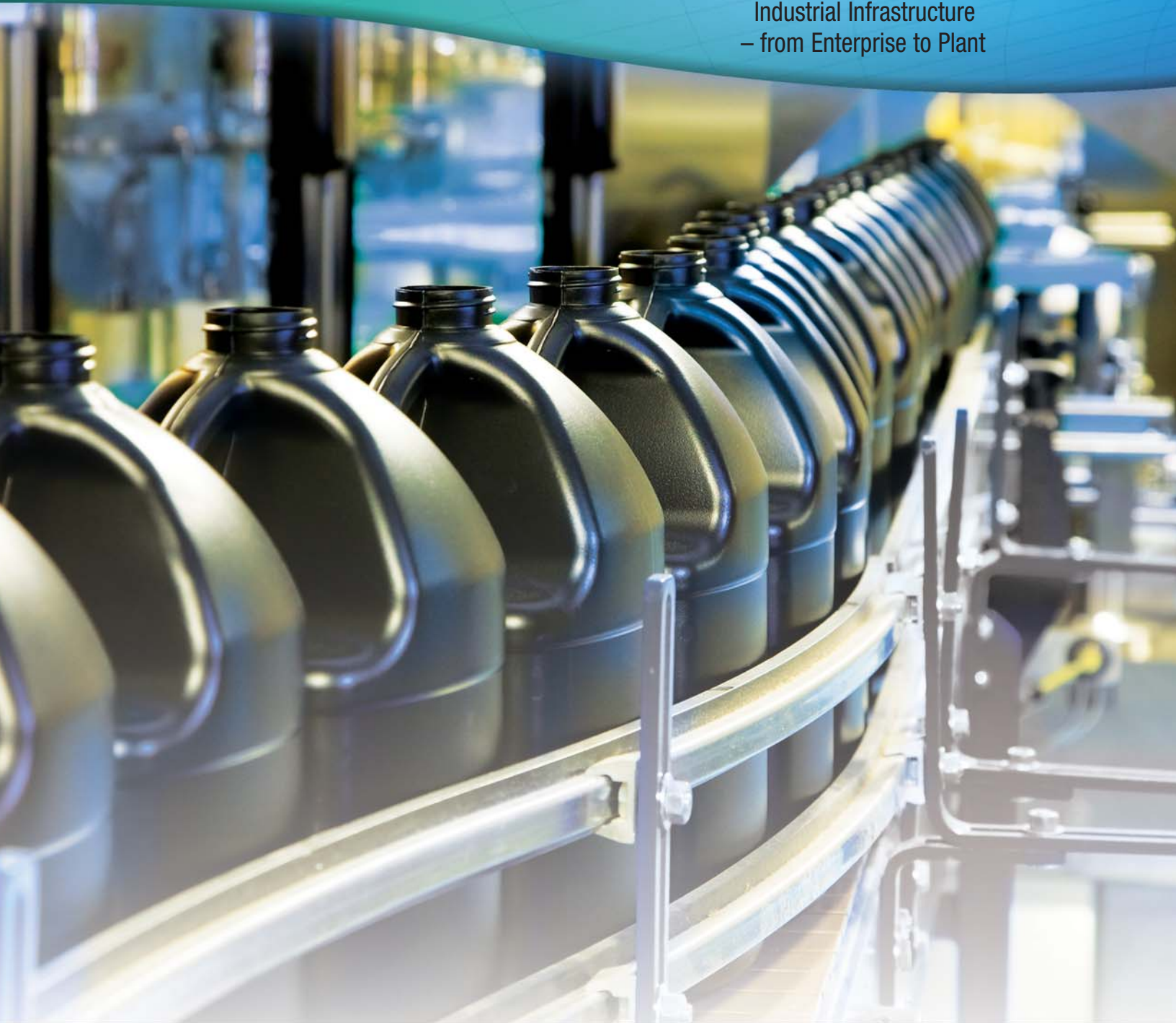


# Industrial Automation

Building a Smarter Unified Business  
Industrial Infrastructure  
– from Enterprise to Plant



**PANDUIT**<sup>®</sup>

building a smarter,  
unified business foundation  
Connect. Manage. Automate.



## Panduit's Unified Physical Infrastructure (UPI)

Panduit is a world-class developer and provider of leading-edge solutions that connect, manage and automate the physical infrastructure. Panduit Unified Physical Infrastructure<sup>SM</sup> (UPI) based solutions help customers design and integrate industrial and IT networks, improve reliability, and enhance operational performance. Our robust partner ecosystem, global staff, and unmatched service and support make Panduit a valuable and trusted partner.

## Streamline operations. Enhance safety. Improve productivity.

When you are updating existing systems to meet growing information demands or planning plant expansions, Panduit solutions can help you with implementing validated solutions in the physical design of a network system that can reduce your deployment time by up to 75%.

### Comprehensive Portfolio

Panduit provides innovative network and electrical solutions that exceed performance requirements, achieve quick and reliable installations, and reduce operational maintenance and repair costs.

### Application Focused Systems

Throughout networking, electrical or control systems, address the complexities of integrating enterprise and plant-level networks. We develop technology focused around meeting the ever-changing needs of our customers worldwide.

### Unmatched Expertise

Panduit invests in relationships and resources to solve our customers' greatest business and technology challenges. Our global network of sales, technical support, distribution, and manufacturing teams makes Panduit solutions readily accessible around the world. With regional specialists and local expertise, Panduit helps our customers meet their demanding schedules and project deadlines.

### Unified Physical Infrastructure



communication    computing    control    power    security



## Improve Reliability, Security, and Safety

The physical infrastructure forms the foundation that creates and supports the power and communication channels connecting a distributed system. These systems are tasked with the demands of real-time control, process data collection, and device configuration. Each element of the physical infrastructure must be designed and deployed to ensure that industrial network channels remain reliable with sufficient performance margin, proper environmental rating, and with the foremost security features.

### Building a Smarter Unified Business Industrial Infrastructure – From Enterprise to Plant

Panduit delivers system expertise and innovations that improve reliability, security, and safety while reducing operating costs. We are the industry's premier single-source supplier of complete physical infrastructure solutions to enable Industrial Automation systems. Targeted to specific plant needs, Panduit's Industrial Automation Solutions are comprised of five core solution groups:

#### **IN-PANEL™ – Control Panels, Electrical Panels, Motor Control Center**

Mitigate disruptions due to electrical noise to ensure reliable system performance and maximize valuable real estate . . . . .pages 6-11

#### **IN-FIELD™ – On the Machine, In the Process Areas, or Outdoors**

Withstand demanding environmental conditions while reducing repair and replacement costs . . . . .pages 12-17

#### **IN-ROUTE™ – Industrial Pathways and Network Zone Enclosures**

Simplify design and deployment of the network physical infrastructure on the plant floor to improve up-time/OEE, and achieve reduced installation/maintenance costs . . . . .pages 18-21

#### **IN-ROOM™ – Control Room, Data Center, Telecommunications Closet**

Provide a common location and infrastructure to integrate industrial and IT networks, improve reliability, and enhance operational performance . . . . .pages 22-25

#### **IN-FRASTRUCTURE™ – Power Distribution, Lighting, HVAC, Security, Safety**

Deploy power to ground strategies that achieve lowest total cost of ownership to protect your workforce and secure your network assets . . . . .pages 26-31

### *Panduit's Industrial Ethernet Physical Infrastructure Reference Architecture Design Guide*

Panduit has collaborated with other industry leaders to address deployment complexities associated with Industrial Ethernet. This has resulted in the *Industrial Ethernet Physical Infrastructure Reference Architecture Design Guide* for designing, deploying, and managing the physical infrastructure for an Industrial Ethernet network.

The Guide bridges the gap between IT terminology and control theory to assist in the convergence of distributed systems. It is intended to provide a structured approach for architects, designers, controls engineers, and IT professionals – to enable consistent deployment of sustainable IT infrastructures.

To request a copy of the Guide visit us at: [www.panduit.com/IA](http://www.panduit.com/IA)

## 1 IN-PANEL™

- Control Panels
- Electrical Panels
- Motor Control Center

## 2 IN-FIELD™

- On the Machine
- In the Process Areas or Outdoors

## 3 IN-ROUTE™

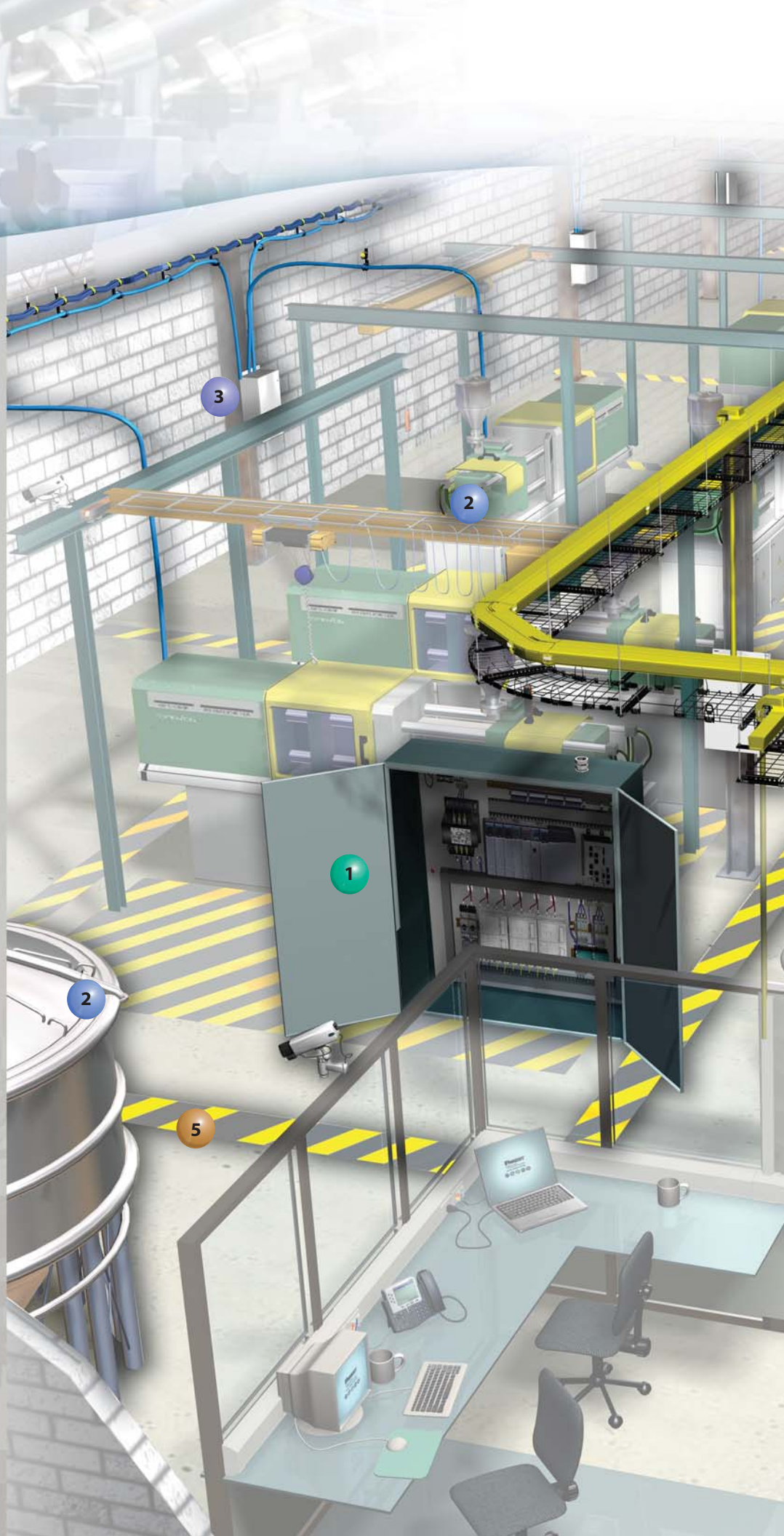
- Industrial Pathways
- Network Zone Enclosures

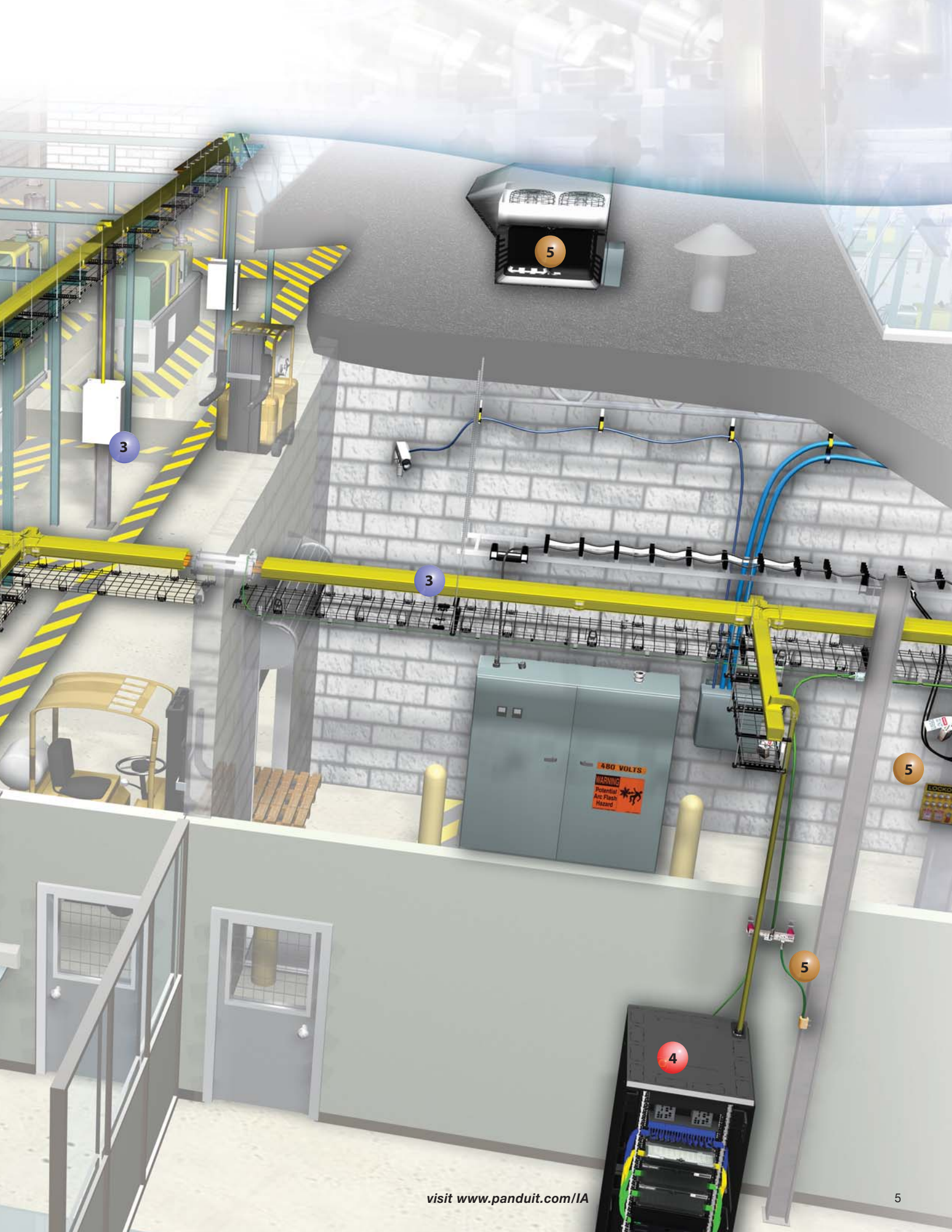
## 4 IN-ROOM™

- Control Room
- Data Center
- Telecommunications Closet

## 5 IN-FRASTRUCTURE™

- Power Distribution
- Lighting
- HVAC
- Security
- Safety





## Enhance Reliable Connections

Your control panel design begins with power, and there is no better way to start than with Panduit's reliable termination system of connectors, dies, and installation tools:

**Regulatory Compliant:** UL 310, UL486-486B, UL 508A.

**Design Flexibility:** Broad selection of termination solutions for code and flex conductors.

### UL and CSA Listed Compression Power Connectors for Code and Flex Conductors:

Available in a broad range of styles and sizes.



### Lithium-Ion Powered Hydraulic, 6 Ton In-Line Crimping Tool:

CT-3001

Provides fingertip operation and up to 90% more crimps per battery charge than tools powered with NiCd or NiMH batteries.



### Mechanical Connectors:

Designed for easy installation – no special tools required.



### Terminal and Ferrules:

Designed and manufactured for fast assembly and superior performance.



### Contour Crimp Controlled Cycle Tool:

CT-1550

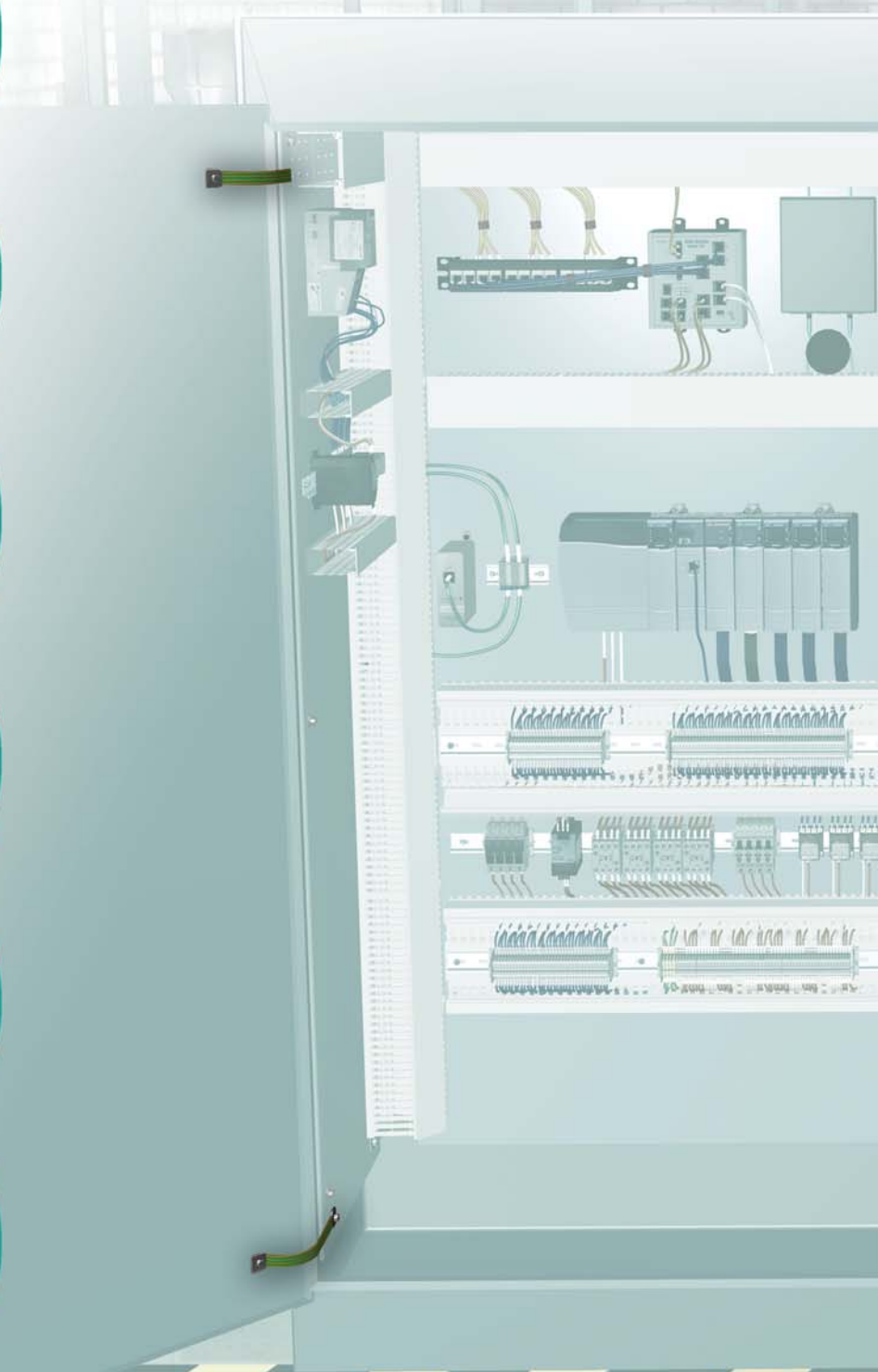
Ergonomically designed.



### Miniature Circuit Breaker Lockout Devices:

PSL-MCB  
PSL-MCBNT

No-tool option quickly locks out miniature circuit breakers without the use of a tool.



Your customer is counting on what's inside  
– Trust Panduit.

## Reduce the Effects of Electromagnetic Interference (EMI)

**Bonding/Grounding for Electrical Systems:** Create low noise return path with bonding straps, ground bars, and bonding hardware.

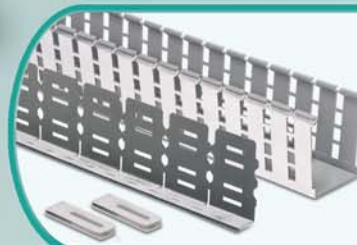
**Segregation and Shielding:** Create physical barriers by using shielding products such as Panel Max™ Shielded Wiring Duct, Noise Shield, and Shielded Patch Cords.

**Avoidance through Robust Design Practices:** Use fiber optic cabling to separate electrical and communications systems; consider shielded copper cabling as an alternative to UTP and fiber based cabling and connectivity for uplinks leading from the control panel.



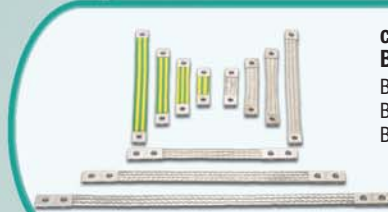
**Plenum Rated Hook and Loop Cable Ties:**  
HLTP2I-X12  
HLTP2I-X0

Delivers reliability by protecting against over-tensioning high performance cables.



**PanelMax™ Shielded Wiring Duct and Noise Shield:**  
G2X2LG6EMI  
SD2EMI **NEW!**

Provide up to 20dB noise reduction (equal to six inches of air space).



**cULus Listed Braided Bonding Straps:**  
BS100445  
BS100445U  
BS201246EU



**UL and CSA Listed Universal Ground Bar:**  
UGB2/0-414-6  
UGB2/0-414-12  
UGB2/0-414-18

Provides the most flexible grounding solution for your panel.



**Dielectric Conduited Fiber Cable (DCF):**  
FSPD512 (OM2), FSPD612 (OM1),  
FSPD912 (OS1/OS2)  
Conduit extruded over cable outer jacket eliminates additional channel protection, need for grounding and bonding and provides smaller crush resistant pathway. Available in 02, 04, 08 and 12 fiber cables



**Copper Patch Cords:**  
Available in shielded and UTP Category 6A, 6, and 5e options for keyed and non-keyed applications. A variety of colors and lengths provide additional design flexibility.

# IN-PANEL™ – Control

## PanelMax™ DIN Rail Wiring Duct: DRD33LG6

Up to 30% space savings vs. conventional duct/rail layouts.

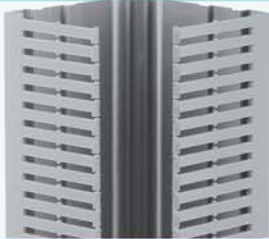


## PanelMax™ Corner Wiring Duct: CWD3LG6

Up to 20% space savings in layouts with side and back panels.



New smaller 2" Corner Wiring Duct available: CWD2LG6



## PanelMax™ Shielded Wiring Duct and Noise Shield: G2X2LG6EMI

SD2EMI  
Shields sensitive wiring from noise emission, allowing pathways to be placed in closer proximity, saving panel space (up to 6 inches).



## Dynamic Cable Manager:

ABDCM30-A-C  
ABDCM30-A-E  
(use with) PLT2S-C

Provides strain relief at the hinge of control panel door to extend service life.



## Cable Tie Tool:

GTH  
GTS

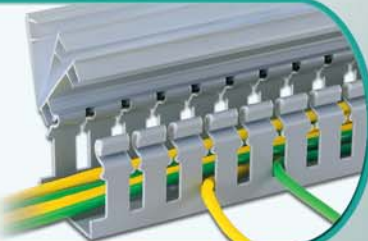
Ergonomic design to ease installation and reduce fatigue; provides flush cut-off and speeds installation to lower installed cost.



## Hinged Cover Wiring Duct:

H3X3LG6  
HC3LG6

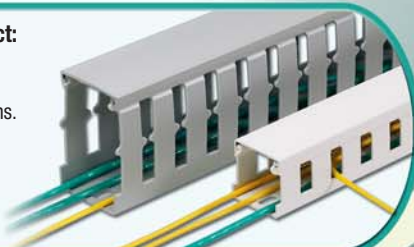
Hinged cover eases access allowing simple wiring changes to be made up to 20% faster compared to conventional wiring duct installations.



## Halogen Free Wiring Duct:

TNC50X50LG2

Used in fire safety applications. Low Smoke Halogen Free material also available.



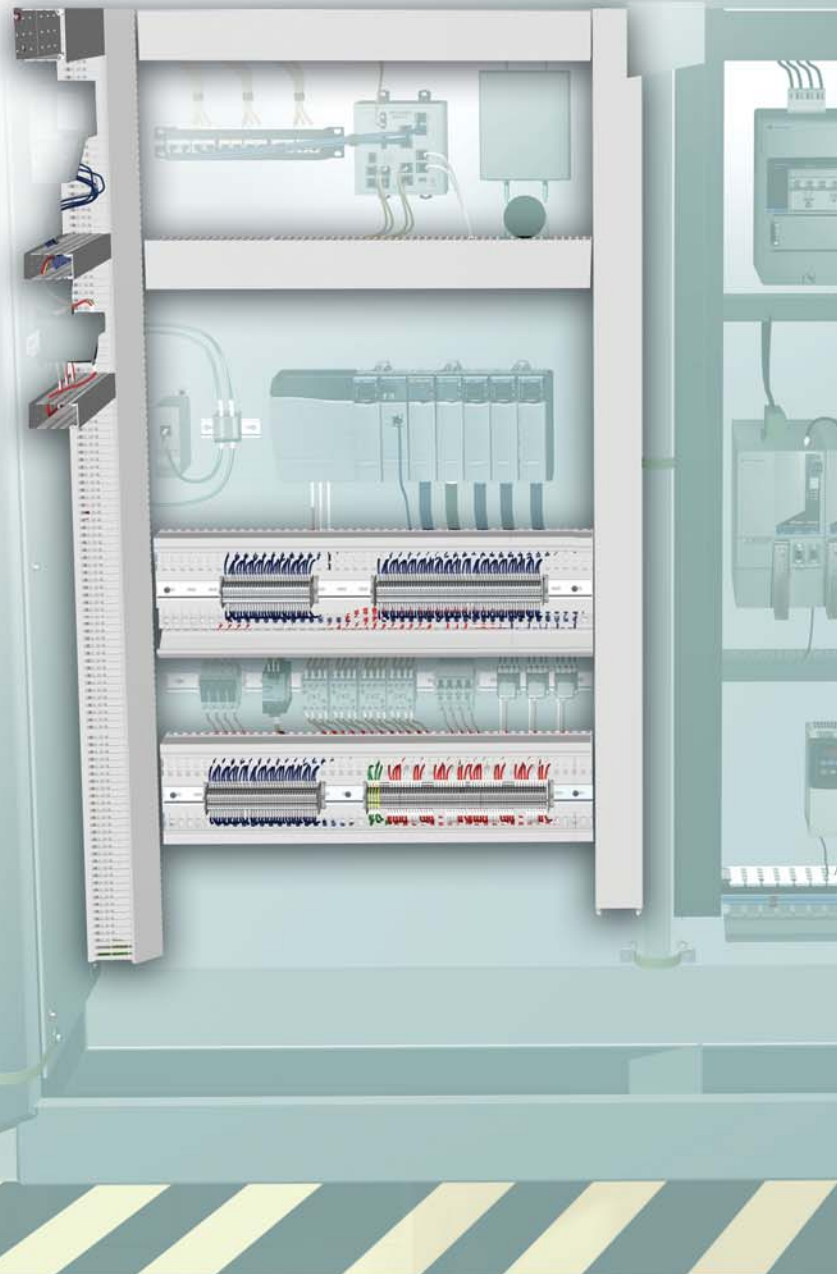
## Increase Control Panel Space Savings

Wiring can dominate a control panel, pushing wire pathways to the limit.

**Space Optimization:** Reduce control panel space by up to 30% with innovative PanelMax™ DIN Rail Wiring Duct and Corner Wiring Duct.

**Noise Mitigation:** Reduce EMI through the use of Panduit's noise mitigation products and design practices that also allow for reduced panel space requirements.

**Identify Hazards:** Create a visual workplace with safety and facility signage that informs workers of hazardous conditions such as arc flash.





*Your customer is counting on what's inside  
– Trust Panduit.*

## Avoid Stray Wires in Troublesome High Density Terminal Blocks

**High Quality Connections:** Improve system reliability with ferrules and tooling that provide superior performance.

**Cost Effective Installations:** Cut, strip, and terminate strip-fed ferrules with Panduit's all-in-one CT-1000 tool.



### Ferrule End Sleeves:

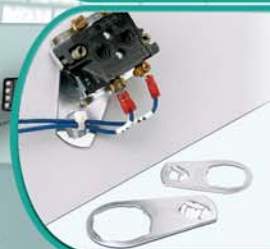
Control stranded wires in terminal blocks, providing superior termination performance.



### Semiautomatic Ferrule Crimping Tool:

CT-1000

Wire cutting, stripping, ferrule termination, and dispensing all in one tool for quick and easy installation.



### Control Panel Switch Cable Tie Mount:

CPM122S-C

CPM875S-C

(use with) PLT2S-C

Provides strain relief behind control panel buttons.



### Pan-Wrap™ Split Harness Wrap:

PW50F-T

Patented slot pattern provides improved flexibility and cable abrasion protection with reduced installation time.



### Turn-Tell® Labels

### Self-Laminating Labels

### Heat Shrink Labels

### Marker Plates



### Adhesive Backed Mounts:

Premium adhesive for a long-term, reliable bond; adhesive backing allows routing of wires and cables where mounting holes cannot be drilled.



### ARC Flash and Safety Labels:

PVS0305W2201Y

PVS0305W2102Y

Pre-printed and blank labels.

## Enable Your Network

A recent study from ARC indicates that 85% of all new industrial network installations are Ethernet based. Panduit has the ability to help you connect, manage, and protect the network inside the control panel.

**Communication:** Wide variety of choices for cable and connectors such as copper, fiber, and wireless.

**Safe and Secure Access:** Prevent the unintentional disruption of service by unauthorized personnel by using data access ports.

\*ARC is the premier provider of market analysis, forecasts, and strategic reports for the full range of enterprise applications, plan systems, and automation solutions.

### Data Access Port with GFCI and Category 5e Coupler: IAPNG5EWH

Modular solution accepts all Mini-Com® Modules for design flexibility.



### Copper Patch Cords:

Available in shielded and UTP Category 6A, 6, and 5e options for keyed and non-keyed applications. A variety of colors and lengths provide additional design flexibility.



### Network Security Copper and Fiber Lock-In/Blockout:

PSL-DCJB  
PSL-DCPLX  
PSI-DCPLRX  
PSL-LCAB  
PSL-SCBD  
FLCCLIW-X



### Push-Pull LC Duplex Fiber Optic Patch Cords:

OM3 LC Push-Pull Patch Cord - 5m  
FZ2ERQNSNM005C  
OM4 LC Push-Pull Patch Cord - 5m  
FZ2ERQNSNM005C  
OS2/OS2 LC Push-Pull Patch Cord - 5m  
F92ERQNSNM005C



Available in lengths of 001 – 020, 025, 030 and 035.

### LC Push-Pull Connector for use with PCF fiber cable:

FLCSHMIG – Simplex  
FLCDHMIG - Duplex

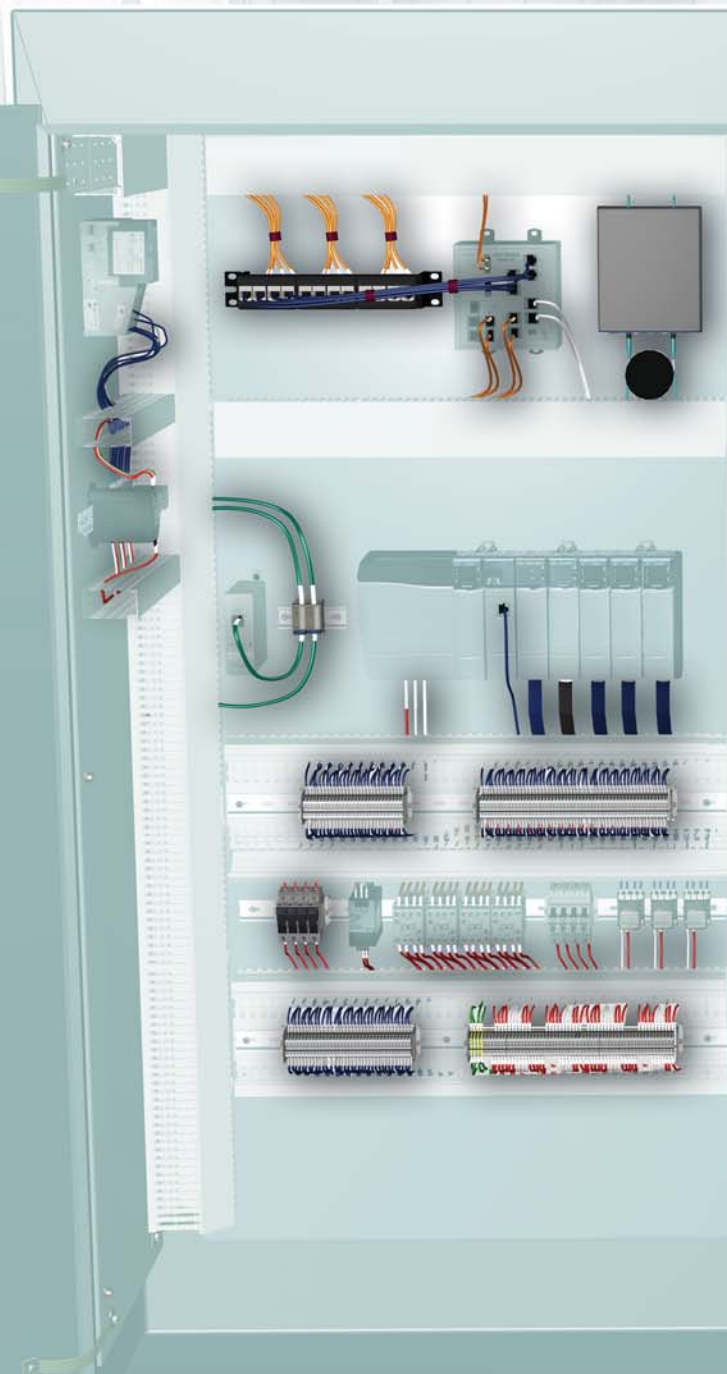
IndustrialNet™ PCF Cable (Interconnect)  
FIID102 (OM1 duplex), FIID202 (OM2 duplex)  
IndustrialNet™ PCF Cable (Breakout)  
FI2D102 (OM1), FI2D202 (OM2) 2-fiber breakout cable  
FI2D104 (OM1), FI2D204 (OM2) 4-fiber breakout cable



### Thermal Transfer Desktop Printer:

TDP43ME

Produces identification for all industrial automation solutions.



Your customer is counting on what's inside  
– Trust Panduit.

## Future Proof Your Network

**Wire Management Solutions:** Bundle, fasten, clamp, and identify a variety of applications with a broad offering of cable ties and mounts.

**Diagnostics:** Quickly troubleshoot and speed correction for network issues with the use of labeling and color-coding.



**DIN Rail Adapter:**  
CADIN11G

Securely mounts to standard 35mm DIN rail within a control panel or enclosure and accepts any single-width Mini-Com® Module to terminate cable or patch cords.



**IndustrialNet™ DIN Rail Mount Patching Solutions:**  
CDPP8RG Copper  
FDME8RG Fiber

Consolidates patching (fiber and copper) onto the DIN rails of a control panel.



**Cable Ties Peel and Seal:**

Bags are re-sealable to reduce product handling time and prevent spillage and product loss; helps maintain product performance qualities over time (moisture retention).



**Mounts:**  
ABMQS-A-C

Multiple cable tie bridges on one mount speeds installation of cable bundles; 4-way cable tie bridges allow bundles to be secured perpendicular or in-line to the mount.



**Raised Panel Labels:**  
C120X150APT-22

Convenient, economical alternative to engraved plates. Provides high quality, durable identification of industrial controls with strong, high tack adhesive.



**Turn-Tell® Labels**

**Self-Laminating Labels**

**Heat Shrink Labels**

**Marker Plates**

## For Tough Applications

### Pan-Ty® and Barb Ty Cable Ties:

PLT2S-CO  
BT2S-CO

Broad selection of cable tie sizes, materials, and colors available.



### Terminals – Bottles and Convenience Packs:

Terminals are available in ergonomic, reusable plastic bottles with color-coded flip top lids for easy product selections, dispensing, and identification.

Terminals are also available in 20-piece convenience packs for smaller jobs.



### Cable Tie Tool:

GTH  
GTS

Ergonomic design to ease installation and reduce fatigue; provides flush cut-off and speeds installation to lower installed cost.



### New Low Smoke Halogen-Free Spiral Wrap:

T50NZFR-C20



Used for fire safety bundling applications with added flexibility and abrasion resistance.



### Slotted Grommet Edging – Nylon:

GEE71N-C

Up to 149°F (65°C) operating temperature.



### Pan-Steel® Metal Locking Ties:

MLT4EH-LP316  
MLT4H-LP316  
MLT4SH-LP316

AISI 316 stainless steel for the most corrosive environments.



Moving controls from inside a control panel onto the machine generates several notable benefits including reduced panel footprint, line-of-site diagnostic capabilities, and reduced field wiring.

**Protect Your Connections:** Insulate, harness and identify electrical/electronic components and cable with Panduit abrasion protection.

**Increase Productivity:** Design custom markers on-site quickly and economically with rugged hand-held printers.

**Ease of Use:** Enhance flexibility for a wide range of job site applications with cable ties or terminal convenience packs.

*When the front line delivers to the bottom line  
– Trust Panduit.*



**Disconnects:**  
Disconnects are precision made to function as a reliable method of making quick, repeatable installations.



**Thermal Transfer Hand-Held Printer with QWERTY Keyboard:**  
LS8EQ

Keypad design similar to smart phones for faster, easier typing.



**Screw Applied Cable Tie Mounts:**  
TM2S6-C0  
TM3S8-C0

Available in a broad selection of materials, sizes, and styles.



**Heat Shrink Labels**

**Self-Laminating Labels**

**Marker Plates**



**Braided Expandable Sleeving:**  
SE50P-DR0

Highly flexible cable abrasion protection. Rated for use up to 257°F (125°C).

# IN-FIELD™ – Rugged

## IndustrialNet™ LC Fiber Optic Bulkhead Adapter and Patch Cords:

IAEF7JMA  
IndustrialNet™ LC Fiber Optic  
Bulkhead Adapter.  
IAEF617P-7PM110  
IndustrialNet™ LC to LC  
Patch Cord.



## IndustrialNet™ Copper Connectors, Couplers, and Patch Cords:

Connectors – IAEBH5E, IAEBH5ES,  
IAEBH6, IAEBH6S  
Couplers – IAEBHC5E, IAEBHC6,  
IAEBHUSBAA  
Patch Cords – IUTPCH3BLY,  
ISTPCH1MBLY, IUTPSP3BL, ISTPSP1MBL



## Polypropylene Cable Ties:

PLT2S-M109  
PLT2H-TL109

For chemical resistance  
especially in the presence of  
hydrochloric acid, salts, and bases.



## High Bond Adhesive Cord Clips:

ACC19-AV-M300  
ACC38-AV-M300  
ACC62-AV-D300

Provide maximum adhesion  
in rugged, high-temperature,  
and outdoor environments.



## Lockout/Tagout System:

System includes training tools,  
electrical lockout devices and stations,  
various kits, and other components to  
protect employees from hazardous  
electrical energy.



## ARC Flash and Safety Labels:

PVS0305W2201Y  
PVS0305W2102Y

Pre-printed and blank labels.



*When the front line delivers to the bottom line  
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## Built for Durability

Whether it is a daily wash-down, continual chemical exposure, or close proximity to a blast furnace, certain environments wreak havoc on control systems. Panduit products are built for resiliency and built to last.

For example, Pan-Ty® Cable Ties are offered in a variety of specialty materials:

**Polypropylene Cable Ties:** Provide superior chemical resistance to acids, bases, and salts making them ideal for chemical plants.

**Metal Detectable Cable Ties:** Unique metal impregnated material allows identification by metal detectors or x-ray inspection to meet food, beverage, and pharmaceutical safety standards by helping to reduce product contamination.

**HALAR<sup>^</sup> Cable Ties:** Identifiable maroon colored parts UL Listed for use in plenum or air handling spaces per NEC, Section 300-22 (C) and (D).

**Flame Retardant Nylon 6.6 Cable Ties:** Ties are UL94V-0 rated for applications requiring resistance to flame propagation.

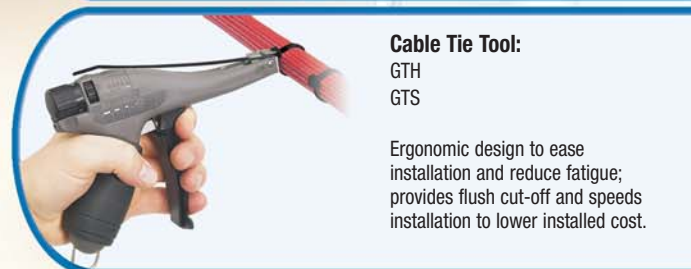
<sup>^</sup>HALAR is a registered trademark of Ausimont USA, Inc.



**Push Mount Cable Tie Mounts:**  
MPMH38-D0  
(for masonry holes – shown)  
PWMS-H25-C0  
(for metal panels)  
PUM-071-C30  
(for varying panel thickness)



**Metal Detectable Nylon Cable Ties and Mounts:**  
PLT2S-C186  
PLT4H-L186  
TM2S8-C186  
  
Detectable by metal detectors and x-ray equipment.



**Cable Tie Tool:**  
GTH  
GTS  
  
Ergonomic design to ease installation and reduce fatigue; provides flush cut-off and speeds installation to lower installed cost.



**Nylon Marker Plates:**  
MP175-C0  
  
Clearly identify cable bundles. Available in black and white.



**Thick Wall Adhesive Lined Heat Shrink:**  
HST0.4-48-5Y  
  
Approved by UL for outdoor, direct sunlight applications as well as direct burial, providing excellent cable protection with an operating temp of 230°F (110°C) with VW-1 Flame rating.

## Pan-Steel® Metal Locking Ties:

MLT4EH-LP316  
MLT4H-LP316  
MLT4SH-LP316

AISI 316 stainless steel for the most corrosive environments.



## Battery Powered MLT (Metal Locking Tie) Installation Tool:

PBTMT

45% faster than conventional tools.



## Pan-Steel® Coated Metal Locking Ties:

MLTFC4H-LP316  
MLTFC6H-LP316

Strength of steel with the additional protection of a polyester coating.



## Stainless Steel and Brass Marker Plates and Tags:

MMP350-C316  
MMP350H-C316  
MTB1D-Q

Can be embossed or laser etched with custom marking service.



## KYNAR® Insulated Ring Terminals PK Series:

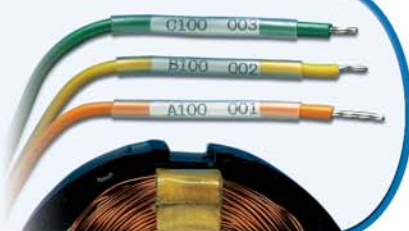
KYNAR® is an engineering polymer that has excellent chemical resistance and has an operating temperature of 300°F (150°C). These terminals are Class IE rated for nuclear applications.



## Thin Wall KYNAR® Heat Shrink Tubing:

HSTTK19-48-Q

Dry shrink applications – clear. Up to 347°F (175°C) operating temperature.



## High-Temp PEEK Cable Ties and Mounts:

PLT1M-C71  
PLT2S-C71  
TM2S8-C71

Ideal for use in high temperature and harsh chemical environments. 500°F (260°C).



## For Severe Environments

We field questions daily on temperature extremes, life expectancy, and caustic environments, and design our products to be pushed to the extremes. We have over 3,200 parts that are certified by the American Bureau of Shipping (ABS), which regulates the standards for the harsh environment performance rating required for product use in Military Seagoing vessels and Offshore Oil and Gas. (The ABS has more stringent standards than Military Specifications and Nuclear Certifications.)

Panduit offers both stainless steel and aluminum cable ties, along with laser etched or embossed marker plates and tags that are part of our Pan-Steel® System, which is dedicated to meet your most demanding applications:

- Stainless Steel Cable Ties
- Stainless Steel Strapping
- Permanent Identification
- Installation Tools

Our Pan-Ty® Cable Ties are available in a variety of specialty materials:

**Weather Resistant Nylon 12 Cable Ties** — A material with 15 years of weathering life and resistance to zinc chlorides and dilute acids.

**High-Temperature PEEK Cable Ties** — Provide excellent performance at continuous operating temperatures of up to 500°F (260°C), best in class strength, in addition to chemical and radiation resistance.

**Tefzel\*\* Cable Ties** — Low smoke density and excellent flammability rating of UL 94V-0. Distinct aqua blue color.

\*KYNAR is a registered trademark of Atofina Chemicals, Inc.

\*\*TEFZEL is a registered trademark of E.I. du Pont de Nemours and Company.




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**StructuredGround™ Direct Burial Compression Grounding System:**

Meets IEEE Std. 837-2002, provides the highest performance and most reliable compression connection in the industry.



**Lay-In Lugs:**

For use with stranded aluminum or copper code conductors.



**UL and CSA Listed Compression Power Connectors for Code and Flex Conductors:**

Connectors meet NEBS Level 3 performance in extreme conditions and are approved by ABS.



**UL and CSA Listed Compression Power Connectors for Metric Conductors:**

Temperature rated to 90°C when crimped with Panduit tools and dies.



**Thin Wall TFE Heat Shrink Tubing:**  
HSTTT24-48-Q

Dry shrink applications. Up to 482°F (250°C) operating temperature.



**Heat Shrink Moisture Resistant Terminals and Splices:**  
PH14-10R-Q  
DNH14-250FIB-Q  
BSH14-Q

Protects against moisture.



**TEFZEL\*\* Cable Ties and Mounts:**  
PLT2S-C76  
TM3S8-C76

Ideal for applications requiring resistance to gamma radiation and chemical attack.

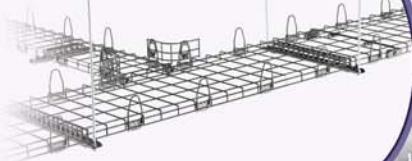
\*\*TEFZEL is a registered trademark of E.I. du Pont de Nemours and Company.

# IN-ROUTE™ – Pathways

## Wyr-Grid® Overhead Cable Tray Routing System:

Designed to route and manage copper data cables, fiber optic cables, or power cables in industrial automation applications.

Available in black and electrozinc finishes.



## Grounding Cable Hanger Brackets:

GACB-2  
GACB-3

Provides the flexibility to install grounding conductors above or below the Wyr-Grid® System.



## J-Pro™ Cable Support System:

Provide a standards-compliant method for routing communication cables throughout the plant infrastructure. Available in several sizes and mounting options.



## FiberRunner® Routing System:

Designed to segregate, route, and protect fiber optic and high performance copper cabling.

Available in several sizes and colors.



## IndustrialNet™ PCF Cable (Interconnect):

FID102 (OM1) : 2-fiber  
FID202 (OM2) : 2-fiber

## IndustrialNet™ PCF Cable (Breakout):

FI2D102 (OM1), FI2D202 (OM2): 2-fiber  
FI2D104 (OM1), FI2D204 (OM2): 4-fiber



## Copper Cable:

Available in Category 6A, 6, and 5e unshielded and shielded twisted pair in a full complement of flame ratings; robust specialty cables engineered for use in temperature extremes and harsh environments.



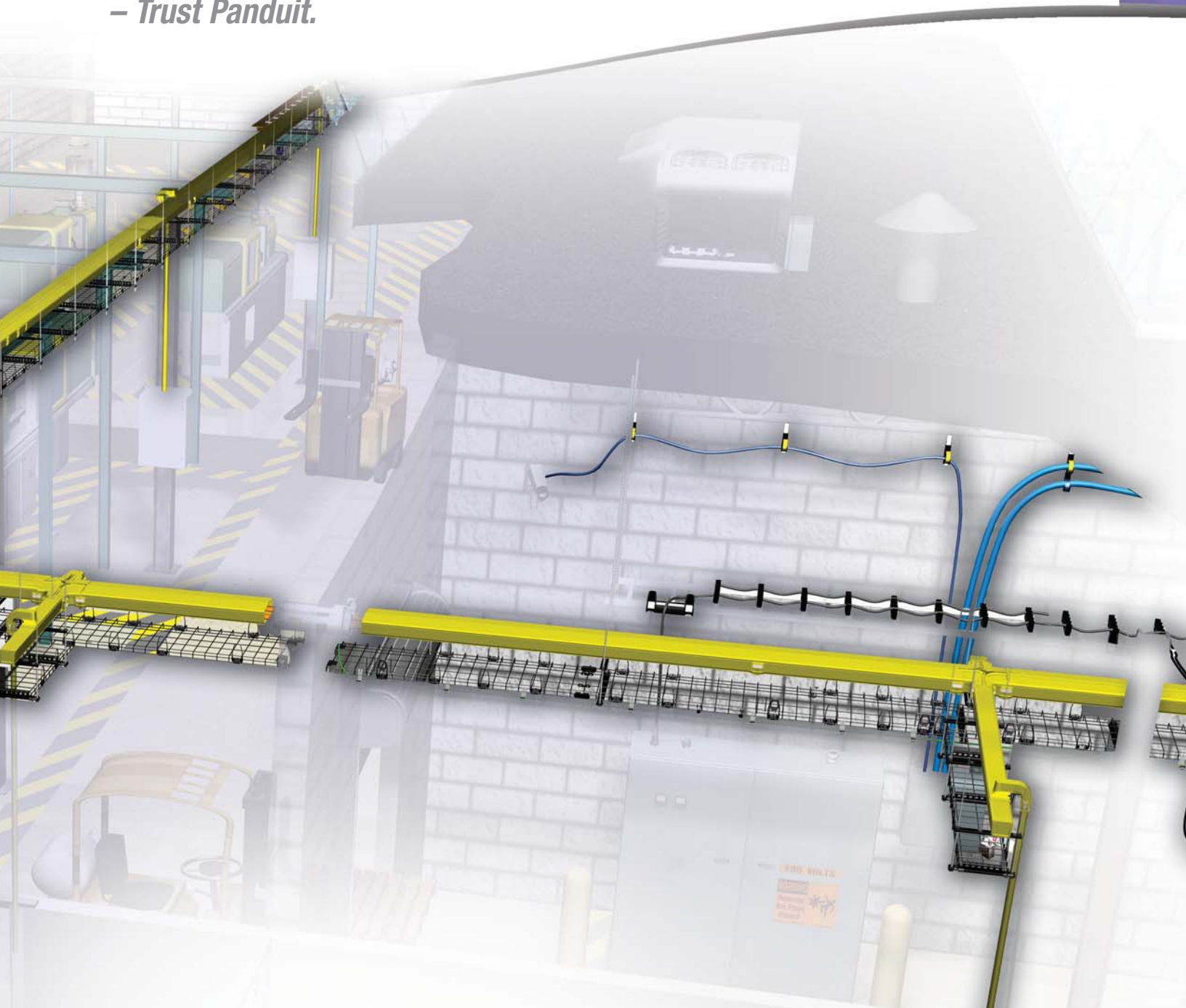
## Thermal Transfer Desktop Printer:

TDP43ME

Compact, lightweight design for use in the office and remote locations.



*For optimal connections  
– Trust Panduit.*



## Route and Protect Your Cables

Connect your micro data center and panels by managing cable deployment for large, medium, or small volumes of cables:

**Medium — Large Cable Runs:** Wyr-Grid® Overhead Cable Tray Routing System contributes to effective real estate usage and network performance. It provides speed of deployment, structural integrity, cable protection, and ease of use. FiberRunner® Cable Routing System can be configured to meet virtually any network application to provide optimum cable protection and assure network performance.

**Small — Medium Cable Runs:** J-Pro™ Cable Support System provides complete bend radius control and includes many easy to use mounting options to provide the lowest installed cost.

# IN-ROUTE™ – Zone Architecture

## Industrial Zone System:

IAZ2436C Pre-configured  
Z23N-SBABD1 Integrated

UL Type 4 12/ IP66 enclosure available pre-configured or integrated. Optimized for the Stratix^ 8000, Cisco IE3000 industrial switches.



## NEMA 4X/IP66 Wireless Access Point Enclosure:

PZNWE14

Mount popular wireless access points in wet or outdoor locations.



## Active Equipment Wall Mount Enclosure:

PZAEWM3

Vertical mounting of up to 3 rack units of active EIA mountable equipment or patching.



## Wall Mount Zone Enclosure:

PZC12S

Up to 12 rack units of active or passive equipment and patching; optional fan kit available.



## Push-Pull LC Duplex Fiber Optic Patch Cords:

OM3 LC Push-Pull Patch Cord - 5m  
FZ2ERQNSNM005C  
OM4 LC Push-Pull Patch Cord - 5m  
FZ2ERQNSNM005C  
OS2/OS2 LC Push-Pull Patch Cord - 5m  
F92ERQNSNM005C



Available in lengths of 001 – 020, 025, 030 and 035.

## Tak-Ty® Hook & Loop Cable Ties and Mounts:

Mounts are used with TTS Tak-Tape and HLT/HLS Tak-Ty® Hook & Loop Cable Ties. Protects against over-tensioning of high performance network cables.



Available in several varieties.

## Network Security Copper and Fiber Lock-In/Blockout:

PSL-DCJB  
PSL-DCPLX  
PSL-DCPLRX  
PSL-LCAB  
PSL-SCBDs  
FLCCLIW-X



*For optimal connections  
– Trust Panduit.*

## Proper Implementation Starts with Good Design

**Industrial Automation Zone Systems – Robust and Pre-Engineered:** Address dusty, dirty, and wet environmental challenges with NEMA 4 rated network zone enclosures.

**Communication – Media and Security:** Prevent accidental network access and vandalism through the use of physical deterrents such as keyed blockouts, lock-ins, and keyed solutions for copper or fiber based media solutions.

**Route and Protect Cables:** Protect and minimize data loss while maximizing network speed with proper structural support such as Wyr-Grid® Cabling System or J-Pro™ Cable Support System.



**OptiCam® Fiber Termination Kit:**  
FCAMKIT



**Copper Wire Snipping Tool:**  
CWST

**Cable Jacket Stripping Tool:**  
CJAST

**Jack Termination Tool:**  
TGJT



**OptiCam® Field Polish Termination Kit (FIELDKIT):**

For termination of Panduit field polish connectors.

Fast acting adhesive; no long curing epoxy required for termination.

# IN-ROOM™ – Micro Data Centers

## Pre-configured Micro Data Center Cabinet:

CQSMDC48

Factory assembled to include the connectivity, cable management and power supply.



## Micro Data Center Rack:

IAR4P48CNB



Space for basic EIA rack mount manufacturing equipment.



## 2 and 4 post 19" Standard EIA Racks:

R2P

R4P

Basic mounting frame for equipment, patching, and vertical and horizontal cable management.



## Vertical Cable Manager:

WMPV45E

Provides critical cable management for optimal equipment performance. Heights to fit all Panduit Racks.



## Modular Patch Panels:

CPPLA24WBLY

24-port angled patch panel with labels.

CPPL24WBLY

24-port patch panel with labels.

Also available in 48-port angled and standard.

CPA48HDBL

48-port angled high density shielded patch panel. Also available in flat.



## 2 RU PatchLink Horizontal Cable Manager:

WMPH2E

Manage cables to or from equipment or patch panels to the vertical managers.



## DIN Rail Switch Mount Bracket:

IABDIN4

Allows DIN rail mountable equipment to be mounted in a 19" EIA rack or cabinet.



## Micro Data Centers – Dedicated to Improving Factory Automation

Most likely you have seen them before: desktop PCs stacked on top of one another, a tower computer tucked underneath a desk, or perhaps even a server mounted to some plywood on a control room wall. It is time to rethink your network, compute, and storage needs, and the best place to start is with a *Micro Data Center* from Panduit.

Your compute and storage demands continue to grow for programming, visualization, process monitoring, quality control, asset management, and maintenance. So wouldn't you be better served with a Micro Data Center to host and protect these soft assets?

A Micro Data Center is a demarcation point between the enterprise and plant. Panduit's job is keeping it structured and well organized for today's needs and tomorrow's opportunities.

## Making a Direct Impact on High Availability

Panduit has products that facilitate high availability architecture, ensure reliable connectivity, improve meantime between failure, and minimize risk.

- Identification products, e.g. Turn-Tell® Labels, color bands, flag ties labels
- Port connectivity, e.g. lock-in devices
- Color-coding, e.g. jacks and patch cords

## DEFINITION:

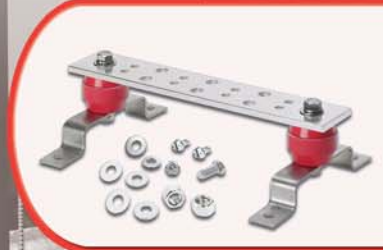
A Micro Data Center is a rack/cabinet that houses the servers, switches, patch panels, horizontal/vertical cable management, accessories, and DIN mounted devices that are dedicated to the manufacturing zone. It could also contain the devices that create the Demilitarized Zone (DMZ).

*When everything inside is mission critical  
– Trust Panduit.*



**FiberRunner®  
Routing System:**  
FR4X4YL6

Designed to segregate, route, and protect fiber optic and high performance copper cabling.



**Telecommunications  
Grounding Busbars (TGB):**  
GB2B0306TPI-1  
HDW1/4-KT

Meets BICSI/TIA-607-B standard.



**Telecommunications  
Equipment Bonding  
Conductor (TEBC) Kits:**  
GJ6144UH

Bonds the rack or cabinet to the TGB. Available in various lengths, pre-terminated.



**Cabinet Grounding Kits:**  
RGEJ660U  
RGRB19U

Provides a dedicated ground system to maintain system performance and protect network equipment and personnel.



**Power Cord Retainers:**  
PRPC13W-2.0-X PRPC13W-2.25-X  
PRPC19Y-2.0-X PRPC19Y-2.25-X

Plug retention devices ensure a secure connection for power cords installed in Panduit Power Outlet Units. For use with Panduit power cords that have IEC 320 C13/C14 and IEC 320 C19/C20 connectors.



**Color-Coded Patch Cords:**

Provides maximum design flexibility.



**Power over Ethernet  
Systems (DPOE™):**  
DPOE8KIT

Scalable kit includes 8-port midspan, power supply, and power cord.

## Leave Nothing to Chance

Ensure physical network security; prevent accidental access and vandalism to the network through the use of physical deterrents:

**Blockout Devices:** Restrict access to adapters and jacks while preventing them from being damaged when not in use.

**Lock-In Devices:** Prevent unauthorized removal of cables from computers, IP phones, other networking equipment, or any critical connection.

## Create a Visual Workplace

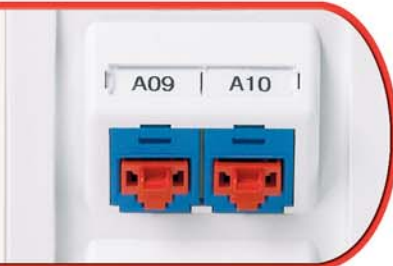
Identification in a Micro Data Center aids installation, maintenance, and troubleshooting. Panduit has a full range of color-coded cables, jacks, patchcords, and bands.

Possible color-coding applications:

- Redundant Network “A” and “B” path
- VLAN
- Equipment grouping
- Process/production line grouping
- Building location

### RJ45 Jack Blockout Device: PSL-DCJB

Blocks unauthorized access to jacks and potentially harmful foreign objects, saving time and money.



### RJ45 Plug Lock-In Devices: PSL-DCPLX PSL-DCPLRX



### LC Lock-In Fiber Duplex Clip: FLCCLIW-X



### LC Duplex Adapter Blockout Device: PSL-LCAB

### SC Duplex Adapter Blockout Device: PSL-SCBD

### Keyed LC Fiber Adapter Module: CMDBRDLCZIW

### Keyed Fiber Patch Cord: FXE10D-10DM1

Available in OM3, OM2, OM1, OS1/OS2 fiber cable types and 18 keyed colors.



### Keyed Jack Module: CJK688TGBU

### Keyed Patch Cord: UTPKSP3BU

Available in Category 6A, 6, and 5e options for UTP and shielded installations.



### USB Blockout Devices:

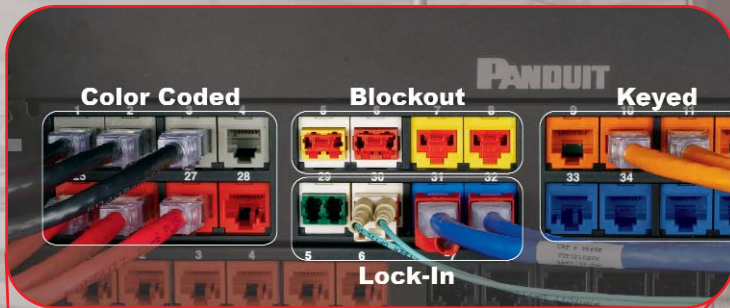
PSL-USBA, PSL-USBB,  
PSL-PERM-USBA,  
PSL-PERM-USBB

Block unauthorized access to Type A and Type B USB ports, to protect networks and data.





*When everything inside is mission critical  
– Trust Panduit.*



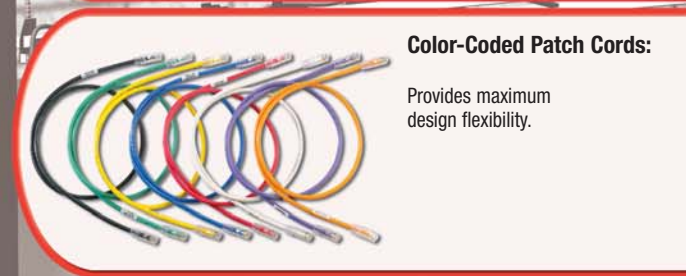
**Tape-Ty™ Hook & Loop Cable Ties:**

Non-slip applicator prevents movement of tie laterally along cable bundle; facilitates one-hand installation in tight spaces, and allows for tighter fastening of cable bundle.



**Tak-Ty® Hook & Loop Cable Ties:**

Safe for use on high-performance network cables. Adjustable, releasable, and re-usable hundreds of times.



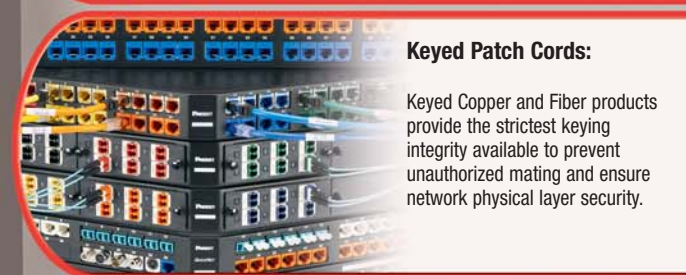
**Color-Coded Patch Cords:**

Provides maximum design flexibility.



**Patch Cord Color Bands: PCBAND\*\*~Q**

Available in 10 standard colors, removable and reusable.



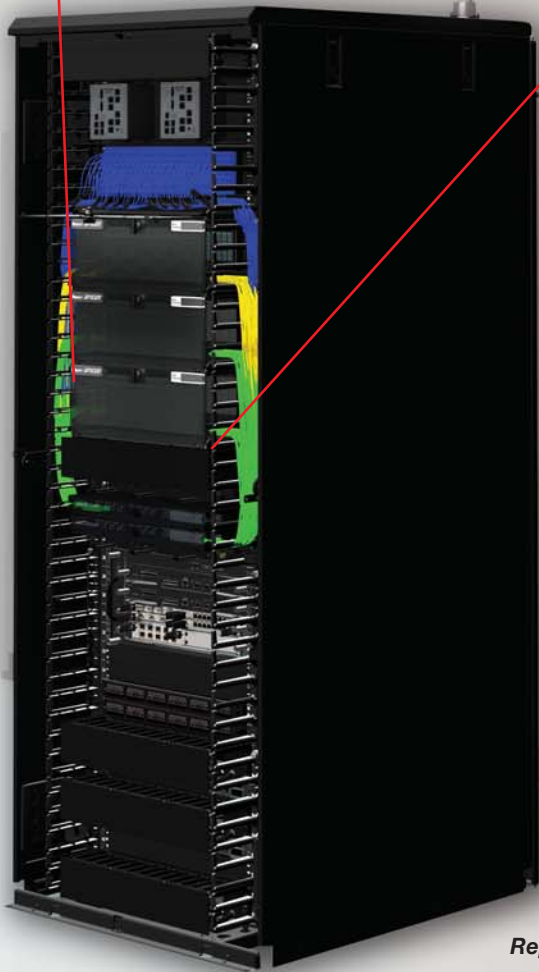
**Keyed Patch Cords:**

Keyed Copper and Fiber products provide the strictest keying integrity available to prevent unauthorized mating and ensure network physical layer security.

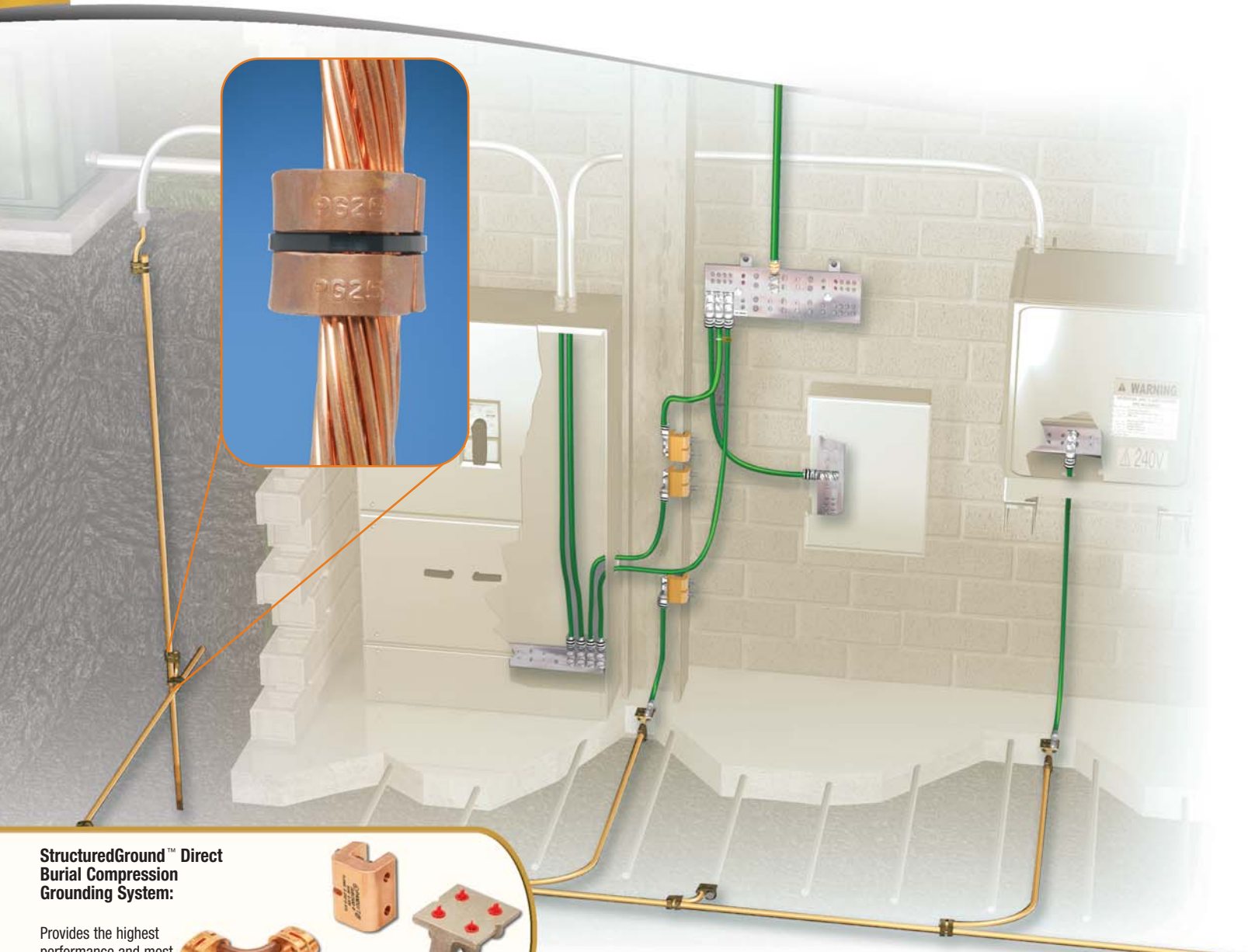


**Turn-Tell® Labels:**

Innovative label design allows labels to rotate for visibility from any angle.



# IN-FRASTRUCTURE™ – Power and Grounding



## StructuredGround™ Direct Burial Compression Grounding System:

Provides the highest performance and most reliable compression connection in the industry.



## Lithium-Ion Powered Hydraulic, 14 Ton, Crimping Tool: CT-2930/L

Provides fingertip operation and up to 63% more crimps per battery charge than tools powered with NiCd or NiMH batteries.



## Mechanical Grounding Connectors:

Designed for easy installation – no special tools required. Wire range-taking capability minimizes inventory requirements, saves cost.



## Reliability and Performance from the Ground Up

Panduit is the industry's only single source supplier with a broad, integrated portfolio of power solutions that help customers maximize return on investment and lower operating expenses:

**StructuredGround™ Direct Burial Grounding System:** Offers the speed and safety of a compression connection while meeting IEEE Std. 837™ -2002.

**Power Connectors:** Ensure maximum performance over the service life. Panduit copper compression lugs and splices are UL Listed, CSA Certified, and are the first and only connectors to meet Network Equipment-Building Systems (NEBS) Level 3 Requirements as tested by Telcordia Technologies.

**Industry-Leading Installation Tools:** Deliver strong, dependable connections. NEBS Level 3 is a set of stringent tests that subject components to extreme environmental conditions.

*To protect your capital assets  
– Trust Panduit.*



## Proven Reliability for Mission Critical Applications

Panduit provides solutions for all of the critical connections from the utility transformer through the network equipment to protect your data center investment.

**Regulatory Standards Compliant:** Meets UL, CSA, IEEE Std. 837-2002, ABS, NEBS and OSHA.

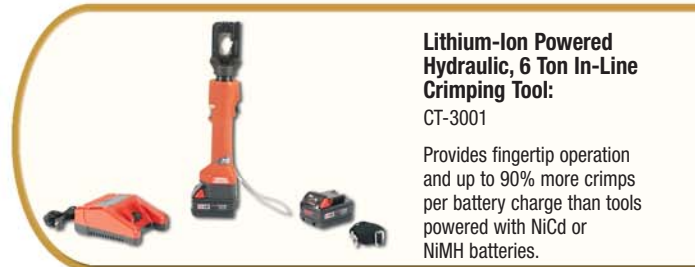
**Enhance Workplace Safety:** Protects personnel and equipment throughout the lifecycle with power connections and cable management that are easy to use, install, and maintain safely.

**Engineered for Maximum Reliability and Extended Service Life:** Provides superior electrical performance in harsh environmental applications.



**UL and CSA Listed Copper Compression Lugs for Code, Flex, and Metric Conductors:**

Available in a broad range of styles and sizes.



**Lithium-Ion Powered Hydraulic, 6 Ton In-Line Crimping Tool:**

CT-3001

Provides fingertip operation and up to 90% more crimps per battery charge than tools powered with NiCd or NiMH batteries.



**Semi-Rigid Adhesive Lined Heat Shrink Tubing:**

HSTTRA50-48-5

Damp shrink applications.

# IN-FRASTRUCTURE™ – Lockout/Tagout and Safety

## Circuit Breaker Lockout Devices:

- PSL-CB
- PSL-CBIL
- PSL-CBNT
- PSL-CBILNT
- PSL-MCB
- PSL-MCBNT



## Safety Signs:

- PVS Series (vinyl)
- PPS Series (polyester)
- PRS Series (rigid)

High quality signs for use indoors and outdoors.



## Toggle Switch Lockout Devices:

- PSL-WS

Locks out electrical supply controlled by ordinary toggle switches.



## Electrician Lockout Kit:

- PSL-PK-EA

Kit contains a variety of lockout/tagout devices commonly used by an individual electrician.



## Lockout Stations:

- PSL-4SWCA
- PSL-10SWCA
- PSL-20SWCA

Conveniently store padlocks, tags, and lockout devices in one common area.



## Gate Valve Lockout Devices:

- PSL-V2A
- PSL-V9
- PSL-V13

Prevents valve handle from being turned.



## OSHA Compliance Training Program:

Complete Lockout/Tagout program to help your organization enhance safety in the workplace, compliance with regulatory standards, and mitigating the risk of fines.



## Comprehensive Safety Solutions

The control of hazardous energy, 1910.147 is the OSHA standard for Lockout /Tagout. The fundamental goal for this standard is to control the release of hazardous energy during maintenance and servicing. All of the following energy types have the potential to cause personnel fatalities/injury and/or environmental and capital equipment damage/destruction.

- Mechanical
- Hydraulic
- Electrical
- Gas
- Pneumatic
- Water
- Chemical
- Thermal

Safety is no accident! Panduit not only provides comprehensive Lockout/Tagout products and signage, but we also deliver on the necessary training materials to help your entire enterprise. Panduit safety products lockout a full range of energy sources. We also have a complementary array of warning tapes that illuminate affected areas.

**To protect your capital assets  
– Trust Panduit.**



**DANGER**  
HIGH VOLTAGE  
UNAUTHORIZED PERSONNEL  
KEEP OUT



**Lockout Padlocks:**

- PSL-6
- PSL-7
- PSL-8 (shown)

Each lock keyed differently and supplied with two keys.



**Ball Valve Lockout Devices:**

- PSL-BV1
- PSL-BV2
- PSL-BV3

Prevents valve handle from being turned.



**Voltage and Pipe Markers:**

Identify voltage, pipe content, and flow direction for safety and compliance.



**Pneumatic Energy Lockout Device:**

- PSL-PEL

Quickly locks out pneumatic energy device without costly tool modifications or inconvenient in-line valves.



**Multiple Lockout Device:**

- PSL-MLD

Only one device needed to perform a variety of lockout functions.



**Thermal Transfer Hand-Held Printer with QWERTY Keyboard:**

- LS8EQ

Keypad design similar to smart phones for faster, easier typing.



**Arc Flash and Safety Labels:**

- PVS0305W2201Y
- PVS0305W2102Y

Pre-printed and blank labels.

## Inform, Direct, and Warn

Signage is used in multiple locations throughout a facility. It forms the backbone for life safety information such as exit signs, arc flash potential, high voltage, and sheltered areas. It also helps with routine tasks that mark, for example, the location for parking a fork lift truck.

Panduit is continually developing quicker ways to deploy signage through innovative printers which work with software such as:

- Easy-Mark™ Labeling Software
- Easy-Mark™ To Go Labeling Software
- CAD-Connect™ Software

### Arc Flash and Safety Labels:

PVS0305W2201Y  
PVS0305W2102Y

Pre-printed and blank labels.



### Thermal Transfer Desktop Printer:

TDP43ME

Compact, lightweight design for use in the office and remote locations.



### Safety Signs:

PVS Series (vinyl)  
PPS Series (polyester)  
PRS Series (rigid)

High quality signs for use indoors and outdoors.



### Lockout/Tagout System:

System includes training tools, electrical lockout devices and stations, various kits, and other components to protect employees from hazardous electrical energy.



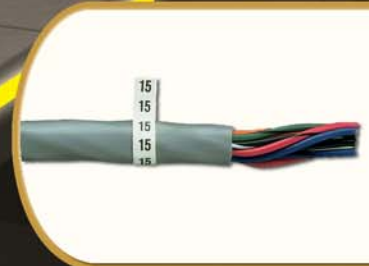
To protect your capital assets  
– Trust Panduit.

EXIT



**Photoluminescent Signs/Tapes:**

Absorbs energy from ambient light and releases this energy in the form of a glow when power is out.



**Pre-Printed Marker Books:**  
PCMB-3

Pre-assembled convenient, pocket-sized books.



**Turn-Tell® Labels:**

Innovative label design allows labels to rotate for visibility from any angle.



**Thermal Transfer Hand-Held Printer with QWERTY Keyboard:**  
LS8EQ

Keypad design similar to smart phones for faster, easier typing.

EXIT

## Real-World Solutions

With a proven reputation for excellence and innovation, Panduit and our partners work with you to overcome challenges and implement real-world solutions that create a competitive business advantage. Panduit offers the broadest range of solutions, from data centers and intelligent buildings to manufacturing operations, to help you build a **smarter, unified business foundation**.



### Technology Leadership

Panduit develops innovative physical infrastructure solutions that meet the rapidly changing needs of our clients, from hardware and software to advisory services. This commitment is supported by investment in advanced research, solutions-focused product development, world-class manufacturing, and collaboration with customers at the forefront of technology.



### Partner Ecosystem

Our best-in-class partner ecosystem offers a comprehensive portfolio of services that span the project lifecycle, from planning and design to delivery, deployment, maintenance, and operation. Panduit business partners – distributors, and certified architects, consultants, engineers, designers, system integrators, and contractors – are qualified to help you achieve your objectives and realize predictable and measurable results.



### Strategic Alliances

Panduit cultivates long-term strategic alliances with industry leaders, including Cisco Systems, EMC, IBM, and Rockwell Automation, to develop, optimize, and validate solutions for our customers. This investment in people and resources helps solve our customers' greatest business challenges.



### Global Business Commitment

Panduit is committed to delivering a consistently high level of quality and service the world over. With a presence in more than 100 countries, local Panduit sales representatives and technical specialists offer guidance and support that bring value to your business. Our global supply chain, which includes manufacturing, customer service, logistics, and distribution partners, provides prompt response to your inquiries and streamlines delivery to any worldwide destination.



### Sustainability

With a commitment to environmental sustainability, Panduit develops and implements solutions that protect, replenish, and restore the world in which we live. This commitment is demonstrated by Panduit's LEED Gold certified World Headquarters, leveraging the Unified Physical Infrastructure<sup>SM</sup> approach to enable convergence of critical building systems to drive energy efficiency and ongoing operational improvement.

*Transform Your  
Physical Infrastructure  
from Enterprise to Plant*

*Call or visit us online,  
we can show you how.*

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