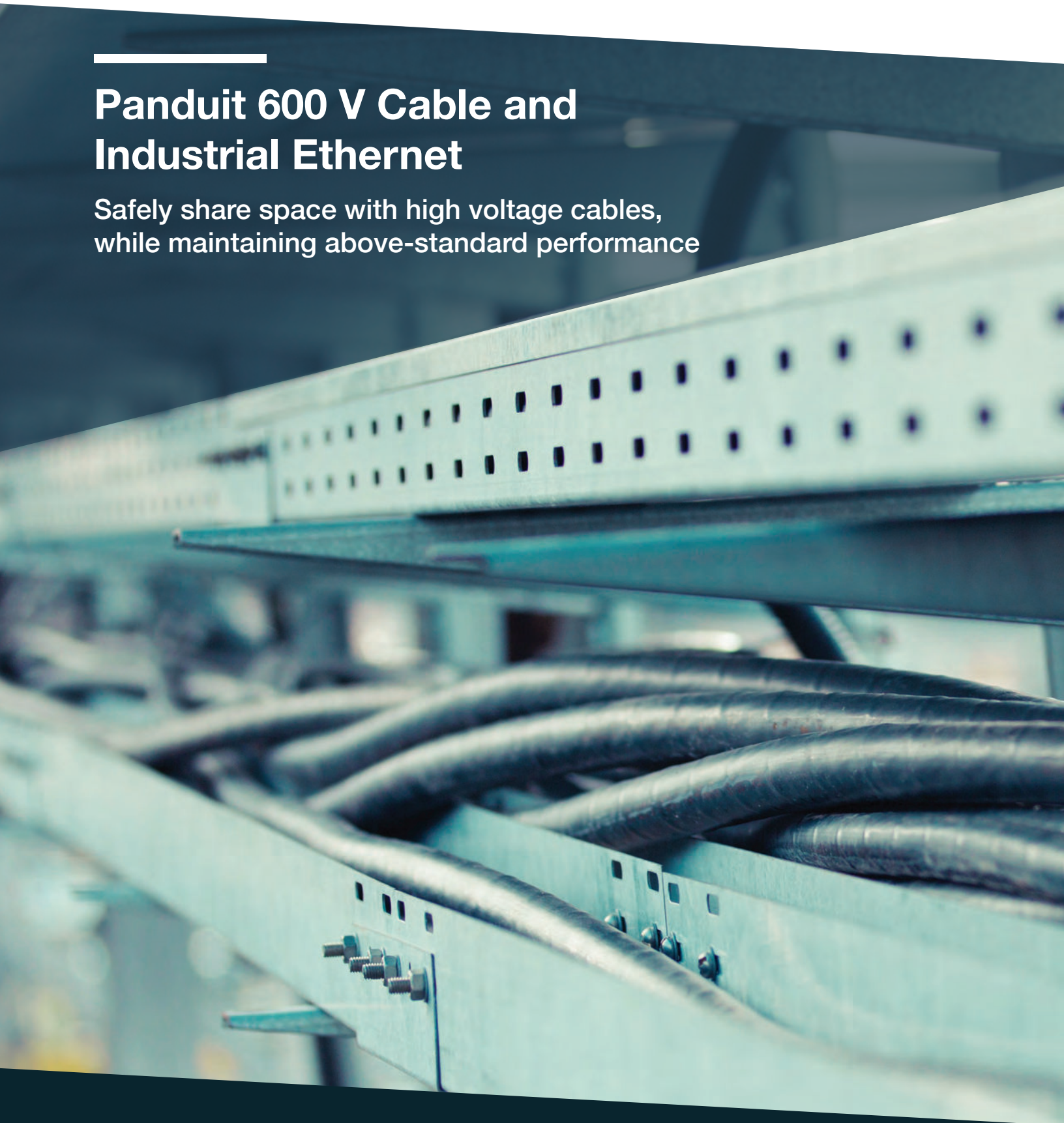

Panduit 600 V Cable and Industrial Ethernet

Safely share space with high voltage cables,
while maintaining above-standard performance



Introduction

Panduit now offers cables and patch cords typically rated for 300 volt (Class 2) installations with a 600 volt (Class 1 power-limiting circuits) classification intended for in-panel or on-machine installations, where space or raceway is shared with other 600 volt rated power circuits.

Advantages of Use

- Cable insulation is rated to meet and withstand the elevated temperatures emitted by power circuit cables such as THHN, S.O. cords and other 600 volt power circuits cables
- Added shielding provides electromagnetic interference (EMI) immunity from adjacent similarly rated power cables from leaching on to the data cables
- A common requirement for signal and communication within Motor Control Centers (MCC), Variable Frequency Drives (VFD's) and other high EMI environments

Standards or Codes Used When Installing Ethernet Cables in an Industrial Environment

- Primary governance code
 - NFPA 70, also known as National Electric Code (NEC), focuses on cable installation and identifies Life Safety regulations
 - Applicable for all building wiring, equipment, tray, and raceway installations
 - If an installation is deemed non-compliant by an Authority Having Jurisdiction (AHJ), typically the N.E.C. code section is referenced and a fine could be issued
 - Applicable for building wiring, tray, and raceway installations
 - Includes the installation and removal of conductors, equipment, and pathways for electricity, communications, and signaling
 - Does not apply to ships, railyards, and underground mines
- Secondary governing codes
 - NFPA 79 is the electrical standard for industrial machinery
 - Related to the wiring of electrical and electronic equipment or systems of industrial machinery operating at a nominal voltage of 600 V or less
 - Applicable for wiring that is used in and on machinery
- UL 508A is the standard for industrial control panels
 - Applies to control panels operating at 1000 V or less (nominal voltage), and at temperatures not exceeding 40°C (104°F)
 - Relates to two or more power circuit components (motor controllers, circuit breakers, etc.)

Appliance Wiring Material (AWM)

- Recognized UL component
- Must be installed in or on a UL-listed product
- Most often found in general purpose wiring circuits, for machine tool wiring and the internal wiring of appliances, such as control panels
- The Panduit 600 V cable is classified as Style 2570
- Not intended for in-building wiring/hardwiring

AWM Style 2570 Guidelines

- Multiconductor, thermoplastic -insulated and -jacketed wire
- Granted under NFPA 79
- Cable must be tray rated to be approved for installation into an NEC environment, alongside 600 V operating voltage cables

Tray Cable (TC)

- Designed to be installed in the same channel as cables operating at 600 V
 - Minimum conductor size is 18 AWG
 - Barriers are not required, however, high voltage cables are very heavy and therefore may present a crush risk cables
- Must meet the following guidelines:
 - UL 83 – Thermoplastic Wire & Cable
 - UL 44 – Thermoset Insulated Wire & Cable
 - UL 1277 – Electrical Power & Control Tray Cable
 - UL requirements for Sunlight Resistance & Direct Bury
 - IEEE 1202 Vertical Tray Flame Test
 - NFPA 70 – NEC 336
 - NEMA WC57/ICEA S-73-532
 - ICEA T-29-520 (210,000 BTU/hr Flame Test)

TC vs Power Limited Tray Cable (PLTC)

- Approved for installation alongside 300 V (maximum) rated cables
 - Minimum conductor size is 22 AWG
 - Can be installed alongside 600 V cables
- Barrier must be present to prevent crushing
 - Can be used in locations identified as hazardous under UL 698A, as well as NEC Class I & II, Div. II

Panduit’s 600 V Cable: TC or PLTC?

- Excluding IURHT5C04BL-UG, which is PLTC, none of these cables meet the criteria for TC
- All of these cables are UL 508A approved
 - Can share space with high voltages power cables, up to 600 V, in control panels or on-machine applications

Applicable Flame Ratings

- Our family of 600 V rated cable holds several types of flame ratings: CMX Outdoor/CMR, CMX/CM, or CMR (reference table below)

Flame Rating	Performance	Part Number	Type
CMX Outdoor/CMX	5e	IURHT5C04BL-UG	(PLTC) cable
CMX/CM	5e	ISTPHCH1MTL	patch cord
CMX Outdoor/CMR	6	IFRH6C04BL-UG	cable
CMX/CM	6A	ISFCH6X04ATL-UG	cable
CMX/CM	6A	ISFCH6X04BTL-UG	cable
CMX/CM	6A	ISTPH6X1MTL	patch cord

Differentiating Between These Flame Ratings

- CM- identifies cable as “communication” cable
 - general-purpose/residential grade cable that can be used in in-building installations, where riser or plenum cables are not required
 - The cables are flame tested but are held to a lower standard than plenum or riser
- CMX Outdoor
 - General-purpose/residential grade cable, that can be used in outdoor installations for short lengths
 - Jacket construction is not designed for prolonged exposure to extreme temperatures and elements
- CMR
 - Still considered “general-purpose/residential grade” cable, however, it is riser rated

Comparing CM to OSP Cable

- OSP, or Outside Plant, the cable does not have a riser or plenum flame rating, as it is not approved for indoor installations
 - Jacket construction is typically a UV-resistant and abrasion resistant

Conclusion

With the demanding environments of a plant/factory floor, Ethernet cabling components are required to be reliable and robust with protection against vibration, high temperatures, UV resistance, electromagnetic interference (EMI), and oil/chemical resistance.

Additionally, Ethernet technology is more common in motor control centers (MCCs) and switch gear, so the cabling design and selection must be reliable and robust. MCCs produce enough EMI to interfere with many commercial grade Ethernet cables. The need to monitor and control these devices may demand that the cable enter the MCC and/or control panels and to be routed within these enclosures. As a result, an appropriately-rated Ethernet cable with excellent noise immunity and the ability to run on or near appliances/devices is needed.

Because network cabling is not designed to carry these power voltages, the cable jacket must be constructed of the appropriate insulation to meet this voltage isolation withstand requirement. By upgrading the jacket insulation “withstand voltage” users eliminate the possibility of hazardous power voltages being carried on network wiring in the event of a failure. 600 V rated cables provide a cost saving by avoiding the need to separate your network infrastructure from high voltage drive cables using additional conduit or other means of separation.



For more information, visit us at

www.panduit.com

Contact Customer Service by email: cs@panduit.com
or by phone: 800.777.3300

PANDUIT US/CANADA
Phone: 800.777.3300

PANDUIT EUROPE LTD.
London, UK
cs-emea@panduit.com
Phone: 44.20.8601.7200

PANDUIT SINGAPORE PTE.
LTD. Republic of Singapore
cs-ap@panduit.com
Phone: 65.6305.7575

PANDUIT JAPAN
Tokyo, Japan
cs-japan@panduit.com
Phone: 81.3.6863.6000

PANDUIT LATIN AMERICA
Guadalajara, Mexico
cs-la@panduit.com
Phone: 52.33.3777.6000

PANDUIT AUSTRALIA PTY.
LTD. Victoria, Australia
cs-aus@panduit.com
Phone: 61.3.9794.9020