backbone, Premise Backbone

## **Fiber Specifications**

Fiber Type:	OS2
Fiber Core Diameter:	8.2/125μm μm
Fiber Diameter:	250 μm
Fiber Count:	12
Fiber Color Coding:	TIA-598-D

# **Inner Jacket Specifications**

Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.190 in (4.8 mm)
Color:	Yellow

# **Armor Specifications**

Armor Type and Material:	AIA - Aluminum Interlock Armor
--------------------------	--------------------------------

# **Outer Jacket Specifications**

Jacket Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.520 in (13.2 mm)
Color:	Yellow

# **Mechanical Characteristics**

Min. Bend Radius During Installation:	20x Cable OD
Min. Bend Radius During Operation:	10x Cable OD
Max. Tensile Strength During Installation:	660 N (150 lbf)
Max. Tensile Strength During Operation:	200 N (45 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	92 lbs/1000ft (140 kg/km)

# **Temperature Range**

Installation Temperature Range:	0°C to +60°C
Operating Temperature Range:	0°C to +70°C
Storage Temperature Range:	-40°C to +70°C

# **Standards and Compliance**

Environmental Suitability:	Indoor
Sustainability:	CA Prop 65
Flammability / Reaction to Fire:	OFCP, FT6
NEC / UL Compliance:	OFCP
CEC / C(UL) Compliance:	OFCP
ICEA Compliance:	S-83-596
TIA/EIA Compliance:	EIA/TIA 568, GR-409-CORE
European Directive Compliance:	EU Directive 2015/863/EU (RoHS 2 amendment), REACH, EU Directive 2011/65/EU (RoHS 2), EU Directive 2012/19/EU (WEEE)

#### **History**

Update and Revision:	Revision Number: 0.28 Revision Date: 10-15-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FISR024A0 ☑

Indoor OFCP OS2 Flexible Ribbon 24 Fibers Non-unitized

# **Product Description**

Indoor Plenum Aluminum Interlocked Armor OS2 Flexible Ribbon 24 Fibers Non-unitized Yellow Jacket

# **Technical Specifications**

#### **Product Overview**

Suitable Applications:	Data Center, RAN, Horizontal Backbone, Premise Backbone
Fiber Specifications	

Fiber Type:	OS2
Fiber Core Diameter:	8.2/125µm µm
Fiber Count:	24
Fiber Color Coding:	TIA-598-D

# **Inner Jacket Specifications**

Strength Member:	Aramid Yarns
Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.190 in (3.0 mm)
Color:	Yellow

# **Armor Specifications**

Armor Type and Material:	AIA - Aluminum Interlock Armor

# **Outer Jacket Specifications**

Strength Member:	Aramid Yarns
Jacket Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.39 in (9.9 mm)
Color:	Yellow

### Optical Characteristics

Wavelength	850 nm	1310 nm	1550 nm
Max. Attenuation		0.50 dB/km	0.50 dB/km
Mode Field Diameter		9.2 µm	10.4 µm
1 Gigabit Ethernet Performance		5,000 m	-
10 Gigabit Ethernet Performance		10,000 m	50000

## **Mechanical Characteristics**

Min. Bend Radius During Installation:	20x Cable OD
Min. Bend Radius During Operation:	10x Cable OD
Max. Tensile Strength During Installation:	670 N (150 lbf)
Max. Tensile Strength During Operation:	200 N (45 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	92 lbs/1000ft

# **Temperature Range**

Installation Temperature Range:	0°C to +60°C
Operating Temperature Range:	0°C to +70°C
Storage Temperature Range:	-40°C to +70°C

#### **Standards and Compliance**

Environmental Suitability:	Indoor
Sustainability:	CA Prop 65
Flammability / Reaction to Fire:	OFNP, FT6
ICEA Compliance:	S-83-596
TIA/EIA Compliance:	EIA/TIA 568, GR-409-CORE

#### History

Update and Revision:	Revision Number: 0.30 Revision Date: 05-31-2024

#### © 2025 Belden, Inc

#### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: FISR288A5 ☑

Indoor OFCP OS2 Flexible Ribbon 288 Fibers 24F Subs

# **Product Description**

Indoor, Plenum, Aluminum Interlocked Armor, OS2, Flexible Ribbon, 288 Fibers, 24F Subunit, Yellow Jacket

# **Technical Specifications**

## **Product Overview**

Product Category:	Fiber Ribbon Cable
Suitable Applications:	Data Center, RAN, Horizontal Backbone, Premise Backbone

# **Fiber Specifications**

Fiber Type:	OS2
Fiber Core Diameter:	8.2/125µm µm
Fiber Count:	288
Fiber Color Coding:	TIA-598-D

### **Cable Construction**

Number of Active Subunits:	12
Fibers Per Subunit:	24
Subunit Diameter:	0.118 in (3.0 mm)
Subunit Color:	Yellow
Subunit Strength Members:	Aramid Yarns
Central Strength Member:	Upjacketed GRP

# **Inner Jacket Specifications**

Strength Member:	Aramid Yarns
Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	0.720 in (18.3 mm)
Color:	Yellow

## **Armor Specifications**

Armor Type and Material:	AIA - Aluminum Interlock Armor

# **Outer Jacket Specifications**

Jacket Material:	PVC - Polyvinyl Chloride
Nom. Diameter:	1.07 (27.2 mm)
Color:	Yellow

### **Optical Characteristics**

Wavelength	1310 nm	1550 nm
Max. Attenuation	0.50 dB/km	0.50 dB/km
1 Gigabit Ethernet Performance	5,000 m	
10 Gigabit Ethernet Performance	10,000 m	
Min. Effective Modal Bandwidth (EMB)	0.050 dB/km	

#### **Mechanical Characteristics**

Min. Bend Radius During Installation:	20x Cable OD
Min. Bend Radius During Operation:	10x Cable OD
Max. Tensile Strength During Installation:	1320 N (300 lbf)
Max. Tensile Strength During Operation:	400 N (90 lbf)
Crush Resistance:	440 N/cm
Bulk Cable Weight:	420 lbs/kft (625 kg/km)

## **Temperature Range**

Installation Temperature Range:	0°C to +60°C
Operating Temperature Range:	0°C to +70°C
Storage Temperature Range:	-40°C to +70°C

#### **Standards and Compliance**

Environmental Suitability:	Indoor
Sustainability:	CA Prop 65
Flammability / Reaction to Fire:	NFPA262
NEC / UL Compliance:	OFCP
CEC / C(UL) Compliance:	FT6
ICEA Compliance:	S-83-596
TIA/EIA Compliance:	598-D
Telcordia Compliance:	GR-409
European Directive Compliance:	EU Directive 2015/863/EU (RoHS 2 amendment)

## **History**

Update and Revision:	Revision Number: 0.24 Revision Date: 01-28-2025

#### © 2025 Belden, Inc

### All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: BHVHHXX ☑

Belden High Density Vertical Cable Managers

# **Product Description**

Double-Sided High Density Vertical Managers w/doors (See table below for part numbers)

# **Technical Specifications**

# **Application**

Product Overview:	Modular High-Density Racking System (HDRS) for network cross-connect. HDRS is a well-engineered cross connect and hosting platform that offers you a high level of versatility and flexibility in systems design for ultimate network density and management. These high-reliability products have been designed specifically for networking environments - from telecom closets to world-class data centers - to help you make the best use of valuable real estate and simplify MACs (moves, adds and changes).
Benefits:	One standard hand tools are required for quick installation and simple field reconfiguration and modification, Designed to work seamlessly with Belden IBDN copper and fiber systems, cable management fingers align with the rack RUs for easy routing of patch cords to vertical managers, eliminating the need for horizontal managers, High level of modularity enables ease of removal of reconfiguring Belden's wide selection of accessories and components, Interchangeable cable retention gates, doors, fingers and accessories adapt to specific needs
Features:	Available in high or low density, finger sections can be easily removed during reconfigurations and easily replaced as needed., High-density 11RU sections are riveted into the vertical managers and align with the rack units, Designed to handle both copper and optical fiber structured cable networks, 1/4" diameter mounting holes along length of each vertical manager enable easy attachment of accessories, like cable bundle fasteners, Cable can be easily routed from one patch panel to another within the same rack, to the back of the rack or to an adjacent rack while still maintaining proper cable bend radius.
Environmental Space:	Indoor

## **Construction and Dimensions**

Rack Units:	45U
Depth:	18.8 in

## **Mechanical Characteristics**

Mounting: Vertical

# **Environmental and Overall Characteristics**

Finish:	Black Powdercoat
Material:	6063-T6 Aluminum & Black Plastic
Color:	Black

# **Related Part Numbers**

Included Parts:	Mounting Hardware
Packaging:	Individually Boxed

#### Variants

Part #	Height	Width	Depth	Weight
BHVHH10	79.63 in	10.0 in	18.8 in	58.0 lb
BHVHH03	79.63 in	3.72 in	18.8 in	46.0 lb
BHVHH06	79.63 in	6.0 in	18.8 in	50.0 lb
BHVHH08	79.63 in	8.0 in	18.8 in	54.0 lb
BHVHH12	79.63 in	12.0 in	18.8 in	62.0 lb

Update and Revision: Revision Number: 0.214 Revision Date: 11-09-2022

#### © 2025 Belden, Inc

## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: BHVHHXX ☑

Belden High Density Vertical Cable Managers

# **Product Description**

Double-Sided High Density Vertical Managers w/doors (See table below for part numbers)

# **Technical Specifications**

# **Application**

Product Overview:	Modular High-Density Racking System (HDRS) for network cross-connect. HDRS is a well-engineered cross connect and hosting platform that offers you a high level of versatility and flexibility in systems design for ultimate network density and management. These high-reliability products have been designed specifically for networking environments - from telecom closets to world-class data centers - to help you make the best use of valuable real estate and simplify MACs (moves, adds and changes).
Benefits:	One standard hand tools are required for quick installation and simple field reconfiguration and modification, Designed to work seamlessly with Belden IBDN copper and fiber systems, cable management fingers align with the rack RUs for easy routing of patch cords to vertical managers, eliminating the need for horizontal managers, High level of modularity enables ease of removal of reconfiguring Belden's wide selection of accessories and components, Interchangeable cable retention gates, doors, fingers and accessories adapt to specific needs
Features:	Available in high or low density, finger sections can be easily removed during reconfigurations and easily replaced as needed., High-density 11RU sections are riveted into the vertical managers and align with the rack units, Designed to handle both copper and optical fiber structured cable networks, 1/4" diameter mounting holes along length of each vertical manager enable easy attachment of accessories, like cable bundle fasteners, Cable can be easily routed from one patch panel to another within the same rack, to the back of the rack or to an adjacent rack while still maintaining proper cable bend radius.
Environmental Space:	Indoor

## **Construction and Dimensions**

Rack Units:	45U
Depth:	18.8 in

## **Mechanical Characteristics**

Mounting: Vertical

# **Environmental and Overall Characteristics**

Finish:	Black Powdercoat
Material:	6063-T6 Aluminum & Black Plastic
Color:	Black

# **Related Part Numbers**

Included Parts:	Mounting Hardware
Packaging:	Individually Boxed

#### Variants

Part #	Height	Width	Depth	Weight
BHVHH10	79.63 in	10.0 in	18.8 in	58.0 lb
BHVHH03	79.63 in	3.72 in	18.8 in	46.0 lb
BHVHH06	79.63 in	6.0 in	18.8 in	50.0 lb
BHVHH08	79.63 in	8.0 in	18.8 in	54.0 lb
BHVHH12	79.63 in	12.0 in	18.8 in	62.0 lb

Update and Revision: Revision Number: 0.214 Revision Date: 11-09-2022

#### © 2025 Belden, Inc

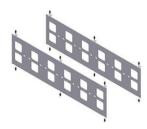
## All Rights Reserved.

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.





Product: BHBC ☑

# Belden High Density Vertical Manager Backcovers

# **Product Description**

Vertical Manager Backcover

# **Technical Specifications**

## **Application**

Product Overview:	Back covers provide closure on the rear side of vertical cable managers. Back covers are designed with pass thru openings for cable routing, slots for cable straps, and keyhole slots for
Floduct Overview.	attaching cable spools. Includes mounting hardware.

#### **Environmental and Overall Characteristics**

Finish:	Black Powdercoat
Material:	Aluminum .090
Color:	Black

### **Related Part Numbers**

## Variants

Part #	Width	Weight
BHBC12X	12.0 in	6.2 lb
BHBC03X	3.6 in	2.0 lb
BHBC06X	6.0 in	3.5 lb
BHBC10X	10.0 in	5.0 lb

Update and Revision:	Revision Number: 0.187 Revision Date: 11-09-2022
----------------------	--

#### © 2025 Belden, Inc

#### All Rights Reserved

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: BHH192UR ☑



# Belden Horizontal Cable Management

# **Product Description**

Horizontal Manager with Molded Fingers and Hinging Cover

#### **Technical Specifications**

#### **Application**

Product Overview:	Horizontal Managers allow routing of copper and fiber cables/patch cords in rack and cabinets while helping to maintain proper bend radius and organize array for ease of moves, adds and changes. Features include 1U - 4U height, 19" mount includes mounting hardware, Compatible with racks & cabinets, selection of ring, finger and cable tie bar style horizontal managers.
Environmental Space:	Indoor

#### **Construction and Dimensions**

Rack Units:	2U
Height:	3.5 in
Width:	19.0
Depth:	7.22 in

## **Mechanical Characteristics**

Rack Mount 19" Horizontal	
---------------------------	--

#### **Environmental and Overall Characteristics**

Finish:	Black powdercoat finish
Material:	Steel and Plastic Molded Fingers
Color:	Black
Weight:	3.5 LB

#### **Related Part Numbers**

Part Number:	BHH192UR
Included Parts:	Mounting Hardware
Packaging:	Individually Boxed

#### Variants

BHH192UR
Jpdate and Revision:

#### © 2025 Belden, Inc

#### All Rights Reserved

Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

All sales of Belden products are subject to Belden's standard terms and conditions of sale.



Product: BHH193UR ☑



### Belden Horizontal Cable Management

### **Product Description**

Horizontal Manager with Molded Fingers and Hinging Cover

#### **Technical Specifications**

#### **Application**

Product Overview:	Horizontal Managers allow routing of copper and fiber cables/patch cords in rack and cabinets while helping to maintain proper bend radius and organize array for ease of moves, adds and changes. Features include 1U - 4U height, 19" mount includes mounting hardware, Compatible with racks & cabinets, selection of ring, finger and cable tie bar style horizontal managers.
Environmental Space:	Indoor

#### **Construction and Dimensions**

Rack Units:	3U
Height:	5.25 in
Width:	19.0 in
Depth:	7.22 in

### **Mechanical Characteristics**

Mounting: Rack Mount 19" Horizontal	
-------------------------------------	--

#### **Environmental and Overall Characteristics**

Finish:	Black powdercoat finish
Material:	Steel and Plastic Molded Fingers
Color:	Black
Weight:	4.4 LB

#### **Related Part Numbers**

Part Number:	BHH193UR
Included Parts:	Mounting Hardware
Packaging:	Individually Boxed

#### Variants

Part #	neigiii	vvidili	Deptili	weigni
BHH193UR	5.25 in	19.0 in	7.22 in	4.4 LB
Update and Revision:	F	Revision N	lumber: (	0.50 Revis

#### © 2025 Belden, Inc

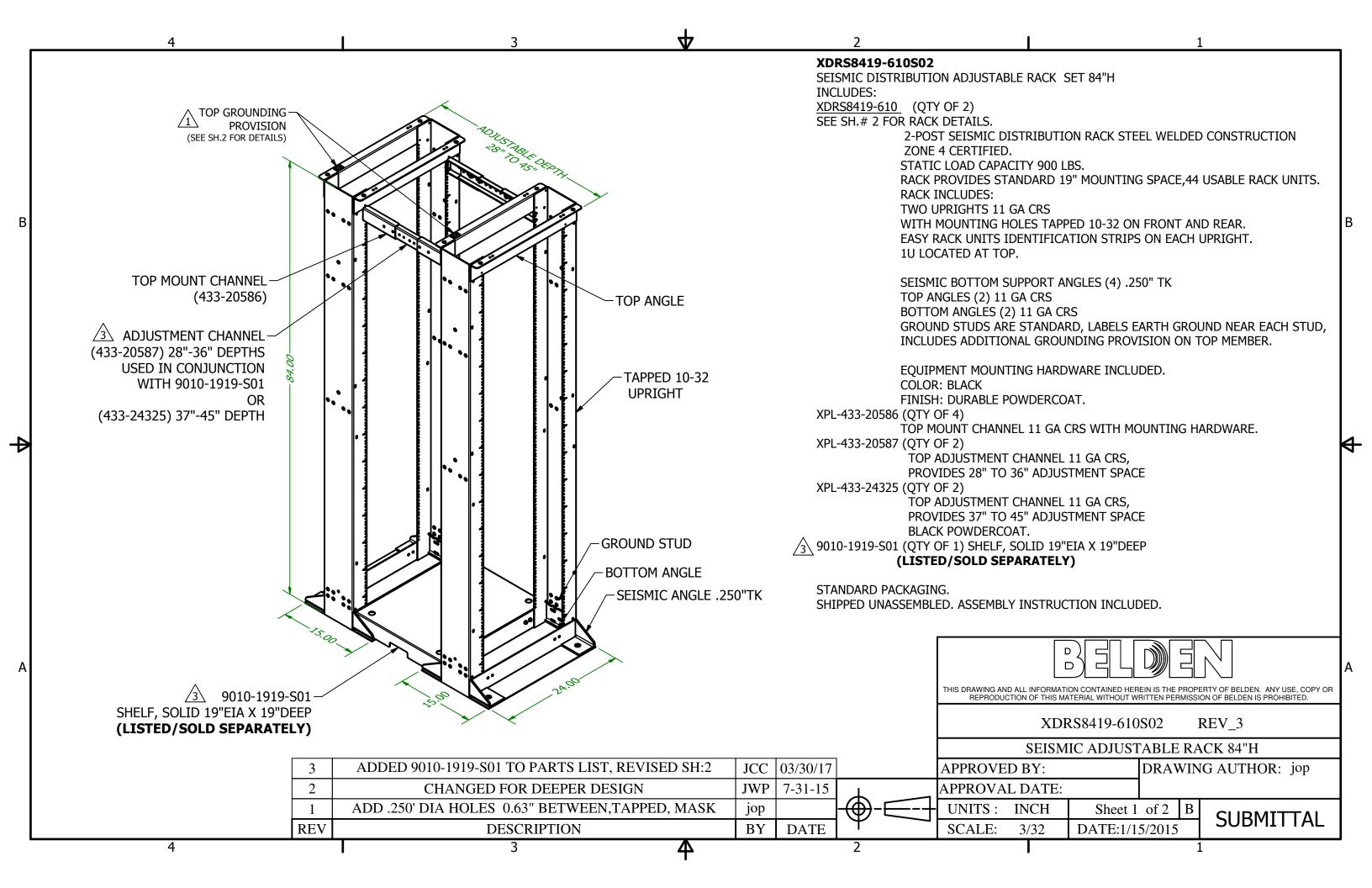
#### All Rights Reserved

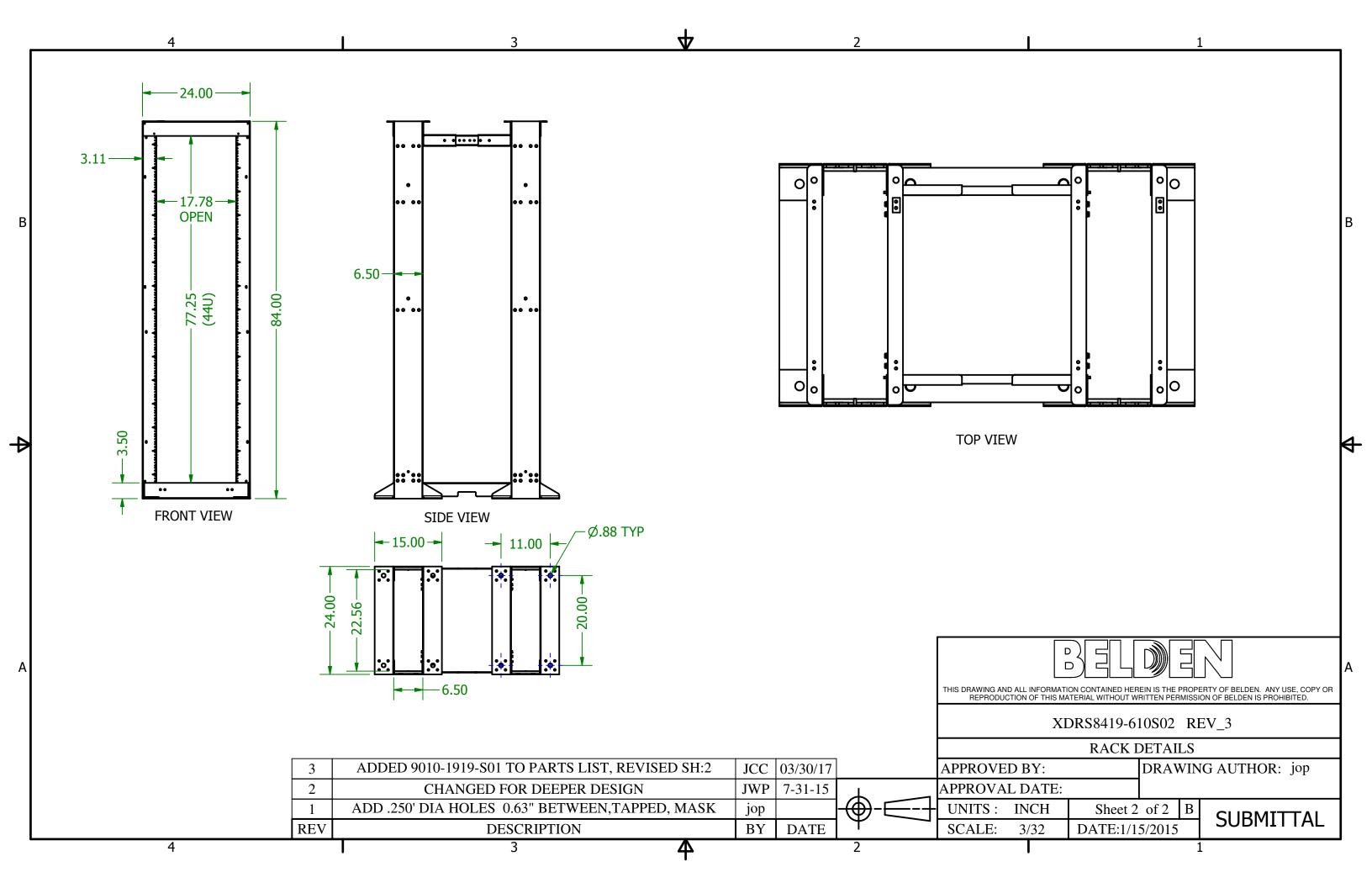
Although Belden makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described here in are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

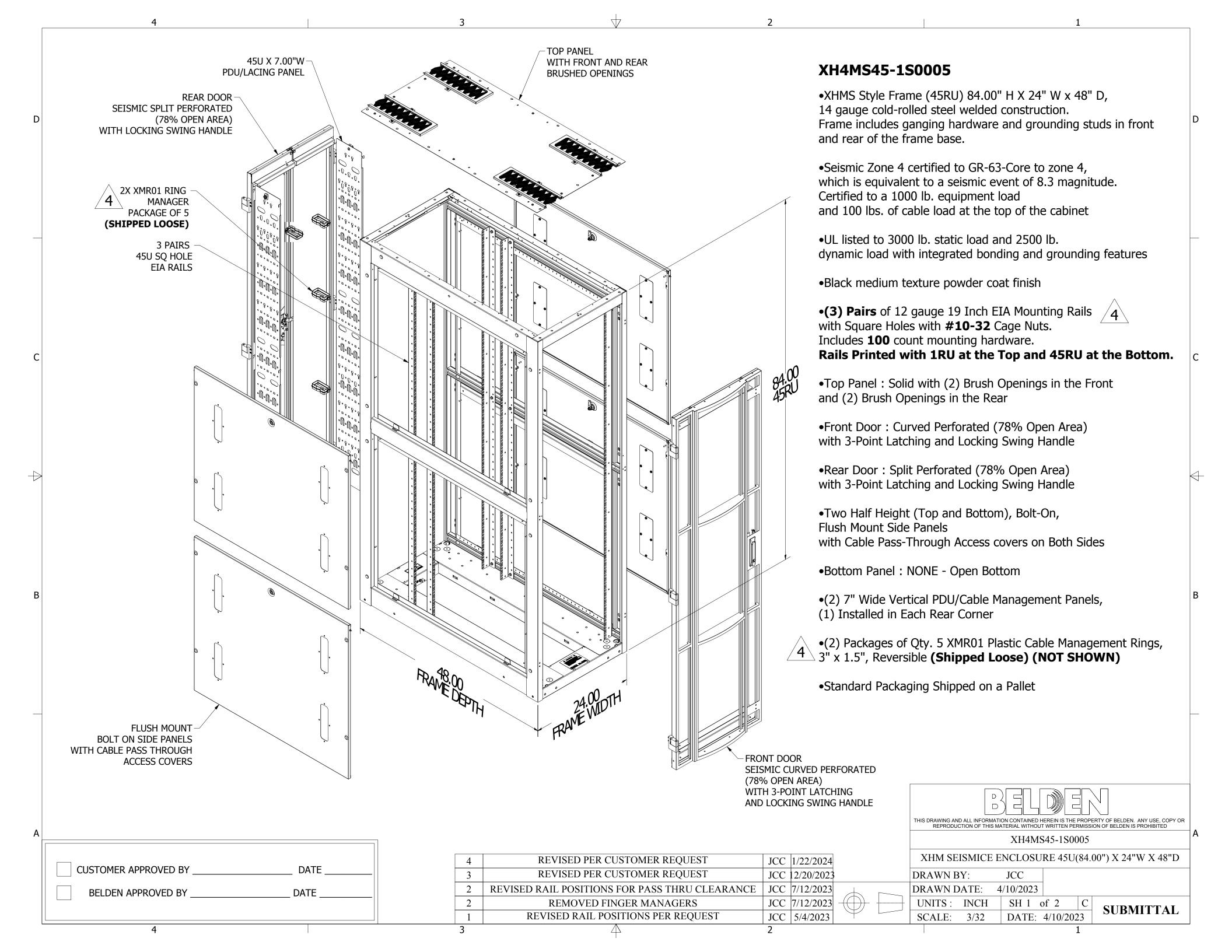
Belden provides the information and specifications herein on an "ASIS" basis, with no representations or warranties, whether express, statutory or implied. In no event will Belden be liable for any damages (including consequential, indirect, incidental, special, punitive, or exemplary damages) whatsoever, even if Belden has been advised of the possibility of such damages, whether in an action under contract, negligence or any other theory, arising out of or in connection with the use, or inability to use, the information or specifications described herein.

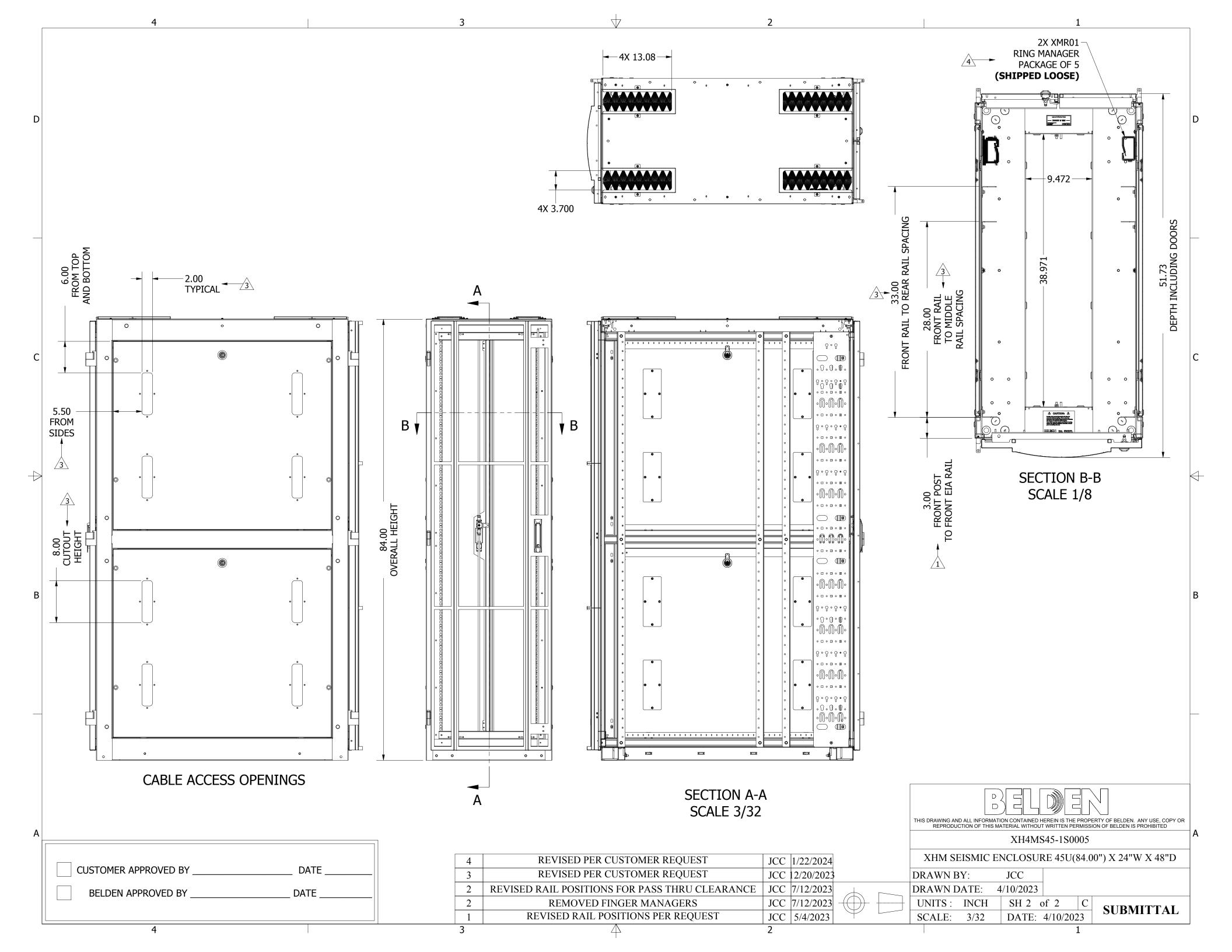
All sales of Belden products are subject to Belden's standard terms and conditions of sale.

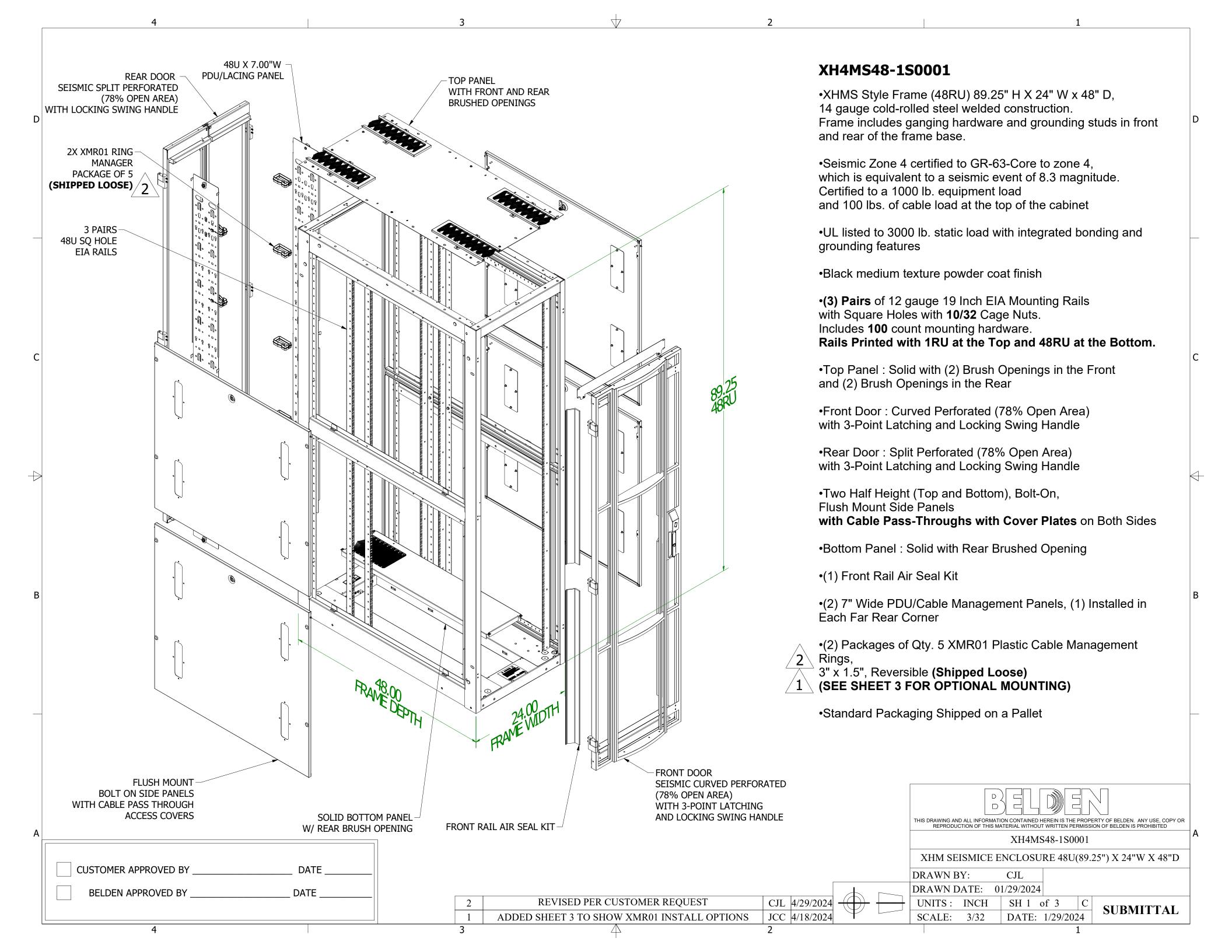
Belden believes this product to be in compliance with all applicable environmental programs as listed in the data sheet. The information provided is correct to the best of Belden's knowledge, information and belief at the date of its publication. This information is designed only as a general guide for the safe handling, storage, and any other operation of the product itself or the one that it becomes a part of. The Product Disclosure is not to be considered a warranty or quality specification. Regulatory information is for guidance purposes only. Product users are responsible for determining the applicability of legislation and regulations based on their individual usage of the product.

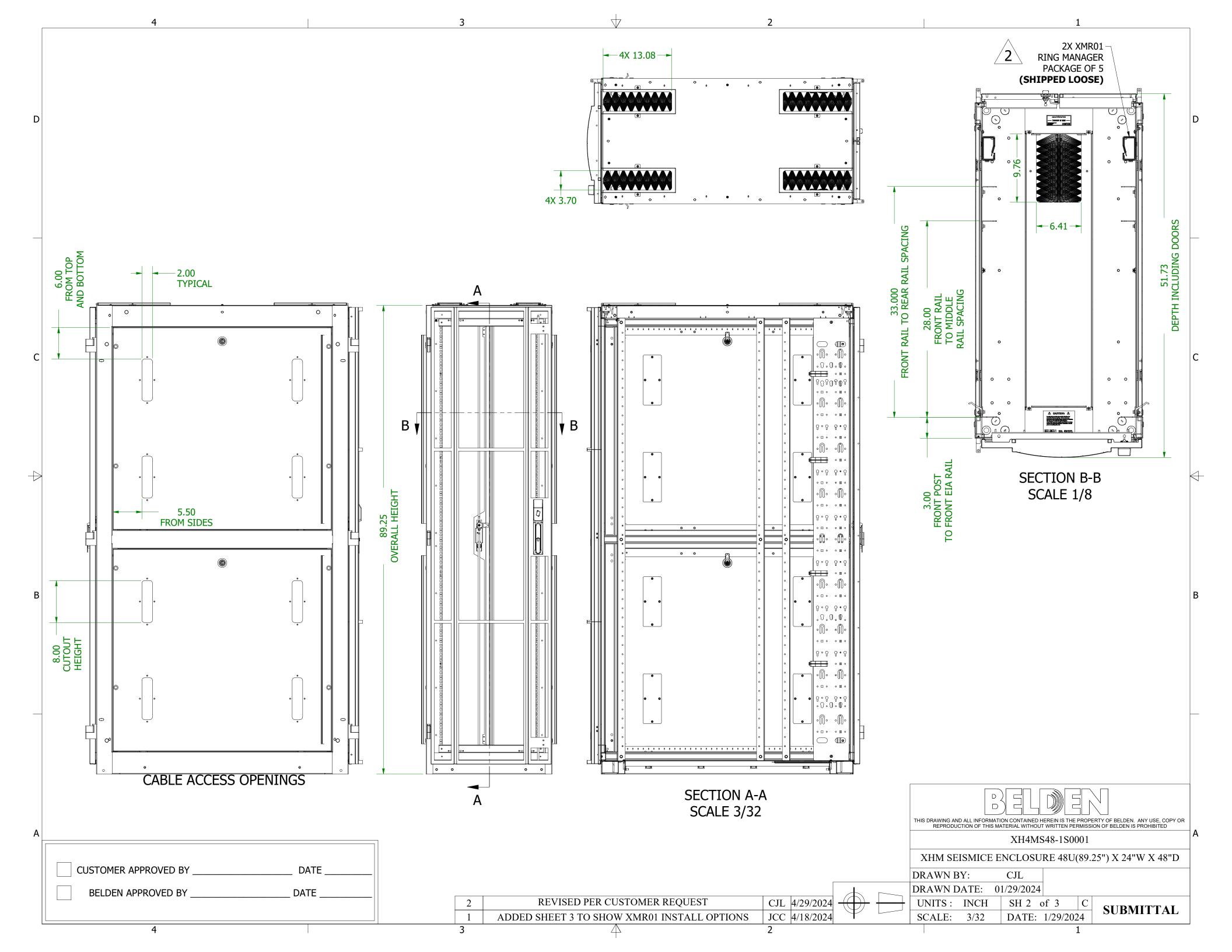


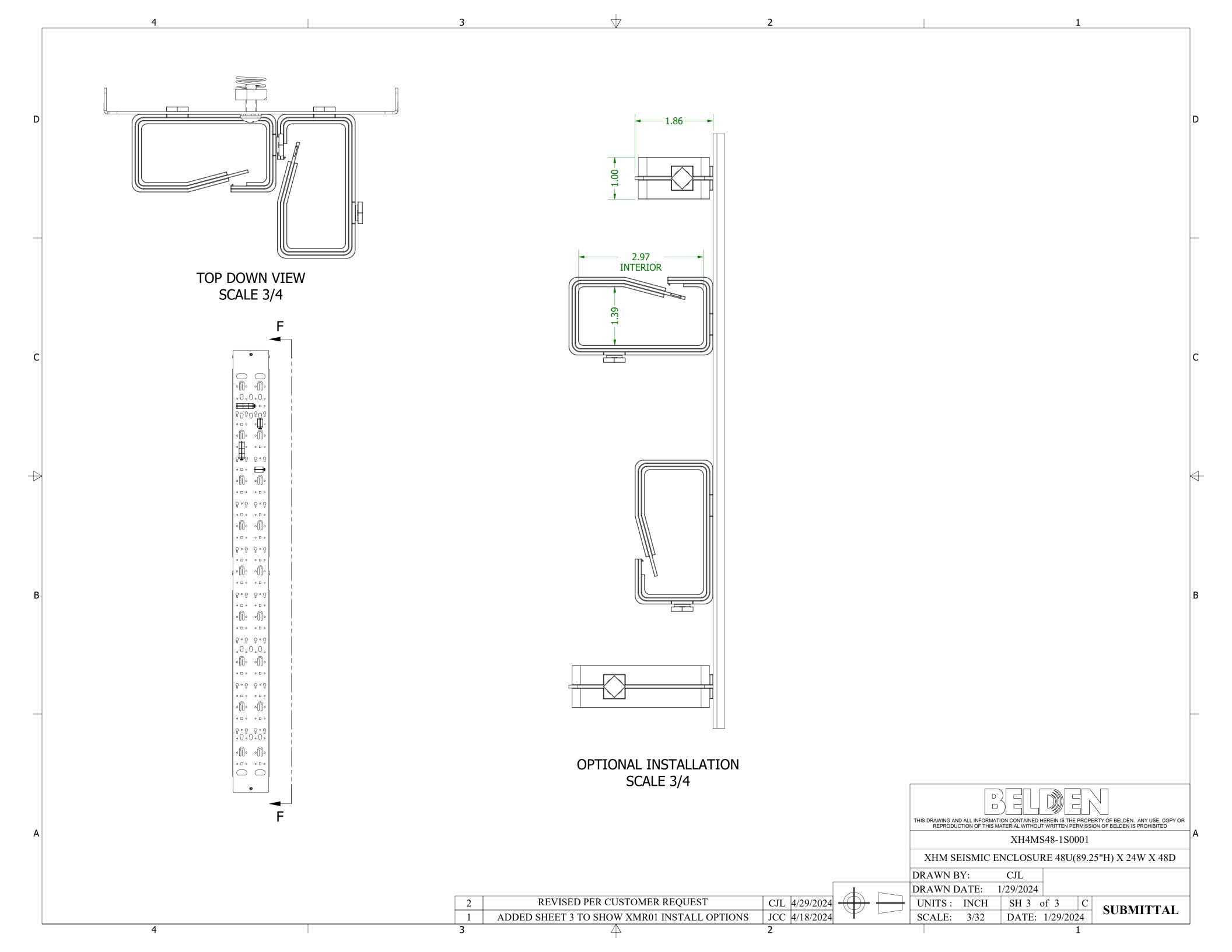


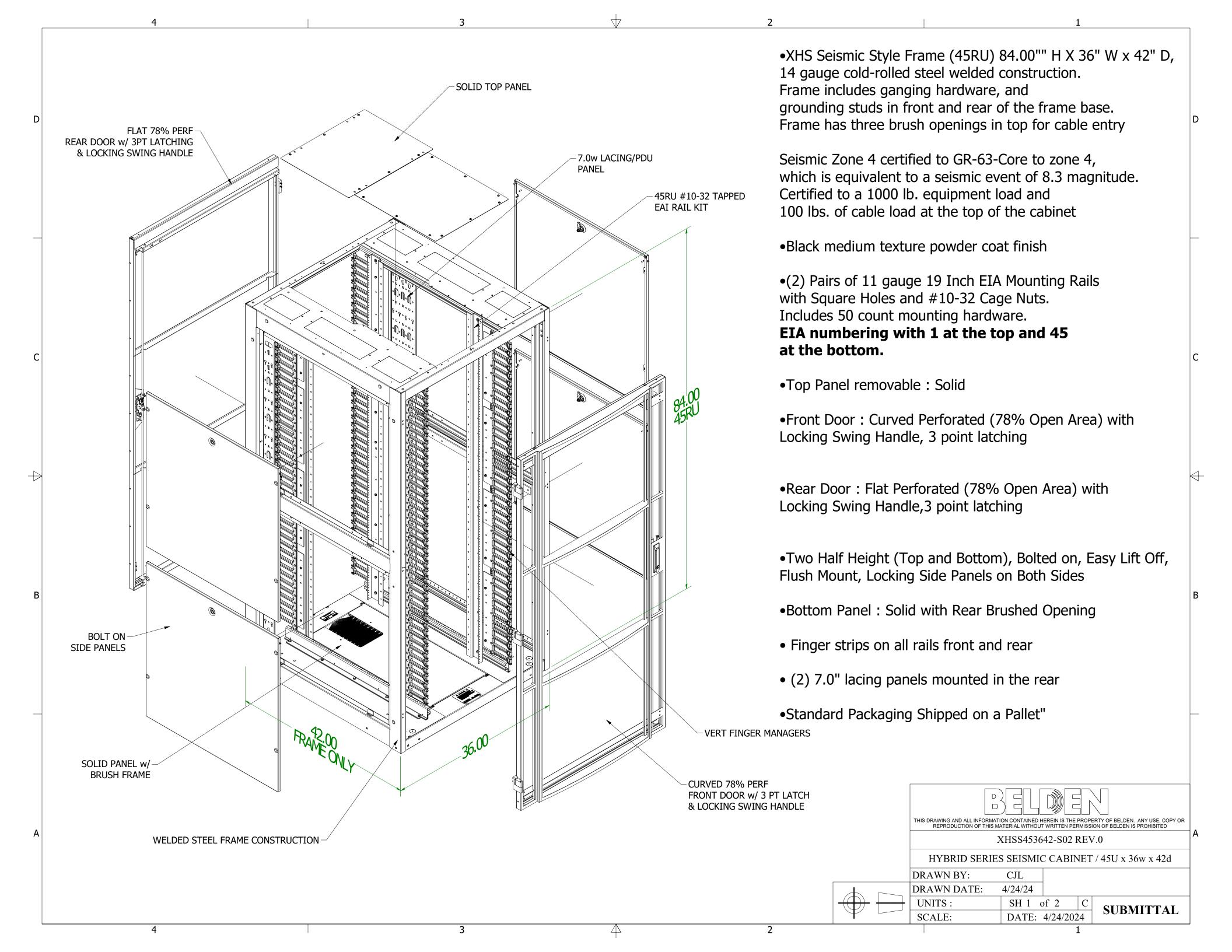


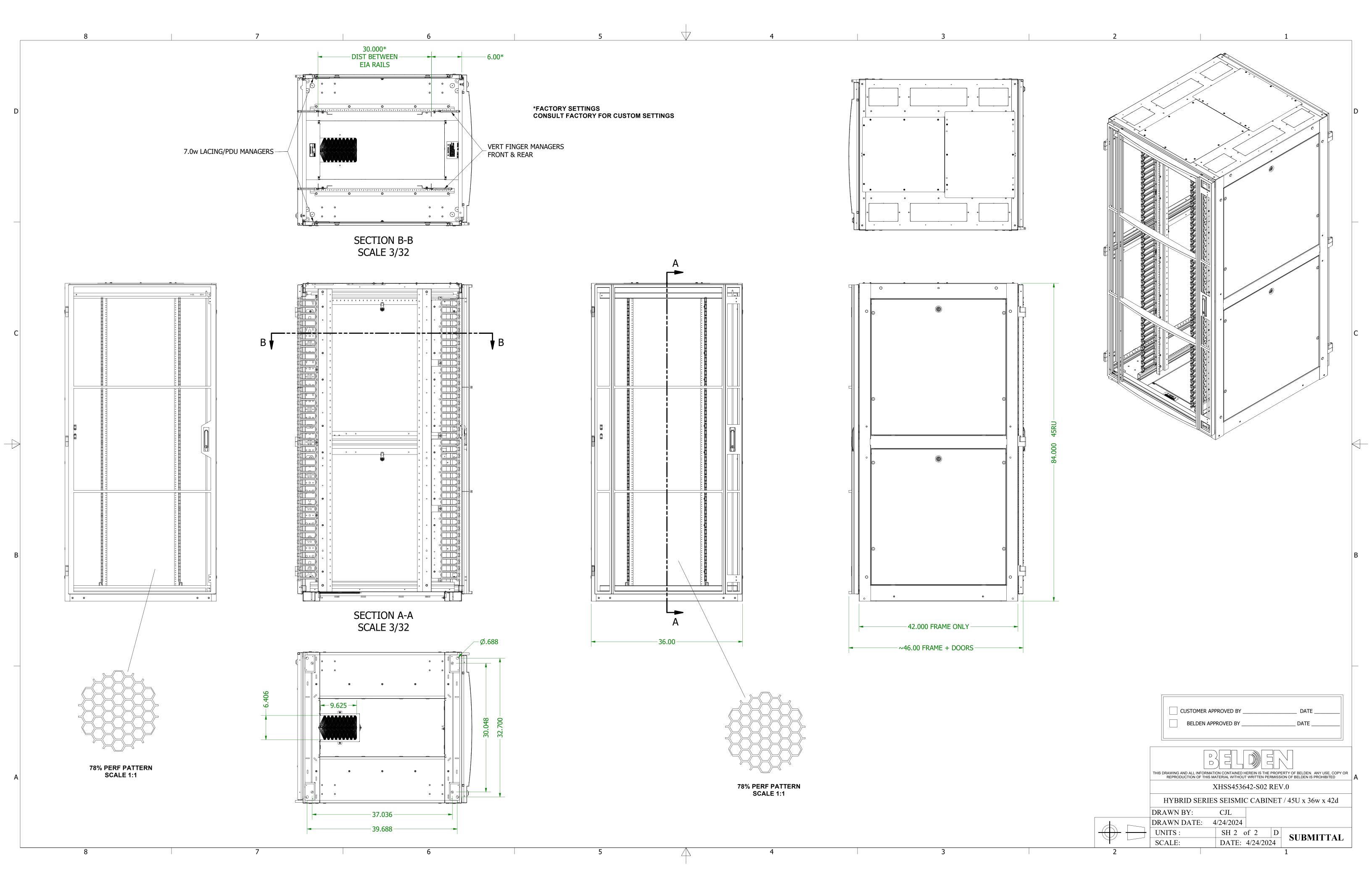


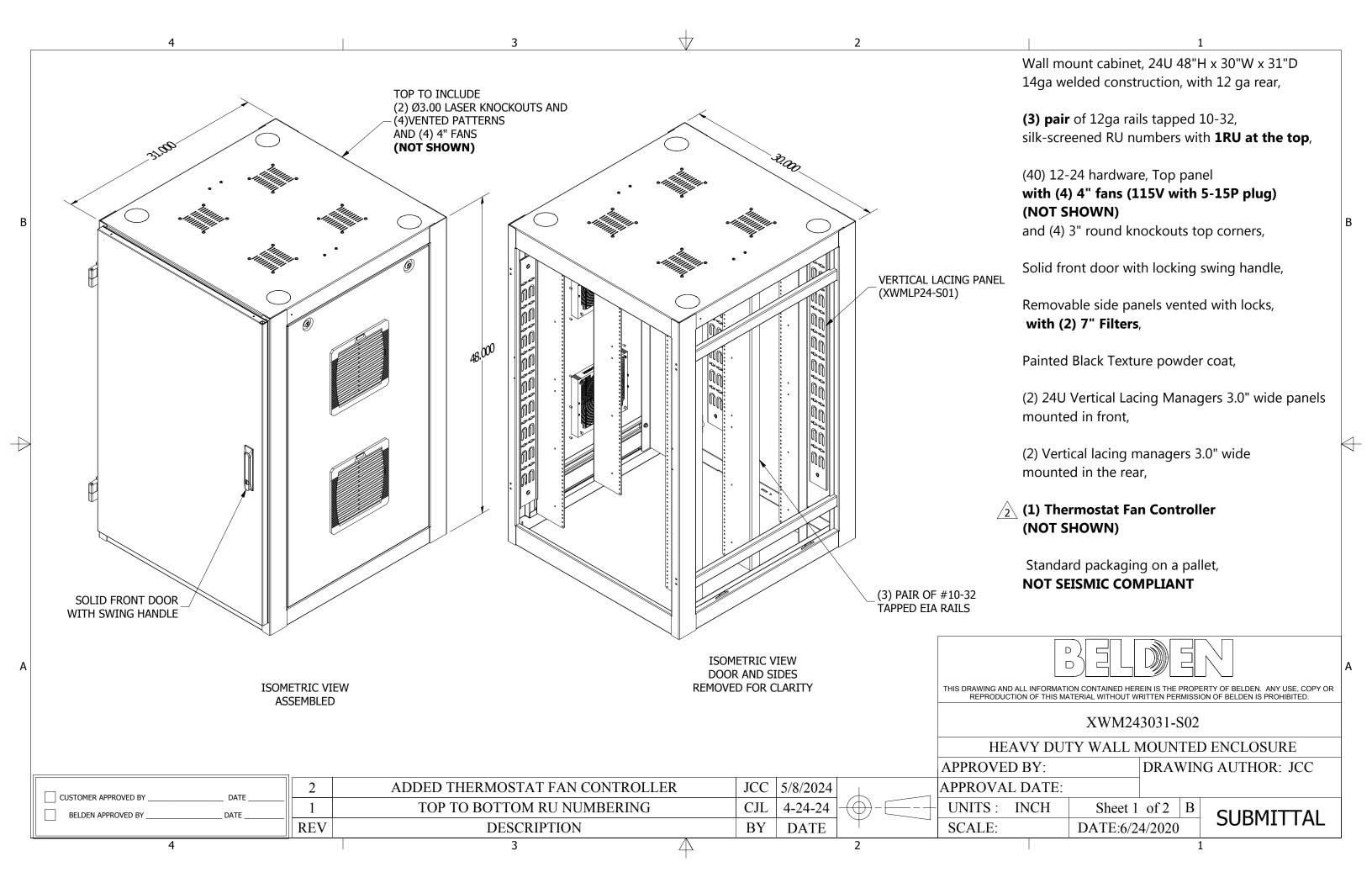


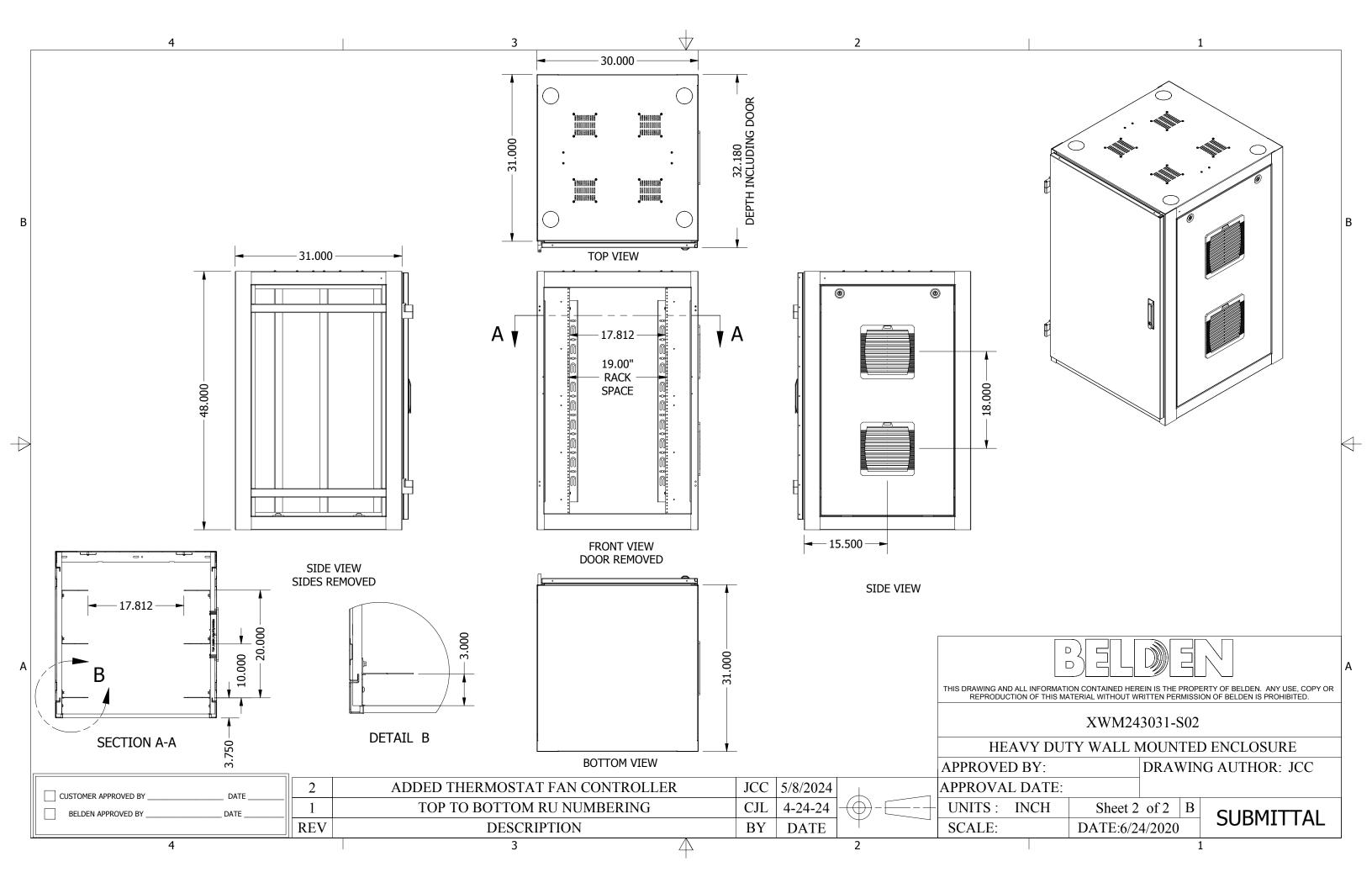


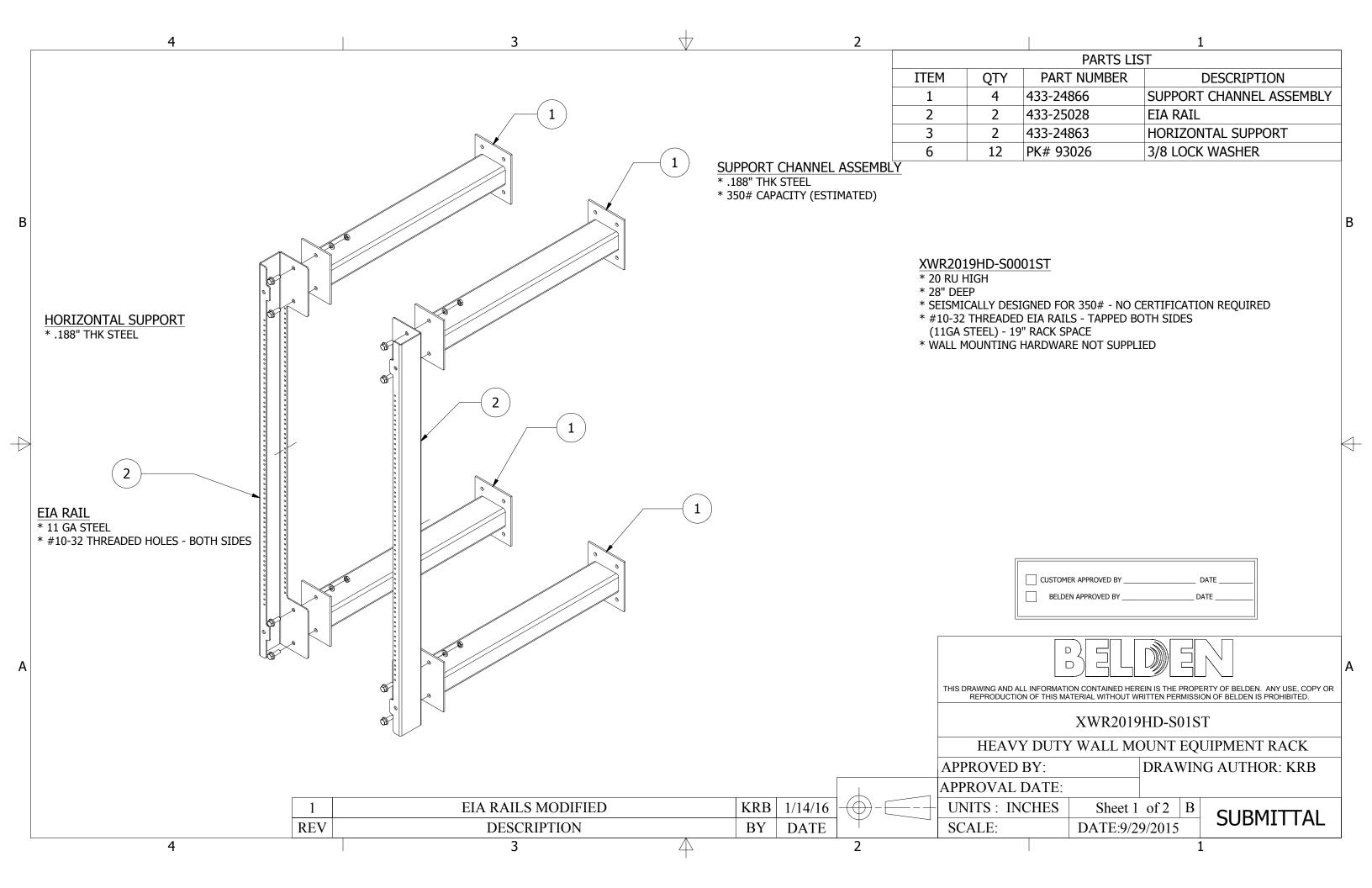


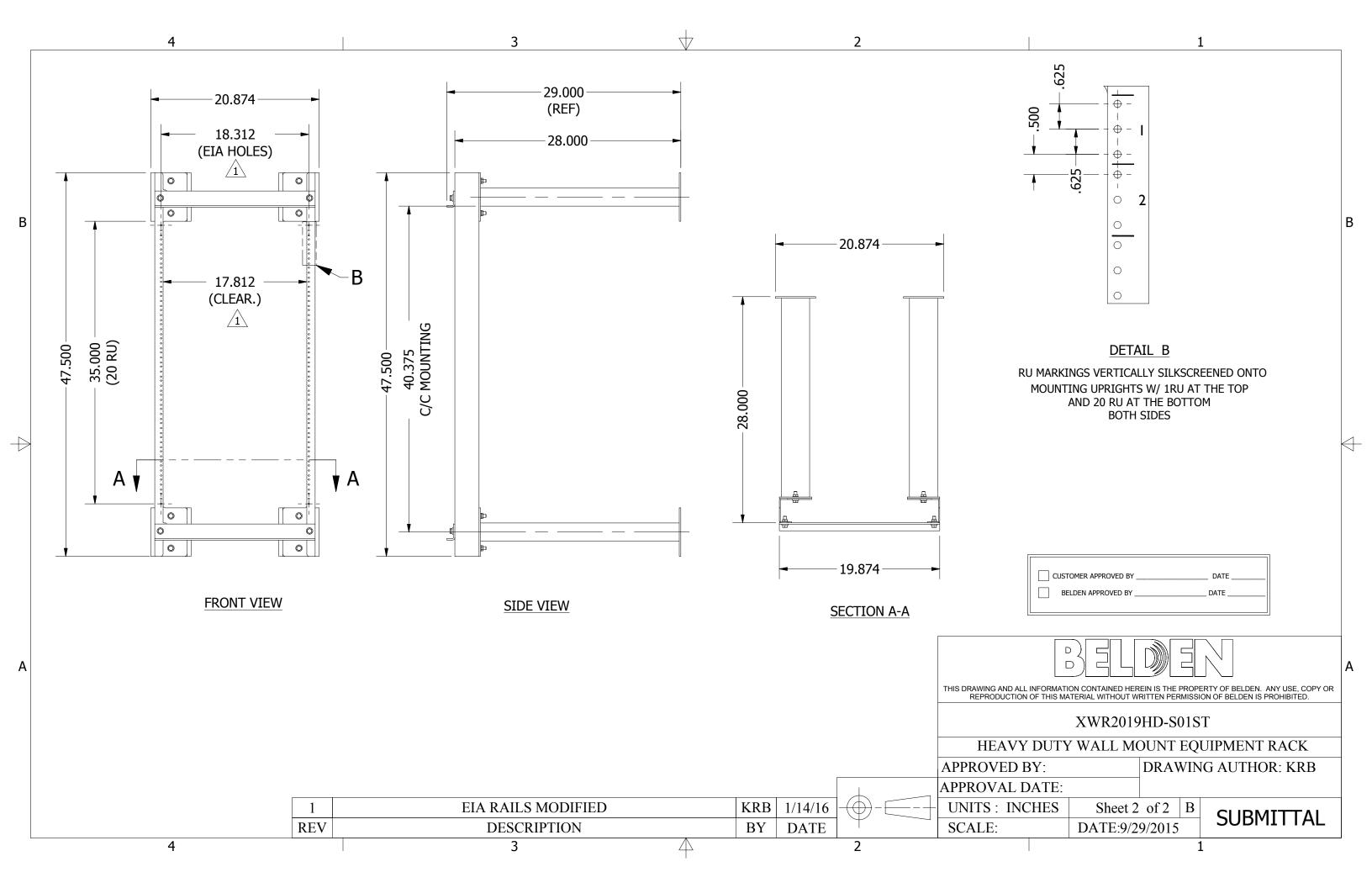
















APPENDIX E.2: COMMSCOPE UNIPRISE CAT6 CS37 STRUCTURED CABLING SYSTEM PART NUMBERS - ACUTE SITE RENOVATION PROJECT WITH EXISTING CAT6 MER/TR, AND COMMUNITY SITE NEW CONSTRUCTION AND RENOVATION PROJECTS

**Version 01** 

January 2025



# List Name: PHSA January 2025 C6 Copper (Uniprise)

Submitted by: CommScope Date: 02/03/2025

ATTN: Kevin Wallingford@commscope.com

CA

### Category 6 Cables

Part Number   Name	Description	Comment	Quantity
UN874043014/10   CS37P BLU C6 4/23 U/UTP CPK 1KFT	CS37P ETL Verified Category 6 U/UTP Cable, plenum, blue jacket, 4 pair count, 1000 ft (305 m) length CommPak		1
UN884026814/10   CS37R BLU C6 4/23 U/UTP CPK 1KFT	CS37R ETL Verified Category 6 U/UTP Cable, non-plenum, blue jacket, 4 pair count, 1000 ft (305 m) length, CommPak		1

### Category 6 Jacks

Par	rt Number   Name	Description	Comment	Quantity
760		SL-Series Modular Jack, RJ45, Cat6 Unshielded, Black		1

### Category 6 Patch Cords

Part Number   Name	Description	Comment	Quantity
CO166S2-03F001	MiNo6 Cat 6 U/UTP Reduced Diameter RJ45 Patch Cord, LS-CM Dual Rated, 1, ft, 3 - Dark Gray		1
CO166S2-03F005	MiNo6 Cat 6 U/UTP Reduced Diameter RJ45 Patch Cord, LS-CM Dual Rated, 5, ft, 3 - Dark Gray		1

Page 1 of 3 February 3, 2025





# List Name: PHSA January 2025 C6 Copper (Uniprise)

	Part Number   Name	Description	Comment	Quantity
	CO166S2-03F007	MiNo6 Cat 6 U/UTP Reduced Diameter RJ45 Patch Cord, LS-CM Dual Rated, 7, ft, 3 - Dark Gray		1
	CO166S2-03F010	MiNo6 Cat 6 U/UTP Reduced Diameter RJ45 Patch Cord, LS-CM Dual Rated, 10, ft, 3 - Dark Gray		1
	UC1BBB2-0CF010	Uniprise® Cat 6 U/UTP RJ45 Patch Cord, Non-Plenum, 10, ft, C - Slate/Gray		1
	UC1BBB2-0CF025	Uniprise® Cat 6 U/UTP RJ45 Patch Cord, Non-Plenum, 25, ft, C - Slate/Gray		1
W.	UC1BBB2-0CF030	Uniprise® Cat 6 U/UTP RJ45 Patch Cord, Non-Plenum, 30, ft, C - Slate/Gray		1

### Copper Panels

	Part Number   Name	Description	Comment	Quantity
man man man	760237040   CPP-UDDM-SL-1U-24	Unshielded Discrete Distribution Module Panel, SL, 1U, 24 port, Black		1
Part I man Andre man	760237041   CPP-UDDM-SL-2U-48	Unshielded Discrete Distribution Module Panel, SL, 2U, 48 port, Black		1
	760237054   UNP-UDDM-SL-1U-48	Discrete Distribution Module Panel, Cat6, UTP, 1U, 48 port		1

**Faceplates** 

Page 2 of 3 February 3, 2025





# List Name: PHSA January 2025 C6 Copper (Uniprise)

	Part Number   Name	Description	Comment	Quantity
- 11 -	760249130   FP-LBL-4P-262	Faceplate Kit, Labelled, 1-gang, 4 port, electric white		1

### Surface Mount & Zone Boxes

Part Number   Name	Description	Comment	Quantity
760248525   SMB-2P-262	Surface Mount Box, universal, two ports, white		1

Page 3 of 3 February 3, 2025



# 760237040 | CPP-UDDM-SL-1U-24



Unshielded Discrete Distribution Module Panel, SL, 1U, 24 port, Black

### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Product Type

RJ45 patch panel

Product Series SL Series

General Specifications

Cable TypeUnshieldedColorBlackModules, quantity0

Panel Style Straight

Rack Type EIA 19 in

Rack Units 1

Total Ports, quantity 24

**Dimensions** 

 Height
 44.45 mm | 1.75 in

 Width
 482.6 mm | 19 in

 Depth, with cable management
 119.38 mm | 4.7 in

Material Specifications

Material Type High-impact, flame retardant, thermoplastic | Powder-coated steel

## **Environmental Specifications**

Operating Temperature  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

Storage Temperature  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-40  $^{\circ}\text{F}$  to +158  $^{\circ}\text{F}$ )

Flammability Rating UL 94 V-0

COMMSC PE°

# 760237040 | CPP-UDDM-SL-1U-24

Safety Standard RCM | UL | cUL

Packaging and Weights

Packaging MaterialEco-friendly, single-use plastics-free

Packaging quantity 1

# Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760237041 | CPP-UDDM-SL-2U-48



Unshielded Discrete Distribution Module Panel, SL, 2U, 48 port, Black

### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Product Type

RJ45 patch panel

**Product Series** SL Series

## General Specifications

Cable TypeUnshieldedColorBlack

Modules, quantity 0

Panel StyleStraightRack TypeEIA 19 in

Rack Units 2

Total Ports, quantity 48

### **Dimensions**

 Height
 88.9 mm | 3.5 in

 Width
 482.6 mm | 19 in

 Depth, with cable management
 119.38 mm | 4.7 in

# Material Specifications

Material Type High-impact, flame retardant, thermoplastic | Powder-coated steel

## **Environmental Specifications**

Operating Temperature  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

Storage Temperature  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-40  $^{\circ}\text{F}$  to +158  $^{\circ}\text{F}$ )

Flammability Rating UL 94 V-0

COMMSC PE°

# 760237041 | CPP-UDDM-SL-2U-48

Safety Standard RCM | UL | cUL

Packaging and Weights

Packaging Material Eco-friendly, single-use plastics-free | Eco-friendly, single-use plastics-free

Packaging quantity 1

# Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760237054 | UNP-UDDM-SL-1U-48



Discrete Distribution Module Panel, Cat6, UTP, 1U, 48 port

### **OBSOLETE**

### Replaced By:

760237060 CPP-6-UDDM-SL-1U-48

Unshielded Discrete Distribution Module Panel, Cat 6, SL, 1U, 48 port, Black

### **Product Classification**

Regional AvailabilityNorth AmericaPortfolioUniprise®

Product Type RJ45 patch panel

## General Specifications

ANSI/TIA Category 6

 Cable Type
 Unshielded

**Color** Black

Modules, quantity 4

Panel StyleStraightRack TypeEIA 19 in

Rack Units 1

Total Ports, quantity 48

**Wiring** T568A | T568B

### **Dimensions**

Height44.45 mm| 1.75 inWidth482.6 mm| 19 inDepth, with cable management93.98 mm| 3.7 inCompatible Diameter Over Dielectric, maximum1.168 mm| 0.046 inCompatible Diameter Over Dielectric, minimum0.762 mm| 0.03 in

Page 1 of 2



# 760237054 | UNP-UDDM-SL-1U-48

# **Electrical Specifications**

Current Rating at Temperature  $1.5 \text{ A} \otimes 20 \text{ °C} + 1.5 \text{ A} \otimes 68 \text{ °F}$ 

Dielectric Withstand Voltage, RMS, conductive surface1,500 Vac @ 60 HzDielectric Withstand Voltage, RMS, contact-to-contact1,000 Vac @ 60 Hz

Insulation Resistance, minimum 500 MOhm

Material Specifications

Material Type High-impact, flame retardant, thermoplastic | Powder-

coated steel

**Environmental Specifications** 

Operating Temperature -10 °C to +60 °C (+14 °F to +140 °F)

Storage Temperature  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-40  $^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

**Relative Humidity** Up to 95%, non-condensing

Flammability Rating UL 94 V-0
Safety Standard UL | cUL

Packaging and Weights

Included Modular jacks (48)

Packaging quantity

## Regulatory Compliance/Certifications

CHINA-ROHS Below maximum concentration value

Classification

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



**Agency** 



# 760237627 | USL600-BK



### SL-Series Modular Jack, RJ45, Cat6 Unshielded, Black

### **Product Classification**

Regional AvailabilityNorth AmericaPortfolioUniprise®Product TypeModular jackProduct SeriesUSL Series

General Specifications

ANSI/TIA Category 6

Cable Type Unshielded

**Color** Black

Conductor Type Solid | Stranded

Integrated Dust Cover Type None

Mounting Note Color matches with SL-style Black Faceplates and Surface

Mount Boxes

Termination Type IDC

**Wiring** T568A | T568B

**Dimensions** 

Compatible Conductor Gauge, solid22 AWG24 AWGCompatible Conductor Gauge, stranded24 AWG26 AWG

**Electrical Specifications** 

 Contact Resistance Variation, maximum
 20 mOhm

 Contact Resistance, maximum
 100 mOhm

**Current Rating at Temperature** 1.5 A @ 20 °C | 1.5 A @ 68 °F

Dielectric Withstand Voltage, RMS, conductive surface1,500 Vac @ 60 HzDielectric Withstand Voltage, RMS, contact-to-contact1,000 Vac @ 60 Hz

Insulation Resistance, minimum 500 MOhm

COMMSCOPE®

# 760237627 | USL600-BK

**Remote Powering** Fully supports the safe delivery of power over LAN cabling

described by IEEE 802.3bt (Type 4) and complies with the unmating under electrical load requirements prescribed by IEC

60512-99-002

PoE Durability Supports IEEE 802.3bt Type 4 (90 W) applications greater than

3000 plug to jack mating cycles

Material Specifications

Contact Plating Material Precious metals

Material Type Copper alloy | High-impact, flame retardant, thermoplastic

Termination Contact Plating Nickel

Mechanical Specifications

Plug Insertion Life, test plug IEC 60603-7 compliant plug

Plug Retention Force, minimum 133 N | 29.9 lbf

Plug to Jack Mating Cycles Complies to IEC 60603-7 series

**Environmental Specifications** 

**Operating Temperature**  $-10 \,^{\circ}\text{C} \text{ to } +60 \,^{\circ}\text{C} \, (+14 \,^{\circ}\text{F to } +140 \,^{\circ}\text{F})$ 

**Storage Temperature**  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  ( $-40 \,^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

**Relative Humidity** Up to 95%, non-condensing

Flammability Rating UL 94 V-0
Safety Standard UL | cUL

Packaging and Weights

Packaging quantity

## Regulatory Compliance/Certifications

CHINA-ROHS Below maximum concentration value

Classification

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



Agency



# 760248525 | SMB-2P-262



### Surface Mount Box, universal, two ports, white

### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

**Product Type** Surface mount box

# General Specifications

Application Used with KJ Series outlets with adapter | Used with M Series modular information outlet | Used with

SL Series outlets

**Color** Electrical white

MountingSurfaceOutlet OrientationFlatPort Marking TypeIconTotal Ports, quantity2

### **Dimensions**

 Height
 37.6 mm | 1.48 in

 Width
 72.9 mm | 2.87 in

 Depth
 101.8 mm | 4.008 in

# Material Specifications

Material Type High-impact, flame retardant, thermoplastic, UL listed material

# **Environmental Specifications**

Environmental Space Indoor
Flammability Rating UL 94 V-0
Safety Standard UL | cUL

Packaging and Weights

COMMSCOPE®

Page 1 of 2

# 760248525 | SMB-2P-262

Packaging quantity

1

**Weight, net** 0.06 kg | 0.132 lb

# Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760249130 | FP-LBL-4P-262



### Faceplate Kit, Labelled, 1-gang, 4 port, electric white

- Engineered for residential and commercial applications from classrooms and hospitals to offices and homes
- Labeling models feature mold-over icon and leveling and convex labels for maximum visibility in low density areas

### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

PortfolioCommScope®Product TypeFaceplate kit

Product Series FP-LBL

Warranty For more information, please consult our Product Warranty guidelines

## General Specifications

**Application** Used with KJ Series outlets with adapter | Used with M Series outlets | Used with SL Series outlets

**Color** Electrical white

Gangs, quantity 1

Mounting Flush
Outlet Orientation Flat

Port Marking Type | Icon | Label

Total Ports, quantity 4

### **Dimensions**

 Height
 115.824 mm | 4.56 in

 Width
 71.374 mm | 2.81 in

 Depth
 10.668 mm | 0.42 in

## Material Specifications

Material Type High-impact, flame retardant, thermoplastic, UL listed material

## **Environmental Specifications**

Environmental Space Indoor

COMMSCOPE®

# 760249130 | FP-LBL-4P-262

Flammability Rating UL 94 V-0

Safety Standard cUL US 1863

## Packaging and Weights

Included Label cover (2) | Mounting screw (2)

Packaging quantity 1

Packaging Type Bag

**Weight, net** 0.036 kg | 0.08 lb

# Regulatory Compliance/Certifications

### Agency Classification

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



### \* Footnotes

Warranty For more information, please consult our Product Warranty guidelines



# CO166S2

#### **Base Product**



# MiNo6 Cat 6 U/UTP Reduced Diameter RJ45 Patch Cord, LS-CM Dual Rated

- Perfect for cross connects, workstations or racks with higher-density and/or limited space
- Small diameter unshielded twisted pair patch cords (0.15 inch/3.81 mm) that offers flexibility, durability and reliability
- Unique laminate barrier wrap provides excellent alien cross-talk performance

### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

**Product Type** Twisted pair patch cord

Product Series CO | UTG

Ordering Note Cords < 1 m are valid elements for use in a channel or as an equipment interconnect but

due to their limited length are not guaranteed to meet component compliance

requirements that were developed to assess the quality of longer cords | Cords > 1 m are authorized for use in channels and are an effective standalone method used to

connect active devices

## General Specifications

ANSI/TIA Category 6 (except wire gauge)

Cable Type U/UTP (unshielded)

Conductor Type Solid

Interface, Connector ARJ45 plugInterface Feature, connector AStandardInterface, Connector BRJ45 plugInterface Feature, connector BStandard

Jacket Color Black | Blue | Dark gray | Green | Light

blue | Orange | Purple | Red | Spring green | Violet | White | Yellow

Pairs, quantity 4

**Transmission Standards** IEEE 802.3bt Type 4

Wiring T568B

**Dimensions** 



# CO166S2

Cable Assembly Length Range (m) 1-40Cable Assembly Length Range (ft) 1-131

Cable Assembly Length Range (cm) 15 - 999
Cable Assembly Length Range (in) 6 - 999

**Diameter Over Jacket** 3.708 mm | 0.146 in

Compatible Conductor Gauge, solid 28 AWG

## Wiring Diagram

	Connector A	Connector B
Position 1	White/Orange	White/Orange
Position 2	Orange	Orange
Position 3	Lt. Green	Lt. Green
Position 4	Blue	Blue
Position 5	Lt. Blue	Lt. Blue
Position 6	Green	Green
Position 7	Lt. Brown	Lt. Brown
Position 8	Brown	Brown

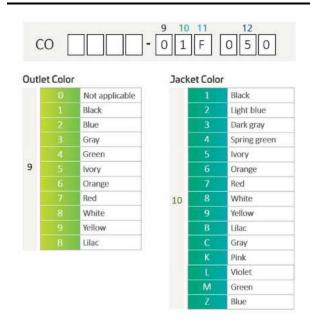
# **Electrical Specifications**

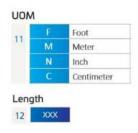
dc Resistance, maximum0.3 ohmSafety Voltage Rating300 V

# Ordering Tree



# CO166S2





#### Notes

- Cords > 1m are authorized for use in channels and are an effective standalone method used to connect active devices
- Cords < 1m are also valid elements for use in a channel or as an equipment interconnect but due to their limited length are not guaranteed to meet component compliance requirements that were developed to assess the quality of longer cords

## Material Specifications

Contact Plating Material Precious metals

Material Type Copper alloy | Polycarbonate

Mechanical Specifications

Plug Insertion Life, minimum 750 times

Plug Retention Force, minimum 90 N | 20.233 lbf

## **Environmental Specifications**

**Operating Temperature**  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

Environmental Space Low Smoke Zero Halogen (LSZH) | Non-plenum

Flammability Rating UL 94 V-0

Safety Standard Anatel | UL 1863

Packaging and Weights

Packaging quantity

## Regulatory Compliance/Certifications

Agency Classification

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

COMMSCOPE®

# UC1BBB2

#### **Base Product**



### Uniprise® Cat 6 U/UTP RJ45 Patch Cord, Non-Plenum

### **Product Classification**

Regional Availability North America

Portfolio Uniprise®

Product Type Twisted pair patch cord

Product Series UC

Ordering Note Cords < 1 m are valid elements for use in a channel or as an equipment interconnect

but due to their limited length are not guaranteed to meet component compliance requirements that were developed to assess the quality of longer cords | Cords > 1 m are authorized for use in channels and are an effective standalone method used to

connect active devices

### General Specifications

ANSI/TIA Category 6

Cable Type U/UTP (unshielded)

Conductor TypeStrandedInterface, Connector ARJ45 plugInterface Feature, connector AStandardInterface, Connector BRJ45 plugInterface Feature, connector BStandard

Jacket Color Black | Blue | Green | Orange | Purple | Red | Slate | Violet | White | Yellow

Pairs, quantity 4

**Transmission Standards** IEEE 802.3bt Type 4

Wiring T568B

### **Dimensions**

Cable Assembly Length Range (m) 1 - 30

Cable Assembly Length Range (ft) 1 - 100

Cable Assembly Length Range (cm) 15 - 999

Page 1 of 3



# UC1BBB2

Cable Assembly Length Range (in) 6 - 999

**Diameter Over Jacket** 5.97 mm | 0.235 in

Compatible Conductor Gauge, stranded 24 AWG

# Wiring Diagram

	Connector A	Connector B
Position 1	White/Orange	White/Orange
Position 2	Orange	Orange
Position 3	Lt. Green	Lt. Green
Position 4	Blue	Blue
Position 5	Lt. Blue	Lt. Blue
Position 6	Green	Green
Position 7	Lt. Brown	Lt. Brown
Position 8	Brown	Brown

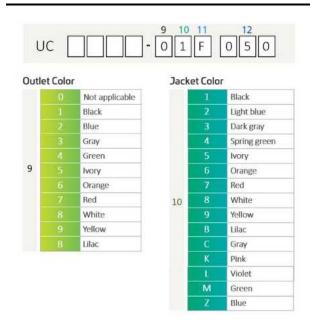
# **Electrical Specifications**

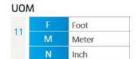
dc Resistance, maximum0.3 ohmSafety Voltage Rating300 V

Ordering Tree



# UC1BBB2





# Length

#### Notes

- Cords > 1m are authorized for use in channels and are an effective standalone method used to connect active devices
- Cords < 1m are also valid elements for use in a channel or as an equipment interconnect but due to their limited length are not guaranteed to meet component compliance requirements that were developed to assess the quality of longer cords

## Material Specifications

Contact Plating Material Precious metals

Material Type Copper alloy | Polycarbonate

Mechanical Specifications

Plug Insertion Life, minimum 750 times

Plug Retention Force, minimum 133 N | 29.9 lbf

## **Environmental Specifications**

**Operating Temperature**  $-10 \,^{\circ}\text{C} \text{ to } +60 \,^{\circ}\text{C} \text{ (+14 }^{\circ}\text{F to } +140 \,^{\circ}\text{F)}$ 

Environmental SpaceNon-plenumFlammability RatingUL 94 V-0Safety StandardETL | cETL

Packaging and Weights

Packaging quantity 1

## Regulatory Compliance/Certifications

Agency Classification

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

COMMSCOPE®



CS37P ETL Verified Category 6 U/UTP Cable, plenum, blue jacket, 4 pair count, 1000 ft (305 m) length CommPak

#### **Product Classification**

Regional AvailabilityNorth AmericaPortfolioUniprise®

Product Type Twisted pair cable

General Specifications

**Product Number** CS37P

ANSI/TIA Category 6

Cable Component Type Horizontal

 Cable Type
 U/UTP (unshielded)

Conductor Type, singlesSolidConductors, quantity8Jacket ColorBlue

Note All electrical transmission tests include swept frequency measurements

Pairs, quantity 4

Separator Type Isolator

Transmission Standards ANSI/TIA-568.2-D | CENELEC EN 50288-6-1 | ISO/IEC 11801 Class E

**Dimensions** 

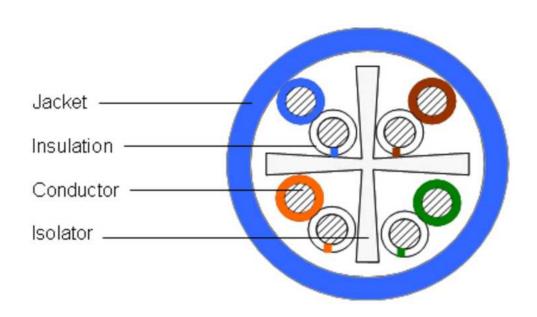
**Cable Length** 304.8 m | 1000 ft

Diameter Over Insulated Conductor0.978 mm0.038 inDiameter Over Jacket, nominal5.639 mm0.222 inJacket Thickness0.483 mm0.019 in

Conductor Gauge, singles 23 AWG

Cross Section Drawing





## **Electrical Specifications**

**Characteristic Impedance** 100 ohm

dc Resistance Unbalance, maximum 5~%

dc Resistance, maximum 8 ohms/100 m | 2.438 ohms/100 ft

**Delay Skew, maximum** 45 ns

Dielectric Strength, minimum1500 Vac | 2500 VdcMutual Capacitance at Frequency5.6 nF/100 m @ 1 kHz

Nominal Velocity of Propagation (NVP) 75 %

Operating Frequency, maximum400 MHzOperating Voltage, maximum80 V

**Remote Powering** Fully complies with the recommendations set forth by IEEE 802.3bt (Type 4) for the

safe delivery of power over LAN cable when installed according to ISO/IEC 14763-2,

CENELEC EN 50174-1, CENELEC EN 50174-2 or TIA TSB-184-A

Safety Voltage Rating 300 V



#### Flectrical Cable Performance

**CS** CommScope

STD Refers to the standard value listed under Transmission Standards in the Electrical Specifications above

TYP Typical Electrical Performance

IL Insertion Loss (dB/100m) NEXT Near End Crosstalk (dB/100m)

 ACR
 Attenuation to Crosstalk Ratio (dB/100m)
 PSNEXT
 Power Sum Near End Crosstalk (db/100m)

 PSACR
 Power Sum Attenuation to Crosstalk Ratio (dB/100m)
 ACRF
 Attenuation to Crosstalk Ratio - Far End (dB/100m)

PSACRF Power Sum Attenuation to Crosstalk Ratio - Far End (dB/100m) RL Return Loss (dB)

TCL Transverse Conversion Loss (dB/100m) ELTCTL Equal Level Transverse Conversion Transfer Loss (dB/100m)

Freq.		IL			NEXT			ACR			PSNEX	г		PSACR	t		ACRF			PSACR	F		RL	
MHz	cs	STD	TYP	cs	STD	TYP	cs	STD	ТҮР	CS	STD	ТҮР	cs	STD	TYP	cs	STD	TYP	cs	STD	TYP	cs	STD	TYP
1	2	2	1.8	77.3	74.3	90.3	75.3	72.3	88.5	75.3	72.3	88.1	73.3	70.3	86.3	68.8	67.8	84.1	65.8	64.8	82.6	20	20	32
4	3.8	3.8	3.6	68.3	65.3	82.7	64.5	61.5	79.1	66.3	63.3	80.4	62.5	59.5	76.8	56.8	55.8	72.7	53.8	52.8	71.4	23.6	23	30
8	5.3	5.3	5.1	63.8	60.8	78.1	58.5	55.4	72.9	61.8	58.8	75.8	56.5	53.4	70.6	50.7	49.7	66.9	47.7	46.7	65.5	25.4	24.5	34.3
10	5.9	6	5.8	62.3	59.3	76.5	56.4	53.3	70.7	60.3	57.3	74.3	54.4	51.3	68.5	48.8	47.8	65	45.8	44.8	63.6	26	25	34.9
16	7.5	7.6	7.3	59.2	56.2	73.5	51.7	48.7	66.1	57.2	54.2	71.3	49.7	46.7	64	44.7	43.7	61	41.7	40.7	59.5	26	25	35.2
20	8.4	8.5	8.2	57.8	54.8	72	49.4	46.3	63.8	55.8	52.8	69.8	47.4	44.3	61.6	42.8	41.8	59	39.8	38.8	57.6	26	25	35
25	9.4	9.5	9.2	56.3	53.3	70.3	46.9	43.8	61	54.3	51.3	68.2	44.9	41.8	58.9	40.8	39.8	57.1	37.8	36.8	55.7	25.3	24.3	36.1
31.25	10.6	10.7	10.3	54.9	51.9	68.9	44.3	41.2	58.6	52.9	49.9	66.8	42.3	39.2	56.5	38.9	37.9	55.2	35.9	34.9	53.8	24.6	23.6	36.4
62.5	15.3	15.4	14.8	50.4	47.4	63.8	35.1	32	49	48.4	45.4	61.7	33.1	30	46.8	32.9	31.9	49	29.9	28.9	47.6	22.5	21.5	34.1
100	19.7	19.8	19	47.3	44.3	60.5	27.6	24.5	41.6	45.3	42.3	58.3	25.6	22.5	39.3	28.8	27.8	44.7	25.8	24.8	43.3	21.1	20.1	32.4
155	25	25.2	23.9	44.4	41.4	58.6	19.5	16.3	34.7	42.4	39.4	56.3	17.5	14.3	32.4	25	24	41.3	22	21	39.8	19.8	18.8	30
200	28.8	29	27.4	42.8	39.8	55.4	14	10.8	28	40.8	37.8	53.3	12	8.8	26	22.8	21.8	38.5	19.8	18.8	37.1	19	18	29.3
250	32.6	32.8	30.8	41.3	38.3	54	8.7	5.5	23.2	39.3	36.3	51.9	6.7	3.5	21	20.8	19.8	36.5	17.8	16.8	35	18.3	17.3	28.3
300	36.2		34	40.1		52.2	4		18.2	38.1		50.2	2		16.2	19.3		34.6	16.3		33.1	17.8		28.2
350	39.5		37	39.1		50.9	-0.4		14	37.1		48.9	-2.4		12	17.9		33	14.9		31.4	17.3		28.1
400	42.7		39.7	38.3		49.9	-4.4		10.2	36.3		47.9	-6.4		8.2	16.8		30.9	13.8		29.4	16.9		28.6
500			44.9			48			3.1			45.9			1			26.9			25.2			28.7
550			45.2			47.5			2.3			45.5			0.3			26.9			25.2			28.5
650			49.8			46.4			-2.5			44.2			-5.6			23.3			21.5			25.3

## Material Specifications

Conductor Material Bare copper

**Insulation Material** FEP | Polyolefin

Jacket MaterialPVCSeparator MaterialFEP

Mechanical Specifications

**Pulling Tension, maximum** 11.34 kg | 25 lb

**Environmental Specifications** 

COMMSC PE®

Installation temperature  $0 \,^{\circ}\text{C}$  to +60  $^{\circ}\text{C}$  (+32  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

**Operating Temperature**  $-20 \,^{\circ}\text{C to } +60 \,^{\circ}\text{C (-4 °F to } +140 \,^{\circ}\text{F)}$ 

Environmental Space Plenum

**Temperature Rating, ETL** 75 °C | 167 °F

Smoke Test Method CMP/FT6

Packaging and Weights

**Cable weight** 41.49 kg/km | 27.88 lb/kft

Packaging Type CommPak® box

## Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant



# UN884026814/10 | CS37R BLU C6 4/23 U/UTP CPK 1KFT



CS37R ETL Verified Category 6 U/UTP Cable, non-plenum, blue jacket, 4 pair count, 1000 ft (305 m) length, CommPak

#### **Product Classification**

Regional AvailabilityNorth AmericaPortfolioUniprise®

Product Type Twisted pair cable

General Specifications

Product Number CS37R

ANSI/TIA Category 6

Cable Component Type Horizontal

Cable Type U/UTP (unshielded)

Conductor Type, singlesSolidConductors, quantity8Jacket ColorBlue

**Note**All electrical transmission tests include swept frequency measurements

Pairs, quantity 4

Separator Type Isolator

Transmission Standards ANSI/TIA-568.2-D | CENELEC EN 50288-6-1 | ISO/IEC 11801 Class E

#### **Dimensions**

**Cable Length** 304.8 m | 1000 ft

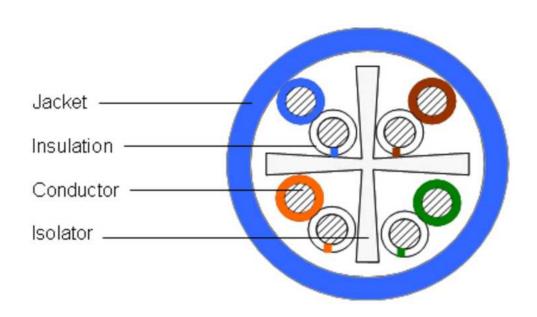
Diameter Over Insulated Conductor1.054 mm0.041 inDiameter Over Jacket, nominal5.766 mm0.227 inJacket Thickness0.508 mm0.02 in

Conductor Gauge, singles 23 AWG

## Cross Section Drawing



# UN884026814/10 | CS37R BLU C6 4/23 U/UTP CPK 1KFT



## **Electrical Specifications**

**Characteristic Impedance** 100 ohm

dc Resistance Unbalance, maximum  $5\,\%$ 

dc Resistance, maximum 8 ohms/100 m | 2.438 ohms/100 ft

**Delay Skew, maximum** 45 ns

Dielectric Strength, minimum1500 Vac | 2500 VdcMutual Capacitance at Frequency5.6 nF/100 m @ 1 kHz

Nominal Velocity of Propagation (NVP) 69 %

Operating Frequency, maximum400 MHzOperating Voltage, maximum80 V

**Remote Powering** Fully complies with the recommendations set forth by IEEE 802.3bt (Type 4) for the

safe delivery of power over LAN cable when installed according to ISO/IEC 14763-2,

CENELEC EN 50174-1, CENELEC EN 50174-2 or TIA TSB-184-A

Safety Voltage Rating 300 V



# UN884026814/10 | CS37R BLU C6 4/23 U/UTP CPK 1KFT

#### Flectrical Cable Performance

**CS** CommScope

STD Refers to the standard value listed under Transmission Standards in the Electrical Specifications above

TYP Typical Electrical Performance

IL Insertion Loss (dB/100m) NEXT Near End Crosstalk (dB/100m)

 ACR
 Attenuation to Crosstalk Ratio (dB/100m)
 PSNEXT
 Power Sum Near End Crosstalk (db/100m)

 PSACR
 Power Sum Attenuation to Crosstalk Ratio (dB/100m)
 ACRF
 Attenuation to Crosstalk Ratio - Far End (dB/100m)

PSACRF Power Sum Attenuation to Crosstalk Ratio - Far End (dB/100m) RL Return Loss (dB)

TCL Transverse Conversion Loss (dB/100m) ELTCTL Equal Level Transverse Conversion Transfer Loss (dB/100m)

Freq.		IL			NEXT			ACR			PSNEX	г		PSACR	1		ACRF			PSACR	F		RL	
MHz	cs	STD	ТҮР	cs	STD	ТҮР	cs	STD	ТҮР	cs	STD	ТҮР	cs	STD	TYP	cs	STD	ТҮР	cs	STD	TYP	cs	STD	TYP
1	2	2	1.8	77.3	74.3	90.3	75.3	72.3	88.5	75.3	72.3	88.1	73.3	70.3	86.3	68.8	67.8	84.1	65.8	64.8	82.6	20	20	32
4	3.8	3.8	3.6	68.3	65.3	82.7	64.5	61.5	79.1	66.3	63.3	80.4	62.5	59.5	76.8	56.8	55.8	72.7	53.8	52.8	71.4	23.6	23	30
8	5.3	5.3	5.1	63.8	60.8	78.1	58.5	55.4	72.9	61.8	58.8	75.8	56.5	53.4	70.6	50.7	49.7	66.9	47.7	46.7	65.5	25.4	24.5	34.3
10	5.9	6	5.8	62.3	59.3	76.5	56.4	53.3	70.7	60.3	57.3	74.3	54.4	51.3	68.5	48.8	47.8	65	45.8	44.8	63.6	26	25	34.9
16	7.5	7.6	7.3	59.2	56.2	73.5	51.7	48.7	66.1	57.2	54.2	71.3	49.7	46.7	64	44.7	43.7	61	41.7	40.7	59.5	26	25	35.2
20	8.4	8.5	8.2	57.8	54.8	72	49.4	46.3	63.8	55.8	52.8	69.8	47.4	44.3	61.6	42.8	41.8	59	39.8	38.8	57.6	26	25	35
25	9.4	9.5	9.2	56.3	53.3	70.3	46.9	43.8	61	54.3	51.3	68.2	44.9	41.8	58.9	40.8	39.8	57.1	37.8	36.8	55.7	25.3	24.3	36.1
31.25	10.6	10.7	10.3	54.9	51.9	68.9	44.3	41.2	58.6	52.9	49.9	66.8	42.3	39.2	56.5	38.9	37.9	55.2	35.9	34.9	53.8	24.6	23.6	36.4
62.5	15.3	15.4	14.8	50.4	47.4	63.8	35.1	32	49	48.4	45.4	61.7	33.1	30	46.8	32.9	31.9	49	29.9	28.9	47.6	22.5	21.5	34.1
100	19.7	19.8	19	47.3	44.3	60.5	27.6	24.5	41.6	45.3	42.3	58.3	25.6	22.5	39.3	28.8	27.8	44.7	25.8	24.8	43.3	21.1	20.1	32.4
155	25	25.2	23.9	44.4	41.4	58.6	19.5	16.3	34.7	42.4	39.4	56.3	17.5	14.3	32.4	25	24	41.3	22	21	39.8	19.8	18.8	30
200	28.8	29	27.4	42.8	39.8	55.4	14	10.8	28	40.8	37.8	53.3	12	8.8	26	22.8	21.8	38.5	19.8	18.8	37.1	19	18	29.3
250	32.6	32.8	30.8	41.3	38.3	54	8.7	5.5	23.2	39.3	36.3	51.9	6.7	3.5	21	20.8	19.8	36.5	17.8	16.8	35	18.3	17.3	28.3
300	36.2		34	40.1		52.2	4		18.2	38.1		50.2	2		16.2	19.3		34.6	16.3		33.1	17.8		28.2
350	39.5		37	39.1		50.9	-0.4		14	37.1		48.9	-2.4		12	17.9		33	14.9		31.4	17.3		28.1
400	42.7		39.7	38.3		49.9	-4.4		10.2	36.3		47.9	-6.4		8.2	16.8		30.9	13.8		29.4	16.9		28.6
500			45.2			47.5			2.3			45.5			0.3			26.9			25.2			28.5
550			44.9			50.9			6			48.8			3.9			28.7			27.3			33.6
650			49.8			46.4			-2.5			44.2			-5.6			23.3			21.5			25.3

## Material Specifications

Conductor MaterialBare copperInsulation MaterialPolyolefin

Jacket Material PVC

Separator Material Polyolefin

Mechanical Specifications

**Pulling Tension, maximum** 11.34 kg | 25 lb

**Environmental Specifications** 

COMMSCOPE®

# UN884026814/10 | CS37R BLU C6 4/23 U/UTP CPK 1KFT

Installation temperature  $0 \,^{\circ}\text{C}$  to +60  $^{\circ}\text{C}$  (+32  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

**Operating Temperature**  $-20 \,^{\circ}\text{C to } +60 \,^{\circ}\text{C (-4 °F to } +140 \,^{\circ}\text{F)}$ 

Environmental Space Non-plenum

**Temperature Rating, UL** 75 °C | 167 °F

Flame Test Method CMR | NEC Article 800 | UL 1666 | UL 444

Packaging and Weights

**Cable weight** 36.639 kg/km | 24.62 lb/kft

Packaging Type CommPak® box

# Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system
REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant







# APPENDIX D.3: COMMSCOPE SYSTIMAX CAT6A STRUCTURED CABLING SYSTEM PART NUMBERS

# ACUTE SITE NEW CONSTRUCTION PROJECT AND RENOVATION PROJECT WITH NEW MER/TR

**Version 01** 

August 2025



Submitted by: CommScope Date: 02/03/2025

ATTN: Kevin Wallingford@commscope.com

CA

#### Category 6A Cables

	Part Number   Name	Description	Comment	Quantity
<b>&gt;</b>	760105338   2091B BLU C6A 4/23 U/UTP R1000	GigaSPEED X10D® 2091B ETL Verified Category 6A U/UTP Cable, blue jacket, 4 pair count, 1000 ft (305 m) length, reel		1
*	760105759   1091B BLU C6A 4/23 U/UTP R1000	GigaSPEED X10D® 1091B ETL Verified Category 6A U/UTP Cable, blue jacket, 4 pair count, 1000 ft (305 m) length, reel		1

#### Category 6A Jacks

	Part Number   Name	Description	Comment	Quantity
	760092361   MGS600-BK	GigaSPEED X10D® M-Series Modular Jack, RJ45, Cat6A Unshielded, Black		1
To Section 1	760152801   HGS620	GigaSPEED X10D® HGS-Series Modular Jack, RJ45, Cat6A, Shielded, Silver		1

#### Category 6A Patch Cords

Part Number   I	Name Des	scription	Comment	Quantity
CO199K2-03F00	_	No6A Series Category 6A U/UTP Reduced meter LS-CM Dual Rated Cord, 3 - Dark Gray, t		1

Page 1 of 4 February 3, 2025





Part Number   Name	Description	Comment	Quantity
CO199K2-03F005	MiNo6A Series Category 6A U/UTP Reduced Diameter LS-CM Dual Rated Cord, 3 - Dark Gray, 5, ft		1
CO199K2-03F007	MiNo6A Series Category 6A U/UTP Reduced Diameter LS-CM Dual Rated Cord, 3 - Dark Gray, 7, ft		1
CO199K2-03F010	MiNo6A Series Category 6A U/UTP Reduced Diameter LS-CM Dual Rated Cord, 3 - Dark Gray, 10, ft		1
CPCSSX2-03F010	GigaSPEED X10D® 360GS10E Solid Cordage Modular Patch Cord, 3 - Dark Gray, 10, ft		1
CPCSSX2-03F025	GigaSPEED X10D® 360GS10E Solid Cordage Modular Patch Cord, 3 - Dark Gray, 25, ft		1
CPCSSX2-03F030	GigaSPEED X10D® 360GS10E Solid Cordage Modular Patch Cord, 3 - Dark Gray, 30, ft		1

#### Copper Panels

	Part Number   Name	Description	Comment	Quantity
	760150144   360-IPR-MFTP-E- HD6B-1U-24	SYSTIMAX 360™ GigaSPEED X10D® Evolve High Density Shielded Modular Panel, 24 port		1
STATE OF THE PARTY	760151498   360-IPR-MFTP-E- HD6B-2U-48	SYSTIMAX 360™ GigaSPEED X10D® Evolve High Density Shielded Modular Panel, 48 port		1

Page 2 of 4 February 3, 2025





Part Number   Name	Description	Comment	Quantity
760237066   CPP-6A-SDDM-SL-1U- 48	Shielded Discrete Distribution Module Panel, Cat 6A, SL, 1U, 48 port, Black		1

#### Faceplates

	Part Number   Name	Description	Comment	Quantity
	760100891   M10LW4SP	M10LW4SP 1-port Single Gang Stainless Steel Telephone Faceplate, 4.00 in lug spacing		1
	760118232   M14CE-E -262	M14CE-E Type Furniture Faceplate, four port white		1
- 1 -	760249130   FP-LBL-4P-262	Faceplate Kit, Labelled, 1-gang, 4 port, electric white		1

#### Horizontal & Vertical Cable Managers

	Part Number   Name	Description	Comment	Quantity
A. L.	760172916   HTK-19-SS-2U- SILVER	Horizontal Trough Kit, 2 RU, 19 in, single sided, silver		1
	760244775   VCM-DS-84-6	Vertical Cable Management Kit, 6in X 84in (152mm X 2134mm) Double Sided, With Doors, Silver		1
	760244777   VCM-DS-84-10	Vertical Cable Management Kit, 10in X 84in (254mm X 2134mm) Double Sided, With Doors, Silver		1

Page 3 of 4 February 3, 2025





#### **RJ45 Jack Accessories**

	Part Number   Name	Description	Comment	Quantity
B	760164434   H61K-ICON-RD	HGS620 Icon Strip (Voice / Data / Blank), Red (25 ea/pkg)		1

#### Surface Mount & Zone Boxes

	Part Number   Name	Description	Comment	Quantity
**	760248525   SMB-2P-262	Surface Mount Box, universal, two ports, white		1

Page 4 of 4 February 3, 2025



# 760092361 | MGS600-BK



# GigaSPEED X10D® M-Series Modular Jack, RJ45, Cat6A Unshielded, Black

- Electrical performance guaranteed to meet or exceed the channel specifications to ISO/IEC 11801 Class EA and ANSI/TIA-568-C.2 Category 6A
- Patented crossing of straddling pair contacts enables efficient alien crosstalk reduction in the channel
- Snaps into standard M-series faceplates, surface-mount boxes, consolidation point boxes and modular panels
- Mountable either at 90 degrees (straight) or 45 degrees (angled) in M-series faceplate
- Universal design and label supports both T568 A & B wiring
- IDC connector terminations on rear of base allow quick and easy installation of 22 to 24 AWG cable
- Support network line speeds up to at least 10 gigabits per second
- Low-profile rear protective strain relief cap, protects against contamination and secures the connection

## **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin

America | North America

Portfolio SYSTIMAX®
Product Type Modular jack

Product Brand GigaSPEED X10D®

Product Series MGS600

General Specifications

ANSI/TIA Category 6A

Cable Type Unshielded

**Color** Black

Conductor Type Solid | Stranded

Integrated Dust Cover Type None

**Mounting Note**Color matches with M-series Black Faceplates and Surface

Mount Boxes

IDC

Termination Type

**Wiring** T568A | T568B

**Dimensions** 

COMMSCOPE®

# 760092361 | MGS600-BK

 Height
 19.4 mm | 0.764 in

 Width
 21.08 mm | 0.83 in

**Depth** 30.2 mm | 1.189 in

Compatible Conductor Gauge, solid 22-24 AWG | 21 AWG (for CommScope GigaREACH cable

only)

Compatible Conductor Gauge, stranded 22-24 AWG

**Electrical Specifications** 

Contact Resistance Variation, maximum 20 mOhm

Contact Resistance, maximum 100 mOhm

Current Rating at Temperature 1.5 A @ 20 °C | 1.5 A @ 68 °F

Dielectric Withstand Voltage, RMS, conductive surface1,500 Vac @ 60 HzDielectric Withstand Voltage, RMS, contact-to-contact1,000 Vac @ 60 Hz

**Insulation Resistance, minimum** 500 MOhm

**Remote Powering** Fully supports the safe delivery of power over LAN cabling

described by IEEE 802.3bt (Type 4) and complies with the unmating under electrical load requirements prescribed by IEC

60512-99-002

PoE Durability

Supports IEEE 802.3bt Type 4 (90 W) applications greater than

3000 plug to jack mating cycles

Material Specifications

Contact Plating Material Precious metals

Material Type Copper alloy | High-impact, flame retardant, thermoplastic

Termination Contact Plating Nickel

Mechanical Specifications

Plug Retention Force, minimum 133 N | 29.9 lbf

Plug to Jack Mating Cycles Complies to IEC 60603-7 series

**Environmental Specifications** 

Operating Temperature  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

Storage Temperature  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-40  $^{\circ}\text{F}$  to +158  $^{\circ}\text{F}$ )

**Relative Humidity** Up to 95%, non-condensing

Flammability Rating UL 94 V-0

**COMMSCOPE®** 

# 760092361 | MGS600-BK

Safety Standard UL | cUL

Packaging and Weights

Packaging Material Standard

Packaging quantity

## Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760152801 | HGS620



GigaSPEED X10D® HGS-Series Modular Jack, RJ45, Cat6A, Shielded, Silver



#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin

America | North America

Portfolio SYSTIMAX®
Product Type Modular jack

Product Brand GigaSPEED X10D®

Product Series HGS620

General Specifications

ANSI/TIA Category 6A

**Application** Adapts to M Series and Keystone

Cable TypeShieldedColorSilver

Conductor Type Solid | Stranded

Integrated Dust Cover Type None

Outlet Type High density

Termination Type IDC

Transmission Standards ANSI/TIA-568-D.2 | ISO/IEC 11801 Class EA

**Wiring** T568A | T568B

**Dimensions** 

 Height
 19.56 mm | 0.77 in

 Width
 17.02 mm | 0.67 in

 Depth
 33.53 mm | 1.32 in

 Compatible Conductor Gauge, solid
 22 AWG | 24 AWG

 Compatible Conductor Gauge, stranded
 22 AWG | 24 AWG



# 760152801 | HGS620

## **Electrical Specifications**

Contact Resistance Variation, maximum 20 mOhm

Contact Resistance, maximum 100 mOhm

**Current Rating at Temperature** 1.5 A @ 20 °C | 1.5 A @ 68 °F

Dielectric Withstand Voltage, RMS, conductive surface1,500 Vac @ 60 HzDielectric Withstand Voltage, RMS, contact-to-contact1,000 Vac @ 60 Hz

**Insulation Resistance, minimum** 500 MOhm

**Remote Powering**Fully supports the safe delivery of power over LAN cabling

described by IEEE 802.3bt (Type 4) and complies with the unmating under electrical load requirements prescribed by IEC

60512-99-002

Material Specifications

Contact Plating Material Precious metals

Material Type Copper alloy | High-impact, flame retardant,

thermoplastic | Tin | Zinc

Termination Contact Plating Nickel

Mechanical Specifications

Plug Insertion Life, minimum 750 times

Plug Insertion Life, test plug IEC 60603-7 compliant plug

Plug Retention Force, minimum 133 N | 29.9 lbf

**Environmental Specifications** 

**Operating Temperature**  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

Storage Temperature  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  ( $-40 \,^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

**Relative Humidity** Up to 95%, non-condensing

Flammability Rating UL 94 V-0

Safety Standard UL | cUL

Packaging and Weights

Packaging quantity 25

Regulatory Compliance/Certifications

Agency Classification

# 760152801 | HGS620

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



#### Included Products

760154187 – HGS620 M-Series Adapter, White (25 ea/pkg) HGS-A-MS-WH-25



# 760100891 | M10LW4SP



M10LW4SP 1-port Single Gang Stainless Steel Telephone Faceplate, 4.00 in lug spacing

#### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

PortfolioCommScope®Product TypeFaceplate kitProduct SeriesM Series

### General Specifications

**Application** Used with M Series modular information outlet

**Color** Stainless steel

Mounting Flush

Total Ports, quantity 1

#### **Dimensions**

 Height
 115.824 mm | 4.56 in

 Width
 71.374 mm | 2.81 in

 Depth
 7.366 mm | 0.29 in

## Material Specifications

Material Type Stainless steel

## **Environmental Specifications**

Safety Standard UL

## Packaging and Weights

Packaging quantity 1

## Regulatory Compliance/Certifications

Agency Classification



# 760100891 | M10LW4SP

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system
REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760118232 | M14CE-E-262



## M14CE-E Type Furniture Faceplate, four port white

#### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

Product Type Faceplate kit
Product Series M Series

## General Specifications

Application Fit the modular furniture raceway | Hold M Series modular outlets

ColorWhiteMountingFlushTotal Ports, quantity4

#### **Dimensions**

 Height
 55.88 mm | 2.2 in

 Width
 103.886 mm | 4.09 in

 Depth
 40.64 mm | 1.6 in

## Material Specifications

Material Type High-impact, flame retardant, thermoplastic

## **Environmental Specifications**

Flammability Rating UL 94 V-0

Safety Standard UL | cUL

## Packaging and Weights

Packaging quantity 1

**Weight, net** 0.064 kg | 0.14 lb

Regulatory Compliance/Certifications



# 760118232 | M14CE-E -262

Agency	Classification
Agency	Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760249130 | FP-LBL-4P-262



#### Faceplate Kit, Labelled, 1-gang, 4 port, electric white

- Engineered for residential and commercial applications from classrooms and hospitals to offices and homes
- Labeling models feature mold-over icon and leveling and convex labels for maximum visibility in low density areas

#### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

PortfolioCommScope®Product TypeFaceplate kit

Product Series FP-LBL

Warranty For more information, please consult our Product Warranty guidelines

## General Specifications

**Application** Used with KJ Series outlets with adapter | Used with M Series outlets | Used with SL Series outlets

**Color** Electrical white

Gangs, quantity 1

Mounting Flush
Outlet Orientation Flat

Port Marking Type | Icon | Label

Total Ports, quantity 4

#### **Dimensions**

 Height
 115.824 mm | 4.56 in

 Width
 71.374 mm | 2.81 in

 Depth
 10.668 mm | 0.42 in

## Material Specifications

Material Type High-impact, flame retardant, thermoplastic, UL listed material

## **Environmental Specifications**

Environmental Space Indoor

COMMSCOPE®

# 760249130 | FP-LBL-4P-262

Flammability Rating UL 94 V-0

Safety Standard cUL US 1863

## Packaging and Weights

Included Label cover (2) | Mounting screw (2)

Packaging quantity 1

Packaging Type Bag

**Weight, net** 0.036 kg | 0.08 lb

## Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



### \* Footnotes

Warranty For more information, please consult our Product Warranty guidelines



# 760105338 | 2091B BLU C6A 4/23 U/UTP R1000



GigaSPEED X10D® 2091B ETL Verified Category 6A U/UTP Cable, blue jacket, 4 pair count, 1000 ft (305 m) length, reel

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio SYSTIMAX®

Product TypeTwisted pair cableProduct BrandGigaSPEED X10D®

General Specifications

Product Number 2091B
ANSI/TIA Category 6A

Cable Component Type Horizontal

Cable Type U/UTP (unshielded)

Conductor Type, singles Solid
Conductors, quantity 8

Jacket Color Blue

**Note** Consult ANSI/TIA-568-C.2 Annex G for length de-rating guidance for cable

installation in higher temperature environments

Pairs, quantity 4

Separator Type Isolator

**Transmission Standards** ANSI/TIA-568.2-D | ISO/IEC 11801 Class EA

**Dimensions** 

Cable Length304.8 m | 1000 ftDiameter Over Insulated Conductor0.889 mm | 0.035

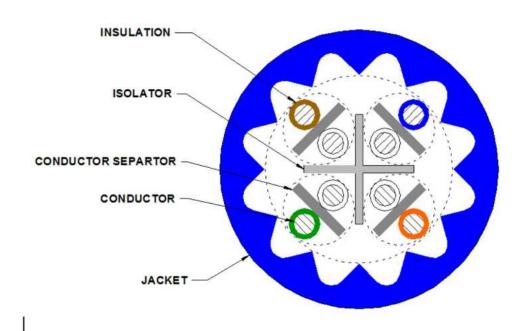
Diameter Over Insulated Conductor0.889 mm | 0.035 inDiameter Over Jacket, nominal7.239 mm | 0.285 inJacket Thickness1.295 mm | 0.051 in

Conductor Gauge, singles 23 AWG

Cross Section Drawing

COMMSC PE®

# 760105338 | 2091B BLU C6A 4/23 U/UTP R1000



## **Electrical Specifications**

dc Resistance Unbalance, maximum 4 %

**dc Resistance, maximum** 7.61 ohms/100 m | 2.32 ohms/100 ft

**Dielectric Strength, minimum** 1500 Vac | 2500 Vdc

LP (Limited Power) Rating 0.6 A

Mutual Capacitance at Frequency 6.0 nF/100 m @ 1 kHz

Nominal Velocity of Propagation (NVP) 66 %

**Operating Frequency, maximum** 550 MHz

Operating Voltage, maximum 80 V

**Remote Powering**Fully complies with the recommendations set forth by IEEE 802.3bt (Type 4) for the

safe delivery of power over LAN cable when installed according to ISO/IEC 14763-2,

CENELEC EN 50174-1, CENELEC EN 50174-2 or TIA TSB-184-A

## Material Specifications

**Conductor Material** Bare copper

Insulation MaterialFEPJacket MaterialPVC

Separator Material FEP

Separator 2 Material Polyolefin

COMMSC PE°

# 760105338 | 2091B BLU C6A 4/23 U/UTP R1000

## Mechanical Specifications

**Pulling Tension, maximum** 11.34 kg | 25 lb

## **Environmental Specifications**

Installation temperature 0 °C to +60 °C (+32 °F to +140 °F)

**Operating Temperature**  $-20 \,^{\circ}\text{C}$  to  $+75 \,^{\circ}\text{C}$  (-4  $^{\circ}\text{F}$  to  $+167 \,^{\circ}\text{F}$ )

Environmental Space Plenum

Temperature Rating, ETL  $105 \,^{\circ}\text{C} \mid 221 \,^{\circ}\text{F}$  Temperature Rating, UL  $105 \,^{\circ}\text{C} \mid 221 \,^{\circ}\text{F}$ 

Flame Test Method CMP/FT6
Safety Standard UL 444

Smoke Test Method CMP/FT6 | NFPA 262

Packaging and Weights

**Cable weight** 60.568 kg/km | 40.7 lb/kft

Packaging Type Reel

## Regulatory Compliance/Certifications

#### Agency Classification

CHINA-ROHS Below maximum concentration value

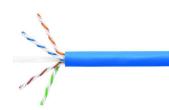
ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760105759 | 1091B BLU C6A 4/23 U/UTP R1000



GigaSPEED X10D® 1091B ETL Verified Category 6A U/UTP Cable, blue jacket, 4 pair count, 1000 ft (305 m) length, reel

#### Product Classification

Regional Availability

Asia | Australia/New Zealand | Latin America | North America

Portfolio SYSTIMAX®

Product Type Twisted pair cable
Product Brand GigaSPEED X10D®

General Specifications

Product Number 1091B
ANSI/TIA Category 6A

Cable Component Type Horizontal

Cable Type U/UTP (unshielded)

Conductor Type, singlesSolidConductors, quantity8Jacket ColorBluePairs, quantity4

Separator Type Isolator

**Transmission Standards** ANSI/TIA-568.2-D | ISO/IEC 11801 Class EA

**Dimensions** 

Cable Length304.8 m | 1000 ftDiameter Over Insulated Conductor0.864 mm | 0.034 in

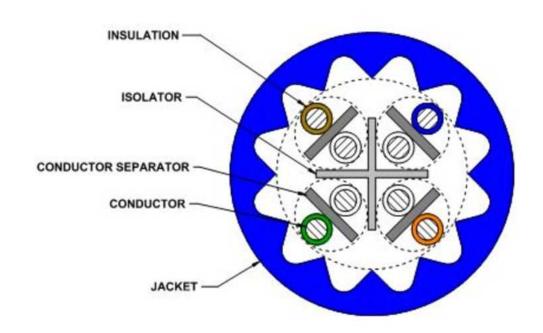
Diameter Over Jacket, nominal7.239 mm | 0.285 inJacket Thickness1.295 mm | 0.051 in

Conductor Gauge, singles 23 AWG

Cross Section Drawing



# 760105759 | 1091B BLU C6A 4/23 U/UTP R1000



## **Electrical Specifications**

Characteristic Impedance100 ohmCharacteristic Impedance Tolerance±15 ohmdc Resistance Unbalance, maximum4 %

dc Resistance, maximum 7.61 ohms/100 m | 2.32 ohms/100 ft

**Dielectric Strength, minimum** 1500 Vac | 2500 Vdc

LP (Limited Power) Rating 0.5 A

**Mutual Capacitance at Frequency** 6.0 nF/100 m @ 1 kHz

Nominal Velocity of Propagation (NVP) 65%

Operating Frequency, maximum550 MHzOperating Voltage, maximum80 V

**Remote Powering** Fully complies with the recommendations set forth by IEEE 802.3bt (Type 4) for the

safe delivery of power over LAN cable when installed according to ISO/IEC 14763-2,

CENELEC EN 50174-1, CENELEC EN 50174-2 or TIA TSB-184-A

## Material Specifications

 Conductor Material
 Bare copper

 Insulation Material
 Polyolefin

 Jacket Material
 PVC

Page 2 of 3

# 760105759 | 1091B BLU C6A 4/23 U/UTP R1000

Separator MaterialPolyolefinSeparator 2 MaterialPolyolefin

Mechanical Specifications

**Pulling Tension, maximum** 11.34 kg | 25 lb

**Environmental Specifications** 

Installation temperature  $0 \,^{\circ}\text{C}$  to +60  $^{\circ}\text{C}$  (+32  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

Operating Temperature  $-20 \,^{\circ}\text{C}$  to +60  $^{\circ}\text{C}$  (-4  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

Environmental Space Non-plenum

Temperature Rating, UL 90 °C | 194 °F

Flame Test Method CMR

Packaging and Weights

**Cable weight** 55.509 kg/km | 37.3 lb/kft

Packaging Type Reel

Regulatory Compliance/Certifications

Agency Classification

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

Below maximum concentration value

ROHS Compliant UK-ROHS Compliant



CHINA-ROHS

# 760150144 | 360-IPR-MFTP-E-HD6B-1U-24



SYSTIMAX 360™ GigaSPEED X10D® Evolve High Density Shielded Modular Panel, 24 port

#### Product Classification

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin

America | North America

**Portfolio** SYSTIMAX®

**Product Type** RJ45 patch panel

Product Brand GigaSPEED X10D® | SYSTIMAX 360™

Product Series HGS Series

General Specifications

ANSI/TIA Category 6A

Cable Type Shielded

Color Cool gray | Satin chrome

Conductor Type Solid | Stranded

Intelligence Type iPatch® ready

Panel StyleStraightRack TypeEIA 19 in

Rack Units 1

Termination Type IDC

Total Ports, quantity 24

**Transmission Standards**ANSI/TIA-568.2-D | ISO/IEC 11801 Class EA

**Wiring** T568A | T568B

**Dimensions** 

Height43.69 mm | 1.72 inWidth482.6 mm | 19 inDepth, with cable management165.1 mm | 6.5 inCompatible Conductor Gauge, solid22 AWG | 24 AWG

Page 1 of 3



# 760150144 | 360-IPR-MFTP-E-HD6B-1U-24

Compatible Conductor Gauge, stranded 22 AWG | 24 AWG

**Electrical Specifications** 

**Dielectric Withstand Voltage, RMS, contact-to-contact** 1,000 Vac @ 60 Hz

**Insulation Resistance, minimum** 500 MOhm

Material Specifications

Contact Plating Material Precious metals

Material Type High-impact, flame retardant, thermoplastic | Powder-

coated steel

Termination Contact Plating Nickel

Mechanical Specifications

Plug Insertion Life, minimum 750 times

Plug Insertion Life, test plug IEC 60603-7 compliant plug

Plug Retention Force, minimum 133 N | 29.9 lbf

**Environmental Specifications** 

**Operating Temperature**  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

**Storage Temperature**  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  ( $-40 \,^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

**Relative Humidity** Up to 95%, non-condensing

Flammability Rating UL 94 V-0
Safety Standard UL | cUL

Packaging and Weights

Packaging Material Eco-friendly, single-use plastics-free | Eco-friendly, single-

use plastics-free

Packaging quantity 1

**Weight, net** 0.816 kg | 1.8 lb

Regulatory Compliance/Certifications

Agency Classification

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant

Page 2 of 3



# 760150144 | 360-IPR-MFTP-E-HD6B-1U-24



# 760151498 | 360-IPR-MFTP-E-HD6B-2U-48



SYSTIMAX 360™ GigaSPEED X10D® Evolve High Density Shielded Modular Panel, 48 port

#### Product Classification

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin

America | North America

**Portfolio** SYSTIMAX®

**Product Type** RJ45 patch panel

Product Brand GigaSPEED X10D® | SYSTIMAX 360™

Product Series HGS Series

General Specifications

ANSI/TIA Category 6A

Cable Type Shielded

Color Cool gray | Satin chrome

Conductor Type Solid | Stranded

Intelligence Type iPatch® ready

Panel StyleStraightRack TypeEIA 19 in

Rack Units 2
Termination Type IDC

Total Ports, quantity 48

**Transmission Standards** ANSI/TIA-568-D.2 | ISO/IEC 11801 Class E

**Wiring** T568A | T568B

**Dimensions** 

Height44.45 mm| 1.75 inWidth482.6 mm| 19 inDepth, with cable management165.1 mm| 6.5 inCompatible Diameter Over Dielectric, minimum0.762 mm| 0.03 in

Page 1 of 3



# 760151498 | 360-IPR-MFTP-E-HD6B-2U-48

Compatible Conductor Gauge, solid22 AWG24 AWGCompatible Conductor Gauge, stranded22 AWG24 AWG

**Electrical Specifications** 

Dielectric Withstand Voltage, RMS, contact-to-contact 1,000 Vac @ 60 Hz

**Insulation Resistance, minimum** 500 MOhm

Material Specifications

Contact Plating Material Precious metals

Material Type High-impact, flame retardant, thermoplastic | Powder-

coated steel

Termination Contact Plating Nickel

Mechanical Specifications

**Plug Insertion Life, minimum** 750 times

**Plug Insertion Life, test plug**IEC 60603-7 compliant plug

Plug Retention Force, minimum 133 N | 29.9 lbf

**Environmental Specifications** 

**Operating Temperature**  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

Storage Temperature  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  ( $-40 \,^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

**Relative Humidity** Up to 95%, non-condensing

Flammability Rating UL 94 V-0
Safety Standard UL | cUL

Packaging and Weights

Packaging Material Eco-friendly, single-use plastics-free

Packaging quantity 1

**Weight, net** 1.361 kg | 3 lb

## Regulatory Compliance/Certifications

Classification
Below maximum concentration value
Designed, manufactured and/or distributed under this quality management system
Compliant as per SVHC revision on www.commscope.com/ProductCompliance

Page 2 of 3



# 760151498 | 360-IPR-MFTP-E-HD6B-2U-48

ROHS UK-ROHS Compliant Compliant





COMMSCOPE®

# 760237066 | CPP-6A-SDDM-SL-1U-48

Shielded Discrete Distribution Module Panel, Cat 6A, SL, 1U, 48 port, Black



#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin

America | North America

Portfolio CommScope®

**Product Type** RJ45 patch panel

**Product Series** SL Series

General Specifications

ANSI/TIA Category 6A

Cable TypeShieldedColorBlack

**Growth Configuration** Fully loaded

Modules, quantity 4

Panel StyleStraightRack TypeEIA 19 in

Rack Units 1

Total Ports, quantity 48

**Transmission Standards**ANSI/TIA-568-D.2 | ISO/IEC 11801 Class EA

**Wiring** T568A | T568B

**Dimensions** 

Height44.45 mm | 1.75 inWidth482.6 mm | 19 inDepth, with cable management119.38 mm | 4.7 inCompatible Diameter Over Dielectric, maximum1.168 mm | 0.046 in

Page 1 of 2



# 760237066 | CPP-6A-SDDM-SL-1U-48

Compatible Diameter Over Dielectric, minimum 0.762 mm | 0.03 in

**Electrical Specifications** 

Current Rating at Temperature 1.5 A @ 20 °C | 1.5 A @ 68 °F

Dielectric Withstand Voltage, RMS, conductive surface1,500 Vac @ 60 HzDielectric Withstand Voltage, RMS, contact-to-contact1,000 Vac @ 60 Hz

**Insulation Resistance, minimum** 500 MOhm

Material Specifications

Material Type High-impact, flame retardant, thermoplastic | Powder-

coated steel

**Environmental Specifications** 

**Operating Temperature**  $-10 \,^{\circ}\text{C} \text{ to } +60 \,^{\circ}\text{C} \text{ (+14 }^{\circ}\text{F to } +140 \,^{\circ}\text{F)}$ 

Storage Temperature -40 °C to +70 °C (-40 °F to +158 °F)

**Relative Humidity**Up to 95%, non-condensing

Flammability Rating UL 94 V-0

Safety Standard RCM | UL | cUL

Packaging and Weights

Included Modular jacks (48)

Packaging quantity 1

Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

RCM Compliant to electrical safety & telecommunications requirements

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance







# 760164434 | H61K-ICON-RD

HGS620 Icon Strip (Voice / Data / Blank), Red (25 ea/pkg)



#### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

Product Type Icon kit

Ordering Note Minimum order quantity, 20 packs

#### General Specifications

**Color** Red

#### **Dimensions**

 Height
 13.97 mm | 0.55 in

 Width
 23.62 mm | 0.93 in

 Depth
 2.79 mm | 0.11 in

#### Material Specifications

Material Type High-impact, flame retardant, thermoplastic

### **Environmental Specifications**

Operating Temperature  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

Storage Temperature  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-40  $^{\circ}\text{F}$  to +158  $^{\circ}\text{F}$ )

Flammability Rating UL 94 V-0

Safety Standard UL | cUL

## Packaging and Weights

Packaging quantity 25

COMMSCOPE®

# 760164434 | H61K-ICON-RD

# Regulatory Compliance/Certifications

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance



# 760172916 | HTK-19-SS-2U-SILVER



#### Horizontal Trough Kit, 2 RU, 19 in, single sided, silver

#### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

Product Type Horizontal cable management

Ordering Note Available in Europe, the Middle East, and Africa

#### General Specifications

Color Single-sided

Black | Silver

Rack Units 2

#### **Dimensions**

 Height
 88.138 mm | 3.47 in

 Width
 482.6 mm | 19 in

 Depth
 196.342 mm | 7.73 in

### Material Specifications

Finish Powder-coated, smooth

Material Type Aluminum | Steel

#### **Environmental Specifications**

Safety Standard UL | cUL

#### Packaging and Weights

**Included** Four #12-24 x 1/2 in screws | Instruction sheet

Packaging quantity 1

Packaging Type Assembled

COMMSCOPE®

# 760172916 | HTK-19-SS-2U-SILVER

## Regulatory Compliance/Certifications

Agency	Classification
--------	----------------

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance





Vertical Cable Management Kit, 6in X 84in (152mm X 2134mm) Double Sided, With Doors, Silver

#### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

Product Type Vertical cable management

#### General Specifications

Configuration Type Double-sided

Color Silver
Door, quantity 2

#### Dimensions

 Height
 2,133.6 mm | 84 in

 Width
 152.4 mm | 6 in

 Depth
 558.8 mm | 22 in

### Material Specifications

**Finish** Powder-coated, smooth

Material Type Metal

## **Environmental Specifications**

Safety Standard UL | cUL

#### Packaging and Weights

Included Four 1/2-20 hex nuts | Four 1/2-20 x 1 in hex head bolts | Four flat washers | Instruction sheet

Packaging quantity 1

Packaging Type Assembled

## Regulatory Compliance/Certifications

COMMSC PE°

#### Agency Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance





Vertical Cable Management Kit, 10in X 84in (254mm X 2134mm) Double Sided, With Doors, Silver

#### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

Product Type Vertical cable management

#### General Specifications

Configuration Type Double-sided

Color Silver
Door, quantity 2

#### Dimensions

 Height
 2,133.6 mm | 84 in

 Width
 254 mm | 10 in

 Depth
 558.8 mm | 22 in

### Material Specifications

**Finish** Powder-coated, smooth

Material Type Metal

## **Environmental Specifications**

Safety Standard UL | cUL

### Packaging and Weights

Included Four 1/2-20 hex nuts | Four 1/2-20 x 1 in hex head bolts | Four flat washers | Instruction

sheet | Two spools

Packaging quantity

Packaging Type Assembled

COMMSCOPE®

## Regulatory Compliance/Certifications

Agency	Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance



# 760248525 | SMB-2P-262



#### Surface Mount Box, universal, two ports, white

#### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

Product Type Surface mount box

## General Specifications

Application Used with KJ Series outlets with adapter | Used with M Series modular information outlet | Used with

SL Series outlets

**Color** Electrical white

MountingSurfaceOutlet OrientationFlatPort Marking TypeIconTotal Ports, quantity2

#### **Dimensions**

 Height
 37.6 mm | 1.48 in

 Width
 72.9 mm | 2.87 in

 Depth
 101.8 mm | 4.008 in

## Material Specifications

Material Type High-impact, flame retardant, thermoplastic, UL listed material

## **Environmental Specifications**

Environmental Space Indoor
Flammability Rating UL 94 V-0
Safety Standard UL | cUL

#### Packaging and Weights

Page 1 of 2

# 760248525 | SMB-2P-262

Packaging quantity

**Weight, net** 0.06 kg | 0.132 lb

## Regulatory Compliance/Certifications

1

Agency Classification

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance



#### **Base Product**



# MiNo6A Cat 6A U/UTP Reduced Diameter RJ45 Patch Cord, LS-CM Dual Rated

- Perfect for cross connects, workstations or racks with higher-density and/or limited space
- Small diameter unshielded twisted pair patch cords (0.195 inch/4.95 mm) that offers flexibility, durability and reliability
- Unique laminate barrier wrap provides excellent alien cross-talk performance

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

**Product Type** Twisted pair patch cord

Product Series CO | CON | UTG

Ordering Note Cords < 1 m are valid elements for use in a channel or as an equipment interconnect but

due to their limited length are not guaranteed to meet component compliance

requirements that were developed to assess the quality of longer cords | Cords > 1 m are authorized for use in channels and are an effective standalone method used to

connect active devices

#### General Specifications

ANSI/TIA Category 6A

Cable Type U/UTP (unshielded)

Conductor Type Solid

Interface, Connector ARJ45 plugInterface Feature, connector AStandardInterface, Connector BRJ45 plugInterface Feature, connector BStandard

Jacket Color Black | Blue | Dark gray | Light

blue | Orange | Pink | Purple | Red | Spring

green | Violet | White | Yellow

Pairs, quantity 4

Transmission Standards IEEE 802.3bt Type 4 | ISO/IEC 11801 Class EA | TIA/EIA-568 Cat 6A

Wiring T568B

**Dimensions** 

COMMSCOPE®

Cable Assembly Length Range (m) 1 - 30

Cable Assembly Length Range (ft) 1 - 131

Cable Assembly Length Range (cm) 15 - 999

Cable Assembly Length Range (in) 6 - 999

**Diameter Over Jacket** 4.95 mm | 0.195 in

Compatible Conductor Gauge, solid 28 AWG

## Wiring Diagram

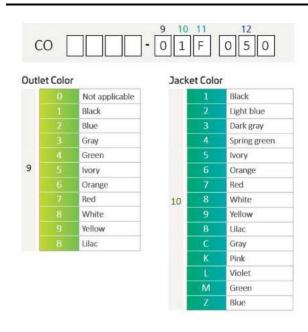
	Connector A	Connector B
Position 1	White/Orange	White/Orange
Position 2	Orange	Orange
Position 3	Lt. Green	Lt. Green
Position 4	Blue	Blue
Position 5	Lt. Blue	Lt. Blue
Position 6	Green	Green
Position 7	Lt. Brown	Lt. Brown
Position 8	Brown	Brown

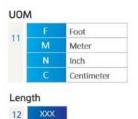
## **Electrical Specifications**

dc Resistance, maximum0.3 ohmSafety Voltage Rating300 V

# Ordering Tree







#### Notes

- Cords > 1m are authorized for use in channels and are an effective standalone method used to connect active devices
- Cords < 1m are also valid elements for use in a channel or as an equipment interconnect but due to their limited length are not guaranteed to meet component compliance requirements that were developed to assess the quality of longer cords

#### Material Specifications

 Conductor Material
 Bare copper

 Contact Plating Material
 Gold over nickel

Material Type Phosphor bronze contacts | Polycarbonate plug housing

Mechanical Specifications

Plug Insertion Life, minimum 750 times

Plug Retention Force, minimum 90 N | 20.233 lbf

### **Environmental Specifications**

**Operating Temperature** -10 °C to +75 °C (+14 °F to +167 °F)

Environmental Space Low Smoke Zero Halogen (LSZH) | Non-plenum

Flammability Rating CM-ST1 | IEC 60332-1

Safety Standard Anatel | UL 1863

Packaging and Weights

Packaging quantity

#### Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

COMMSC PE®

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance



#### **Base Product**



#### GigaSPEED X10D® Cat 6A U/UTP Patch Cord, Non-Plenum

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio SYSTIMAX®

**Product Type**Twisted pair patch cord

Product Brand GigaSPEED X10D®

Product Series CON | CPC | UTG

Ordering Note Cords < 1 m are valid elements for use in a channel or as an equipment interconnect but

due to their limited length are not guaranteed to meet component compliance

requirements that were developed to assess the quality of longer cords | Cords > 1 m are authorized for use in channels and are an effective standalone method used to

connect active devices

## General Specifications

ANSI/TIA Category 6A

Cable Type U/UTP (unshielded)

Conductor Type Solid

Interface, Connector ARJ45 plugInterface Feature, connector AStandardInterface, Connector BRJ45 plugInterface Feature, connector BStandard

Jacket Color Black | Blue | Dark gray | Light

blue | Lilac | Orange | Pink | Purple | Red | Slate | Spring

green | Violet | White | Yellow

Pairs, quantity

**Transmission Standards** IEEE 802.3bt Type 4

Wiring T568B

Dimensions

Cable Assembly Length Range (m) 1 – 30

COMMSCOPE®

Cable Assembly Length Range (ft)1 - 100Cable Assembly Length Range (cm)15 - 999Cable Assembly Length Range (in)6 - 999

**Diameter Over Jacket** 7.24 mm | 0.285 in

Compatible Conductor Gauge, solid 24 AWG

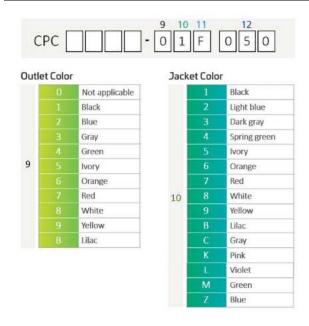
## Wiring Diagram

	Connector A	Connector B
Position 1	White/Orange	White/Orange
Position 2	Orange	Orange
Position 3	Lt. Green	Lt. Green
Position 4	Blue	Blue
Position 5	Lt. Blue	Lt. Blue
Position 6	Green	Green
Position 7	Lt. Brown	Lt. Brown
Position 8	Brown	Brown

## **Electrical Specifications**

dc Resistance, maximum0.3 ohmSafety Voltage Rating300 V

Ordering Tree



# 11 F Foot M Meter N Inch C Centimeter

#### Length

12 XXX

#### Notes

- Cords > 1m are authorized for use in channels and are an effective standalone method used to connect active devices
- Cords < 1m are also valid elements for use in a channel or as an equipment interconnect but due to their limited length are not guaranteed to meet component compliance requirements that were developed to assess the quality of longer cords

#### Material Specifications

Contact Plating Material Precious metals

Material Type Copper alloy | Polycarbonate

Mechanical Specifications

Plug Insertion Life, minimum 750 times

Plug Retention Force, minimum 133 N | 29.9 lbf

#### **Environmental Specifications**

**Operating Temperature**  $-10 \,^{\circ}\text{C} \text{ to } +60 \,^{\circ}\text{C} \text{ (+14 }^{\circ}\text{F to } +140 \,^{\circ}\text{F)}$ 

Environmental SpaceNon-plenumFlammability RatingUL 94 V-0Safety StandardETL | cETL

Packaging and Weights

Packaging quantity

## Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

Page 3 of 4



REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance







APPENDIX E.4: COMMSCOPE SYSTIMAX PROPEL FIBER STRUCTURED CABLING SYSTEM PART NUMBERS

ACUTE SITE NEW CONSTRUCTION PROJECT AND RENOVATION PROJECT; AND COMMUNITY SITE NEW CONSTRUCTION AND RENOVATION PROJECTS

**Version 01** 

January 2025



Submitted by: CommScope Date: 02/13/2025

ATTN: Kevin Wallingford@commscope.com

CA

#### **Fiber Cassettes**

	Part Number   Name	Description	Comment	Quantity
THE WATER WATER	760255053   PPL-SP-24LC-SM-PT- BEU	Propel Splice Cassette, 24LC/UPC with internal shutters, OS2 with 250 µm single fiber pigtails, Method B Enhanced ULL		1
	760255055   PPL-SP-24LC-OM5- PT-BEU	Propel Multimode Splice Cassette, 24LC with internal shutters, OM5 single fiber pigtails, Method B Enhanced ULL		1
in the last take take the last take take the last take take the last take the last take take the last take take the last take take take the last take take take take take take take tak	760255056   PPL-SP-24LC-SM- RPT-BEU	Propel Singlemode Splice Cassette, 24LC/UPC with internal shutters, OS2 ribbon fiber pigtail, Method B Enhanced ULL		1

#### **Fiber Connectors**

Part Number   Name	Description	Comment	Quantity
760243371   MFC-LCF-20-5Y-12- PACK	Qwik-Fuse Connector, LC, OM3/OM4/OM5, Aqua, for 1.6/2.0 mm, 12 per pack		1
760243372   SFC-LCF-09-8Y-12- PACK	Qwik-Fuse Connector, LC, Singlemode-UPC, Blue, for 250μm/900μm, 12 per pack		1
760243391   MFC-SCF-09-5Y-12- PACK	Qwik-Fuse Connector, SC, OM3/OM4/OM5 , Aqua, for 250μm/900μm, 12 per pack		1

Page 1 of 7 February 13, 2025





Part Number   Name	Description	Comment	Quantity
760243394   SFC-SCF-09-8Y-12- PACK	Qwik-Fuse Connector, SC, Singlemode-UPC, Blue, for 250μm/900μm, 12 per pack		1

#### Fiber Indoor & Outdoor Cables

Part Number   Name	Description	Comment	Quantity
760134924   P-012-OZ-8W-FSUBK	Fiber indoor/outdoor cable, TeraSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, Singlemode G.652.D and G.657.A1, 12 fiber single-unit, Black jacket color, Feet cable marking		1
760238363   P-012-LZ-5G- F12BK/25D	Fiber indoor/outdoor cable, LazrSPEED®, Plenum Rated, Gel-Free, Multimode OM5, 12 fiber, Stranded Loose Tube with Aluminum Interlocking Armor containing a Plenum Rated Outer Jacket, Feet jacket marking, Black jacket color		1
760248083   Z-288-CZ-RR- F12BK/8G1/99G/B2	Fiber indoor/outdoor cable, Interlocking Armored, LSZH Riser-Rated, Gel-Free, Central Tube Rollable Ribbon, 288 fiber, Singlemode G.657.A2/B2, Feet jacket marking, Black jacket color, B2ca flame rating		1
760249436   Z-024-CZ-RB- F12BK/8W/99F	Fiber Indoor/outdoor Cable, Interlocking Armored, Low Smoke Zero Halogen (LSZH), Riser-Rated, 24 fiber, Gel-Free, Central Tube Ribbon, Singlemode G.652.D and G.657.A1, Feet jacket marking, Black jacket color		1
760250013   P-024-OZ-5G-FSUBK	Fiber indoor/outdoor cable, LazrSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, Multimode OM5, 24 fiber single-unit, Gel-free, Feet jacket marking, Black jacket color		1

#### Fiber Indoor Cables

Do	ort Number I Neme	Description	Commont	Quantity
Га	art Number   Name	Description	Comment	Quantity

Page 2 of 7 February 13, 2025





Part Number   Name	Description	Comment	Quantity
760127803   P-012-DZ-8W-FSUYL	Fiber Indoor cable, TeraSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, 12 fiber single-unit, Gel-free, Singlemode G.652.D and G.657.A1, Feet jacket marking, Yellow jacket color		1
760127886   P-024-DZ-8W-FSUYL	Fiber Indoor cable, TeraSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, 24 fiber single-unit, Gel-free, Singlemode G.652.D and G.657.A1, Feet jacket marking, Yellow jacket color, Build America Buy America (BABA)		1
760229518   P-012-DZ-5G-FSULM	Fiber indoor cable, LazrSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, 12 fiber single-unit, Gel-free, Multimode OM5, Feet jacket marking, Lime green jacket color		1
760229534   P-024-DZ-5G-FSULM	Fiber indoor cable, LazrSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, 24 fiber single-unit, Gel-free, Multimode OM5, Feet jacket marking, Lime green jacket color		1

#### Fiber Modules

	Part Number   Name	Description	Comment	Quantity
warm ar air air	760252348   PPL-DM-12AU-24LC- SM-BEU	Propel ULL Singlemode MPO-12 Distribution Module, 12 duplex LC/UPC to 2X12f MPO/APC non-pinned, Method B Enhanced		1
	760252357   PPL-DM-24U-24LC- OM5-BEU	Propel ULL Multimode OM5 MPO-24 Distribution Module, 12 duplex LC to 1X24f MPO/UPC nonpinned, Method B Enhanced		1

#### Fiber Panels

Part Number	Name Descrip		nment Quantity
-------------	--------------	--	----------------

Page 3 of 7 February 13, 2025





	Part Number   Name	Description	Comment	Quantity
A -	760252002   PPL-1U	Propel 1RU sliding tray fiber panel, accepts Propel ULL modules or adapter packs, providing up to 72 duplex LC ports, 72 MPO ports or 144 SN ports (288f)		1
	760252003   PPL-2U	Propel 2RU sliding tray fiber panel, accepts Propel ULL modules or adapter packs, providing up to 144 duplex LC ports, 144 MPO ports or 288 SN ports (576f)		1
	760252004   PPL-4U	Propel 4RU sliding tray fiber panel, accepts Propel ULL modules or adapter packs, providing up to 288 duplex LC ports, 288 MPO ports or 576 SN ports (1152f)		1

#### Fiber Patch Cords

Part Number   Name	Description	Comment	Quantity
UDGLCLC42-JXF003	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, J - Yellow, X - No breakouts, 3, ft		1
UDGLCLC42-JXF005	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, J - Yellow, X - No breakouts, 5, ft		1
UDGLCLC42-JXF007	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, J - Yellow, X - No breakouts, 7, ft		1
UDGLCLC42-JXF010	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, J - Yellow, X - No breakouts, 10, ft		1
UDGLCLC42-JXF015	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, J - Yellow, X - No breakouts, 15, ft		1

Page 4 of 7 February 13, 2025





Part Number   Name	Description	Comment	Quantity
UDGLCLC42-JXF020	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, J - Yellow, X - No breakouts, 20, ft		1
UDVLCLC42-NXF003	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, N - Lime Green, X - No breakouts, 3, ft		1
UDVLCLC42-NXF005	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, N - Lime Green, X - No breakouts, 5, ft		1
UDVLCLC42-NXF007	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, N - Lime Green, X - No breakouts, 7, ft		1
UDVLCLC42-NXF010	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, N - Lime Green, X - No breakouts, 10, ft		1
UDVLCLC42-NXF015	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, N - Lime Green, X - No breakouts, 15, ft		1
UDVLCLC42-NXF020	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Plenum, N - Lime Green, X - No breakouts, 20, ft		1
UFGLCLC42-JXF003	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, J - Yellow, X - No breakouts, 3, ft		1
UFGLCLC42-JXF005	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, J - Yellow, X - No breakouts, 5, ft		1

Page 5 of 7 February 13, 2025





Part Number   Name	Description	Comment	Quantity
UFGLCLC42-JXF007	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, J - Yellow, X - No breakouts, 7, ft		1
UFGLCLC42-JXF010	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, J - Yellow, X - No breakouts, 10, ft		1
UFGLCLC42-JXF015	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, J - Yellow, X - No breakouts, 15, ft		1
UFGLCLC42-JXF020	Ultra Low Loss Singlemode, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, J - Yellow, X - No breakouts, 20, ft		1
UFVLCLC42-NXF003	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, N - Lime Green, X - No breakouts, 3, ft		1
UFVLCLC42-NXF005	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, N - Lime Green, X - No breakouts, 5, ft		1
UFVLCLC42-NXF007	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, N - Lime Green, X - No breakouts, 7, ft		1
UFVLCLC42-NXF010	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, N - Lime Green, X - No breakouts, 10, ft		1
UFVLCLC42-NXF015	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, N - Lime Green, X - No breakouts, 15, ft		1
UFVLCLC42-NXF020	Ultra Low Loss OM5, LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen, N - Lime Green, X - No breakouts, 20, ft		1

Page 6 of 7 February 13, 2025





	Part Number   Name	Description	Comment	Quantity
MPO Cable	Assemblies .	·		
	Part Number   Name	Description	Comment	Quantity
17	UJGMXMXAF-JAM100	Ultra Low Loss (ULL) Singlemode MPO12 (Pinned) to MPO12 (Pinned), Fiber Trunk Cable Assembly, 24-Fiber, Low Smoke Zero Halogen (LSZH), 100, m, J - Yellow, A - 33 inch breakout (end A/end B), no gland, no pulling grip [standard option]		1
9	UJV2X2XBF-NAM100	Ultra Low Loss (ULL) OM5 MPO24 (Pinned) to MPO24 (Pinned), Fiber Trunk Cable Assembly, 24-Fiber, Low Smoke Zero Halogen (LSZH), 100, m, N - Lime Green, A - 33 inch breakout (end A/end B), no gland, no pulling grip [standard option]		1

Page 7 of 7 February 13, 2025





Fiber Indoor cable, TeraSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, 12 fiber single-unit, Gel-free, Singlemode G.652.D and G.657.A1, Feet jacket marking, Yellow jacket color

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | Latin America | Middle East/Africa | North

America

Portfolio CommScope®

**Product Type** Fiber indoor cable

**Product Series** P-DZ

#### General Specifications

Armor Type Interlocking aluminum

Cable TypeDistributionConstruction TypeArmoredSubunit TypeGel-freeJacket ColorYellow

Jacket Marking Feet
Total Fiber Count 12

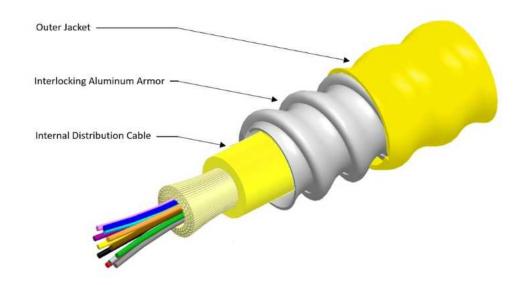
**Dimensions** 

 Diameter Over Armor
 10.8 mm | 0.425 in

 Diameter Over Jacket
 12.8 mm | 0.504 in

## Representative Image





#### Mechanical Specifications

Minimum Bend Radius, loaded192 mm7.559 inMinimum Bend Radius, unloaded128 mm5.039 inTensile Load, long term, maximum200 N | 44.962 lbfTensile Load, short term, maximum667 N | 149.948 lbf

 Compression
 85 N/mm | 485.363 lb/in

 Compression Test Method
 FOTP-41 | IEC 60794-1 E3

Flex 25 cycles

Flex Test Method FOTP-104 | IEC 60794-1 E6

**Impact** 35 N-m | 309.776 in lb

Impact Test Method FOTP-25 | IEC 60794-1 E4

**Strain** See long and short term tensile loads

Strain Test Method FOTP-33 | IEC 60794-1 E1

Twist 10 cycles

Twist Test Method FOTP-85 | IEC 60794-1 E7

**Vertical Rise, maximum** 136 m | 446.194 ft

Optical Specifications

**Fiber Type** G.652.D and G.657.A1, TeraSPEED®



### **Environmental Specifications**

Installation temperature 0 °C to +70 °C (+32 °F to +158 °F)

-20 °C to +70 °C (-4 °F to +158 °F) **Operating Temperature** 

**Storage Temperature** -40 °C to +70 °C (-40 °F to +158 °F)

**Cable Qualification Standards** ANSI/ICEA S-83-596 | Telcordia GR-409

**Environmental Space** Plenum

NEC OFCP (ETL) and c(ETL) Flame Test Listing

Flame Test Method NFPA 130 | NFPA 262

#### **Environmental Test Specifications**

**Heat Age** -20 °C to +85 °C (-4 °F to +185 °F)

**Heat Age Test Method** IEC 60794-1 F9

Low High Bend -20 °C to +70 °C (-4 °F to +158 °F)

Low High Bend Test Method FOTP-37 | IEC 60794-1 E11

**Temperature Cycle** -20 °C to +70 °C (-4 °F to +158 °F)

**Temperature Cycle Test Method** FOTP-3 | IEC 60794-1 F1

Packaging and Weights

Cable weight 151 kg/km | 101.467 lb/kft

## Regulatory Compliance/Certifications

Classification Agency

Compliant CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system **REACH-SVHC** Compliant as per SVHC revision on www.commscope.com/ProductCompliance

**ROHS** Compliant **UK-ROHS** Compliant



ANATFI



#### Included Products

CS-8W-TB - TeraSPEED® Singlemode Fiber



#### \* Footnotes

**Operating Temperature** Specification applicable to non-terminated bulk fiber cable



Fiber Indoor cable, TeraSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, 24 fiber single-unit, Gel-free, Singlemode G.652.D and G.657.A1, Feet jacket marking, Yellow jacket color, Build America Buy America (BABA)

 \*Product complies with the Build America, Buy America Act (BABAA) requirements of the Infrastructure Investment and Jobs Act of 2021 (Pub. L. 117- 58, §§ 70901-70953), or is the subject of a waiver approved by the Secretary of Commerce or designee. Compliance requirements and waiver applicability vary based on government funding program. Check the laws and regulations for your specific program.

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | Latin America | Middle East/Africa | North

America

Portfolio CommScope®

Product Type Fiber indoor cable

**Product Series** P-DZ

**Government Requirements**Build America Buy America (BABA) compliant\*

General Specifications

Armor Type Interlocking aluminum

 Cable Type
 Distribution

 Construction Type
 Armored

 Subunit Type
 Gel-free

 Jacket Color
 Yellow

 Jacket Marking
 Feet

**Location of Manufacturing**Claremont, North Carolina

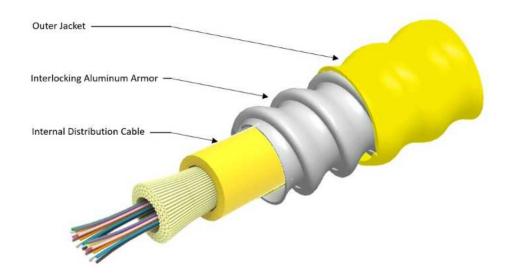
Total Fiber Count 24

**Dimensions** 

Diameter Over Armor13.34 mm | 0.525 inDiameter Over Jacket17.4 mm | 0.685 in

Representative Image





## Mechanical Specifications

Minimum Bend Radius, loaded261 mm | 10.276 inMinimum Bend Radius, unloaded174 mm | 6.85 inTensile Load, long term, maximum400 N | 89.924 lbfTensile Load, short term, maximum1335 N | 300.12 lbf

 Compression
 85 N/mm | 485.363 lb/in

 Compression Test Method
 FOTP-41 | IEC 60794-1 E3

Flex 25 cycles

Flex Test Method FOTP-104 | IEC 60794-1 E6

**Impact** 35 N-m | 309.776 in lb

Impact Test Method FOTP-25 | IEC 60794-1 E4

**Strain** See long and short term tensile loads

Strain Test Method FOTP-33 | IEC 60794-1 E1

Twist 10 cycles

Twist Test Method FOTP-85 | IEC 60794-1 E7

**Vertical Rise, maximum** 133 m | 436.352 ft

**Optical Specifications** 

**Fiber Type** G.652.D and G.657.A1, TeraSPEED®



### **Environmental Specifications**

Installation temperature 0 °C to +70 °C (+32 °F to +158 °F)

-20 °C to +70 °C (-4 °F to +158 °F) **Operating Temperature** 

**Storage Temperature** -40 °C to +70 °C (-40 °F to +158 °F)

**Cable Qualification Standards** ANSI/ICEA S-83-596 | Telcordia GR-409

**Environmental Space** Plenum

NEC OFCP (ETL) and c(ETL) Flame Test Listing

Flame Test Method NFPA 130 | NFPA 262

#### **Environmental Test Specifications**

**Heat Age** -20 °C to +85 °C (-4 °F to +185 °F)

**Heat Age Test Method** IEC 60794-1 F9

Low High Bend -20 °C to +70 °C (-4 °F to +158 °F)

FOTP-37 | IEC 60794-1 E11 Low High Bend Test Method

**Temperature Cycle** -20 °C to +70 °C (-4 °F to +158 °F)

FOTP-3 | IEC 60794-1 F1 **Temperature Cycle Test Method** 

Packaging and Weights

Cable weight 307 kg/km | 206.294 lb/kft

## Regulatory Compliance/Certifications

#### Classification Agency

ANATFI Compliant

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system **REACH-SVHC** Compliant as per SVHC revision on www.commscope.com/ProductCompliance

**ROHS** Compliant **UK-ROHS** Compliant





#### Included Products

CS-8W-TB - TeraSPEED® Singlemode Fiber



# 760127886 | P-024-DZ-8W-FSUYL

## \* Footnotes

# 760229518 | P-012-DZ-5G-FSULM



Fiber indoor cable, LazrSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, 12 fiber single-unit, Gel-free, Multimode OM5, Feet jacket marking, Lime green jacket color

## **Product Classification**

Regional Availability

Asia | Australia/New Zealand | Latin America | Middle East/Africa | North

America

Portfolio CommScope®

Product Type Fiber indoor cable

Product Series P-DZ

General Specifications

Armor Type Interlocking aluminum

Cable TypeDistributionConstruction TypeArmoredSubunit TypeGel-free

Jacket Color Lime green

Jacket Marking Feet
Total Fiber Count 12

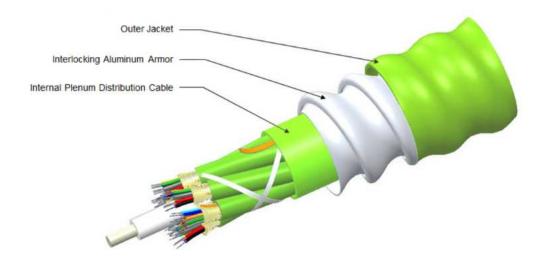
**Dimensions** 

Diameter Over Armor10.8 mm | 0.425 inDiameter Over Jacket12.8 mm | 0.504 in

Representative Image



# 760229518 | P-012-DZ-5G-FSULM



## Mechanical Specifications

Minimum Bend Radius, loaded192 mm7.559 inMinimum Bend Radius, unloaded128 mm5.039 inTensile Load, long term, maximum200 N | 44.962 lbfTensile Load, short term, maximum667 N | 149.948 lbf

 Compression
 85 N/mm | 485.363 lb/in

 Compression Test Method
 FOTP-41 | IEC 60794-1 E3

Flex 25 cycles

Flex Test Method FOTP-104 | IEC 60794-1 E6

**Impact** 35 N-m | 309.776 in lb

Impact Test Method FOTP-25 | IEC 60794-1 E4

**Strain** See long and short term tensile loads

Strain Test Method FOTP-33 | IEC 60794-1 E1

Twist 10 cycles

Twist Test Method FOTP-85 | IEC 60794-1 E7

**Vertical Rise, maximum** 136 m | 446.194 ft

Optical Specifications

Fiber Type OM5, LazrSPEED® wideband | OM5, LazrSPEED® wideband

## **Environmental Specifications**

**Installation temperature** 0 °C to +70 °C (+32 °F to +158 °F)

Page 2 of 3



# 760229518 | P-012-DZ-5G-FSULM

**Operating Temperature**  $-20 \,^{\circ}\text{C to} + 70 \,^{\circ}\text{C (-4 °F to} + 158 \,^{\circ}\text{F)}$ 

**Storage Temperature**  $-40 \,^{\circ}\text{C} \text{ to } +70 \,^{\circ}\text{C} \text{ (-40 }^{\circ}\text{F to } +158 \,^{\circ}\text{F)}$ 

Cable Qualification Standards ANSI/ICEA S-83-596 | Telcordia GR-409

Environmental Space Plenum

Flame Test Listing

NEC OFCP (ETL) and c(ETL)

Flame Test Method

NFPA 130 | NFPA 262

## **Environmental Test Specifications**

**Heat Age** -20 °C to +85 °C (-4 °F to +185 °F)

**Heat Age Test Method** IEC 60794-1 F9

**Low High Bend** -20 °C to +70 °C (-4 °F to +158 °F)

**Low High Bend Test Method** FOTP-37 | IEC 60794-1 E11

**Temperature Cycle** -20 °C to +70 °C (-4 °F to +158 °F)

**Temperature Cycle Test Method** FOTP-3 | IEC 60794-1 F1

Packaging and Weights

**Cable weight** 151 kg/km | 101.467 lb/kft

## Regulatory Compliance/Certifications

Agency	Classification	

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system
REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



#### Included Products

CS-5G-TB - LazrSPEED® OM5 WideBand Multimode

Fiber

#### \* Footnotes



# 760229534 | P-024-DZ-5G-FSULM



Fiber indoor cable, LazrSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, 24 fiber single-unit, Gel-free, Multimode OM5, Feet jacket marking, Lime green jacket color

## **Product Classification**

Regional Availability

Asia | Australia/New Zealand | Latin America | Middle East/Africa | North

America

P-DZ

Portfolio CommScope®

Product Type Fiber indoor cable

General Specifications

Armor Type Interlocking aluminum

Cable TypeDistributionConstruction TypeArmored

**Subunit Type** Gel-free

Jacket Color Lime green

Jacket Marking Feet
Total Fiber Count 24

**Dimensions** 

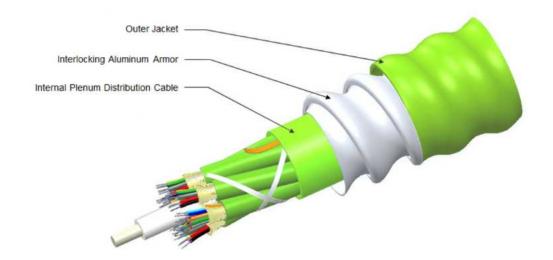
**Product Series** 

Diameter Over Armor13.34 mm | 0.525 inDiameter Over Jacket17.4 mm | 0.685 in

Representative Image



# 760229534 | P-024-DZ-5G-FSULM



## Mechanical Specifications

Minimum Bend Radius, loaded261 mm10.276 inMinimum Bend Radius, unloaded174 mm6.85 in

**Tensile Load, long term, maximum** 400 N | 89.924 lbf

Tensile Load, short term, maximum 1335 N | 300.12 lbf

 Compression
 85 N/mm | 485.363 lb/in

 Compression Test Method
 FOTP-41 | IEC 60794-1 E3

Flex 25 cycles

Flex Test Method FOTP-104 | IEC 60794-1 E6

**Impact** 35 N-m | 309.776 in lb

Impact Test Method FOTP-25 | IEC 60794-1 E4

**Strain** See long and short term tensile loads

Strain Test Method FOTP-33 | IEC 60794-1 E1

Twist 10 cycles

Twist Test Method FOTP-85 | IEC 60794-1 E7

**Vertical Rise, maximum** 133 m | 436.352 ft

Optical Specifications

**Fiber Type** OM5, LazrSPEED® wideband

**Environmental Specifications** 

**Installation temperature** 0 °C to +70 °C (+32 °F to +158 °F)

Page 2 of 3



# 760229534 | P-024-DZ-5G-FSULM

**Operating Temperature**  $-20 \,^{\circ}\text{C} \text{ to } +70 \,^{\circ}\text{C} \, (-4 \,^{\circ}\text{F to } +158 \,^{\circ}\text{F})$ 

**Storage Temperature**  $-40 \,^{\circ}\text{C} \text{ to } +70 \,^{\circ}\text{C} \, (-40 \,^{\circ}\text{F to } +158 \,^{\circ}\text{F})$ 

Cable Qualification Standards ANSI/ICEA S-83-596 | Telcordia GR-409

Environmental Space Plenum

Flame Test Listing

NEC OFCP (ETL) and c(ETL)

Flame Test Method

NFPA 130 | NFPA 262

## **Environmental Test Specifications**

**Heat Age** -20 °C to +85 °C (-4 °F to +185 °F)

**Heat Age Test Method** IEC 60794-1 F9

**Low High Bend**  $-20 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-4 °F to  $+158 \,^{\circ}\text{F}$ )

**Low High Bend Test Method** FOTP-37 | IEC 60794-1 E11

**Temperature Cycle** -20 °C to +70 °C (-4 °F to +158 °F)

**Temperature Cycle Test Method** FOTP-3 | IEC 60794-1 F1

Packaging and Weights

**Cable weight** 307 kg/km | 206.294 lb/kft

## Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant



#### Included Products

CS-5G-TB - LazrSPEED® OM5 WideBand Multimode

Compliant

Fiber

#### \* Footnotes





Fiber indoor/outdoor cable, TeraSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, Singlemode G.652.D and G.657.A1, 12 fiber single-unit, Black jacket color, Feet cable marking

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | Latin America | Middle East/Africa | North

America

Portfolio CommScope®

**Product Type** Fiber indoor/outdoor cable

**Product Series** P-OZ

General Specifications

Armor Type Interlocking aluminum

Cable Type Distribution

Construction Type Armored

**Jacket Color** Black

**Jacket Marking** Feet

**Total Fiber Count** 12

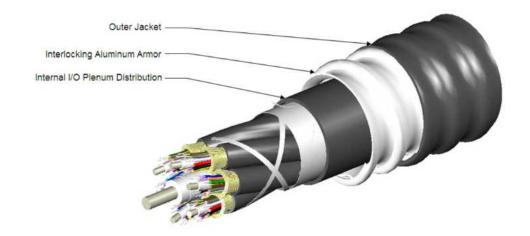
**Dimensions** 

**Diameter Over Armor** 12.07 mm | 0.475 in

**Diameter Over Jacket** 14.1 mm | 0.555 in

Representative Image





## Mechanical Specifications

Minimum Bend Radius, loaded211 mm | 8.307 inMinimum Bend Radius, unloaded141 mm | 5.551 inTensile Load, long term, maximum400 N | 89.924 lbfTensile Load, short term, maximum1335 N | 300.12 lbf

 Compression
 85 N/mm | 485.363 lb/in

 Compression Test Method
 FOTP-41 | IEC 60794-1 E3

Flex 25 cycles

Flex Test Method FOTP-104 | IEC 60794-1 E6

**Impact** 35 N-m | 309.776 in lb

Impact Test Method FOTP-25 | IEC 60794-1 E4

**Strain** See long and short term tensile loads

Strain Test Method FOTP-33 | IEC 60794-1 E1

Twist 10 cycles

Twist Test Method FOTP-85 | IEC 60794-1 E7

Vertical Rise, maximum 211 m | 692.257 ft

**Optical Specifications** 

**Fiber Type** G.652.D and G.657.A1, TeraSPEED®

## **Environmental Specifications**



Installation temperature  $-30 \,^{\circ}\text{C to} + 70 \,^{\circ}\text{C} \, (-22 \,^{\circ}\text{F to} + 158 \,^{\circ}\text{F})$ Operating Temperature  $-40 \,^{\circ}\text{C to} + 70 \,^{\circ}\text{C} \, (-40 \,^{\circ}\text{F to} + 158 \,^{\circ}\text{F})$ 

**Storage Temperature**  $-40 \,^{\circ}\text{C}$  to  $+75 \,^{\circ}\text{C}$  ( $-40 \,^{\circ}\text{F}$  to  $+167 \,^{\circ}\text{F}$ )

Cable Qualification Standards ANSI/ICEA S-104-696 | Telcordia GR-20 (water penetration for internal

cable) | Telcordia GR-409

Environmental Space Plenum

Flame Test Listing NEC OFCP (ETL) and c(ETL)
Flame Test Method NFPA 130 | NFPA 262

Jacket UV Resistance UV stabilized

Water Penetration 24 h

**Water Penetration Test Method** FOTP-82 | IEC 60794-1 F5

**Environmental Test Specifications** 

Cable Freeze Test Method IEC 60794-1 F15

**Heat Age**  $-40 \,^{\circ}\text{C} \text{ to } +85 \,^{\circ}\text{C} \, (-40 \,^{\circ}\text{F to } +185 \,^{\circ}\text{F})$ 

**Heat Age Test Method** IEC 60794-1 F9

**Low High Bend** -40 °C to +70 °C (-40 °F to +158 °F)

**Low High Bend Test Method** FOTP-37 | IEC 60794-1 E11

Temperature Cycle -40 °C to +70 °C (-40 °F to +158 °F)

**Temperature Cycle Test Method** FOTP-3 | IEC 60794-1 F1

Packaging and Weights

**Cable weight** 194 kg/km | 130.362 lb/kft

Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



#### Included Products



CS-8W-TB - TeraSPEED® Singlemode Fiber

## \* Footnotes

# 760238363 | P-012-LZ-5G-F12BK/25D



Fiber indoor/outdoor cable, LazrSPEED®, Plenum Rated, Gel-Free, Multimode OM5, 12 fiber, Stranded Loose Tube with Aluminum Interlocking Armor containing a Plenum Rated Outer Jacket, Feet jacket marking, Black jacket color

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | Latin America | Middle East

/Africa | North America

Portfolio CommScope®

Product Type Fiber indoor/outdoor cable

**Product Series** P-LZ

General Specifications

Armor Type Interlocking aluminum

Cable Type Stranded loose tube

Construction TypeArmoredSubunit TypeGel-free

Filler, quantity 4

Jacket ColorBlackJacket MarkingFeetSubunit, quantity1

Fibers per Subunit, quantity 12

Total Fiber Count 12

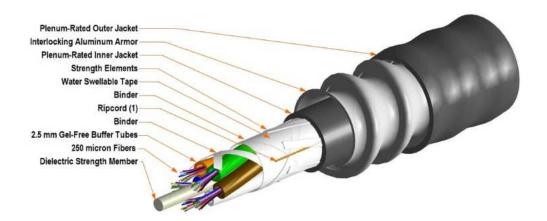
**Dimensions** 

Buffer Tube/Subunit Diameter2.5 mm | 0.098 inDiameter Over Armor15.9 mm | 0.626 inDiameter Over Jacket17.9 mm | 0.705 in

Representative Image



# 760238363 | P-012-LZ-5G-F12BK/25D



## Mechanical Specifications

Minimum Bend Radius, loaded 358 mm | 14.094 in

Minimum Bend Radius, unloaded 250 mm | 9.843 in

**Tensile Load, long term, maximum** 400 N | 89.924 lbf

**Tensile Load, short term, maximum** 1335 N | 300.12 lbf

**Compression** 85 N/mm | 485.363 lb/in

**Compression Test Method** FOTP-41 | IEC 60794-1 E3

Flex 25 cycles

Flex Test Method FOTP-104 | IEC 60794-1 E6

**Impact** 35 N-m | 309.776 in lb

Impact Test Method FOTP-25 | IEC 60794-1 E4

**Strain** See long and short term tensile loads

Strain Test Method FOTP-33 | IEC 60794-1 E1

Twist 10 cycles

Twist Test Method FOTP-85 | IEC 60794-1 E7

**Vertical Rise, maximum** 144 m | 472.441 ft

Optical Specifications

Fiber Type OM5, LazrSPEED® wideband | OM5, LazrSPEED® wideband

## **Environmental Specifications**

Installation temperature  $-30 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-22  $^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

Operating Temperature  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-40  $^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

Page 2 of 3



# 760238363 | P-012-LZ-5G-F12BK/25D

Storage Temperature  $-40 \,^{\circ}\text{C}$  to  $+75 \,^{\circ}\text{C}$  ( $-40 \,^{\circ}\text{F}$  to  $+167 \,^{\circ}\text{F}$ )

Cable Qualification Standards ANSI/ICEA S-104-696 | EN 187105 | Telcordia GR-409

Environmental Space Plenum

Flame Test Listing NEC OFCP (ETL) and c(ETL)
Flame Test Method NFPA 130 | NFPA 262

Jacket UV Resistance UV stabilized

Water Penetration 24 h

Water Penetration Test Method FOTP-82 | IEC 60794-1 F5

**Environmental Test Specifications** 

Cable Freeze -2 °C | 28.4 °F

Cable Freeze Test Method FOTP-98 | IEC 60794-1 F15

**Heat Age**  $-40 \,^{\circ}\text{C} \text{ to } +85 \,^{\circ}\text{C} \, (-40 \,^{\circ}\text{F to } +185 \,^{\circ}\text{F})$ 

Heat Age Test Method IEC 60794-1 F9

**Low High Bend**  $-30 \,^{\circ}\text{C} \text{ to } +60 \,^{\circ}\text{C} \, (-22 \,^{\circ}\text{F to } +140 \,^{\circ}\text{F})$ 

**Low High Bend Test Method** FOTP-37 | IEC 60794-1 E11

**Temperature Cycle**  $-40 \,^{\circ}\text{C to} + 70 \,^{\circ}\text{C } (-40 \,^{\circ}\text{F to} + 158 \,^{\circ}\text{F})$ 

**Temperature Cycle Test Method** FOTP-3 | IEC 60794-1 F1

Packaging and Weights

**Cable weight** 283 kg/km | 190.167 lb/kft

Regulatory Compliance/Certifications

Agency Classification

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

Included Products

CS-5G-LT - LazrSPEED® OM5 WideBand Multimode

Fiber

\* Footnotes





Fiber indoor/outdoor cable, Interlocking Armored, LSZH Riser-Rated, Gel-Free, Central Tube Rollable Ribbon, 288 fiber, Singlemode G.657.A2/B2, Feet jacket marking, Black jacket color, B2ca flame rating

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North

America

Portfolio CommScope®

Product Type Fiber indoor/outdoor cable

Product Series Z-CZ

General Specifications

Cable Type Ribbon central tube

Construction TypeArmoredSubunit TypeGel-free

Fibers per Ribbon, quantity 12

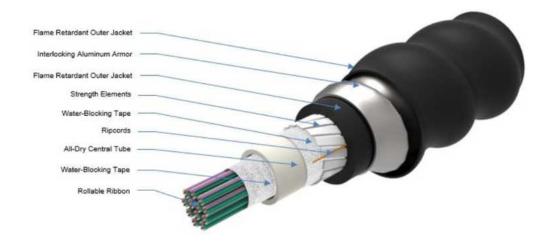
Inner Jacket Color Black
Jacket Color Black
Jacket Marking Feet
Total Fiber Count 288

**Dimensions** 

Buffer Tube/Subunit Diameter8.1 mm | 0.319 inDiameter Over Jacket20.5 mm | 0.807 in

Representative Image





## Mechanical Specifications

Minimum Bend Radius, loaded 410 mm | 16.142 in

Minimum Bend Radius, unloaded 287 mm | 11.299 in

**Tensile Load, long term, maximum** 800 N | 179.847 lbf

Tensile Load, short term, maximum 2670 N | 600.24 lbf

**Compression** 10 N/mm | 57.101 lb/in

Compression Test Method FOTP-41 | IEC 60794-1 E3

Flex 25 cycles

Flex Test Method FOTP-104 | IEC 60794-1 E6

**Impact** 5.15 N-m | 45.581 in lb

Impact Test Method FOTP-25 | IEC 60794-1 E4

**Strain** See long and short term tensile loads

Strain Test Method FOTP-33 | IEC 60794-1 E1

Twist 10 cycles

Twist Test Method FOTP-85 | IEC 60794-1 E7

**Optical Specifications** 

**Fiber Type** G.657.A2/B2 | G.657.A2/B2

**Environmental Specifications** 

**Installation temperature** -20 °C to +60 °C (-4 °F to +140 °F)

**Operating Temperature**  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  ( $-40 \,^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

Page 2 of 4

Storage Temperature  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  ( $-40 \,^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

Cable Qualification Standards ANSI/ICEA S-104-696 | EN 187105 | Telcordia GR-409

EN50575 CPR Cable EuroClass Fire PerformanceB2caEN50575 CPR Cable EuroClass Smoke Ratings1aEN50575 CPR Cable EuroClass Droplets Ratingd2

Environmental Space Aerial, lashed | Buried | Low Smoke Zero Halogen (LSZH) | Riser

a1

Flame Test Listing NEC OFCR-ST1 (ETL) and c(ETL)

Flame Test Method CSA FT4 | IEC 60332-1-2 | IEC 60754-2 | IEC 61034-2 | UL

1666 | UL 1685

Jacket UV Resistance UV stabilized

Water Penetration 24 h

**Water Penetration Test Method** FOTP-82 | IEC 60794-1 F5

**Environmental Test Specifications** 

**EN50575 CPR Cable EuroClass Acidity Rating** 

Cable Freeze -2 °C | 28.4 °F

Cable Freeze Test Method FOTP-98 | IEC 60794-1 F15

**Heat Age** -40 °C to +85 °C (-40 °F to +185 °F)

Heat Age Test Method IEC 60794-1 F9

**Low High Bend**  $-20 \,^{\circ}\text{C} \text{ to } +60 \,^{\circ}\text{C} \, (-4 \,^{\circ}\text{F to } +140 \,^{\circ}\text{F})$ 

Low High Bend Test Method FOTP-37 | IEC 60794-1 E11

**Temperature Cycle**  $-20 \,^{\circ}\text{C} \text{ to } +70 \,^{\circ}\text{C} \, (-4 \,^{\circ}\text{F to } +158 \,^{\circ}\text{F})$ 

**Temperature Cycle Test Method** FOTP-3 | IEC 60794-1 F1

Packaging and Weights

**Cable weight** 372.8 kg/km | 250.51 lb/kft

## Regulatory Compliance/Certifications

Agency Classification
ANATEL Compliant

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant





#### Included Products

CS-8G1-RR-I/O

Enhanced Low Macrobending, Zero Water Peak, Dispersion-Unshifted Singlemode Rollable Ribbon Fiber (ITU-T G.657.A2, B2)

## \* Footnotes



# 760249436 | Z-024-CZ-RB-F12BK/8W/99F



Fiber Indoor/outdoor Cable, Interlocking Armored, Low Smoke Zero Halogen (LSZH), Riser-Rated, 24 fiber, Gel-Free, Central Tube Ribbon, Singlemode G.652.D and G.657.A1, Feet jacket marking, Black jacket color

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North

America

Portfolio CommScope®

Product Type Fiber indoor/outdoor cable

**Product Series** Z-CZ

General Specifications

 Armor Type
 Interlocking aluminum

 Cable Type
 Ribbon central tube

Construction TypeArmoredSubunit TypeGel-free

Fibers per Ribbon, quantity

12

Jacket Color

Black

Jacket Marking

Feet

Total Fiber Count

24

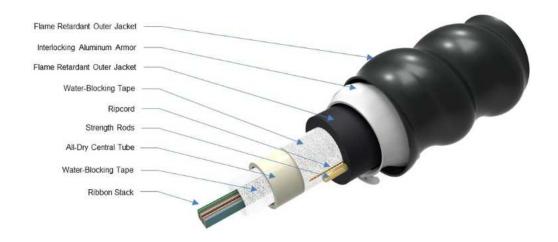
**Dimensions** 

Buffer Tube/Subunit Diameter6 mm | 0.236 inDiameter Over Jacket21.7 mm | 0.854 in

Representative Image



# 760249436 | Z-024-CZ-RB-F12BK/8W/99F



## Mechanical Specifications

Minimum Bend Radius, loaded 326 mm | 12.835 in

Minimum Bend Radius, unloaded 217 mm | 8.543 in

**Tensile Load, long term, maximum** 800 N | 179.847 lbf

**Tensile Load, short term, maximum** 2700 N | 606.984 lbf

**Compression** 85 N/mm | 485.363 lb/in

**Compression Test Method** FOTP-41 | IEC 60794-1 E3

Flex 25 cycles

Flex Test Method FOTP-104 | IEC 60794-1 E6

**Impact** 35 N-m | 309.776 in lb

Impact Test Method FOTP-25 | IEC 60794-1 E4

**Strain** See long and short term tensile loads

Strain Test Method FOTP-33 | IEC 60794-1 E1

Twist 10 cycles

Twist Test Method FOTP-85 | IEC 60794-1 E7

**Optical Specifications** 

**Fiber Type** G.652.D and G.657.A1, TeraSPEED®

## **Environmental Specifications**

Installation temperature  $-30 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (-22  $^{\circ}\text{F}$  to  $+140 \,^{\circ}\text{F}$ )

Operating Temperature  $-40 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-40  $^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

Page 2 of 3



# 760249436 | Z-024-CZ-RB-F12BK/8W/99F

Storage Temperature  $-40 \,^{\circ}\text{C}$  to  $+75 \,^{\circ}\text{C}$  (-40  $^{\circ}\text{F}$  to  $+167 \,^{\circ}\text{F}$ )

Cable Qualification Standards ANSI/ICEA S-104-696 | EN 187105 | Telcordia GR-20-CORE Issue

4 | Telcordia GR-409

Environmental Space Aerial, lashed | Buried | Low Smoke Zero Halogen (LSZH) | Riser

Flame Test Listing NEC OFCR-ST1 (ETL) and c(ETL)

Jacket UV Resistance UV stabilized

Water Penetration 24 h

**Water Penetration Test Method** FOTP-82 | IEC 60794-1 F5

**Environmental Test Specifications** 

**Cable Freeze** -2 °C | 28.4 °F

Cable Freeze Test Method FOTP-98 | IEC 60794-1 F15

-40 °C to +85 °C (-40 °F to +185 °F)

**Heat Age Test Method** IEC 60794-1 F9

**Low High Bend**  $-20 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (-4  $^{\circ}\text{F}$  to  $+140 \,^{\circ}\text{F}$ )

**Low High Bend Test Method** FOTP-37 | IEC 60794-1 E11

**Temperature Cycle**  $-20 \,^{\circ}\text{C to} + 70 \,^{\circ}\text{C} \left(-4 \,^{\circ}\text{F to} + 158 \,^{\circ}\text{F}\right)$ 

**Temperature Cycle Test Method** FOTP-3 | IEC 60794-1 F1

Packaging and Weights

**Cable weight** 405 kg/km | 272.147 lb/kft

Included Products

CS-8W-RB-I/O - TeraSPEED® Singlemode Fiber Flat Ribbon

#### \* Footnotes





Fiber indoor/outdoor cable, LazrSPEED® Plenum Distribution, interlocking aluminum armored with plenum jacket, Multimode OM5, 24 fiber single-unit, Gel-free, Feet jacket marking, Black jacket color

## **Product Classification**

Regional Availability

Asia | Australia/New Zealand | Latin America | Middle East/Africa | North

America

Portfolio CommScope®

Product Type Fiber indoor/outdoor cable

**Product Series** P-OZ

General Specifications

Armor Type Interlocking aluminum

Cable Type Distribution

Construction Type Armored

Jacket Color Black

Jacket Marking Feet

Total Fiber Count 24

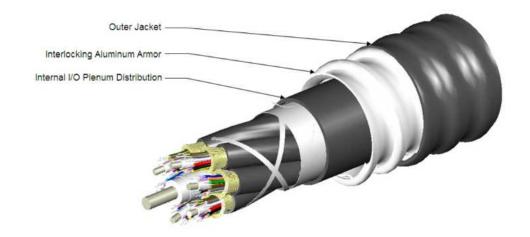
**Dimensions** 

**Diameter Over Armor** 13.34 mm | 0.525 in

**Diameter Over Jacket** 15.4 mm | 0.606 in

## Representative Image





## Mechanical Specifications

Minimum Bend Radius, loaded231 mm | 9.094 inMinimum Bend Radius, unloaded154 mm | 6.063 inTensile Load, long term, maximum400 N | 89.924 lbfTensile Load, short term, maximum1335 N | 300.12 lbf

 Compression
 85 N/mm | 485.363 lb/in

 Compression Test Method
 FOTP-41 | IEC 60794-1 E3

Flex 25 cycles

Flex Test Method FOTP-104 | IEC 60794-1 E6

**Impact** 35 N-m | 309.776 in lb

Impact Test Method FOTP-25 | IEC 60794-1 E4

**Strain** See long and short term tensile loads

Strain Test Method FOTP-33 | IEC 60794-1 E1

Twist 10 cycles

Twist Test Method FOTP-85 | IEC 60794-1 E7

**Vertical Rise, maximum** 187 m | 613.517 ft

**Optical Specifications** 

**Fiber Type** OM5, LazrSPEED® wideband

## **Environmental Specifications**



Installation temperature  $-30 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-22  $^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

Operating Temperature  $-25 \,^{\circ}\text{C}$  to  $+70 \,^{\circ}\text{C}$  (-13  $^{\circ}\text{F}$  to  $+158 \,^{\circ}\text{F}$ )

**Storage Temperature**  $-40 \,^{\circ}\text{C}$  to  $+75 \,^{\circ}\text{C}$  ( $-40 \,^{\circ}\text{F}$  to  $+167 \,^{\circ}\text{F}$ )

Cable Qualification Standards ANSI/ICEA S-104-696 | Telcordia GR-20 (water penetration for internal

cable) | Telcordia GR-409

Environmental Space Plenum

Flame Test Listing NEC OFCP (ETL) and c(ETL)

Flame Test Method NFPA 130 | NFPA 262

Jacket UV Resistance UV stabilized

Water Penetration 24 h

Water Penetration Test Method FOTP-82 | IEC 60794-1 F5

**Environmental Test Specifications** 

Cable Freeze Test Method IEC 60794-1 F15

**Heat Age**  $-40 \,^{\circ}\text{C} \text{ to } +85 \,^{\circ}\text{C} \, (-40 \,^{\circ}\text{F to } +185 \,^{\circ}\text{F})$ 

**Heat Age Test Method** IEC 60794-1 F9

**Low High Bend** -40 °C to +70 °C (-40 °F to +158 °F)

**Low High Bend Test Method** FOTP-37 | IEC 60794-1 E11

**Temperature Cycle**  $-40 \,^{\circ}\text{C} \text{ to } +70 \,^{\circ}\text{C} \, (-40 \,^{\circ}\text{F to } +158 \,^{\circ}\text{F})$ 

**Temperature Cycle Test Method** FOTP-3 | IEC 60794-1 F1

Packaging and Weights

**Cable weight** 218 kg/km | 146.489 lb/kft

Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



#### Included Products

CS-5G-TB - LazrSPEED® OM5 WideBand Multimode

COMMSCOPE®

Fiber

\* Footnotes

# 760243371 | MFC-LCF-20-5Y-12-PACK



Qwik-Fuse Connector, LC, OM3/OM4/OM5, Aqua, for 1.6/2.0 mm, 12 per pack

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®
Product Type Fiber connector

Product Brand LazrSPEED® | Qwik

**Product Series** Qwik-Fuse

General Specifications

Body StyleCordageColor, bootAquaColor, housingAqua

Ferrule Geometry Factory polished

Interface LC/UPC

Interface Feature Field Installable | Fusion splice

**Dimensions** 

**Compatible Cable Diameter** 1.6 mm | 0.063 in | 2 mm | 0.079 in

Material Specifications

Ferrule Material Zirconia

Mechanical Specifications

Cable Retention Strength, maximum 5.08 lb @ 0 °

**Optical Specifications** 

Fiber Mode Multimode

Fiber Type OM3 | OM4 | OM5, LazrSPEED® wideband

Optical Components Standard ANSI/TIA-568. 3-D | IEC 61753-1

**COMMSCOPE®** 

# 760243371 | MFC-LCF-20-5Y-12-PACK

Insertion Loss, maximum0.25 dBInsertion Loss, typical0.1 dBReturn Loss, minimum30 dB

## **Environmental Specifications**

**Operating Temperature**  $-40 \,^{\circ}\text{C} \text{ to } +70 \,^{\circ}\text{C} \, (-40 \,^{\circ}\text{F to } +158 \,^{\circ}\text{F})$ 

Packaging and Weights

Packaging quantity 12

## Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant

UK-ROHS Compliant/Exempted



# 760243372 | SFC-LCF-09-8Y-12-PACK



Qwik-Fuse Connector, LC, Singlemode-UPC, Blue, for 250µm/900µm, 12 per pack

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

Product Type Fiber connector

Product Brand Qwik | TeraSPEED®

**Product Series** Qwik-Fuse

General Specifications

Body StyleBTWColor, bootBlueColor, housingBlue

Ferrule Geometry Factory polished

Interface LC/UPC

Interface Feature Field Installable | Fusion splice

**Dimensions** 

Tube Length 32 mm | 1.26 in

**Compatible Cable Diameter** 0.25 mm | 0.01 in | 0.9 mm | 0.035 in

Material Specifications

Ferrule Material Zirconia

Mechanical Specifications

Cable Retention Strength, maximum  $0.74 \text{ lb} @ 0 \degree | 1.03 \text{ lb} @ 0 \degree$ 

**Optical Specifications** 

**Fiber Mode** Singlemode

Fiber Type OS2



# 760243372 | SFC-LCF-09-8Y-12-PACK

Optical Components Standard ANSI/TIA-568. 3-D | GR-1081 | IEC 61753-1

Insertion Loss, maximum0.3 dBInsertion Loss, typical0.15 dBReturn Loss, minimum55 dB

## **Environmental Specifications**

**Operating Temperature**  $-40 \,^{\circ}\text{C} \text{ to } +75 \,^{\circ}\text{C} \, (-40 \,^{\circ}\text{F to } +167 \,^{\circ}\text{F})$ 

Packaging and Weights

Packaging quantity 12

## Regulatory Compliance/Certifications

# Agency Classification

CHINA-ROHS Below maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant

UK-ROHS Compliant/Exempted



# 760243391 | MFC-SCF-09-5Y-12-PACK



Qwik-Fuse Connector, SC, OM3/OM4/OM5 , Aqua, for 250 $\mu$ m/900 $\mu$ m, 12 per pack

#### **Product Classification**

**Product Type** 

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Fiber connector

Portfolio CommScope®

Product Brand LazrSPEED® | Qwik

**Product Series** Qwik-Fuse

General Specifications

Body Style BTW
Color, boot Aqua
Color, housing Aqua

Ferrule Geometry Factory polished

Interface SC/UPC

Interface Feature Field Installable | Fusion splice

**Dimensions** 

**Tube Length** 32 mm | 1.26 in

**Compatible Cable Diameter** 0.25 mm | 0.01 in | 0.9 mm | 0.035 in

Material Specifications

Ferrule Material Zirconia

Mechanical Specifications

Cable Retention Strength, maximum 1.12 lb @ 0  $^{\circ}$  | 1.57 lb @ 0  $^{\circ}$ 

**Optical Specifications** 

**Fiber Mode** Multimode

Fiber Type OM3 | OM4 | OM5, LazrSPEED® wideband

Optical Components Standard ANSI/TIA-568. 3-D | IEC 61753-1

Page 1 of 2



# 760243391 | MFC-SCF-09-5Y-12-PACK

Insertion Loss, maximum0.25 dBInsertion Loss, typical0.1 dBReturn Loss, minimum30 dB

## **Environmental Specifications**

**Operating Temperature**  $-40 \,^{\circ}\text{C} \text{ to } +75 \,^{\circ}\text{C} \left(-40 \,^{\circ}\text{F to } +167 \,^{\circ}\text{F}\right)$ 

Packaging and Weights

Packaging quantity 12

## Regulatory Compliance/Certifications

AgencyClassificationCHINA-ROHSBelow maximum concentration valueISO 9001:2015Designed, manufactured and/or distributed under this quality management systemREACH-SVHCCompliant as per SVHC revision on www.commscope.com/ProductComplianceROHSCompliant

UK-ROHS Compliant/Exempted



# 760243394 | SFC-SCF-09-8Y-12-PACK



Qwik-Fuse Connector, SC, Singlemode-UPC, Blue, for 250µm/900µm, 12 per pack

#### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio CommScope®

**Product Type** Fiber connector

Product Brand Qwik | TeraSPEED®

**Product Series** Qwik-Fuse

General Specifications

Body Style BTW

Color, boot Blue

Color, housing Blue

Ferrule Geometry Factory polished

Interface SC/UPC

Interface Feature Field Installable | Fusion splice

**Dimensions** 

Tube Length 32 mm | 1.26 in

**Compatible Cable Diameter** 0.25 mm | 0.01 in | 0.9 mm | 0.035 in

Material Specifications

Ferrule Material Zirconia

Mechanical Specifications

Cable Retention Strength, maximum 1.12 lb @ 0  $^{\circ}$  | 1.57 lb @ 0  $^{\circ}$ 

**Optical Specifications** 

**Fiber Mode** Singlemode

Fiber Type OS2



# 760243394 | SFC-SCF-09-8Y-12-PACK

Optical Components Standard ANSI/TIA-568. 3-D | GR-1081 | IEC 61753-1

Insertion Loss, maximum0.3 dBInsertion Loss, typical0.15 dBReturn Loss, minimum55 dB

## **Environmental Specifications**

**Operating Temperature**  $-40 \,^{\circ}\text{C}$  to  $+75 \,^{\circ}\text{C}$  ( $-40 \,^{\circ}\text{F}$  to  $+167 \,^{\circ}\text{F}$ )

Packaging and Weights

Packaging quantity 12

## Regulatory Compliance/Certifications

# Agency Classification CHINA-ROHS Below maximum concentration value ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760252002 | PPL-1U



Propel 1RU sliding tray fiber panel, accepts Propel ULL modules or adapter packs, providing up to 72 duplex LC ports, 72 MPO ports or 144 SN ports (288f)

- Any size Propel component can be used in each panel or blade
- Components can be installed and removed from front or rear of panel
- Supports 8f, 12f, 16f and 24f applications while maintaining full panel density
- Cable mounting system allows for multiple trunk cables to be securely attached in the rear of panel

#### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio SYSTIMAX®

Product Type Fiber patch panel

Product Brand Propel
Product Series PPL

## General Specifications

**Color** Gray

Interface, front Unloaded

Rack Type EIA 19 in

Rack Units 1

**Shelf Movement** Sliding

**Total Ports, quantity** 0

#### **Dimensions**

 Height
 44 mm | 1.732 in

 Width
 483 mm | 19.016 in

 Depth
 470 mm | 18.504 in



# 760252002 | PPL-1U

## Port Configuration

Panel size	8-fiber components	12-fiber components	16-fiber components	24-fiber components
1RU	up to 6 per blade	up to 4 per blade	up to 3 per blade	up to 2 per blade
2RU	up to 6 per blade	up to 4 per blade	up to 3 per blade	up to 2 per blade
4RU	up to 6 per blade	up to 4 per blade	up to 3 per blade	up to 2 per blade
		Each blade has 12	lanes	
	Requires 2 lanes	Requires 3 lanes	Requires 4 lanes	Requires 6 lanes

## Material Specifications

Material Type Aluminum | Steel

**Environmental Specifications** 

Safety Standard c-UL-us

Packaging and Weights

Packaging quantity

**Weight, net** 5.375 kg | 11.85 lb

Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760252003 | PPL-2U



Propel 2RU sliding tray fiber panel, accepts Propel ULL modules or adapter packs, providing up to 144 duplex LC ports, 144 MPO ports or 288 SN ports (576f)

- Any size Propel component can be used in each panel or blade
- Components can be installed and removed from front or rear of panel
- Supports 8f, 12f, 16f and 24f applications while maintaining full panel density
- Cable mounting system allows for multiple trunk cables to be securely attached in the rear of panel

#### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio SYSTIMAX®

Product Type Fiber patch panel

Product Brand Propel
Product Series PPL

## General Specifications

**Color** Gray

Interface, front Unloaded

Rack Type EIA 19 in

Rack Units 2

**Shelf Movement** Sliding

Total Ports, quantity 0

## Dimensions

 Height
 89 mm | 3.504 in

 Width
 483 mm | 19.016 in

 Depth
 470 mm | 18.504 in



# 760252003 | PPL-2U

# Port Configuration

Panel size	8-fiber components	12-fiber components	16-fiber components	24-fiber components
1RU	up to 6 per blade	up to 4 per blade	up to 3 per blade	up to 2 per blade
2RU	up to 6 per blade	up to 4 per blade	up to 3 per blade	up to 2 per blade
4RU	up to 6 per blade	up to 4 per blade	up to 3 per blade	up to 2 per blade
		Each blade has 12	lanes	
	Requires 2 lanes	Requires 3 lanes	Requires 4 lanes	Requires 6 lanes

# Material Specifications

Material Type Steel

# **Environmental Specifications**

Safety Standard c-UL-us

# Packaging and Weights

Packaging quantity

**Weight, net** 5.625 kg | 12.4 lb

# Regulatory Compliance/Certifications

### Agency Classification

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760252004 | PPL-4U



Propel 4RU sliding tray fiber panel, accepts Propel ULL modules or adapter packs, providing up to 288 duplex LC ports, 288 MPO ports or 576 SN ports (1152f)

- Any size Propel component can be used in each panel or blade
- Components can be installed and removed from front or rear of panel
- Supports 8f, 12f, 16f and 24f applications while maintaining full panel density
- Cable mounting system allows for multiple trunk cables to be securely attached in the rear of panel

### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio SYSTIMAX®

Product Type Fiber patch panel

Product Brand Propel
Product Series PPL

# General Specifications

**Color** Gray

Interface, front Unloaded

Rack Type EIA 19 in

Rack Units 4

**Shelf Movement** Sliding

Total Ports, quantity 0

### **Dimensions**

 Height
 178 mm | 7.008 in

 Width
 483 mm | 19.016 in

 Depth
 470 mm | 18.504 in



# 760252004 | PPL-4U

# Port Configuration

Panel size	8-fiber components	12-fiber components	16-fiber components	24-fiber components
1RU	up to 6 per blade	up to 4 per blade	up to 3 per blade	up to 2 per blade
2RU	up to 6 per blade	up to 4 per blade	up to 3 per blade	up to 2 per blade
4RU	up to 6 per blade	up to 4 per blade	up to 3 per blade	up to 2 per blade
		Each blade has 12	lanes	
	Requires 2 lanes	Requires 3 lanes	Requires 4 lanes	Requires 6 lanes

# Material Specifications

Material Type Steel

**Environmental Specifications** 

Safety Standard c-UL-us

Packaging and Weights

Packaging quantity

**Weight, net** 14.742 kg | 32.5 lb

Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760252348 | PPL-DM-12AU-24LC-SM-BEU



Propel ULL Singlemode MPO-12 Distribution Module, 12 duplex LC/UPC to 2X12f MPO/APC non-pinned, Method B Enhanced

- Ultra-low loss (ULL) with Method B Enhanced polarity
- Can be installed and removed from front or rear of panel
- Serialized QR code provides easy access to factory optical test results
- This component requires 6 of the 12 lanes on the Propel Panel blade

### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio SYSTIMAX®
Product Type Fiber module

Product Brand Propel
Product Series PPL

# General Specifications

FunctionalityBreakoutColor, frontBlueColor, rearGrayInterface, frontLC/UPC

Interface Feature, front Internal shutters

Interface, rear MPO

Interface Feature, rear APC | Internal shutters | Key up/up | Unpinned

Polarity Method B Enhanced (ULL)

Total Fibers, quantity 24

Total Ports, quantity, front 12

Total Ports, quantity, rear 2

### **Dimensions**

 Height
 11 mm | 0.433 in

 Width
 98 mm | 3.858 in

 Depth
 170 mm | 6.693 in

# Optical Specifications

COMMSC PE°

# 760252348 | PPL-DM-12AU-24LC-SM-BEU

Fiber Mode Singlemode

Fiber Type OS2
Insertion Loss, maximum 0.6 dB

# **Environmental Specifications**

**Qualification Standards** IEC 61753-1 | TIA-568.3-D

Safety Standard CE | CSA | UL | UL 62368

Packaging and Weights

Packaging quantity 1

# Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ROHS Compliant UK-ROHS Compliant



# 760252357 | PPL-DM-24U-24LC-0M5-BEU



Propel ULL Multimode OM5 MPO-24 Distribution Module, 12 duplex LC to 1X24f MPO/UPC non-pinned, Method B Enhanced

- Ultra-low loss (ULL) with Method B Enhanced polarity
- Can be installed and removed from front or rear of panel
- Serialized QR code provides easy access to factory optical test results
- This component requires 6 of the 12 lanes on the Propel Panel blade

### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio SYSTIMAX®
Product Type Fiber module

Product Brand Propel
Product Series PPL

# General Specifications

Functionality Breakout

Color, front Lime green

Color, rear Gray

Interface, front LC/UPC

Interface Feature, front Internal shutters

Interface, rear MPO

Interface Feature, rear Internal shutters | Key up/up | Standard | Unpinned

Polarity Method B Enhanced (ULL)

Total Fibers, quantity 24

Total Ports, quantity, front 12

Total Ports, quantity, rear 1

# Dimensions

 Height
 11 mm | 0.433 in

 Width
 196 mm | 7.717 in

 Depth
 170 mm | 6.693 in

# Optical Specifications

COMMSC PE°

# 760252357 | PPL-DM-24U-24LC-0M5-BEU

**Fiber Mode** Multimode

**Fiber Type** OM5, LazrSPEED® wideband

**Insertion Loss, maximum** 0.35 dB

# **Environmental Specifications**

**Qualification Standards** IEC 61753-1 | TIA-568.3-D

Safety Standard CE | CSA | UL | UL 62368

Packaging and Weights

Packaging quantity 1

# Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



# 760255053 | PPL-SP-24LC-SM-PT-BEU



Propel Splice Cassette, 24LC/UPC with internal shutters, OS2 with 250 µm single fiber pigtails, Method B Enhanced ULL

- Can be installed and removed from front or rear of panel
- This component requires 6 of the 12 lanes on the Propel Panel blade
- Compatible with either 250 µm or 900 µm incoming fiber

Recommended for use with 24f subunit cable

### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio SYSTIMAX®

**Product Type** Fiber cassette with pigtails

Product Brand Propel
Product Series PPL

# General Specifications

Color, front Blue

Interface, front LC/UPC

Interface, rear Ribbon pigtail

**Polarity** Method B Enhanced (ULL)

Shuttered Yes
Total Fibers, quantity 24

### Dimensions

**Height** 67.31 mm | 2.65 in

**Width** 196.012 mm | 7.717 in

# **Optical Specifications**

Fiber ModeSinglemodeFiber TypeG.657.A2Insertion Loss, maximum0.25 dB

# **Environmental Specifications**



# 760255053 | PPL-SP-24LC-SM-PT-BEU

**Qualification Standards** IEC 61753-1 | TIA-568.3-D

Safety Standard UL

Packaging and Weights

**Included** Mass Fusion Splice Protection Sleeves

Packaging quantity 1

Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ROHS Compliant UK-ROHS Compliant

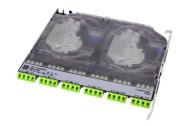


### Included Products

103897-000 - SMOUV Fiber Optic Splice Heat Shrink Protective Sleeve for Single Fusion (See Specs for SMOUV-1120-02 packaging size and MOQ)



# 760255055 | PPL-SP-24LC-0M5-PT-BEU



Propel Multimode Splice Cassette, 24LC with internal shutters, OM5 single fiber pigtails, Method B Enhanced ULL

- Can be installed and removed from front or rear of panel
- This component requires 6 of the 12 lanes on the Propel Panel blade
- Compatible with either 250 µm or 900 µm incoming fiber

Recommended for use with 24f subunit cable

### **Product Classification**

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio SYSTIMAX®

**Product Type** Fiber cassette with pigtails

Product Brand Propel
Product Series PPL

# General Specifications

Color, front Lime green
Interface, front LC/UPC

Interface, rear Stranded pigtail

Polarity Method B Enhanced (ULL)

Shuttered Yes
Total Fibers, quantity 24

### Dimensions

 Height
 67.31 mm | 2.65 in

 Width
 196.012 mm | 7.717 in

# **Optical Specifications**

Fiber ModeMultimodeFiber TypeG.657.A2Insertion Loss, maximum0.15 dB

# **Environmental Specifications**

**COMMSCOPE®** 

# 760255055 | PPL-SP-24LC-0M5-PT-BEU

**Qualification Standards** IEC 61753-1 | TIA-568.3-D

Safety Standard UL

Packaging and Weights

**Included** Single Fusion Splice Protection Sleeves

Packaging quantity 1

# Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant UK-ROHS Compliant



### Included Products

103897-000 - SMOUV Fiber Optic Splice Heat Shrink Protective Sleeve for Single Fusion (See Specs for SMOUV-1120-02 packaging size and MOQ)

# 760255056 | PPL-SP-24LC-SM-RPT-BEU



Propel Singlemode Splice Cassette, 24LC/UPC with internal shutters, OS2 ribbon fiber pigtail, Method B Enhanced ULL

- Can be installed and removed from front or rear of panel
- This component requires 6 of the 12 lanes on the Propel Panel blade

Recommended for use with 24f subunit cable

### Product Classification

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America

Portfolio SYSTIMAX®

**Product Type** Fiber cassette with ribbon pigtail

Product Brand Propel
Product Series PPL

# General Specifications

Color, front Blue
Interface, front LC/UPC

Interface, rear Ribbon pigtail

Polarity Method B Enhanced (ULL)

Shuttered Yes
Total Fibers, quantity 24

### Dimensions

 Height
 67.31 mm | 2.65 in

 Width
 196.012 mm | 7.717 in

# **Optical Specifications**

Fiber ModeSinglemodeFiber TypeG.657.A2Insertion Loss, maximum0.25 dB

# **Environmental Specifications**

**Qualification Standards** IEC 61753-1 | TIA-568.3-D

Page 1 of 2

# 760255056 | PPL-SP-24LC-SM-RPT-BEU

Safety Standard

UL

# Packaging and Weights

**Included** Mass Fusion Splice Protection Sleeves

Packaging quantity

# Regulatory Compliance/Certifications

Agency Classification

CHINA-ROHS Below maximum concentration value

ROHS Compliant UK-ROHS Compliant



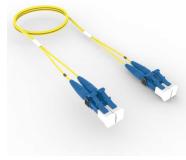
### Included Products

FST-ACC006 – Mass Fusion Splice Protector (See Specs for packaging size and

MOQ)

# UDGLCLC42

### **Base Product**



Ultra Low Loss Singlemode, LC/UPC to LC/UPC, Fiber Patch Cord, 1.6 mm Duplex, Plenum

### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | China | Europe | India | Latin

America | Middle East/Africa | North America

Portfolio CommScope®

**Product Type** Fiber patch cord, duplex

Product Brand SYSTIMAX ULL

**Product Series** UDG

Ordering Note For lengths greater than 999 ft (304 m), orders must be in meters | Minimum length

may vary based on cable configuration

# General Specifications

Color, boot A Blue
Color, connector A Blue
Color, boot B Blue
Color, connector B Blue
Interface, Connector A LC/UPC
Interface, Connector B LC/UPC
Jacket Color Yellow

**Polarity** Pairs, flipped

Total Fibers, quantity 2

### Dimensions

Cable Assembly Length Range (m) 1 - 999

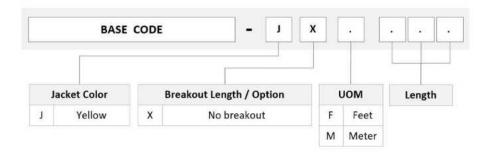
Cable Assembly Length Range (ft) 1 - 999

**Diameter Over Jacket** 1.6 mm | 0.063 in

COMMSC PE®

# UDGLCLC42

# Ordering Tree



# Mechanical Specifications

Cable Retention Strength, maximum 11.24 lb @ 0 ° | 4.40 lb @ 90 °

**Optical Specifications** 

**Fiber Mode** Singlemode

**Fiber Type** G.657.A2, TeraSPEED®

# **Environmental Specifications**

**Operating Temperature**  $-10 \,^{\circ}\text{C} \text{ to } +60 \,^{\circ}\text{C} \text{ (+14 }^{\circ}\text{F to } +140 \,^{\circ}\text{F)}$ 

Environmental Space Plenum

Packaging and Weights

Packaging quantity

# Regulatory Compliance/Certifications

# AgencyClassificationCHINA-ROHSAbove maximum concentration valueISO 9001:2015Designed, manufactured and/or distributed under this quality management systemROHSCompliant/ExemptedUK-ROHSCompliant/Exempted



## Included Products

760238069 – Fiber indoor cable, 1.6 mm diameter, Plenum rated, Zipcord 2-fiber, Singlemode G.657.A2/B2,

Page 2 of 3

# UDGLCLC42

P-002-ZC-8G-F16YL 860655464 Feet jacket marking, Yellow jacket color LC/UPC Connector, Singlemode, Blue



# UDVLCLC42

### **Base Product**



Ultra Low Loss OM5, LC/UPC to LC/UPC, Fiber Patch Cord, 1.6 mm Duplex, Plenum

### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | China | Europe | India | Latin

America | Middle East/Africa | North America

Portfolio CommScope®

**Product Type** Fiber patch cord, duplex

Product Brand SYSTIMAX ULL

Product Series UDV

Ordering Note For lengths greater than 999 ft (304 m), orders must be in meters | Minimum length

may vary based on cable configuration

# General Specifications

Color, boot A Lime green

Color, connector A Black

Color, boot B Lime green

Color, connector B Black

 Interface, Connector A
 LC/UPC

 Interface, Connector B
 LC/UPC

Jacket Color Lime green

**Polarity** Pairs, flipped

Total Fibers, quantity 2

### Dimensions

Cable Assembly Length Range (m) 1 - 999

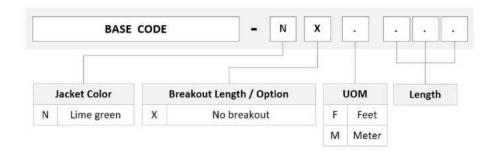
Cable Assembly Length Range (ft) 1 - 999

**Diameter Over Jacket** 1.6 mm | 0.063 in

# Ordering Tree



# UDVLCLC42



# Mechanical Specifications

Cable Retention Strength, maximum  $11.24 \text{ lb} @ 0 \degree | 4.40 \text{ lb} @ 90 \degree$ 

**Optical Specifications** 

Fiber Mode Multimode

**Fiber Type** OM5, LazrSPEED®

# **Environmental Specifications**

**Operating Temperature**  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

Environmental Space Plenum

Packaging and Weights

Packaging quantity

# Regulatory Compliance/Certifications

# Agency Classification ANATEL Compliant

CHINA-ROHS Above maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

ROHS Compliant/Exempted UK-ROHS Compliant/Exempted



# Included Products

760233361 – Fiber indoor cable, LazrSPEED® 1.6 mm Plenum Zipcord, Multimode OM5, Feet jacket marking,

Page 2 of 3



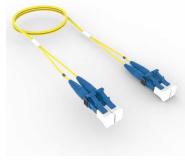
# UDVLCLC42

P-002-ZC-5G-F16LM 860655463 Lime green jacket color

LC/PC Connector, Multimode, Lime

# UFGLCLC42

### **Base Product**



Ultra Low Loss Singlemode, LC/UPC to LC/UPC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen

### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | China | Europe | India | Latin

America | Middle East/Africa | North America

Portfolio CommScope®

**Product Type** Fiber patch cord, duplex

Product Brand SYSTIMAX ULL

Product Series UFG

Ordering Note For lengths greater than 999 ft (304 m), orders must be in meters | Minimum length

may vary based on cable configuration

# General Specifications

Color, boot A

Color, connector A

Blue

Color, boot B

Color, connector B

Interface, Connector A

LC/UPC

Interface, Connector B

LC/UPC

Jacket Color

Yellow

**Polarity** Pairs, flipped

Total Fibers, quantity 2

**Transmission Standards** TIA/EIA-568-C.3

Dimensions

Cable Assembly Length Range (m) 1 - 999

Cable Assembly Length Range (ft) 1 - 999

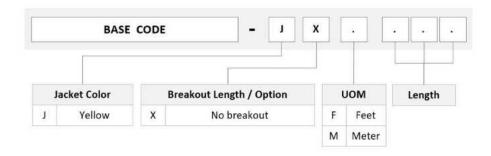


# UFGLCLC42

### **Diameter Over Jacket**

1.6 mm | 0.063 in

# Ordering Tree



# Mechanical Specifications

Cable Retention Strength, maximum 11.24 lb @ 0 ° | 4.40 lb @ 90 °

**Optical Specifications** 

Fiber Mode Singlemode

**Fiber Type** G.657.A2, TeraSPEED®

# **Environmental Specifications**

**Operating Temperature**  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

**Environmental Space** Dual Rated LSZH/Riser

**Qualification Standards** GR-326 CORE

Packaging and Weights

Packaging quantity

# Regulatory Compliance/Certifications

# AgencyClassificationCHINA-ROHSAbove maximum concentration valueISO 9001:2015Designed, manufactured and/or distributed under this quality management systemROHSCompliant/ExemptedUK-ROHSCompliant/Exempted



# UFGLCLC42

## Included Products

760238070 – 1.6mm Low Smoke Zero Halogen Riser Zipcord Cable N-002-ZC-8G-F16YL/E

860655464 – LC/UPC Connector, Singlemode, Blue

# UFVLCLC42

### **Base Product**



Ultra Low Loss OM5, LC/UPC to LC/UPC, Fiber Patch Cord, 1.6 mm Duplex, Low Smoke Zero Halogen

### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | China | Europe | India | Latin

America | Middle East/Africa | North America

Portfolio CommScope®

**Product Type** Fiber patch cord, duplex

Product Brand SYSTIMAX ULL

Product Series UFV

Ordering Note For lengths greater than 999 ft (304 m), orders must be in meters | Minimum length

may vary based on cable configuration

# General Specifications

Color, boot A Lime green

Color, connector A Black

Color, boot B Lime green

Color, connector B Black

Interface, Connector A LC/UPC
Interface, Connector B LC/UPC

**Jacket Color** Lime green

**Polarity** Pairs, flipped

Total Fibers, quantity 2

### Dimensions

Cable Assembly Length Range (m) 1 - 999

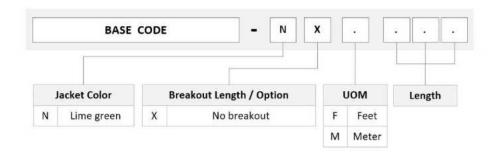
Cable Assembly Length Range (ft) 1 - 999

**Diameter Over Jacket** 1.6 mm | 0.063 in

# Ordering Tree



# UFVLCLC42



# Mechanical Specifications

Cable Retention Strength, maximum  $11.24 \text{ lb} @ 0 \degree | 4.40 \text{ lb} @ 90 \degree$ 

**Optical Specifications** 

Fiber Mode Multimode

**Fiber Type** OM5, LazrSPEED®

# **Environmental Specifications**

**Operating Temperature**  $-10 \,^{\circ}\text{C}$  to  $+60 \,^{\circ}\text{C}$  (+14  $^{\circ}\text{F}$  to +140  $^{\circ}\text{F}$ )

**Environmental Space** Dual Rated LSZH/Riser

Packaging and Weights

Packaging quantity

# Regulatory Compliance/Certifications

Agency Classification
ANATEL Compliant

CHINA-ROHS Above maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

ROHS Compliant/Exempted UK-ROHS Compliant/Exempted



# Included Products

760235067 – Fiber Indoor Cable, LazrSPEED® 1.6 mm Low Smoke Zero Halogen Riser, 2-fiber Zipcord,

Page 2 of 3

# UFVLCLC42

N-002-ZC-5G-F16LM/E 860655463

Multimode OM5, Feet jacket marking, Lime green jacket color, Eca Flame Rating LC/PC Connector, Multimode, Lime

# UJGMXMXAF

### **Base Product**



Ultra Low Loss (ULL) Singlemode MPO12 (Pinned) to MPO12 (Pinned), Fiber Trunk Cable Assembly, 24-Fiber, Low Smoke Zero Halogen (LSZH)

### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | China | Europe | India | Latin

America | Middle East/Africa | North America

Portfolio CommScope®

**Product Type** Fiber trunk cable assembly

Product Brand SYSTIMAX ULL

Ordering Note For additional jacket colors, please contact a CommScope Sales Representative | For

lengths greater than 999 ft (304 m), orders must be in meters | Minimum length may

vary based on cable configuration

# General Specifications

Color, boot ABlackColor, connector AGreenColor, boot BBlackColor, connector BGreenConstruction TypeStranded

**Furcation Color** Yellow

 Interface, Connector A
 MPO-12/APC Male

 Interface, Connector B
 MPO-12/APC Male

Jacket Color Yellow

Polarity Method B Enhanced (ULL)

Fibers per Subunit, quantity 12

Total Fibers, quantity 24

**Dimensions** 

Breakout Length 33 in

Cable Assembly Length Range (m) 3 - 999

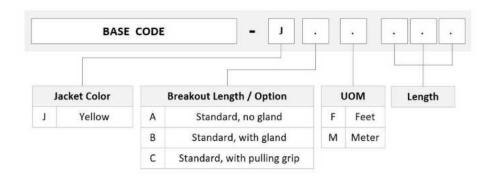
Cable Assembly Length Range (ft) 10 - 999

Page 1 of 3



# **UJGMXMXAF**

# Ordering Tree



# Mechanical Specifications

Cable Retention Strength, maximum 11.24 lb @ 0 ° | 4.40 lb @ 90 °

**Optical Specifications** 

**Fiber Mode** Singlemode

**Fiber Type** G.657.A2, TeraSPEED®

# **Environmental Specifications**

Operating Temperature -10 °C to +60 °C (+14 °F to +140 °F)

Environmental Space Dual Rated LSZH/Riser | Indoor

# Regulatory Compliance/Certifications

Agency	Classification
ANATEL	Compliant
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant/Exempted
UK-ROHS	Compliant/Exempted



## Included Products



# UJGMXMXAF

760237973 N-024-MP-8G1-F12YL/D

860638317 – MPO12, ULTRA LOV

Fiber indoor cable, Low Smoke Zero Halogen Riser MPO Trunk, 24 fiber with 12 fiber subunits, Singlemode G.657.A2/B2, Gel-free, Feet jacket marking, Yellow jacket color, Dca Flame rating

MPO12, ULTRA LOW LOSS, MALE, Singlemode, GREEN, 3mm



# UJV2X2XBF

### **Base Product**



Ultra Low Loss (ULL) OM5 MPO24 (Pinned) to MPO24 (Pinned), Fiber Trunk Cable Assembly, 24-Fiber, Low Smoke Zero Halogen (LSZH)

### **Product Classification**

Regional Availability

Asia | Australia/New Zealand | China | Europe | India | Latin

America | Middle East/Africa | North America

Portfolio CommScope®

**Product Type** Fiber trunk cable assembly

Product Brand SYSTIMAX ULL

Ordering Note Not available in the United States or Canada

# General Specifications

Color, boot A Red

Color, connector A Lime green

Color, boot B Red

Color, connector BLime greenConstruction TypeStrandedFurcation ColorLime green

Interface, Connector A MPO-24/UPC Male
Interface, Connector B MPO-24/UPC Male

Jacket Color Lime green

**Polarity** Method B Enhanced (ULL)

Fibers per Subunit, quantity 24

Total Fibers, quantity 24

### **Dimensions**

Breakout Length 33 in

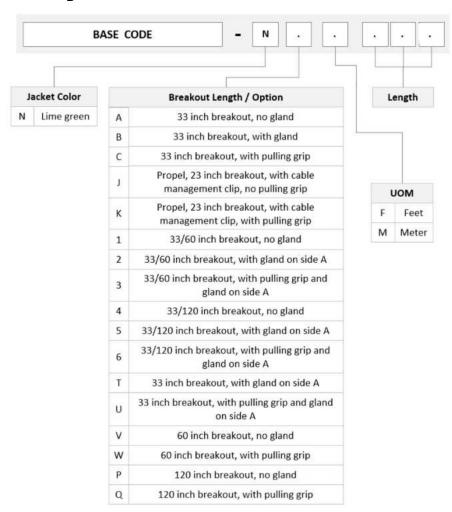
Cable Assembly Length Range (m) 3 - 999

Cable Assembly Length Range (ft) 10 - 999



# UJV2X2XBF

# Ordering Tree



# Mechanical Specifications

Cable Retention Strength, maximum 11.24 lb @ 0 ° | 4.40 lb @ 90 °

Optical Specifications

**Fiber Mode** Multimode

**Fiber Type** OM5, LazrSPEED®

# **Environmental Specifications**

Operating Temperature -10 °C to +60 °C (+14 °F to +140 °F)

Environmental Space Dual Rated LSZH/Riser | Indoor

Page 2 of 3



# UJV2X2XBF

# Regulatory Compliance/Certifications

### Agency Classification

CHINA-ROHS Above maximum concentration value

ISO 9001:2015 Designed, manufactured and/or distributed under this quality management system

REACH-SVHC Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS Compliant/Exempted UK-ROHS Compliant/Exempted



### Included Products

760235981 – Fiber Indoor Cable, LazrSPEED® Low Smoke Zero Halogen Riser MPO Trunk Cable, 24 fiber, N-024-MP-5G-F24LM/D Gel-free, Multimode OM5, Dca Flame Rating, Feet jacket marking, Lime green jacket color

860634625 – LazrSPEED® Elite MPO Male 24 Fiber Connector, lime green







# APPENDIX E.5: HAMMOND 4-POST SEISMIC RACK, WALL-MOUNT CABINET & CABLE MANAGER PART NUMBERS

Version 01

January 2023

Hammond Parts Version 01

# Table of Contents

1. 4-post Seismic Adjustable Rack	. 2
1.1. Special DRZ477 (44U) Seismic Relay Rack SR1701650	. 2
1.2. Adjustable Bottom Shelf	. 2
1.2.1. SR1702607 Adjustable from 28" TO 39"	. 2
1.2.2. SR1702608 Adjustable from 36" TO 48"	. 2
1.3. Adjustable Top Brackets	. 2
1.3.1. SR1702605 Adjustable from 28" TO 39"	. 2
1.3.2. SR1702606 Adjustable from 36" TO 48"	. 2
2. Wall-mount Cabinet Assembly	. 2
2.1. Wall-mount Cabinet Assembly SR1803819	. 2
2.1.1. Door	. 2
2.1.1.1. Tinted - HWCWD3027UBK	. 2
2.1.1.2. Ventilated - HWCVD3027UBK	. 2
2.1.1.3. Solid - HWCSD3027UBK	. 2
2.1.2. Vertical Managers on left and right sides - RB-HFM1	. 2
2.1.3. 19" Mounting Rails - 2nd set of mounting rails at the rear - URR27U	. 2
2.1.4. Fan Kit - 2-Fans/Guards & Cords - DNFK2AC120	. 2
2.1.5. Thermostat - Stat. Celsius Scale - SKT011419NO	. 2
3. Vertical Managers High-Density Vertical Finger Manager with Slam-Latching Door	. 2
3.1. <mark>VFMMD6BK</mark>	. 2
3.2. <mark>VFMMD8BK</mark>	. 2
3.3. VFMMD10BK	. 2
3.4. VFMMD12BK	. 2
4. Horizontal Finger Cable Manager	. 3
4.1. RB-HFMD2	. 3
5. Hammond Product Data Sheets	7

PHSA 1

Hammond Parts Version 01

# 1. 4-post Seismic Adjustable Rack

- 1.1. Special DRZ477 (44U) Seismic Relay Rack SR1701650
- 1.2. Adjustable Bottom Shelf
  - 1.2.1. SR1702607 Adjustable from 28" TO 39"
  - 1.2.2. SR1702608 Adjustable from 36" TO 48"
- 1.3. Adjustable Top Brackets
  - 1.3.1. SR1702605 Adjustable from 28" TO 39"
  - 1.3.2. SR1702606 Adjustable from 36" TO 48"

# 2. Wall-mount Cabinet Assembly

- 2.1. Wall-mount Cabinet Assembly SR1803819
  - 2.1.1. Door
    - 2.1.1.1. Tinted HWCWD3027UBK
    - 2.1.1.2. Ventilated HWCVD3027UBK
    - 2.1.1.3. Solid HWCSD3027UBK
  - 2.1.2. Vertical Managers on left and right sides RB-HFM1
  - 2.1.3. 19" Mounting Rails 2nd set of mounting rails at the rear URR27U
  - 2.1.4. Fan Kit 2-Fans/Guards & Cords DNFK2AC120
  - 2.1.5. Thermostat Stat. Celsius Scale SKT011419NO

# 3. Vertical Managers High-Density Vertical Finger Manager with Slam-Latching Door

- 3.1. VFMMD6BK
- 3.2. VFMMD8BK
- 3.3. VFMMD10BK
- 3.4. VFMMD12BK

PHSA 2

Hammond Parts Version 01

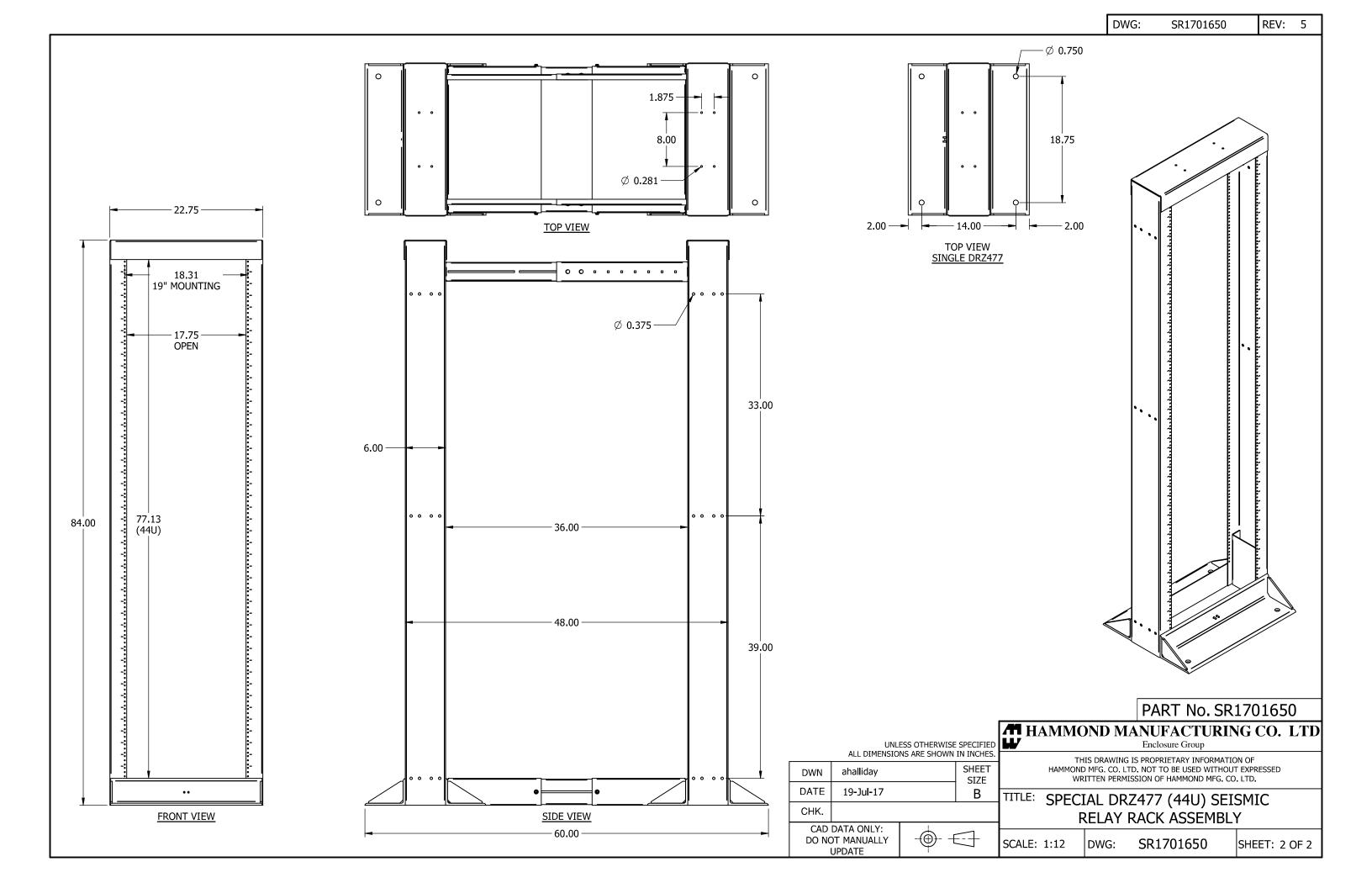
# 4. Horizontal Finger Cable Manager

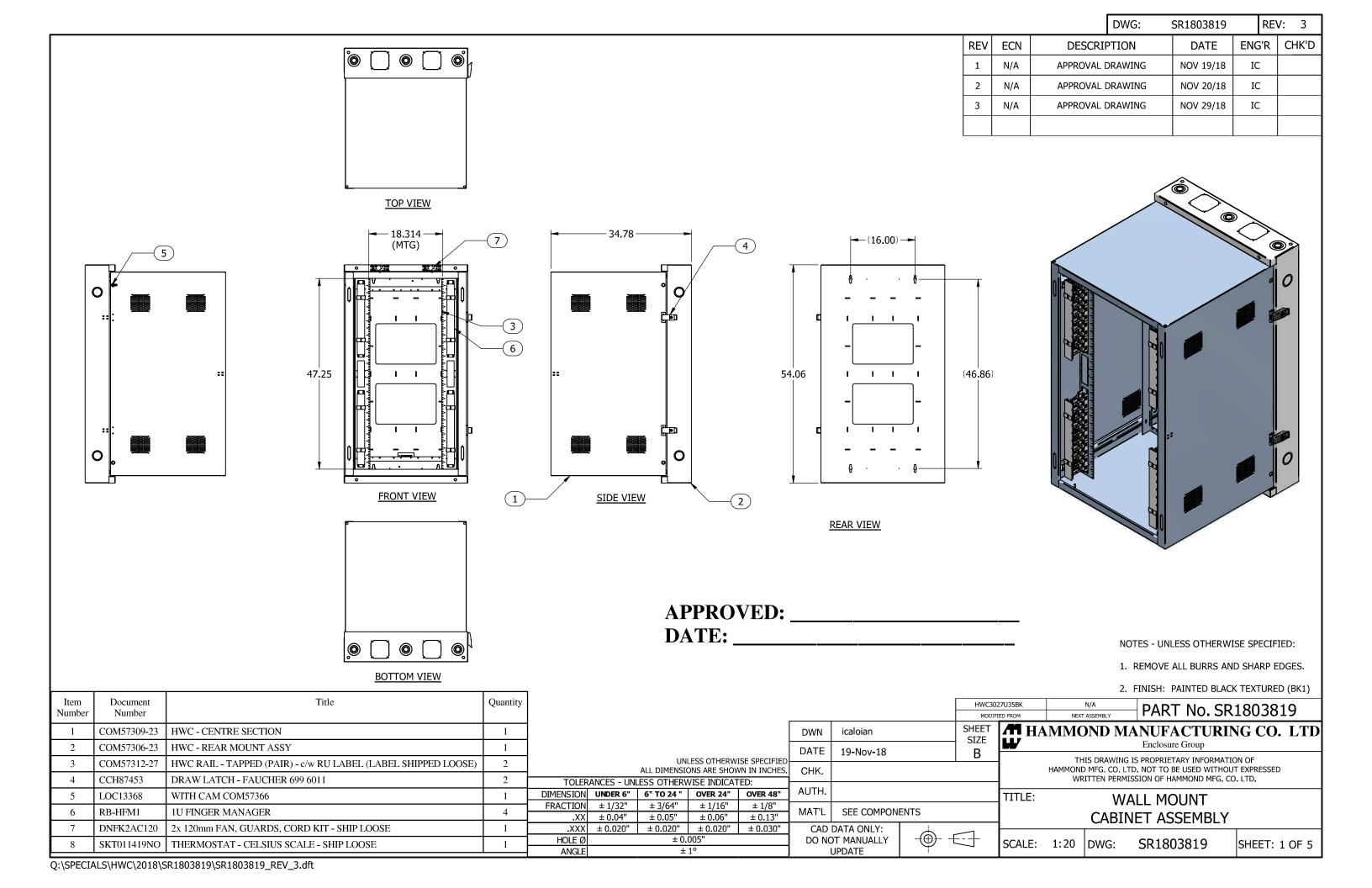
4.1. RB-HFMD2

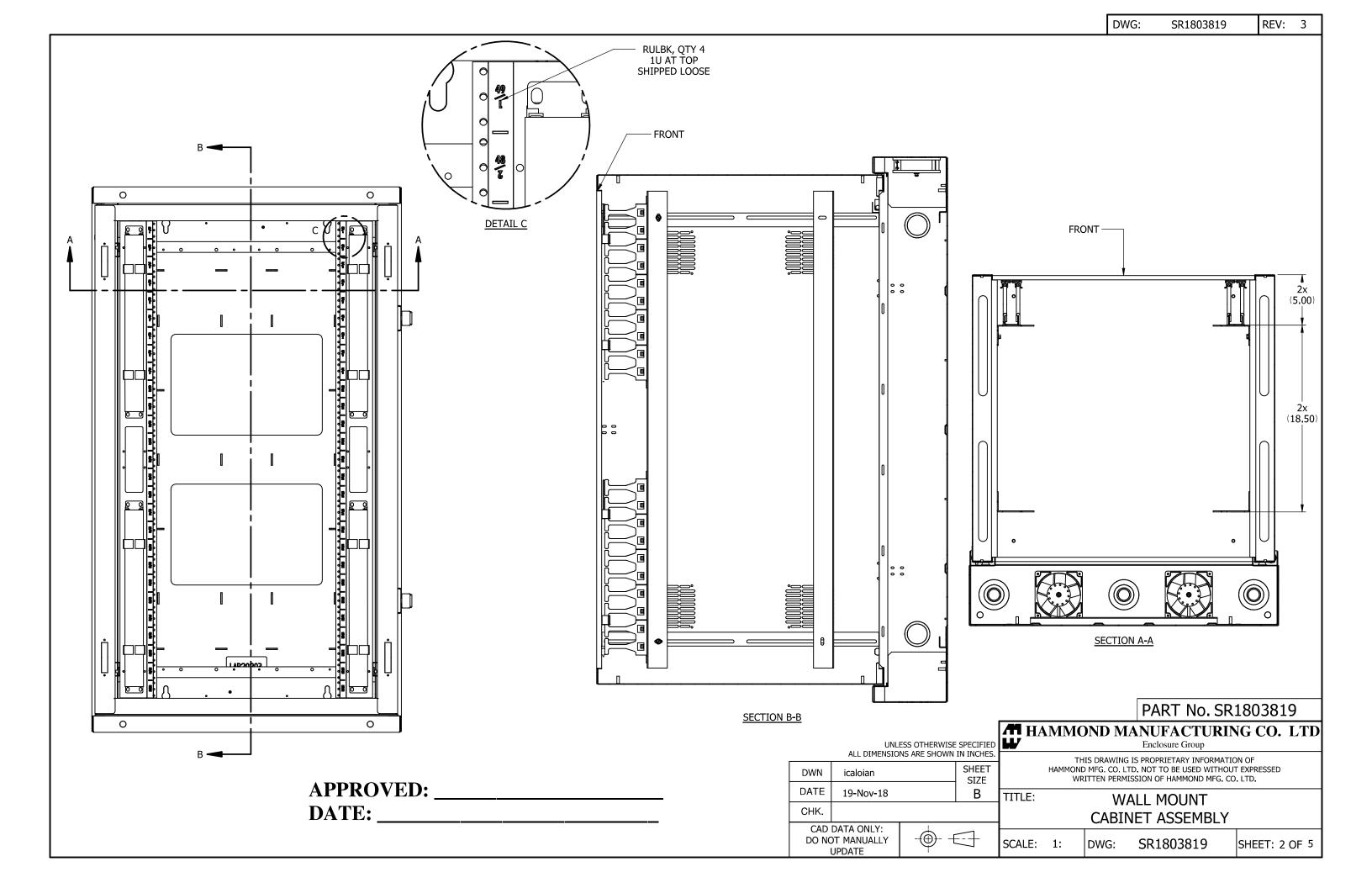
# 5. Hammond Product Data Sheets

PHSA 3

REV **ECN APPROVED:** N/A SUBMITTAL 4x ∅ 0.28 DATE: ADJUSTABLE DEPTH ADJUSTABLE TOP BRACKETS 28" TO 48" SR1702605 ADJUSTABLE FROM 28" TO 39" SR1702606 ADJUSTABLE FROM 36" TO 48" SR1701650 - SEISMIC Adjustable Relay Rack Assembly Assembly Includes: #10-32 - Two **DRZ477** - Zone 4 certified 44U Seismic relay racks, welded steel construction. **GROUND STUDS** - Dynamic (SEISMIC) suggested load capacity of 800lb of equipment installed plus 50lb overhead, when secured using C4K-Z4 seismic bolt down kit. - UL rated (STATIC) load capacity of 2000lb when secured using C4K-Z4 seismic bolt down kit. MOUNTING CHANNELS - Rack provides stanard 19" mounting with 44 usable rack mount units TAPPED # 10-32 FRONT AND REAR - Mounting channels and top made of 10ga.CRS, Bottom mounting feet made of 0.312 angle iron <u>84.00</u> - EIA-310-D tapped #10-32 front and rear rails with 19" mounting. - Includes two (2) pairs of #10-32 ground studs, spaced 5/8" apart with Earth Grounding labels. Stud pairs are located across from each other inside the rail channel and on the front mounting foot. - Top bracket mounting holes compatible with top cable access ories. - Large base for freestanding support of equipment. Ø 0.375-Rack is finished in smooth black powder paint, #10-32 equipment mounting hardware included. SR1702609 SR1702605 - top adjustable bracket pair 28" to 39" finished in smooth black powder paint 44 U-MARKING LABEL (1U TOP TO 44U BOTTOM) SR1702606 - top adjustable bracket pair 36" to 48" finished in smooth black powder paint SR1702607 - bottom adjustable shelf 28" to 39" finished in smooth black powder paint #10-32 **GROUND STUDS** SR1702608 - bottom adjustable shelf 36" to 48" finished in smooth black powder paint 18.00 **BOTTOM ANGLE** SR1702609 - four 44U marking labels, U1 starting at the top, U44 at the bottom. SHEET ahalliday DWN 22.50 SIZE ADJUSTABLE BOTTOM SHELF DATE 19-Jul-17 В SR1702607 ADJUSTABLE FROM 28" TO 39" UNLESS OTHERWISE SPECIFIED SR1702608 ADJUSTABLE FROM 36" TO 48" ALL DIMENSIONS ARE SHOWN IN INCHES. CHK. TOLERANCES - UNLESS OTHERWISE INDICATED: **AUTH** DIMENSION UNDER 6" 6" TO 24" OVER 24" OVER 48" ± 1/32" ± 3/64" ± 1/16" ± 1/8" SHOWN ASSEMBLED FOR REF. ONLY MAT'L SEE COMPONENTS ± 0.06" ± 0.04" ± 0.05" ± 0.13" SHIPPED UNASSEMBLED .XXX ± 0.020" ± 0.020" ± 0.020" ± 0.030" CAD DATA ONLY: DO NOT MANUALLY HOLE Ø ± 0.005" SCALE: 1:12 DWG: UPDATE ANGLE



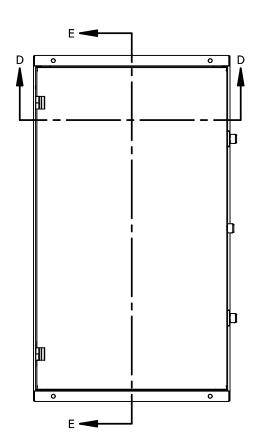


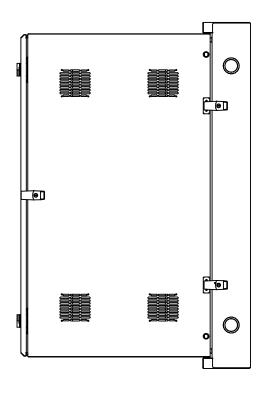


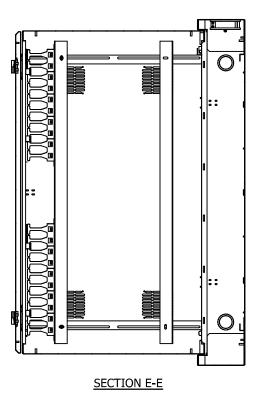
DWG: SR1803819 REV: 3

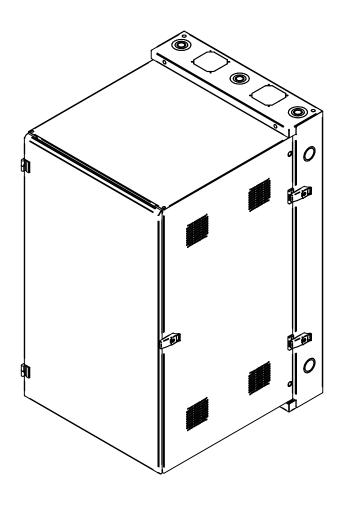
## SR1803819 WITH HWCSD3027UBK - 27U 30W SOLID DOOR REFERENCE DRAWING ONLY

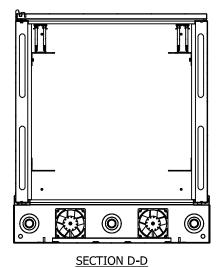
## HWCSD3027UBK DOOR - SOLD SEPARATELY











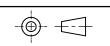
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE SHOWN IN INCHES.

DWN icaloian SHEET SIZE

DATE 19-Nov-18 B

CHK.

CAD DATA ONLY: DO NOT MANUALLY UPDATE



Enclosure Group

THIS DRAWING IS PROPRIETARY INFORMATION OF HAMMOND MFG. CO. LTD. NOT TO BE USED WITHOUT EXPRESSED WRITTEN PERMISSION OF HAMMOND MFG. CO. LTD.

TITLE: WALL MOUNT

PART No. SR1803819

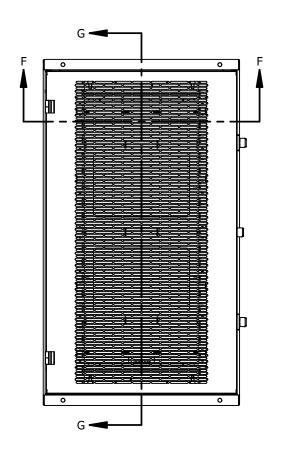
TITLE: WALL MOUNT
CABINET ASSEMBLY

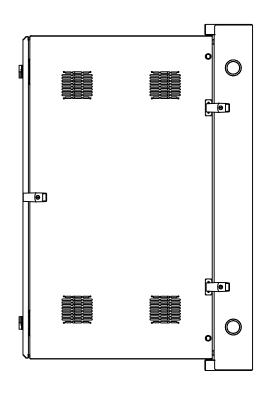
SCALE: 1:15 DWG: SR1803819 SHEET: 3 OF 5

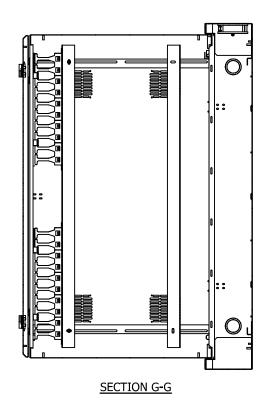
DWG: REV: 3 SR1803819

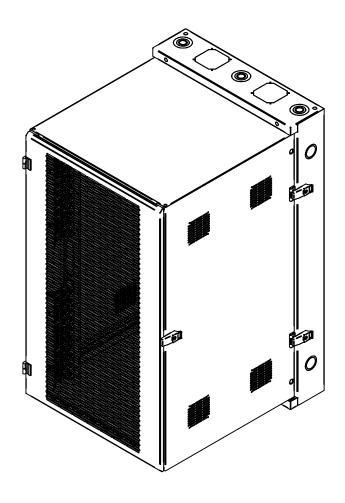
## SR1803819 WITH HWCVD3027UBK - 27U 30W VENTED DOOR REFERENCE DRAWING ONLY

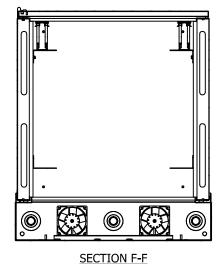
## HWCVD3027UBK DOOR - SOLD SEPARATELY





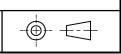






SHEET DWN icaloian SIZE DATE 19-Nov-18 В CHK.

CAD DATA ONLY: DO NOT MANUALLY UPDATE



PART No. SR1803819

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE SHOWN IN INCHES.

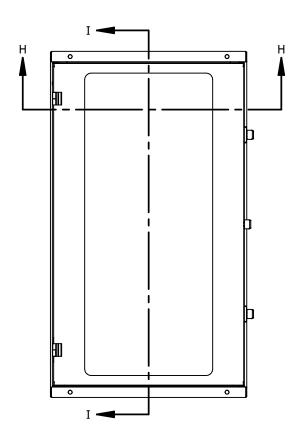
HAMMOND MANUFACTURING CO. LTD
Enclosure Group HAMMOND MFG. CO. LTD. NOT TO BE USED WITHOUT EXPRESSED

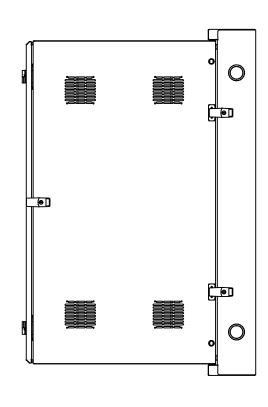
WRITTEN PERMISSION OF HAMMOND MFG. CO. LTD. TITLE: **WALL MOUNT CABINET ASSEMBLY** SCALE: 1:15 DWG: SR1803819 SHEET: 4 OF 5

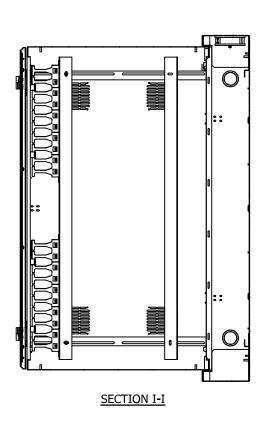
DWG: SR1803819 REV: 3

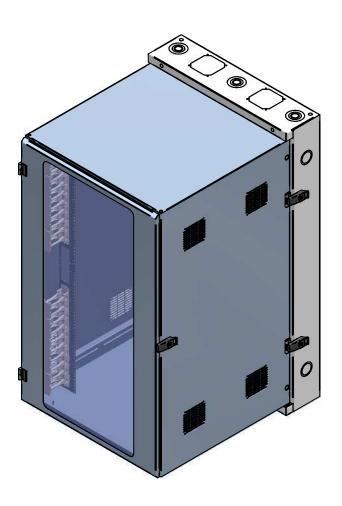
## SR1803819 WITH HWCWD3027UBK - 27U 30W WINDOW DOOR REFERENCE DRAWING ONLY

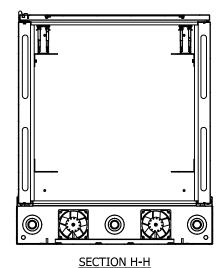
HWCWD3027UBK DOOR - SOLD SEPARATELY





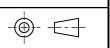






SHEET icaloian SIZE DATE В 19-Nov-18 CHK.

CAD DATA ONLY: DO NOT MANUALLY UPDATE



# PART No. SR1803819 UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE SHOWN IN INCHES. HAMMOND MANUFACTURING CO. LTD Enclosure Group

HAMMOND MFG. CO. LTD. NOT TO BE USED WITHOUT EXPRESSED WRITTEN PERMISSION OF HAMMOND MFG. CO. LTD.

TITLE: **WALL MOUNT CABINET ASSEMBLY** 

SR1803819 SCALE: 1:15 DWG: SHEET: 5 OF 5

Quality Products. Service Excellence.

## High-Density Vertical Finger Manager with Slam-Latching Door VFM

Series

For use with Open Frame Racks











#### **Features**

- Sturdy, reversible steel slam-latch door/cover with pinch-trigger handle included.
- Available in 6", 8", 10" or 12" widths.
- Metal finger features sturdy T-shape steel fingers are spaced at 2RU and provide support for high-density cable bundles and heavy gauge cables. Includes clip-on plastic finger guards (shipped loose) for cable 1.25" bend radius.
- Each manager comes with two openings for cable pass-thru.
- Includes cable mounting lances for hook and loop cable organization.
- Compatible with Hammond DNRRHDW, DC4R, DRZ4, RB-2P and RB-2PA Series of open frame racks. See compatibility chart below.
  - Use the optional riser base VFMB2BK for easier installation and manager support.
  - We strongly recommend you use our **rack bolt-down kit** when mounting large cable managers.
- Optional inner and side panel, spool and cable divider accessories available.
- Finished in a textured black powder paint finish.
- TAA-compliant for GSA Schedule purchases.
- · RoHS and REACH compliant.
- · Manufactured in North America.

#### **Gallery**





#### **Accessories**

- Cable Spool
- Vertical Manager Rack Spacer Bracket
- Cable Channel Divider



**Double-Sided (Steel Fingers with Plastic Radius)** 

Part No.	Part No.	Overal	Overall Dimensions (Inches)			Mounting Dimensions		
Black	White	Height	Width	Depth	Units	Rack Units	Included	
VFMMD6BK	VFMMD6WH	81.00	6.00	24.50	77.00	44	Yes	
VFMMD8BK	VFMMD8WH	81.00	8.00	24.50	77.00	44	Yes	
VFMMD10BK	VFMMD10WH	81.00	10.00	24.50	77.00	44	Yes	
VFMMD12BK	VFMMD12WH	81.00	12.00	24.50	77.00	44	Yes	

## **VFM Specific Accessories**

	6.00		8.	00	10.00		12.00	
	Par	t No.	Part No.		Part No.		Part No.	
Description	Black	White	Black	White	Black	White	Black	White
A BI	VFMAP6BK	VFMAP6WH	VFMAP8BK	VFMAP8WH	VFMAP10BK	VFMAP10WH	VFMAP12BK	VFMAP12WH
Accessory Inner Panel	VFMAP6BK	VFMAP6WH	VFMAP8BK	VFMAP8WH	VFMAP10BK	VFMAP10WH	VFMAP12BK	VFMAP12WH
Solid Inner Panel	VFMFP6BK	VFMFP6WH	VFMFP8BK	VFMFP8WH	VFMFP10BK	VFMFP10WH	VFMFP12BK	VFMFP12WH
Soliu IIIIlei Pariei	VFMFP6BK	VFMFP6WH	VFMFP8BK	VFMFP8WH	VFMFP10BK	VFMFP10WH	VFMFP12BK	VFMFP12WH
Manager End/Side Panel	VFMSPBK	VFMSPWH	VFMSPBK	VFMSPWH	VFMSPBK	VFMSPWH	VFMSPBK	VFMSPWH

#### **Estimated Cable Fill Capacities**

		Recommended Cab	le Fill (50% Fill Ratio)	Maximum Cable F	Fill (100% Fill Ratio)
Part No.	Description	Cat 6 (0.25" Ø)	Cat 6a (0.30" Ø)	Cat 6 (0.25" Ø)	Cat 6a (0.30" Ø)
	Channel Opening	430	298	860	598
VFMMD6BK	Per Finger Opening	28	19	55	38
	Rear Pass Through	774	538	1548	1067
	Channel Opening	648	450	1296	900
VFMMD8BK	Per Finger Opening	28	19	55	38
	Rear Pass Through	1152	800	2302	1598
	Channel Opening	864	600	1728	1200
VFMMD10BK	Per Finger Opening	28	19	55	38
	Rear Pass Through	1526	1060	3054	2120
VFMMD12BK	Channel Opening	1080	750	2162	1502
	Per Finger Opening	28	19	55	38
	Rear Pass Through	1904	1322	3808	2644

The channel opening includes both front and rear channels. The rear opening qty is without accessory inner panels installed.

#### **Cable Manager > Hammond Rack Compatability**

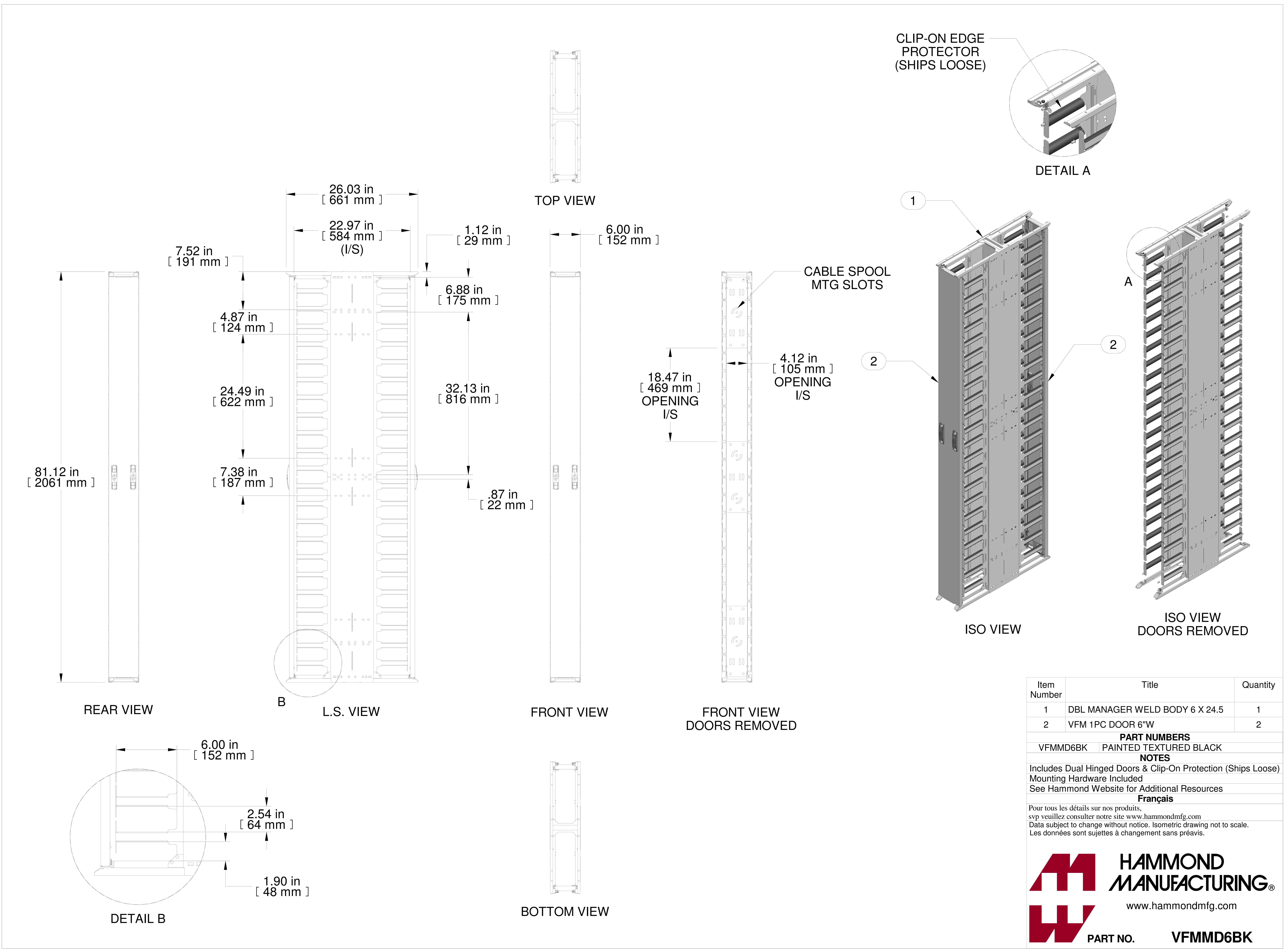
Part No.	RB-2P	RB-2PA19	RB-2PA23	DNRR (19")	DNRR (23")	DC4R	R44*	DRZ4*
All Sizes	·					·	·	
of VFM	RB-2P77	RB-2PA1945BK	RB-2PA2345BK	DNRR77HDW	DNRR2377HDWB	DC4R44	DC4RT44	DRZ477
Compatible								

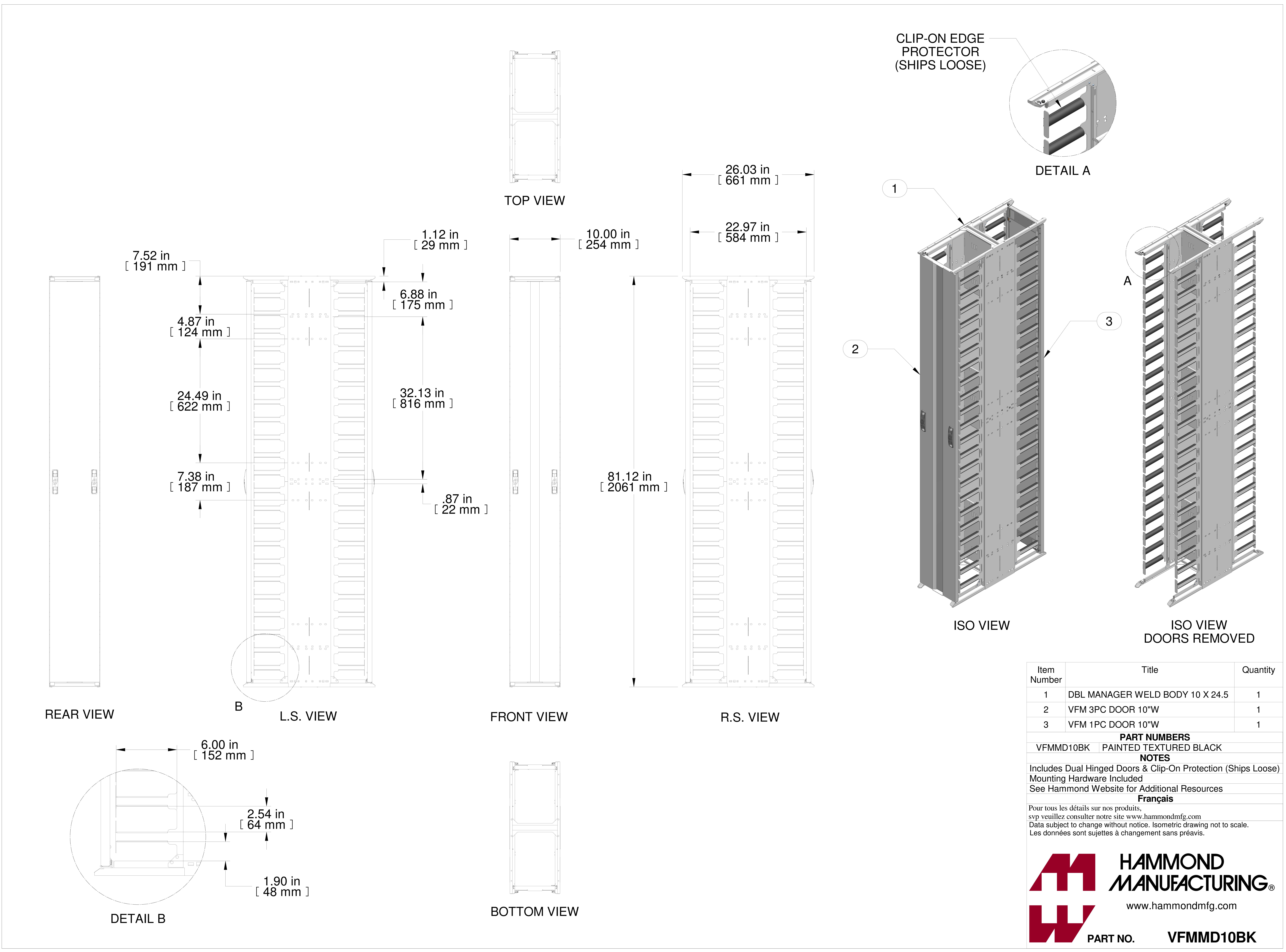
<sup>\*</sup> All options at this height are compatible.

Tags: double-sided manager, double sided

Data subject to change without notice

© 2022. Hammond Manufacturing Ltd. All rights reserved.





Quality Products. Service Excellence.

## Horizontal Finger Cable Manager RB-HFMD Series

#### **Features**



- Fingers constructed in black plastic.
- Snap-on, hinged door.
- Includes cutouts at rear for cable pass-through.
- · EIA compliant.
- Metal components finished in textured RAL9005 black powder paint.
- Requires mounting hardware.
- TAA-compliant for GSA Schedule purchases.
- · RoHS Compliant.
- · Manufactured in North America.







For a doubled-sided manager, install two (2) managers mounted back-to-back. The rear opening provides a cable pass-thru.



## **Gallery**







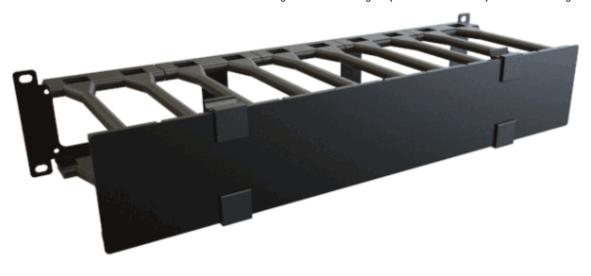


#### **Accessories**

· Mounting Hardware

· Hook and Loop Roll





	Overall Dinmensions			Usable Mounting Dimensions		
Part No.	Height	Width	Depth	Rack Units	Height	
RB-HFMD1	1.47	19.00	6.50	1U	1.75	
RB-HFMD2	3.22	19.00	6.50	2U	3.50	
RB-HFMD3	5.22	19.00	6.50	3U	5.25	
RB-HFMD4	6.97	19.00	6.50	4U	7.00	

### **Estimated Cable Fill Capacities**

Rack		Recommended Ca	ble Fill (50% Fill Ratio)	Maximum Cable	Fill (100% Fill Ratio)
Units	Description	Cat 6	Cat 6a	Cat 6	Cat 6a
	Channel Opening	31	21	61	42
RB-HFMD1	Finger Opening	32	22	64	45
	Rear Pass Through	19	13	39	27
RB-HFMD2	Channel Opening	89	62	177	123
	Finger Opening	32	22	64	45
	Rear Pass Through	47	33	94	65
•	Channel Opening	138	96	276	192
RB-HFMD3	Finger Opening	32	22	64	45
	Rear Pass Through	92	64	183	127
RB-HFMD4	Channel Opening	204	142	408	284
	Finger Opening	32	22	64	45
	Rear Pass Through	92	64	183	127

Data subject to change without notice

© 2022. Hammond Manufacturing Ltd. All rights reserved.

#### APPENDIX F - PHSA COMMUNICATIONS STANDARD - HILTI FIRESTOP SYSTEM DETAILS

Category	System	Application	Product(s)		Detail #	System Note	Device Note
			CP 653 & CP 653 BA 2" Speed Sleeve CP 653 & CP 653 BA 4" Speed Sleeve				
Floors or Walls	C-AJ-3283	Cable bundle through concrete or masonry	CP 618 Firestop Putty FS-One Max	edff-	33.1	See detail	
		Cable bundle through concrete or masonry	CP 653 & CP 653 BA 2" Speed Sleeve CP 653 & CP 653 BA 4" Speed Sleeve CP 606 Sealant CFS-S SIL GG CFS-S SIL SL (floors only) FS-One Max		New (33.1)		
	W-L-3334 (long version of Speed	Cable bundle through gypsum wall assembly	CP 653 & CP 653 BA 2" Speed Sleeve CP 653 & CP 653 BA 4" Speed Sleeve CFS-SL GA L 2" & 4" Speed Sleeves (*shall only be used for wall thickness of 8" or greater) CP 606 Sealant FS-One Max Intumescent Sealant			See detail	
	·		CFS-SL GP 16" & 24" Firestop Gangplate CFS-SL GP CAP Firestop Gangplate CAP CFS-SL RK 4" Firestop Sleeve CFS-SL SK 4" Firestop Retrofit Sleeve CF 653 4" Speed Sleeve CFS-PL Firestop Plug	SECTION R.E. SECTION A.A.		See detail	
Concrete or Masonry Walls	W-J-3189	Multiple cable bundles	CP 653 & CP 653 BA 2" Speed Sleeve CP 653 & CP 653 BA 4" Speed Sleeve CFS-SL GA L 2" & 4" Speed Sleeves ("shall only be used for wall thickness of 8" or greater) CP 606 Sealant FS-One Max Intumescent Sealant	COMPONATION B  COMPONATION B  COMPONATION B	New	INSTALL PER HILTI SYSTEM DRAWING W-J-3189	
Concrete or Masonry Walls	W-J-3200	Multiple cable bundles	CFS-SL GP 16" & 24" Firestop Gangplate CFS-SL GP CAP Firestop Gangplate CAP CFS-SL RK 4" Firestop Sleeve CFS-SL SK 4" Firestop Retrofit Sleeve CFS-PL Firestop Plug CP 653 4" Speed Sleeve	SICTOREA SICTOREA	New	INSTALL PER HILTI SYSTEM DRAWING W-J-3200	
	C-AJ-3345 (Speed Sleeves in Gangplate through late opening in concrete wall, using Hilti	Multiple cable bundles (0 to 100% fill) IN LARGE REC	CP 619T Firestop Putty Roll FS-One Max Intumescent Sealant CFS-COS Firestop Composite Sheet CFS-SL-GP 24" Firestop Gangplate	NCTION A.A.	New	INSTALL PER HILTI SYSTEM DRAWING C-AJ-3345	HILTI FIRESTOP DEVICE CP 653 BA 4" SPEED SLEEVE CFS-COS FIRESTOP COMPOSITE SHEET CFS-SL-GP 24" FIRESTOP GANGPLATE WITH HILTI FIRESTOP SELANT OR PUTTY INSTALLED PER SYSTEM

#### APPENDIX F - PHSA COMMUNICATIONS STANDARD - HILTI FIRESTOP SYSTEM DETAILS

Concrete Floors	F-A-3060	Cable bundle through CIP device with Speed Sleeve	CP 680-M/P 4" / CP 680-M/PX 2" CP 653 4" & 2" Speed Sleeve	SISCION A.A.	33.3	See detail	
Gypsum Walls	W-L-3384 ("ganged" Speed Sleeves through gypsum wall)	Multiple cable bundles (0 to 100% fill) - "ganged"	CP 653 & CP 653 BA 2" Speed Sleeve CP 653 & CP 653 BA 4" Speed Sleeve CFS-SL GA L 2" & 4" Speed Sleeves (*shall only be used for wall thickness of 8" or greater) CP 606 Sealant FS-One Max Intumescent Sealant	COMPARADOR			HILTI FIRESTOP DEVICE CP 653 OR CP 653 BA 4" SPEED SLEEVE OR CF-S-L GA 4" SPEED SLEEVES ("FOR 8" OR GREATER WALL THICKNESS ONLY)
Concrete Floors	F-A-3007	Cable bundle through CIP device	CP 680-M/P 4" / CP 690-M/PX 3" / CP 680- M/PX 2" CP 618 Firestop Putty Stick	SECTION A.A.	33.4	See detail	

Page 1 of 4

#### APPENDIX G.1 - IDENTIFICATION FOR BIOMEDICAL PATCH CABLES

### PART 1 GENERAL 1.1 OVERVIEW

.1 Prior to labeling, the Division 27 Contractor shall submit samples of labeling methods and materials for review and approval to ensure compliance with these specifications.

#### PART 2 PRODUCTS

#### 2.1 LABELS

- .1 Labels on patch panel system:
  - .1 Labels are supplied in the form of tape:

White Patch Cord

- .2 Labels on GigaBix system:
  - .1 Labels are supplied in the form of tape:

White Jumper Wire

#### PART 3 EXECUTION

#### 3.1 INSTALLATION

- .1 Labels shall be provided and installed by the Division 27 Contractor and affixed directly to each patch cord and jumper wire.
- .2 Unless otherwise specified, labels shall be machine-printed on tape using a Brother "P-touch" electronic labeling system or an approved equivalent.
- .3 The Division 27 Contractor shall label all patch cords and jumper wires with 9 mm high, black-on-white mechanical labels for identification.
- .4 Biomedical Label Standard for Patch Cord and Jumper Wire
  - .1 Each patch cord and jumper wire shall be identified with three labels, as shown in the following example:
    - .1 First Label:

Patch Cord Label

i.e. R2-SW1-1.01

R2 Represents Rack #2.

SW1-1 Represents Switch Stack #1, Switch #1.

.01 Represents Port #1 of Switch #1.

Jumper Wire Label

i.e. R2-A-32

R2 Represent Rack #2

A Represent pigtail bundle A terminated on GigaBIX wall.

Page 2 of 4

32

Represent position 32 of bundle A.

.2 Second Label:

Patch Cord and Jumper Wire Labels

i.e. DON'T REMOVE, MI, X-Ray, 2019 2/2

DON'T REMOVE Represents instruction not to remove the patched cable.

MI Represents Medical Imaging (application name).

X-Ray Represents the purpose of the application.

2019 2/2 Represents the date of installation i.e. year, month and day

.3 Third Label:

Patch Cord Label

i.e. R1P1-01

R1 Represents Rack #1.
P1 Represents Panel #1.
01 Represents Port #1.

Jumper Wire Label

i.e. 406

406 Represent horizontal cable position 406 on GigaBIX wall.

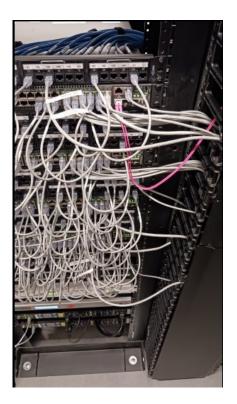
.2 The image below illustrates an example of three 9 mm Biomedical label IDs applied to a 305 mm patch cord.





.3 For patch cords longer than 305 mm (e.g., 1.2 m, 2.1 m, and 3.0 m), the Second Label ID (e.g., "DON'T REMOVE, MI, X-Ray, 2019 2/2") shall be applied at both ends, following the placement of the First and

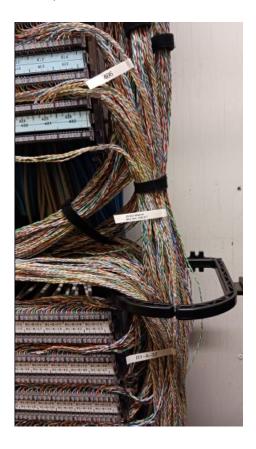
.3 For patch cords longer than 305 mm (e.g., 1.2 m, 2.1 m, and 3.0 m), the Second Label ID (e.g., "DON'T REMOVE, MI, X-Ray, 2019 2/2") shall be applied at both ends, following the placement of the First and Third Labels. The image below shows an example of four 9 mm Biomedical label IDs applied to a long patch cord.







.4 The image below shows an example of three 9 mm Biomedical label IDs applied to a jumper wire.



**END OF SECTION** 

Project No.

#### APPENDIX G.2 - IDENTIFICATION FOR COPPER AND FIBER PATCHED CABLES

#### PART 1 **GENERAL**

#### 1.1 **OVERVIEW**

- Before proceeding with the labelling, the Division 27 Contractor will supply and confirm .1 samples of methods of labelling and materials used as detailed in these specifications.
- .2 The PHSA NC Representative will provide the information relating to the type, length and quantity of the patch cords.

#### PART 2 **PRODUCTS**

#### 2.1 LABELS

- .1 Labels on Copper and Fiber patch cords originating from Network Core Switch:
  - Labels are supplied in the form of tape:

Patch Cord White

#### PART 3 **EXECUTION**

#### 3.1 INSTALLATION

- All Copper and Fiber patch cords originating from Network Core Switch shall be labelled .1 with a unique alpha-numeric label. The information will be displayed in the form of a label supplied and labelled by the Division 27 Contractor, but patched by the PHSA NC Representative. The exact placement of the label will be on both ends of the patch cord.
- .2 Unless specified otherwise, labels will be machine-printed on tape. Brother "P-touch" electronic labelling system, or equal approved shall be used.
- The Division 27 Contractor will label the patch cord with 9 mm high black on white .3 mechanical label for the IDs.
- When printed, Line 1 and Line 2 will be on ONE side of the label so when it is wrapped .4 around the cord, the whole content is visible on ONE side.
- .5 Network Label Standard for Copper Patch Cord from Primary Core to Secondary Core in Data Centre application
  - Each copper patch cable shall be identified on both ends with a unique alphanumeric label.

Copper Patch Cord Label Example:

Line one: Source device/port PCC-01A-R1.8-SW1-Te5/0/42 Line two: Destination device/port PCC-01A-R2.1-SW1-Gi1/0/2

Line one: Source device/port

PHSA

Project No.

Communications
Province Wide

#### APPENDIX G.2 - IDENTIFICATION FOR COPPER AND FIBER PATCHED CABLES

Page 2 of 3

PCC Represents building code

01A Represents from 1st Floor Communications Room A

R1.8 Represents Row 1, Rack 8 SW1 Represents Core Switch Stack 1

Te5/0/42 Represents Ten-Gigabit Ethernet, Unit 5, Module Slot 0,

Port 42

Line two: Destination device/port

PCC Represents building code

01A Represents to 1st Floor Communications Room A

R2.1 Represents Row 2, Rack 1 SW1 Represents Switch Stack 1

Gi1/0/2 Represents Gigabit Ethernet, Unit 1, Module Slot 0, Port 2

.2 Pictured below is an example of a label ID (9 mm) on a Copper patch cable:

TBD

- .6 Network Label Standard for Fiber Patch Cord
  - .1 Each fiber patch cable shall be identified on both ends with a unique alpha-numeric label
    - .1 Core MER, Building 1 to TR, Building 2

Fiber Patch Cord Label Example:

Line one: Source device/port NCC-01A-R2-SW1-Te5/0/42
Line two: Destination device/port CCC-02B-R1-SW1-Gi1/0/2

Line one: Source device/port

NCC Represents building code

01A Represents from 1st Floor Communications Room A

R2 Represents Rack 2 SW1 Represents Switch Stack 1

Te5/0/42 Represents Ten-Gigabit Ethernet, Unit 5, Module Slot 0,

Port 42

Line two: Destination device/port

CCC Represents building code

02B Represents to 2<sup>nd</sup> Floor Communications Room B

R1 Represents Rack 1
SW1 Represents Switch Stack 1

Gi1/0/2 Represents Gigabit Ethernet, Unit 1, Module Slot 0, Port 2

Pictured below is an example of a label ID (9 mm) on a Copper patch cable:

TBD

#### .2 MER, Building 2 (Intermediate Hop would only be passive)

Fiber Patch Cord Label Example:

Line one: Source device/port NCC-01A-R2-SW1-Te5/0/42 Line two: Destination device/port CCC-02B-R1-SW1-Gi1/0/2

Line one: Source device/port

NCC Represents building code

01A Represents from 1st Floor Communications Room A

PHSA

Project No.

Communications
Province Wide

#### APPENDIX G.2 - IDENTIFICATION FOR COPPER AND FIBER PATCHED CABLES

Page 3 of 3

R2 Represents Rack 2

Te5/0/42 Represents Ten-Gigabit Ethernet, Unit 5, Module Slot 0,

Represents Switch Stack 1

Port 42

Line two: Destination device/port

CCC Represents building code

02B Represents to 2<sup>nd</sup> Floor Communications Room B

R1 Represents Rack 1 SW1 Represents Switch Stack 1

Gi1/0/2 Represents Gigabit Ethernet, Unit 1, Module Slot 0, Port 2

Pictured below is an example of a label ID (9 mm) on a Copper patch cable:

TBD

#### .3 TR, Building 2

SW1

Fiber Patch Cord Label Example:

Line one: Source device/port NCC-01A-R2-SW1-Te5/0/42 Line two: Destination device/port CCC-02B-R1-SW1- Gi1/0/2

Line one: Source device/port

NCC Represents building code

01A Represents from 1st Floor Communications Room A

R2 Represents Rack 2 SW1 Represents Switch Stack 1

Te5/0/42 Represents Ten-Gigabit Ethernet, Unit 5, Module Slot 0,

Port 42

Line two: Destination device/port

CCC Represents building code

02B Represents to 2<sup>nd</sup> Floor Communications Room B

R1 Represents Rack 1 SW1 Represents Switch Stack 1

Gi1/0/2 Represents Gigabit Ethernet, Unit 1, Module Slot 0, Port 2

Pictured below is an example of a label ID (9 mm) on a Fiber patch cable:

TBD

#### **END OF SECTION**

#### APPENDIX G.3 - IDENTIFICATION FOR WIRELESS ACCESS POINTS AND NETWORK SWITCHES

Page 1 of 2

#### APPENDIX G.3 - IDENTIFICATION FOR WIRELESS ACCESS POINTS AND NETWORK SWITCHES

#### PART 1 **GENERAL**

#### 1.1 **OVERVIEW**

.1 Before proceeding with the labelling, the PHSA NE representative will supply and confirm samples of methods of labelling and materials used as detailed in these specifications.

#### PART 2 **PRODUCTS**

#### 2.1 LABELS

- .2 Labels on interior wireless access points and network switches:
  - Labels are supplied in the form of tape:

White Wireless Access Point, Network Switch

- .3 Labels on exterior wireless access points and in wet and dirty environments:
  - Labels are supplied in the form of Lamacoid: Wireless Access Point

White

#### PART 3 **EXECUTION**

#### 3.1 INSTALLATION

- All wireless access points and network switches will be assigned an unique alpha-numeric .1 ID number. The number will be displayed in the form of a label supplied and installed by PHSA NE representative or as directed in the project agreement. For wireless access points, the exact placement will be on the face of the device. For switches, the exact placement will be highly visible at the top left corner on the front end of the switch.
- .2 Unless specified otherwise, labels will be machine-printed on tape. Brother "P-touch" electronic labelling system, or equal approved shall be used. When access points are located outside or in wet, dirty or humid environments such as a parkade, a suitable alternate labelling product (ex. Lamacoid) will be employed.
  - .3 The PHSA NE Representative will label the access point with with 24 mm high black on white mechanical label for the wireless device ID, and 12 mm high black on white mechanical label for the cable ID. Extra strength adhesive P-touch TZS laminated tapes shall be used. Labelling colour and lettering height may be adjusted in accordance with the AP elevation and installation environment so that the label does not fade over time and is visible from the ground or floor.
- Wireless Access Point Naming Standard .4
  - Each wireless access points will be identified with an unique number on the face of the device. For example:

Wireless Access Point Label

i.e. RCT-01A-AP01

PHSA
Communications
Province Wide
Project No

## APPENDIX G.3 - IDENTIFICATION FOR WIRELESS ACCESS POINTS AND NETWORK SWITCHES

ct No. Page 2 of 2

RCT Represents combined site/building code in a campus setting environment, or building code only for single building that is not part of

a campus.

01A Represents MER 1st floor Communications room A.

AP01 Represents Wireless Access Point#1. The AP ID range will be confined to the communications zone boundary of a particular communications room so that when adding an AP to a particular communications zone any time after the initial deployment is complete, the ID of that AP will

be next one in sequence for that zone.

.2 In addition to the above, additional labels for the cable IDs will be placed on the face of the wireless access point. Refer to PHSA Communications Infrastructure Standards and Specifications (Section 27 05 53) for further details.

.3 Pictured below is an example of a wireless device ID (24 mm) and 2 x cable IDs (12

mm) labelled at the top:



- .4 If the wireless access points is housed within an enclosure, the enclosure will also be labelled with the wireless access point and cable IDs.
- .5 Network Switch Naming Standard
  - .1 Each switch will be labelled with a unique number. For example:

Network Switch Label

i.e. RCT-01A-R2-SW1-1

RCT Represents combined site/building code in a campus setting

environment, or building code only for single building that is not part of

a campus.

01A Represents MER 1st floor Communications room A.

R2 Represents Rack #2.

SW1-1 Represents Switch Stack #1, Switch #1.

- .2 Label the switch with a 24 mm high black-on-white mechanical label placed at the top left corner on the front end. Ensure the label remains visible when the switch is mounted in the network rack.
- .3 Extra strength adhesive P-touch TZS laminated tapes shall be used.

#### **END OF SECTION**

### APPENDIX H - PHSA POWER STANDARDS - UPS/ePDU DRAWINGS

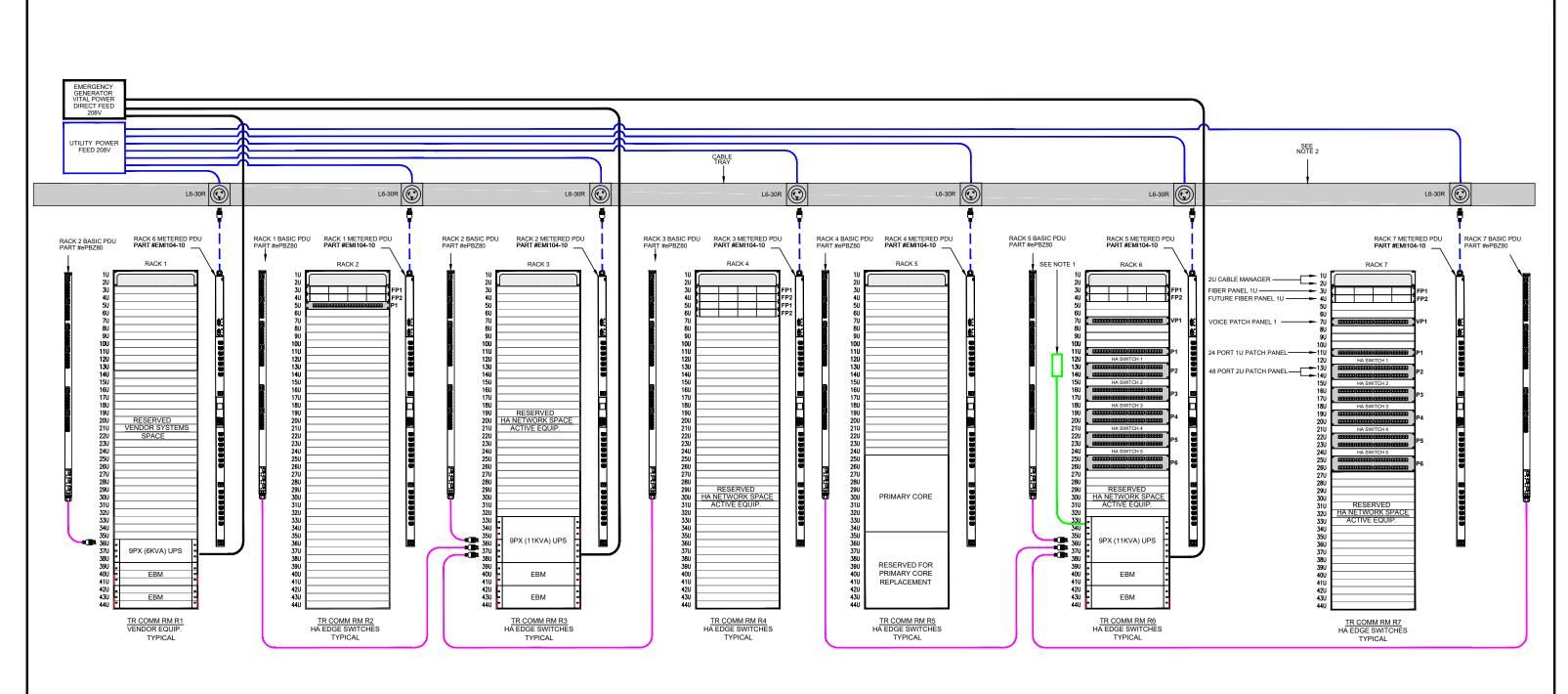
#### TABLE 1 DRAWING INDEX

Drawing No.	Drawing Title	Rev.
APPX-H-001-H-MER-7R-11KVA	Acute MER 7-Racks 11KVA	1
APPX-H-002-H-MER-TR-4R-11KVA	Acute MER/TR 4-Racks 11KVA	1
APPX-H-003-H-MER-TR-3R-8KVA	Acute MER/TR 3-Racks 8KVA	1
APPX-H-004-H-TR-2R-6KVA	Acute TR 2-Racks 6KVA	1
APPX-H-005-H-TR-1R-6KVA	Acute TR 1-Rack 6KVA	1
APPX-H-006-C-MER-4R-8KVA	Community MER 4-Racks 8KVA	1
APPX-H-007-C-MER-TR-3R-8KVA	Community MER/TR 3-Racks 8KVA	1
APPX-H-008-C-TR-2R-6KVA	Community TR 2-Racks 6KVA	1
APPX-H-009-C-TR-1R-3KVA	Community TR 1-Rack 3KVA	1
APPX-H-010-ATS	ATS Connections	1

#### Power Assessment

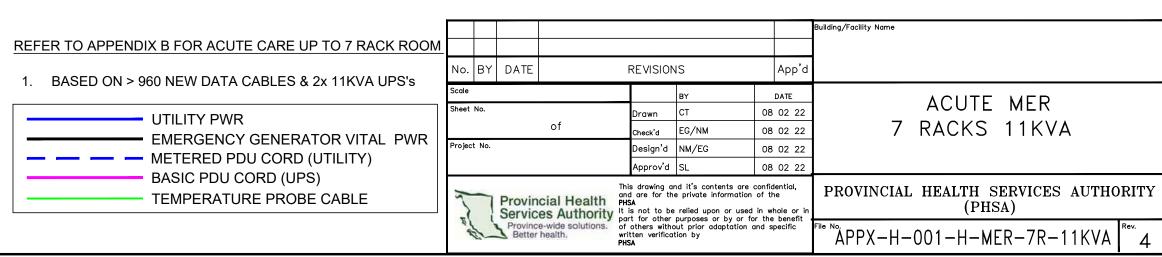
During the process of assessing the Communication Room requirements for both Generator and UPS distribution loads/demand, engage Facilities Maintenance & Operations early in the process to ensure there is sufficient capacity in the distribution system, and inform them of the increased load demand being planned.

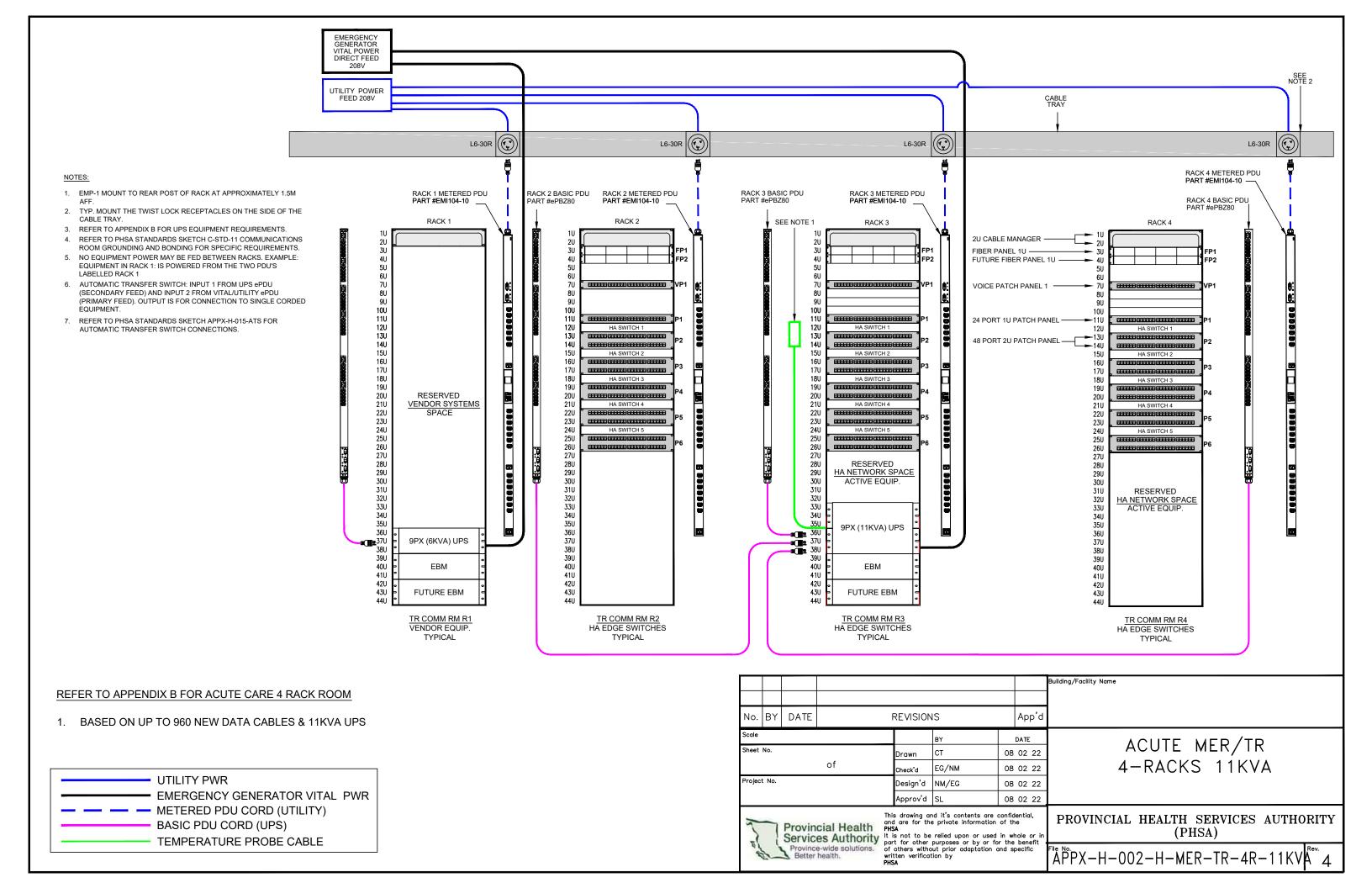
PHSA January 31st, 2022

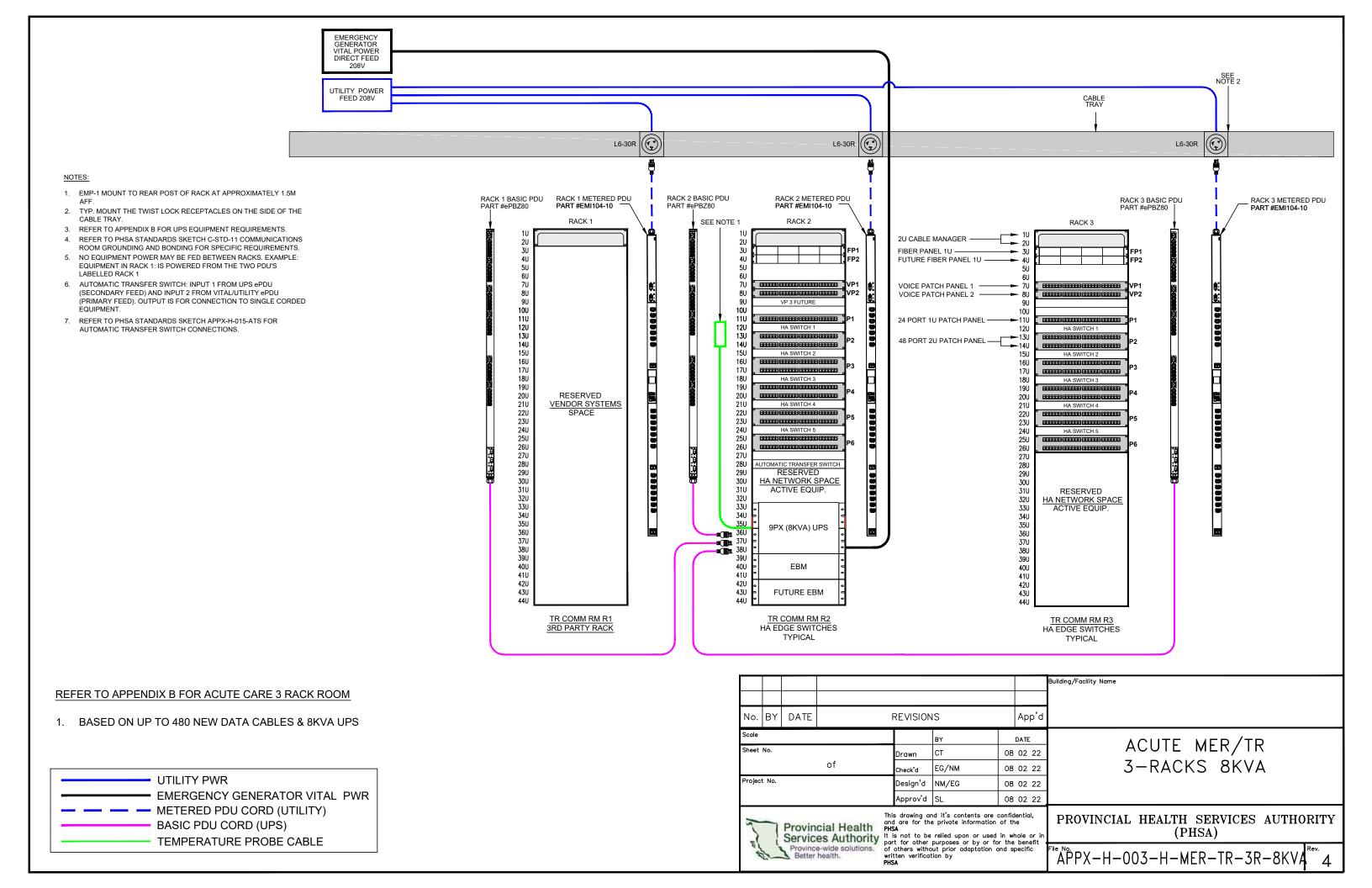


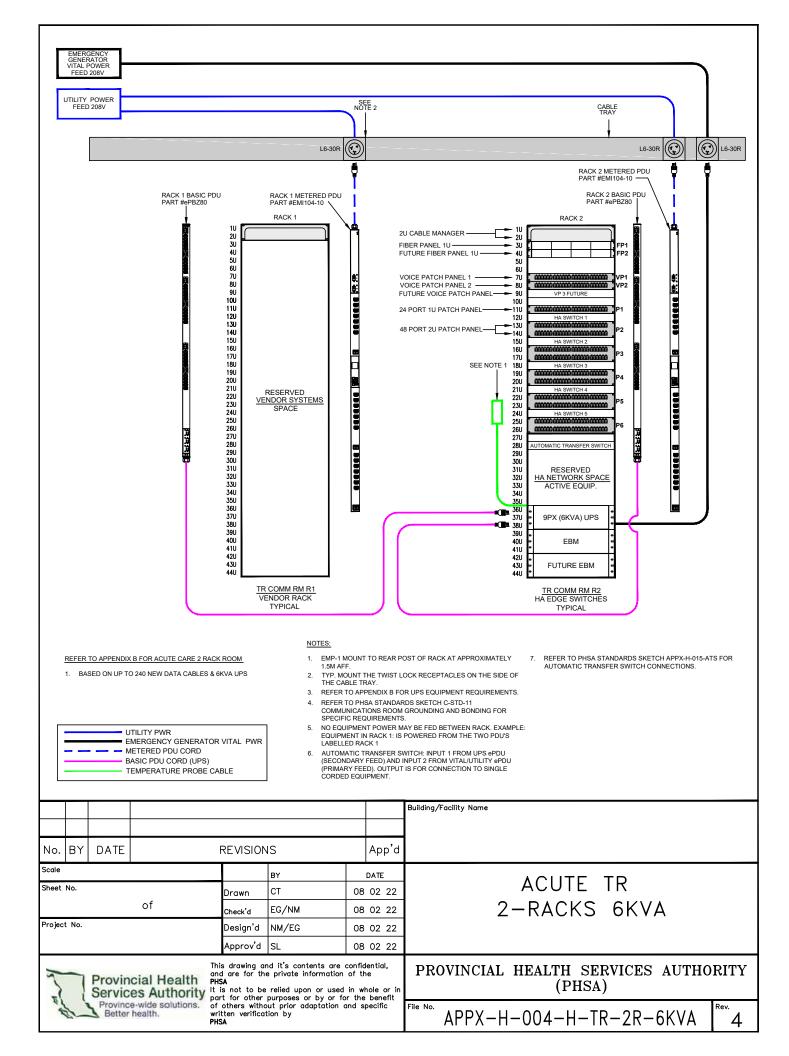
#### NOTES:

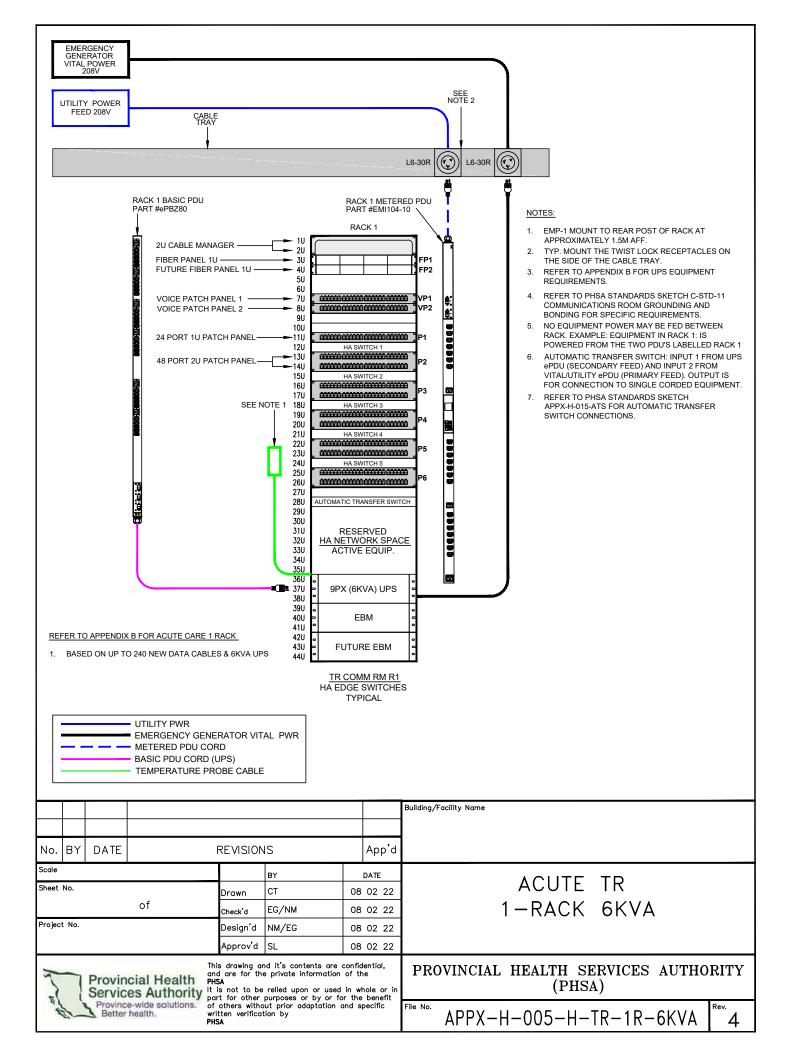
- EMP-1 MOUNT TO REAR POST OF RACK AT APPROXIMATELY 1.5M AFF.
- 2. TYP. MOUNT THE TWIST LOCK RECEPTACLES ON THE SIDE OF THE CABLE TRAY.
- 3. REFER TO APPENDIX B FOR UPS EQUIPMENT REQUIREMENTS.
- 4. REFER TO PHSA STANDARDS SKETCH C-STD-11 COMMUNICATIONS ROOM GROUNDING AND BONDING FOR SPECIFIC REQUIREMENTS.
- 5. NO EQUIPMENT POWER MAY BE FED BETWEEN RACKS. EXAMPLE: EQUIPMENT IN RACK 1: IS POWERED FROM THE TWO PDU'S LABELLED RACK 1
- 6. AUTOMATIC TRANSFER SWITCH: INPUT 1 FROM UPS ePDU (SECONDARY FEED) AND INPUT 2 FROM VITAL/UTILITY ePDU (PRIMARY FEED). OUTPUT IS FOR CONNECTION TO SINGLE CORDED EQUIPMENT.
- REFER TO PHSA STANDARDS SKETCH APPX-H-015-ATS FOR AUTOMATIC TRANSFER SWITCH CONNECTIONS.

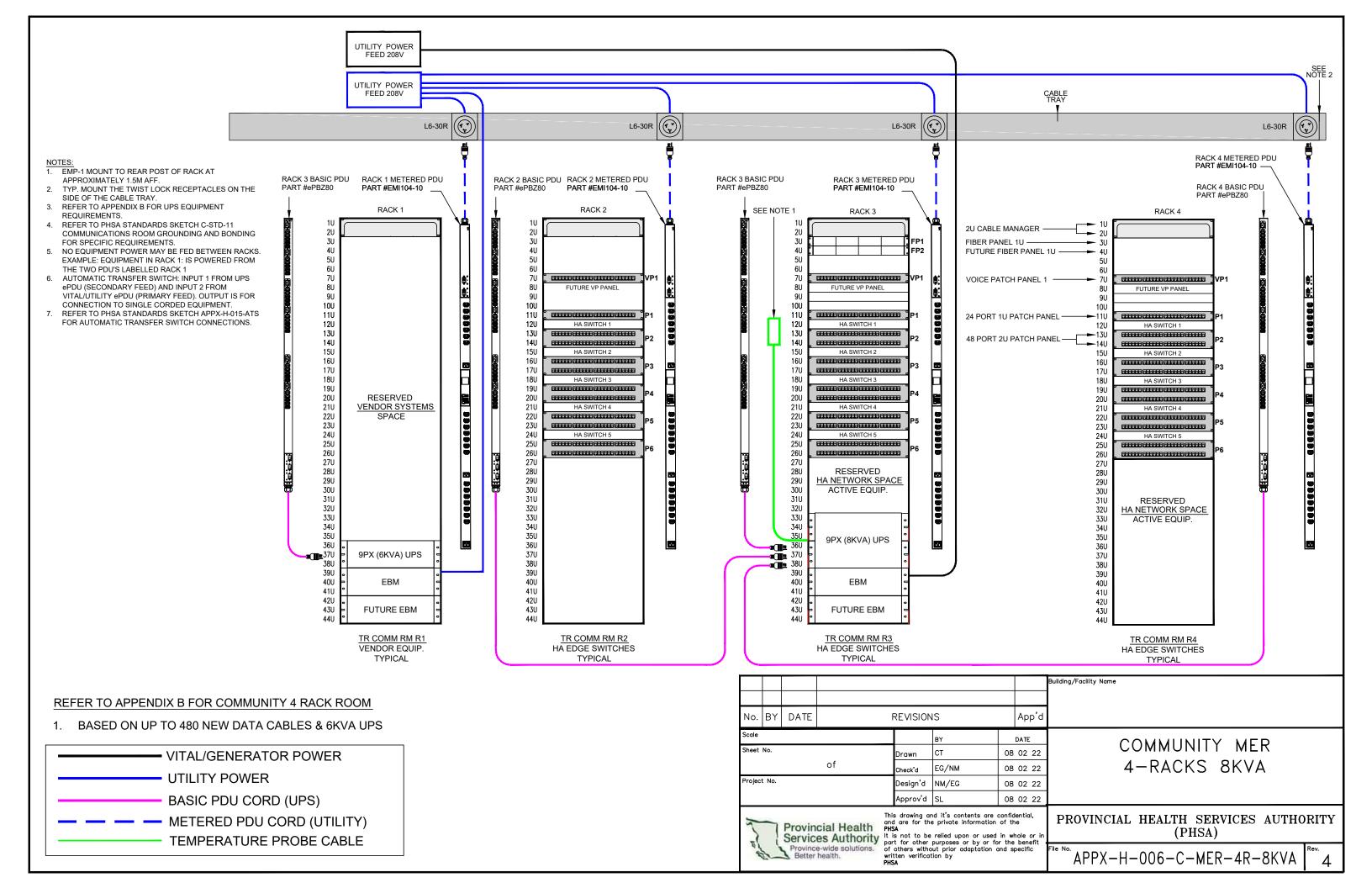


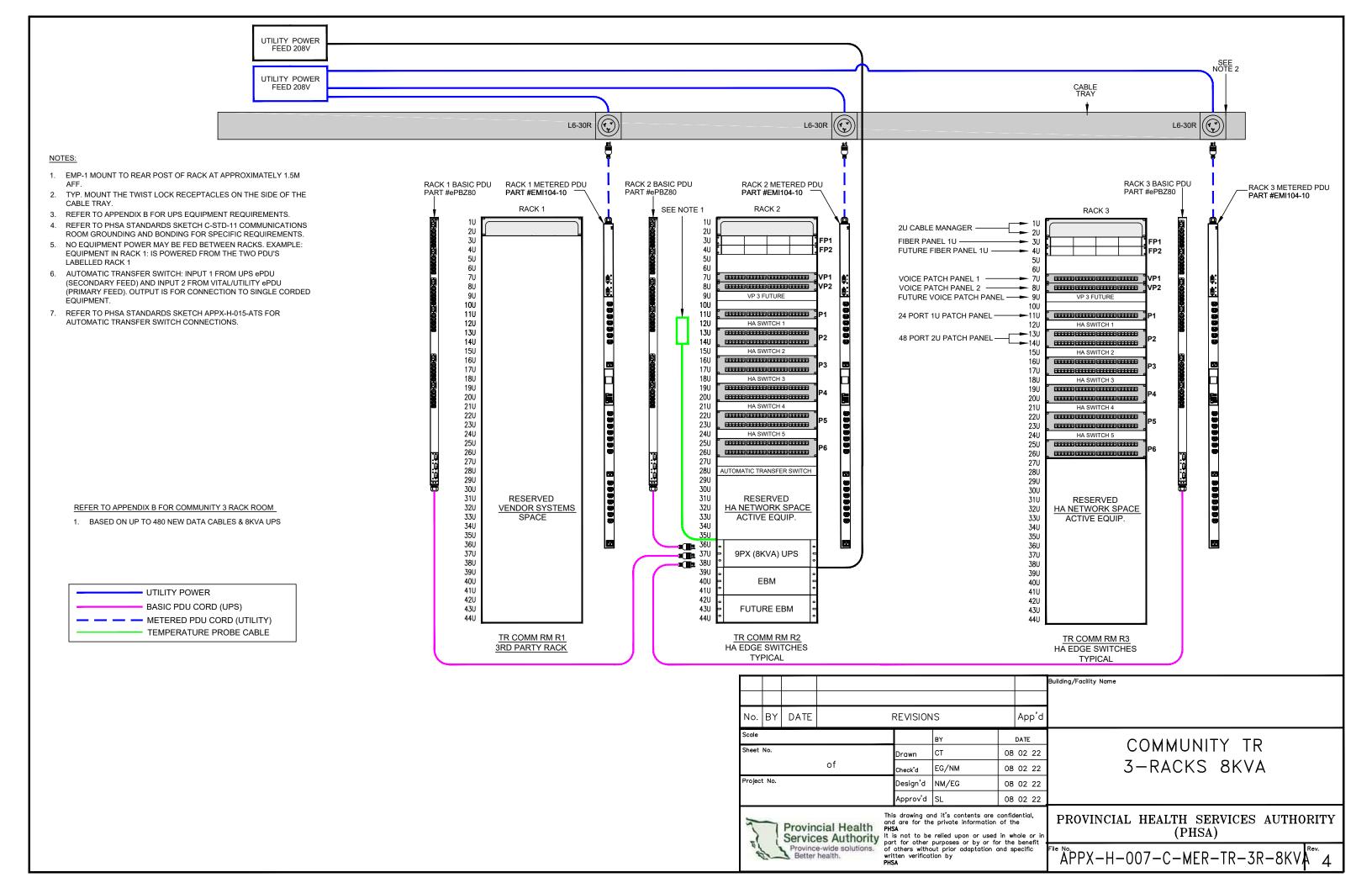


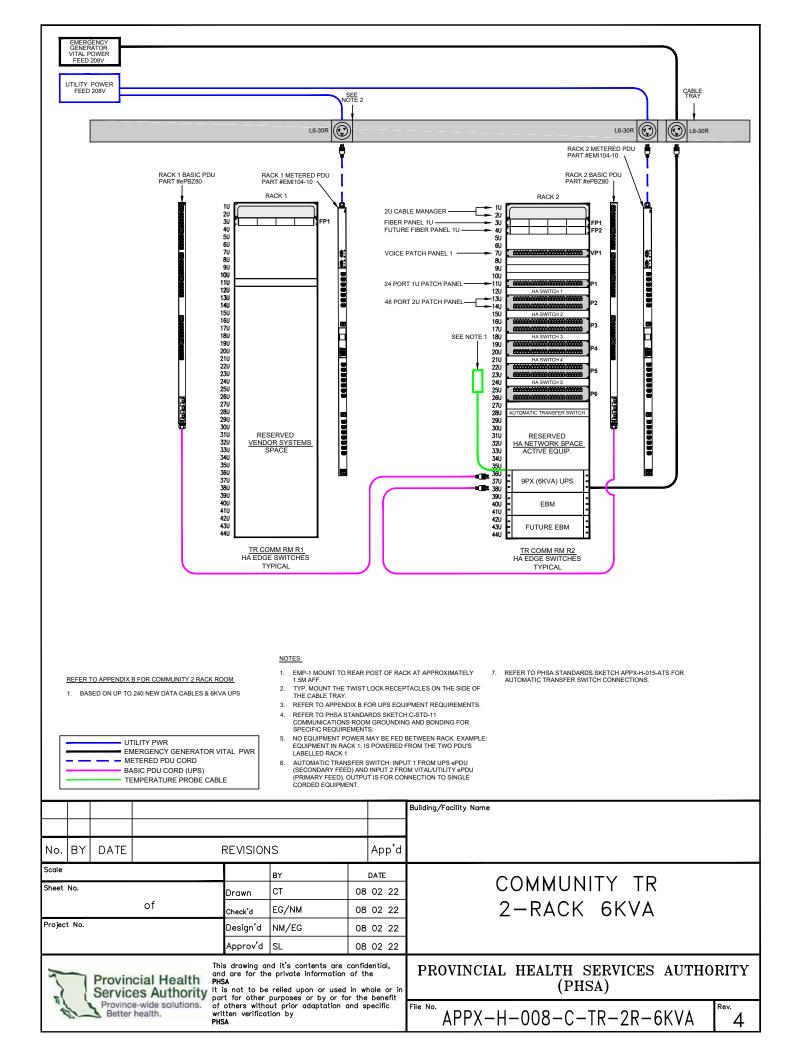


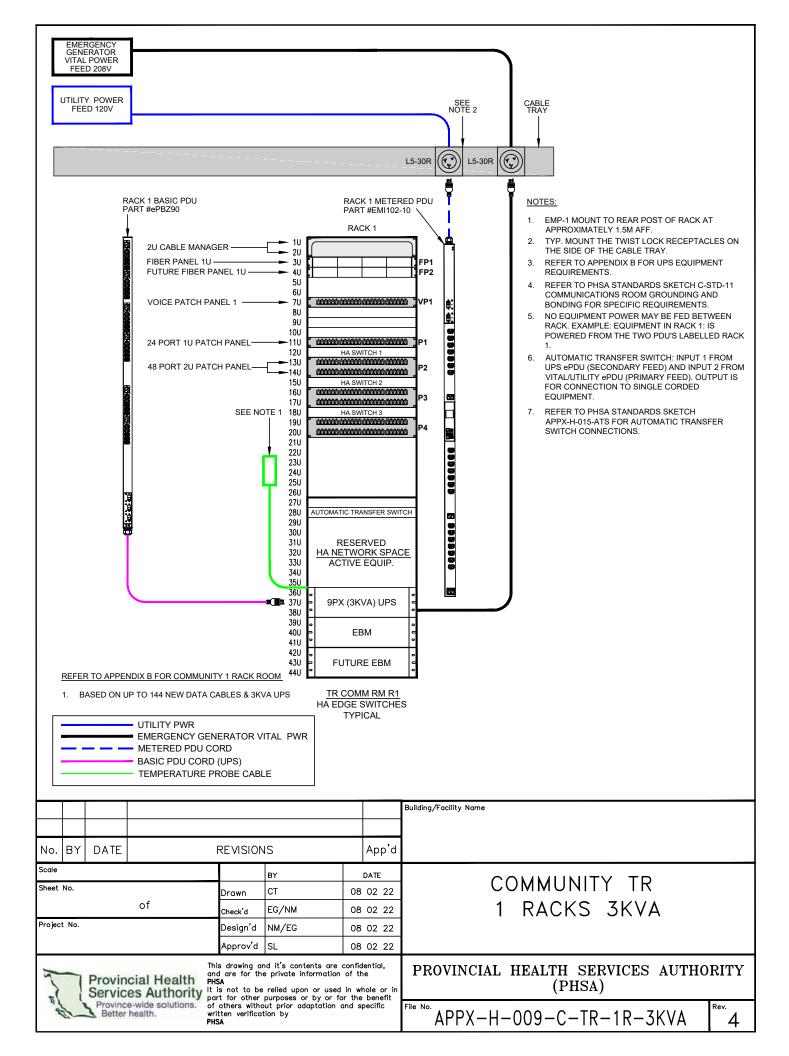


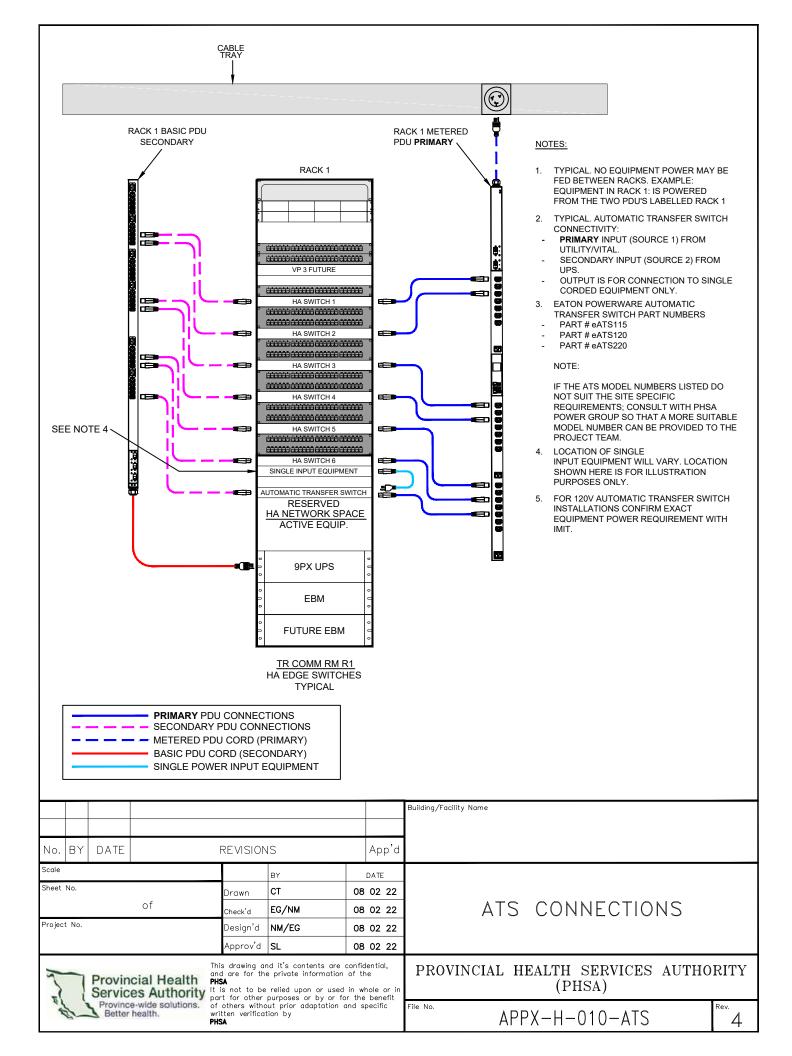












Page 5 of 5

#### APPENDIX I - CATEGORY 6A DATA CABLING TERMINATION & PATCHING LAYOUT

#### PART 1 GENERAL

#### 1.1 DATA CABLING TERMINATION & PATCHING METHODOLOGY

#### .1 Overview:

.1 The following methodology addresses common issues related to patch cord management, specifically focusing on mitigating problems such as excessive patch cable slack and entanglement that can lead to performance degradation over time.

#### .2 Methodology:

- .1 Patching with 310 mm Patch Cables:
  - .1 Utilize 310 mm 28AWG small-diameter patch cables for terminating and patching wireless access point cabling and other data cabling between patch panel jacks and switch ports within the Communications room.
- .2 Wireless Access Point Dual Cable Termination:
  - .1 The Div. 27 contractor shall terminate wireless access point outlets with dual Category 6A horizontal cables per outlet: Primary (P) and Secondary (S) cables. The purpose is to provide link aggregation capability or redundancy.
  - .2 Cable labeling shall adhere to the PHSA standards.

#### .3 Cable Distribution:

- .1 Distribute wireless cables from the same ceiling outlet between separate patch panel of the same rack within the Communications room according to the diagrams and elevation details provided below. The objective is to evenly distribute the power load across the switches.
- .2 WAP 1, WAP 2, WAP 3, etc. shall be installed sequentially in the field to ensure that the failure of a WAP or a switch will not impact the performance of its neighboring WAPs.

#### PART 2 PRODUCTS

#### 2.1 LABELS

#### .1 Standard Patch Cable Usage:

- .1 Only 310 mm (12") standard patch cables (based on Grey) are permitted for patching between the patch panel jacks and the switch ports.
- .2 Exceptions:
  - .1 Longer patch cords may be used to optimize port utilization but not at the expense of compromising the intent of patch cord management using 310 mm patch cables.
  - 2 Connecting from the voice patch panel to the data patch panel may require longer patch cords.

#### .2 Category 6A Patch Cord Specifications:

.1 Category 6A patch cords will be 28AWG small diameter type for manageability of patch cords and performance consistency.

Project No.

Page 5 of 5

#### PART 3 EXECUTION

#### 3.1 INSTALLATION

# .1 WAP 1 Outlet:

- Connect the **Primary (P) cable** to **port P1.1**.
- Connect the Secondary (S) cable to port P2.25.

#### .2 WAP 2 Outlet

- Connect the **Primary (P) cable** to **port P2.26**.
- Connect the Secondary (S) cable to port P1.2.

# .3 WAP 3 Outlet

- Connect the Primary (P) cable to port P1.3.
- Connect the Secondary (S) cable to port P2.27.

#### .4 Patch Panel P1:

# .1 Terminate Wireless Cabling:

- .1 Ports 1 to 6 on Patch Panel P1 will be used for terminating wireless cabling.
- .2 Patch these terminated cables into switch **SW1-1**, top row.

# .2 Terminate Non-Wireless Cabling:

- .1 Ports 7 to 24 on Patch Panel P1 are designated for non-wireless cabling.
- .2 Patch these terminated non-wireless cables into switch **SW1-1**, top row.

#### .5 Patch Panel P2:

# .1 Terminate Wireless Cabling:

- .1 Ports 25 to 30 on Patch Panel P2 will be used for terminating wireless cabling.
- .2 Patch these terminated cables into switch **SW1-2**, top row.

### .2 Terminate Non-Wireless Cabling:

- .1 Ports 1 to 24 on Patch Panel P2 are designated for non-wireless cabling.
- .2 Patch these terminated non-wireless cables into switch **SW1-1**, bottom row.

#### .3 Terminate Non-Wireless Cabling:

- .1 Ports 31 to 48 on Patch Panel P2 are also for non-wireless cabling.
- .2 Patch these terminated non-wireless cables into switch **SW1-2**, top row.

#### .6 Patch Panel P3:

# .1 Terminate Wireless Cabling:

- .1 Ports 25 to 30 on Patch Panel P3 will be used for terminating wireless cabling.
- .2 Patch these terminated cables into switch **SW1-3**, top row.

### .2 Terminate Non-Wireless Cabling:

- .1 Ports 1 to 24 on Patch Panel P3 are designated for non-wireless cabling.
- .2 Patch these terminated non-wireless cables into switch SW1-2, bottom row.

## .3 Terminate Non-Wireless Cabling:

- .1 Ports 31 to 48 on Patch Panel P3 are also for non-wireless cabling.
- .2 Patch these terminated non-wireless cables into switch **SW1-3**, top row.

### .7 Patch Panel P4:

#### .1 Terminate Wireless Cabling:

- 1 Ports 25 to 30 on Patch Panel P4 will be used for terminating wireless cabling.
- .2 Patch these terminated cables into switch SW1-4, top row.

#### .2 Terminate Non-Wireless Cabling:

- 1 Ports 1 to 24 on Patch Panel P4 are designated for non-wireless cabling.
- .2 Patch these terminated non-wireless cables into switch SW1-3, bottom row.

# .3 Terminate Non-Wireless Cabling:

- .1 Ports 31 to 48 on Patch Panel P4 are also for non-wireless cabling.
- .2 Patch these terminated non-wireless cables into switch SW1-4, top row.

# .8 Patch Panel P5:

### .1 Terminate Wireless Cabling:

- .1 Ports 25 to 30 on Patch Panel P5 will be used for terminating wireless cabling.
- .2 Patch these terminated cables into switch SW1-5, top row.

#### 2 Terminate Non-Wireless Cabling:

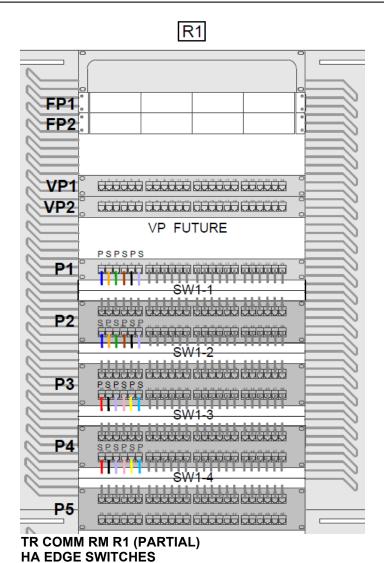
- .1 Ports 1 to 24 on Patch Panel P5 are designated for non-wireless cabling.
- .2 Patch these terminated non-wireless cables into switch SW1-4, bottom row.

# .3 Terminate Non-Wireless Cabling:

- .1 Ports 31 to 48 on Patch Panel P5 are also for non-wireless cabling.
- .2 Patch these terminated non-wireless cables into switch SW1-5, top row.

### .9 Notes:

.1 Ensure that both the Primary and Secondary wireless cabling from the same WAP outlet is terminated in the same Rack.



TYPICAL

# Legend:

.2

#### WAP 1 Outlet:

• The Primary (P) cable and Secondary (S) cable are terminated on separate patch panels.

# WAP 2 Outlet:

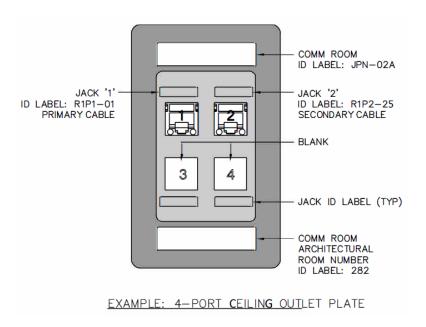
• The Primary (P) cable and Secondary (S) cable are terminated on separate patch panels.

# WAP 3 Outlet:

• The Primary (P) cable and Secondary (S) cable are terminated on separate patch panels.

Non-Wireless Data cables from the same Outlet are terminated sequentially.

Page 5 of 5



**END OF SECTION** 

PHSA

February 28th, 2024

# APPENDIX J (EXT'G FHA CAT6 SITES)

# PHSA WIFI & SWITCH LAYOUT STANDARDIZATION

Mar 15, 2021

# WIFI STANDARDIZED DEPLOYMENT PROCESS

Authors: Pierre Lluncor & Mick Bhullar

WiFi Standardized deployment process for use in any WiFi deployment for FHA



# **TABLE OF CONTENTS**

WiFi Standardized Deployment Process	1
Deployment environment	3
Process for deployment	3
Cat6A Front Loading Patch panel installation details	3
WiFi Deployment	4
WiFi Deployment Example:	4
Switch Deployment:	5
Single Switch Deployment:	5
Method of deployment:	6
Switch implementation example:	7
GigaBix Field implementation example:	8
Logical Switch Stack Deployment:	9
Method of deployment:	10
Switch implementation example:	12
GigaBix Field implementation example:	13
Reclamation of switch ports for Data/Voice or other:	14
Exceptions to the rule:	14
Designated signatories for sign-off	15

# **DEPLOYMENT ENVIRONMENT**

At this time this deployment will occur only in existing CAT6 GigaBix cabling environments.

# PROCESS FOR DEPLOYMENT

# **Cat6A Front Loading Patch panel installation details**

- Cat6A front loading Patch Panels will by default be installed as noted below and only Cat6A cabling shall be installed.
  - o (no mixing of any other category cable is permitted)
- Depending on cable count required a 1x 1RU 24 Port or 1x 2RU 48
   Port front loading Patch panel (Fully populated) is to be installed and labeled APP1.
- Space permitting, the front loading patch panel is to be installed at the top of the rack
- Any further additional front loading Patch panels required are to be installed as 1x 2RU 48 Port front loading Patch panels (Fully populated) and labeled APP2.
- The additional the front loading patch panels are recommended to be installed below APP1, however if there is not sufficient space for both then please consult with PHSA NE representative for best location to install.

# WiFi Deployment

- Each WAP is to have dual Cat6A patch cables installed
- If more WAPs are needed to be deployed they are to be installed on APP2 (1x 2RU 48 Port Front loading Patch Panel)
- The WiFi team or the PHSA NE is required to take the lead on the job.
- The Cable Technician shall follow through with the cross-connections accordingly

# WiFi Deployment Example:

- o WAP 1
  - Primary cable: Terminated on APP1 port 1
  - Secondary cable: Terminated on APP1 port 2
- o WAP 2
  - Primary cable: Terminated on APP1 port 3
  - Secondary cable: Terminated on APP1 port 4
- o Continue on with deployment
- Small diameter Cat6A patch cords will be used to patch the WAP to the switch in an orderly fashion.

# **SWITCH DEPLOYMENT:**

# **Single Switch Deployment:**

- The switch will have the first twelve (12) ports to be designated for use for Wireless deployments and used on an as-needed-basis.
- Ports will be freed up, starting from port 1 progressing to port 12 on the switch, based on the number of WAPs needed to be deployed.
- Require GigaBix field to be updated with the use of special service guard for the pigtails that were unplugged to show that the jack can no longer be used.
- Projects are required to execute the cross-connect moves. This activity shall not be left to PHSA NE field Technicians to complete.
- Requires Projects to plan ahead and monitor/fix the cross-connect moves the next morning for any port activation issues
- Requirement to maintain 20% or more port availability on the switch.
   If this cannot be maintained a new additional switch of the current-in-production model must be ordered as well as one bundle of 48 Cat6 pigtails.

# **Method of deployment:**

# Switch stack 1 → Members in stack: 1

- Active connections before WiFi: 24
- New WAPs needed for activation: 4
- Total ports to be used on switch: 28
- Port availability: 20 ports or 42%
- Require first 4 ports on switch unit 1 to be used to support the WAPs.
- Any active connection on ports 1-4 are to be moved to an available port on the current switch
- Require the pigtail to be unplugged from switch
- Connect the patch cord from the Cat6A the front loading Patch Panel to switch port
  - o Example:
  - $\circ$  WAP 1 is connected to APP1 port 1 to be connected to g1/0/1
  - $\circ$  WAP 2 is connected to APP1 port 2 to be connected to g1/0/2
  - Continue with deployment
- Require GigaBix field to be updated with the use of special service guard for the pigtails that were unplugged to show that the jack can no longer be used.
- Projects are required to execute the cross-connect moves.
- Requires Projects to plan ahead and monitor as the cross-connect is moved.

# **Example deployment below:**

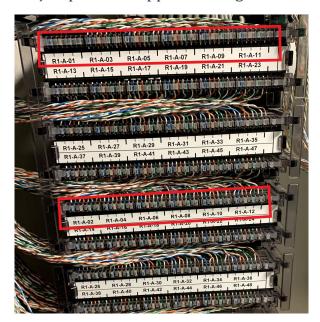
# Switch implementation example:

- Ports highlighted to indicate the designated ports that can be used
- Only the port to be used will have the active connection moved to an inactive port on the switch
- The switch port used will have the pigtail unplugged and it shall be dressed on the horizontal towel bar; if no towel bar exits, dress it with the associated pigtail bundle to keep it neat, and to make it easy to plug back to the switch port when required.
- Projects are required to execute the cross-connect moves. This activity shall not be left to PHSA NE field Technicians to complete.
- Requires Projects to plan ahead and monitor/fix the cross-connect moves the next morning for any port activation issues



# GigaBix Field implementation example:

- GigaBix field to have special service guard to be applied on the pigtails unplugged from the switch.
- Example:
  - o R1-A-01 pigtail unplugged
  - o Block jumper to be applied on GigaBix for R1-A-01



# **Logical Switch Stack Deployment:**

- Each switch in the switch stack will have the first 12 ports designated for use for Wireless deployments and used on an as-needed-basis.
- Ports will be freed up, starting with port 1 on each switch member progressively advancing to port 12 on each switch member in order to evenly distribute the WAPs across the stack.
- Ports used will depend on the number of WAPs needed to be deployed.
- As ports are used for Wireless deployments the pigtail(s) shall not be stored inside the VCM. They shall be dressed on the horizontal towel bar; if no towel bar exits, dress it with the associated pigtail bundle to keep it neat, and to make it easy to plug back to the switch port when required
- Require GigaBix field to be updated with the use of special service guard for the pigtails that were unplugged to show that the jack can no longer be used.
- Projects are required to execute the cross-connect moves. This activity shall not be left to PHSA NE field Technicians to complete.
- Requires Projects to plan ahead and monitor/fix the cross-connect moves the next morning for any port activation issues
- Requirement to maintain 20% or more port availability on the switch stack. If this cannot be maintained a new additional switch of the current-in-production model must be ordered as well as one bundle of 48 Cat6 pigtails.

# **Example deployment below:**

# Method of deployment:

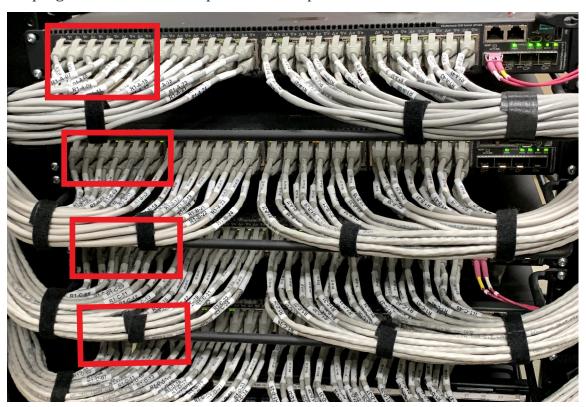
Switch stack 2 → Members in stack: 4

- Active connections before WiFi: 119
- New WAPs needed for activation: 21
- Total ports to be used on switch: 130
- Port availability: 62 ports or 32%
- Any active connections on the required ports on each switch are to be moved to an available port on the existing switch stack.
- Require the WAPs to be evenly distributed across the switch stack by starting with Port 1 on each switch member progressively advancing in sequential manner to port 12 on each switch member, based on the number of WAPs needed to be deployed
  - o Example:
  - All switch members are to be used for WAP deployment in order to evenly distribute the WAPs across the entire switch stack.
  - o Ports will be freed in the following manner:
    - Switch unit 1 port 1
    - Switch unit 2 port 1
    - Switch unit 3 port 1
    - Switch unit 4 port 1
    - Switch unit 1 port 2
    - Continue in sequential manner across all switch members up to port 12
- Require the pigtail to be unplugged from switch, connect patch cord from the Cat6A Patch Panel to the switch port as follows:
  - $\circ$   $\,$  WAP 1 is connected to APP1 port 1 to be connected to g1/0/1  $\,$
  - $\circ$  WAP 2 is connected to APP1 port 2 to be connected to g2/0/1
  - $\circ$  WAP 3 is connected to APP1 port 3 to be connected to g3/0/1
  - $\circ~$  WAP 4 is connected to APP1 port 4 to be connected to g4/0/1

- $\circ$  WAP 5 is connected to APP1 port 5 to be connected to g1/0/2
- WAP 6 is connected to APP1 port 6 to be connected to g2/0/2
- 0 ....
- $\circ$  WAP 25 is connected to APP2 port 1 to be connected to g1/0/7
- WAP 26 is connected to APP2 port 2 to be connected to g2/0/7
- WAP 27 is connected to APP2 port 3 to be connected to g3/0/7
- Continue in sequential manner across all switch members up to port 12
- Require GigaBix field to be updated with the use of special service guard on the pigtails that were unplugged to show that the jack can no longer be used
- Projects are required to execute the cross-connect moves.
- Requires Projects to plan ahead and monitor as the cross-connect is moved.

# Switch implementation example:

- Ports highlighted to indicate the designated ports that can be used
- Only the port to be used will have the active connection moved to an inactive port on the switch
- The switch port used will have the pigtail unplugged and it shall be dressed on the horizontal towel bar; if no towel bar exits, dress it with the associated pigtail bundle to keep it neat, and to make it easy to plug back to the switch port when required.



# GigaBix Field implementation example:

- GigaBix field to have special service guard to be applied on the pigtails unplugged from the switch.
- Example:
  - o R1-A-01 pigtail unplugged
  - o Block jumper to be applied on GigaBix for R1-A-01
  - o R1-B-01 pigtail unplugged
  - o Block jumper to be applied on GigaBix for R1-B-01
  - Continue in sequential manner by applying special service guard for all pigtails unplugged



# Reclamation of switch ports for Data/Voice or other:

If there is a need to use any of the first 12 switch ports on a switch member, which are reserved for APs, the following method will be used reclaim the spare ports as required

- Plug back pigtail as required, remove special service guard
- Cross-connect to the appropriate horizontal cable
- Work backwards in claiming the ports in the port positions 12, 11, 10 sequence, spreading the port reclamation evenly across the switches.

# **Exceptions to the rule:**

In the case that all 12 ports (whether a single switch or logical switch stack) be fully utilized, then any additional WAPs needed for deployment would then continue onto the 13<sup>th</sup> port. Again progressively advancing in sequential manner across the switch member(s) as needed, all the while keeping in check the 20% port availability on the switch stack.

PHSA Network Edge	FHA Manager
Full Name	Full Name

Designated signatories for sign-off

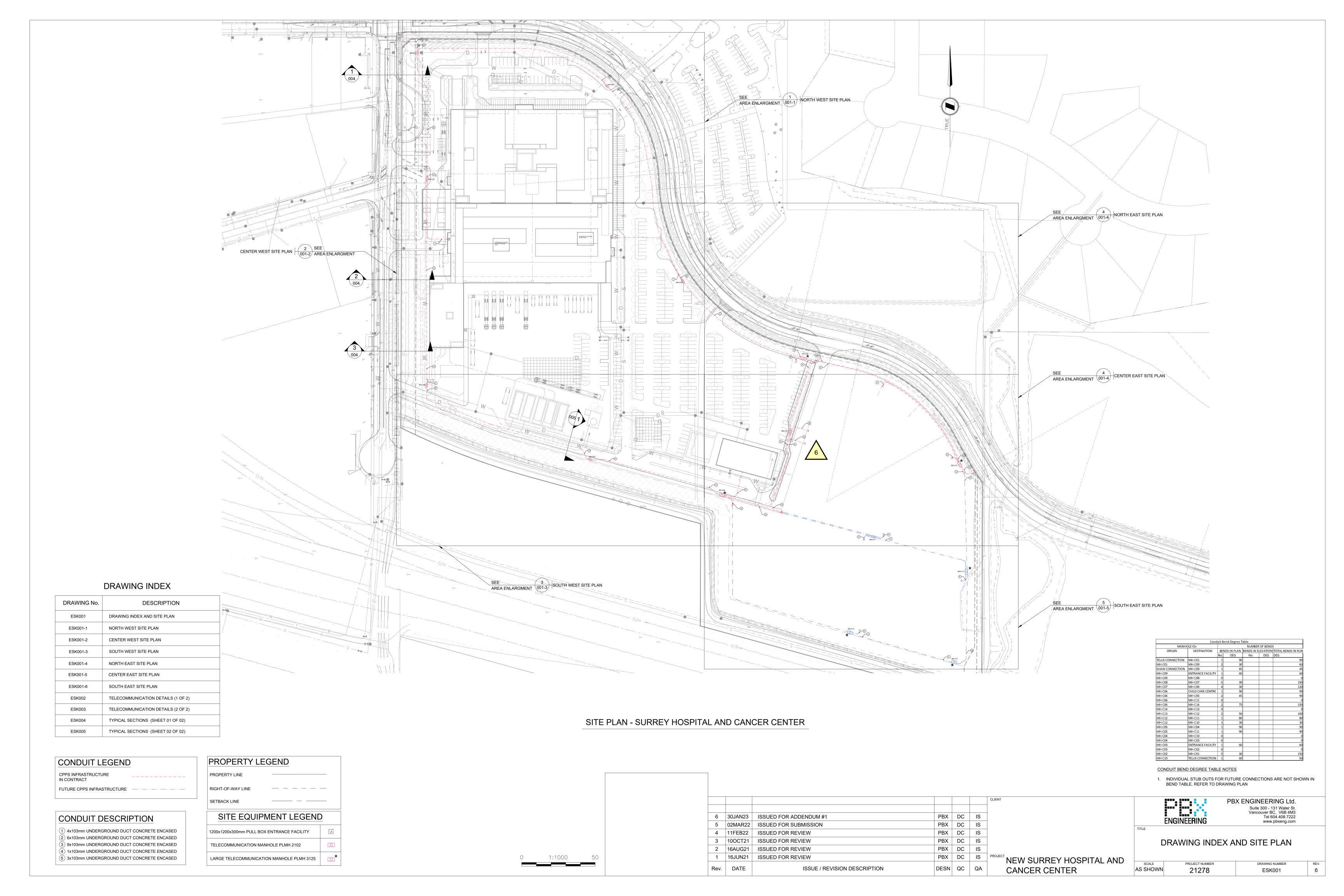
#### APPENDIX K - PHSA MANHOLE LABELLING STANDARDS - DRAWINGS

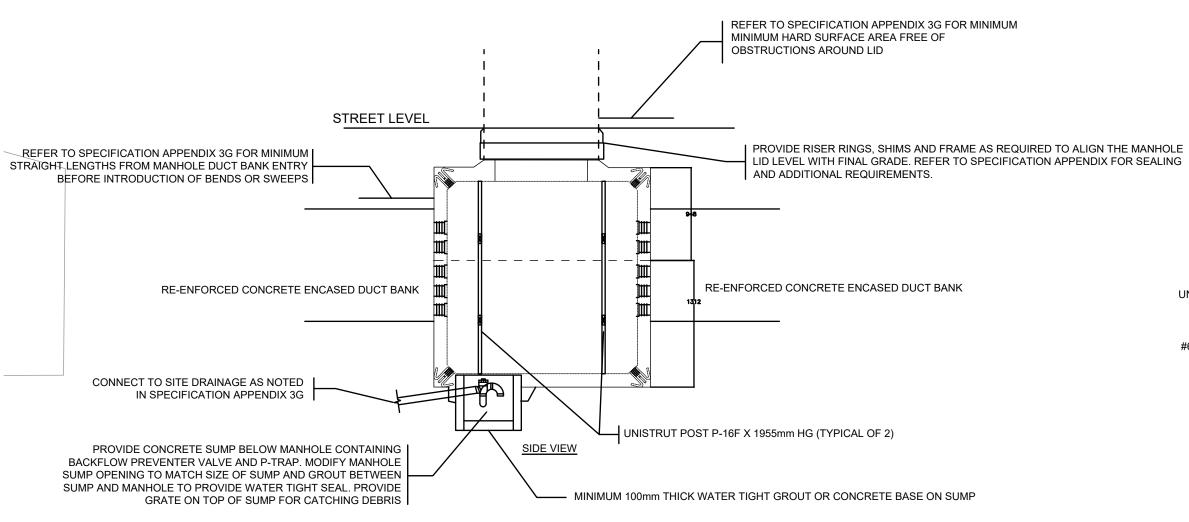
## Manhole Labelling

- 1. When labeling Communications manholes, it's crucial to follow a sequential alphanumeric naming scheme. For instance, label the manholes as "MH-C01," "MH-C02," "MH-C03," and so forth. This systematic approach not only accommodates future expansion but also ensures clear and consistent identification of manholes within the campus outside plant environment.
- 2. On the manhole lid, cast in owner, site identification, and system identification, example, FHA NSH COMMS.
- 3. Inside the manhole, locate the labelling above each duct bank.

Example of Manhole Labelling Site Plan and Details:

PHSA June 25<sup>th</sup>, 2024





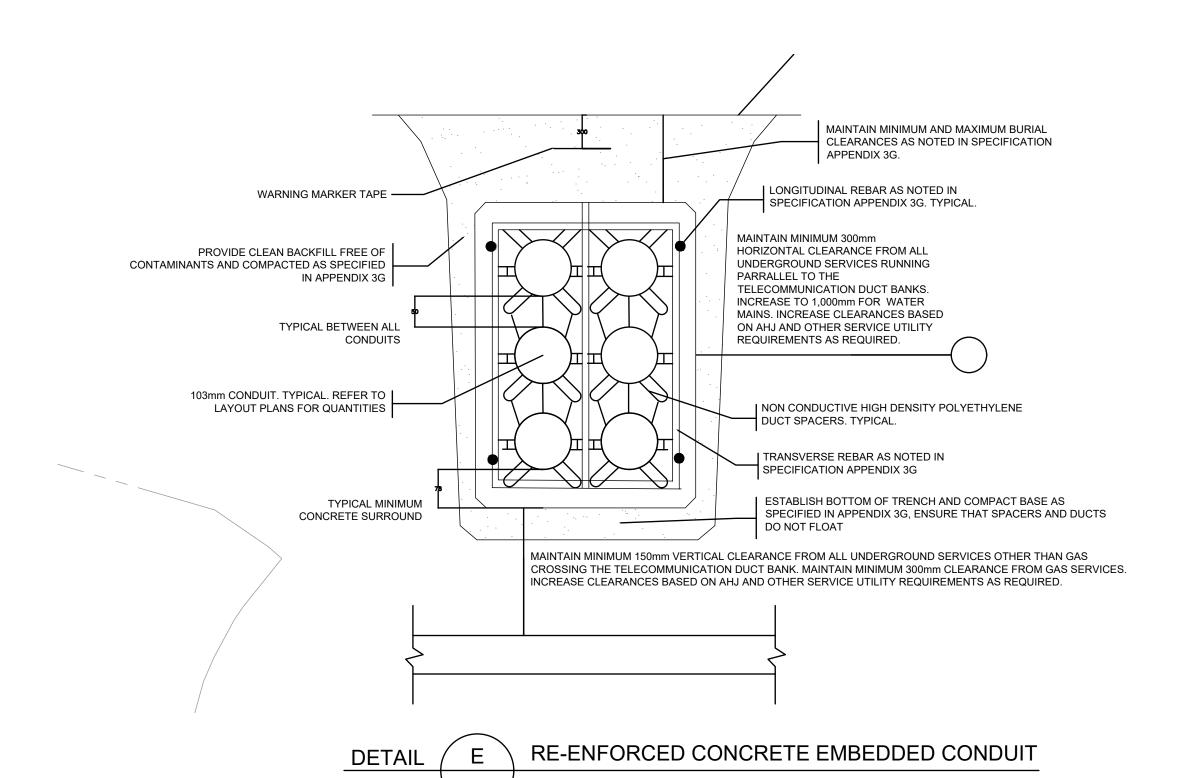
# NOTES:

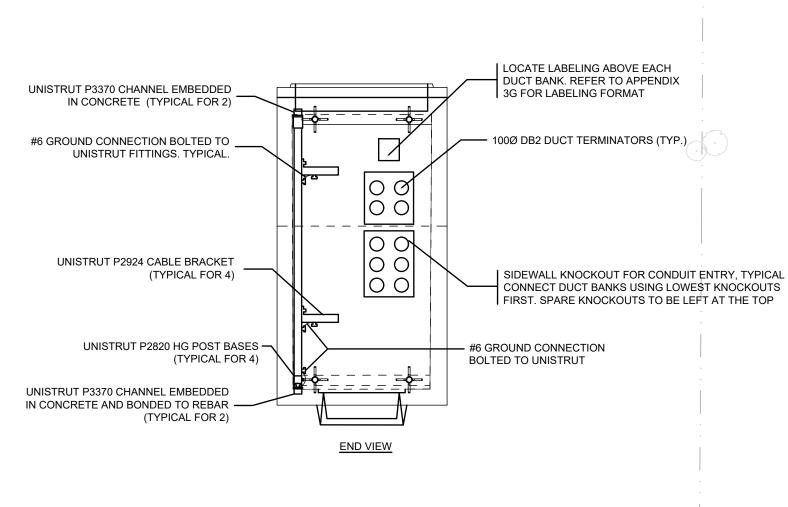
3G RESTRICTIONS.

1. REFER TO SPECIFICATION APPENDIX 3G FOR ADDITIONAL REQUIREMENTS.

- 2. ALL MANHOLES TO BE TYPE 2102 PRECAST CONCRETE MANHOLE SECTIONS.
- 3. BURIAL DEPTH WILL NOT EXCEED MANUFACTURES RATED REQUIREMENTS FOR STRUCTURAL INTEGRITY OF THE MANHOLE AND BE AS PER APPENDIX
- 4. COORDINATE LOCATION TO ENSURE ACCESS FOR SPLICING VEHICLE IS PROVIDED AT EACH MANHOLE.







DETAIL B TELECOMMUNICATION MANHOLE PLMH 2102
N.T.S. - (TYPICAL)

DETAIL C TYPICAL DUCT LABELING
N.T.S. - (TYPICAL)

DETAIL D TYPICAL MANHOLE LID

N.T.S. - (TYPICAL)

, St†E ID.、

MANHOLE ID.

CAST IN OWNER, SITE, AND SYSTEM IDENTIFICATIONS

ARC WELDED

(DANGER)

PERMIT AND SPECIAL PRECAUTIONS REQUIRED

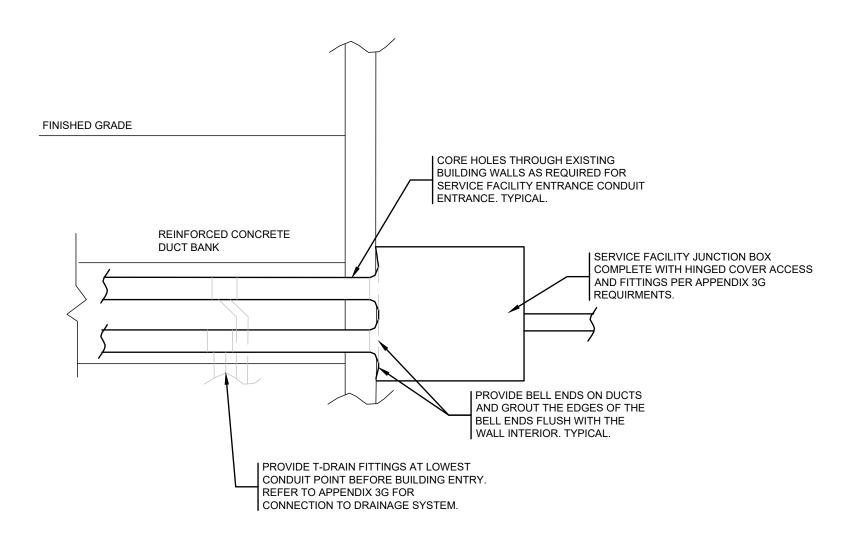
NO UNAUTHORIZED ENTRY

ONFINDED SPACE

INDIVIDUAL MANHOLE ID.

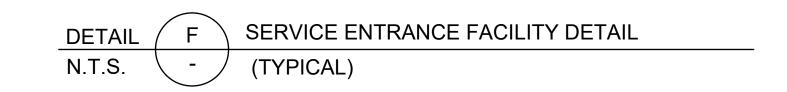
PROVIDE MANHOLE LID CAST IN CHECKING OR PATTERN UNIQUE

TO OTHER MANHOLES ON SITE

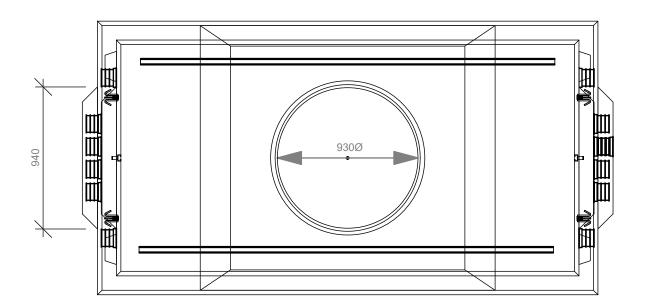


# NOTES:

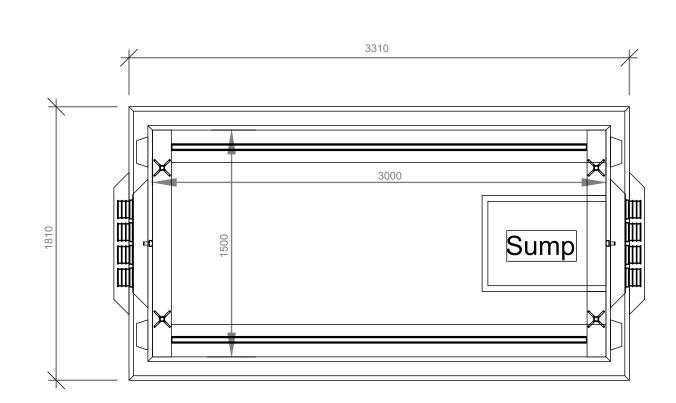
- 1. REFER TO SPECIFICATION APPENDIX 3G FOR ADDITIONAL REQUIREMENTS.
- 2. COORDINATE LOCATION OF SERVICE ENTRANCE FACILITY JUNCTION BOX. FUTURE MAINTENANCE ACCESS TO THE BOX WILL BE UNOBSTRUCTED AND WILL BE POSSIBLE WITHOUT THE USE OF SPECIAL TOOLS AND EQUIPMENT.



						CLIENT		PB	BX ENGINEERING Ltd. Suite 300 - 131 Water St.	
6 30	0JAN23	ISSUED FOR ADDENDUM #1	PBX	DC	IS			ENGINEERING	Vancouver BC, V6B 4M3 Tel 604.408.7222 www.pbxeng.com	
5 02	2MAR22	ISSUED FOR SUBMISSION	PBX	DC	IS		TITLE	LINGINLLITING	www.pbxeng.com	
4 11	1FEB22	ISSUED FOR REVIEW	PBX	DC	IS		'''ב	TELECOMMUNICA	TION DETAILS	
3 10	OCT21	ISSUED FOR REVIEW	PBX	DC	IS					
2 16	6AUG21	ISSUED FOR REVIEW	PBX	DC	IS			(1 OF	2)	
1 16	6JUN21	ISSUED FOR REVIEW	PBX	DC	IS	NEW SURREY HOSPITAL AND				
Rev.	DATE	ISSUE / REVISION DESCRIPTION	DESN	QC	QA	CANCER CENTER	AS SHOW	N PROJECT NUMBER 21278	DRAWING NUMBER ESK002	REV.



Plan View - Top



Plan View - Bottom

**End View** 

UNISTRUT P3370 CHANNEL EMBEDDED IN CONCRETE (TYPICAL FOR 2)

UNISTRUT P3370 CHANNEL EMBEDDED
IN CONCRETE AND BONDED TO REBAR —

UNISTRUT P2924 CABLE BRACKET

(TYPICAL FØR 2)

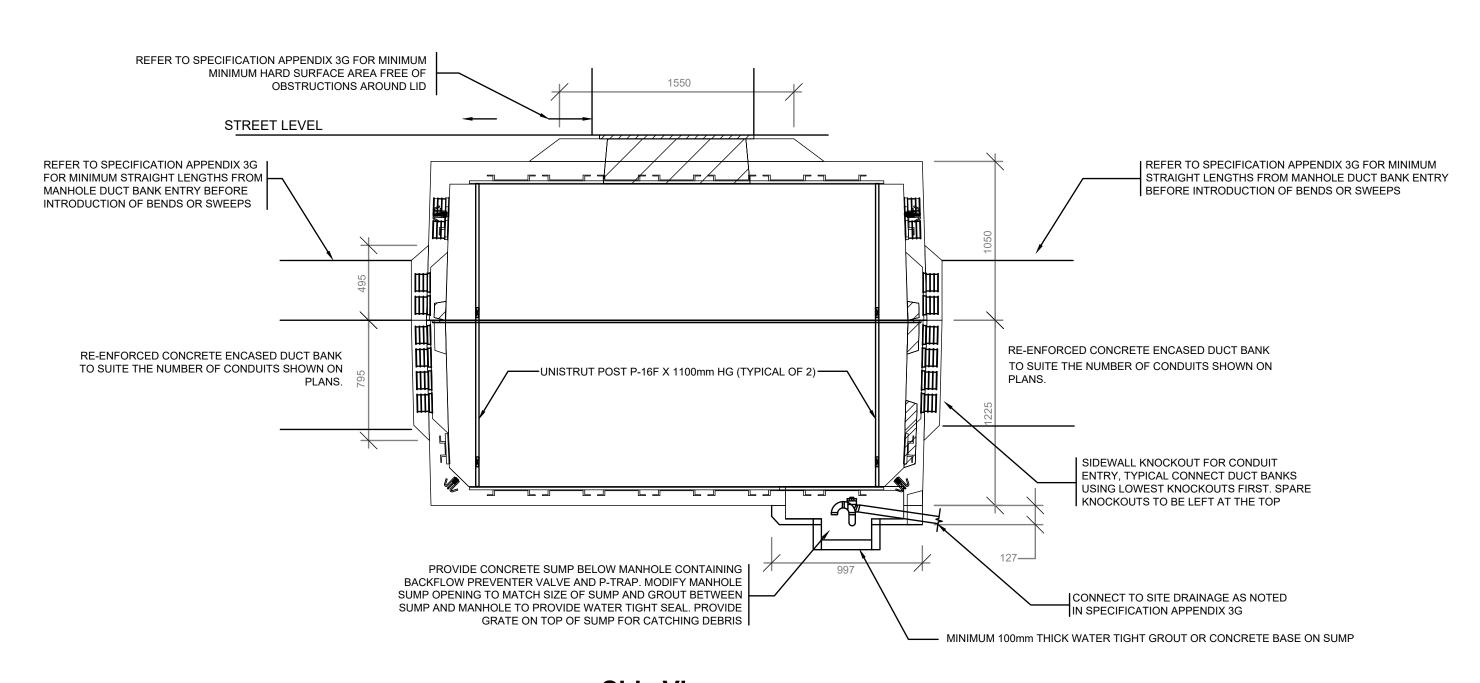
UNISTRUT P2820 HG POST BASES (TYPICAL FOR 4)

(TYPICAL FOR 2)

LOCATE LABELING ABOVE EACH DUCT BANK. REFER TO APPENDIX 3G FOR LABELING FORMAT

— 100Ø DB2 DUCT TERMINATORS (TYP.)

\*#6 GROUND CONNECTION BOLTED TO UNISTRUT.

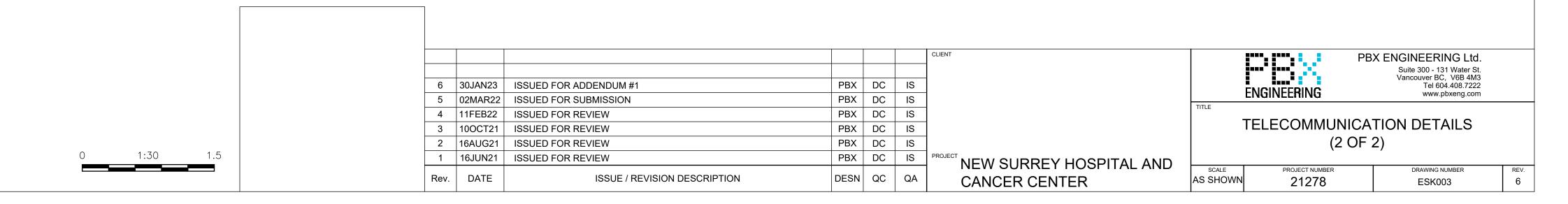


# Side View

# NOTES:

- 1. REFER TO SPECIFICATION APPENDIX 3G FOR ADDITIONAL REQUIREMENTS.
- 2. BURIAL DEPTH WILL NOT EXCEED MANUFACTURES RATED REQUIREMENTS FOR STRUCTURAL INTEGRITY OF THE MANHOLE AND BE AS PER APPENDIX 3G RESTRICTIONS.
- 3. COORDINATE LOCATION TO ENSURE ACCESS FOR SPLICING VEHICLE IS PROVIDED AT EACH MANHOLE.





#### APPENDIX L - POWERED FIBER CABLE SYSTEM

### PART 1 GENERAL

#### 1.1 SUMMARY

#### .1 Introduction

- .1 Provide a powered cabling solution that combines power and optical fiber communications into one complete system.
- .2 The cable must combine electrical power conductors and optical fiber into one package to speed up installations and simplify power and communications delivery to remote outdoor devices e.g., Small Cell, WiFi AP and Security Camera.

# .2 Powered Fiber Cable System

- .1 System must be a complete "rack to device" solution capable of powering and communicating with small cells, Wi-Fi hotspots, HD cameras, and variety of devices requiring optical communications and DC power in one system.
- .2 The hybrid cable shall allow for "standalone" use in delivering of power and fiber data communications.
- .3 When used along with the PoE extender, the powered fiber optic cable shall supply optical fiber communications and PoE+ power for network access and other low voltage DC devices. See Table [1] for cable distances by gauge and input power.

PSU Output Voltage	Cable Gauge (AWG)	Lmax (m) Pout = 60W (PoE+/PoE+)	Lmax (m) Pout = 45.4W (PoE/PoE+)	Lmax (m) Pout = 30.8W (PoE/PoE)	Lmax (m) Pout = 30W (PoE+)	Lmax (m) Pout = 15.4W (PoE)
Maximum (57V)	12	650	1120	1570	1595	2630
Nominal (48V)	12	460	795	1100	1120	1840
Norminal (40V)	12	400	195	1100	1120	1040
Minimum (40.5V)	12	330	555	770	780	1285

#### TABLE [1]

### POE EXTENDER ELECTRIC TRANSMISSION AND RECOMMENDED CABLE LENGTH DISTANCES

Must be compatible with commercially available NEC Class 2 and/or SELV compliant 48-57VDC power supply.

- .4 System shall comply with the following standards:
  - .1 RoHS (2002/95/EC)
  - .2 REACH SVHC, 53 6/20/11
  - .3 Telcordia GR-20-CORE Issue 3 May 2008, EIA/TIA FOTPS
  - .4 TIA-568-C
  - .5 Deca-BDE free
  - .6 Power limited circuit cable UL 13 (CL2R-OF AND CL3R-OF)
  - .7 Communication cable per UL 444 (CMR-OF)
  - .8 UL 1666 standard for test for flame propagation Edition 5 Revision date 2012/06/27

- .9 IEC 60332-1-1, -2, 60332-3-24 Cat. C, 61034 60745-2
- .10 ITU.T K21
- .11 GR-1089
- .12 IEC 60793-2-50 type B.1.3 and B.6.A&B
- .13 ITU-T G.657.A1 or A2/B2 optical fiber, backwards compatible with G.652.D
- .14 PoE (IEEE 802.3af-2003) and PoE+ (IEEE 802.3at-2009)
- .15 Must comply with Canadian code ICES-003
- .5 Equipment must comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules
- .6 Standard system consists of five (5) components:
  - .1 Hybrid fiber/copper cabling
  - .2 PoE Extender
    - .1 1-port
    - .2 2-port
  - .3 Power and fiber distribution element
  - .4 Cable and fiber management
  - .5 SFP connector

# **PART 2 PRODUCTS**

#### 2.1 OWNER FURNISHED

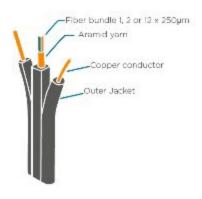
- .1 Systems, products, and accessories that are provided by the owner
  - .1 SFP connectors for switch and POE extender (extended temperate SFP's)
  - .2 Fiber-based switch or Copper based switch

#### 2.2 PROJECT CO/CONTRACTOR FURNISHED

- .1 Systems, products, and accessories that are provided by Project Co or Contractor
  - .1 DC Power supply, LC connector, LC patch cords and fiber patch panels, outdoor rated Cat 6A patch cord
  - .2 For copper-based switch: fiber to copper media converters

### 2.3 MANUFACTURED COMPONENTS

- .1 Manufacturer List
  - .1 CommScope
  - .2 Approved equivalent
- .2 System Components
  - .1 Hybrid fiber/copper cable
    - .1 12 AWG (2mm) conductor size
    - .2 04 optical fibers
    - .3 Singlemode fiber type
    - .4 Outdoor rated polyethylene (PE) or Riser/LSZH indoor/outdoor jacket type
    - .5 1 Km, 2 Km or 4 Km cable length
    - .6 Compatible with FOSC 450A splice closure
    - .7 Cable must meet specifications in Table [1] and Table [2]:



Environmental Characteristics	
Storage Temperature:	-40°C to +70°C
Operating Temperature:	-40°C to +70°C
Installation Temperature:	-10°C to +60°C
Tensile Load	
Short Term: Long	440 N
Term:	132 N
Preferred Axis Bend Radius mm (in.)	
Installed: Loaded:	30 mm (1.18 in.)
	50 mm (1.97 in.)
Impact (N-m)	
EIA/FOTP-25C	4.4 N-m
Crush(N-m)	
EIA/FOTP-41A	2200 N-m
Optical Performance (dB/Km)	
Singlemode Reduce Bend Radius Fiber	0.35/0.25 dB/km (1310/1550 nm)

TABLE [1] POWERED FIBER CABLE SPECIFICATIONS

Conductor	Size Dimens	sions (Nominal, mm)	Weight
(AWG)	Width	Height	(Nominal)
12	12	4.5	110.0 kg/km

Table [2]
Powered Fiber Cable Dimensions and Weight Specifications

.8 Cable shall be CommScope product part number PFC-S-04-L-12 or approved equivalent.

PFC represents Power Fiber Cable

S represents Singlemode (RBR)-G657.A2/B2

04 represents Fiber Count (04)

L represents indoor/outdoor application Riser/LSZH

12 represents Conductor Gauge in AWG (12)

#### .2 PoE Extender

- .1 Provides termination for hybrid cable input and automatically corrects voltage drop over distance
- .2 Optical signal and power in must be converted to RJ45 PoE+ compliant jack(s)
- .3 Shall be available in [1] or [2] port configurations
  - 2-port configuration must allow for two (2) PoE or PoE+ devices to be connected via one hybrid cable
  - .2 2-port must provide option to share the bandwidth of a single 1 Gb/s SFP or utilize two (2) SFPs for 1 Gb/s per port operation
- .4 Must use outdoor rated patch cord
- .5 Must be Earth grounded via a 12AWG conductor connected to the chassis ground lug
- .6 Shall be available in pole or wall mount options
- .7 Extender shall have three (3) levels of electrical protection:
  - .1 Primary GDT component rated to 40kA surge protection
  - .2 Secondary MOV components rated to 4.5kA
  - .3 Tertiary TVS prevents the voltage from rising above 80-100V
- .8 Termination block shall support a minimum of 200 re-terminations while maintaining a contact resistance of less than one (1) milliohm
- .9 Environmentally sealed closure rated to IP67
- .10 Must provide electrical power transmission management
- .11 Must be ascetically appealing for Wi-Fi access point or camera deployment
- .12 SFP module in the POE extender should match module in existing switch
- .13 Must include sunshade for harsh temperature installation
- .14 PoE extender must meet specifications in Tables [4] and [5]:

Item			
Storage Temperature:	-40°C to +70°C		
Operating Temperature:	-40°C to +65°C		
Installation Temperature:	-5°C to +45°C		
65°C assumes 45°C ambient air temperature, plus 20°C sun loading			

### TABLE [4] POE EXTENDER CLIMATIC PERFORMANCE

Item	Dimensions	Weight
PoE Extender 1-port version	238mm x 225mm x 77mm	3.8 kg
PoE Extender 2-port version	283mm x 225mm x 77mm	3.8 kg

# TABLE [5] POE EXTENDER PHYSICAL DIMENSIONS



1-PORT POE EXTENDER



# 2-PORT POEEXTENDER

- .3 Power and Fiber Distribution Element
  - .1 Must be compatible with GE Critical Power Express Class II shelf, DC Rectifier Shelf and Modules.
  - .2 Shall comply with NEC Class II and SELV
  - .3 Each GE Modules shall accommodate eight (8) cable outputs; each GE chassis shall contain up to four (4) modules total per power supply for a total of 32 cables per power supply



#### **POWER SUPPLY**



Slimline SPS DC rectifier Module

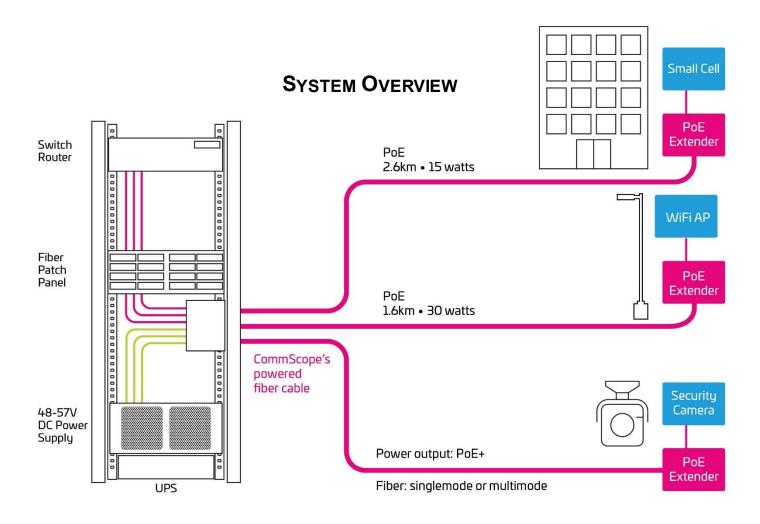
# **PART 3 EXECUTION**

### 3.1 INSTALLATION

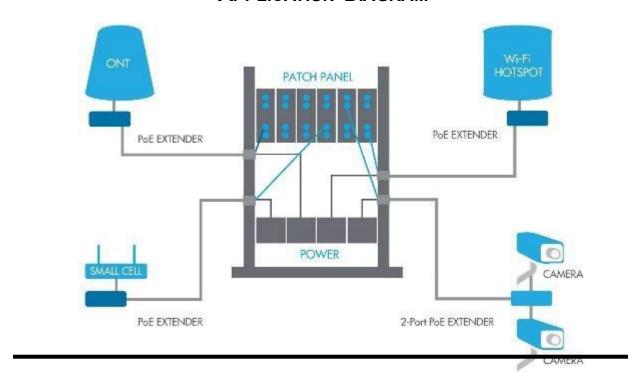
- .1 Install all systems in accordance with manufacturer's printed instructions, as well as all Authorities Having Jurisdiction of codes and standards.
- .2 The power supply shall be installed in a safe location with access to the fiber optic network into which small cells or other network access devices are desired to be connected, and either 120VAC, 240VAC.
- .3 Parameters to be considered prior to system deployment:
  - 1. Distance from power supply to the network devices
  - 2. Maximum power consumption of the network devices
  - 3. Number of devices to be deployed
  - 4. Type of cable (jacket, support)
  - 5. Fiber Management options

Page 7 of 9

- .4 For outdoor direct burial installations, the PE-jacketed "outdoor-only" rated cable is recommended.
  - .1 When installing in ducts, care should be given to avoid cable twisting.
  - .2 Standard cable lubricants may be used to assist with conduit or duct installations.
  - .3 If it is not practical to bring a reel of cable to the installation site, then utilize a standard figure 8 procedure to lay the cable out prior to pulling in duct. This helps avoid cable twisting.
- .5 The PE-jacketed outdoor cable is rated for direct burial but for long-term reliability is recommended installing below-ground cables in conduit/ducts.
- .6 Powered Fiber Cable is not rated for aerial self-support thus cable lashing is recommended.
- .7 Use only a typical pair of wire strippers to access the powered fiber cable and, optionally, a wire cutter or snip.
- .8 The LSZH/riser rated indoor/outdoor cable may also be installed in conduits or ducts, however, frictional forces are greater for the indoor/outdoor cable and, therefore, achievable distances may be less.
- .9 Standard cable lubricants may be used to assist with the indoor/outdoor cable for duct installation.
- .10 PoE Extender port openings must be properly sealed at all times (prior, during and after installation) against weather, moisture, dust/debris. Any exposure could result in catastrophic damage to electronic components.
- .11 PoE Extenders and Power Shelves must be properly grounded per manufacturer's instructions.
- .12 Ensure there is sufficient rack space and good access from the front and the rear to enable proper routing of the powered fiber cable.
- .13 The Power Express shelf and Rectifier shelf installed in the rack, shall allow for unrestricted access to both the front and the rear. Ensure there is adequate ventilation to the units.
- .14 Ensure the Power Express shelf and Rectifier shelf are properly grounded as per manufacturer instructions.
- .15 Secure the cables coming into the rack to a side management or support bars. Label the incoming cables. Leave a minimum of 1m cable slack to reach the fiber panel and to allow for termination.
- .16 Label each power strand connected to the rectifier terminals.
- .17 For the fiber strand, ensure there is sufficient slack to allow the panel to slide in and out without trapping the fiber strand.
- .18 As the PF cables carry a maximum of four fiber strands, in the fiber panel, they shall be installed in the correct color scheme order.
- .19 Duplex fiber patch cord shall be supplied as a cross-over with the keyways in the up position on both ends.
- .20 Do not connect the fiber patch cords until the PoE Extender units have been terminated.
- .21 Two-port PoE extenders shall be provided including solar shield where applicable and outside plant rated patch cords.
- .22 Extenders shall be mounted with the glands facing downwards wherever possible. Plan cable slack into the installation if possible, to allow the termination to be done at ground level.
- .23 When the enclosure lid is opened, ensure the rubber gasket remains clean and undamaged.
- .24 Silicone grease shall be used to create a watertight seal at the grommet and gland.
- .25 The SFP's for the PoE Extender shall only be inserted or removed with the power off.
- .26 Ensure the LC connector is cleaned before inserting into the SFP.
- .27 Ensure the copper patch cords when connected, will be long enough to reach the active devices and not under tension. If connecting to devices externally, an outside plant shielded patch cord shall be used.
- .28 For unused glands, verify that the plugs have been properly inserted.
- .29 Before screwing the lid down, confirm it is sitting correctly onto the seal gasket as water ingress will destroy the electronics.
- .30 Ensure the Extender is properly bonded and grounded to a reliable ground.



# **APPLICATION DIAGRAM**



# **END OF SECTION**