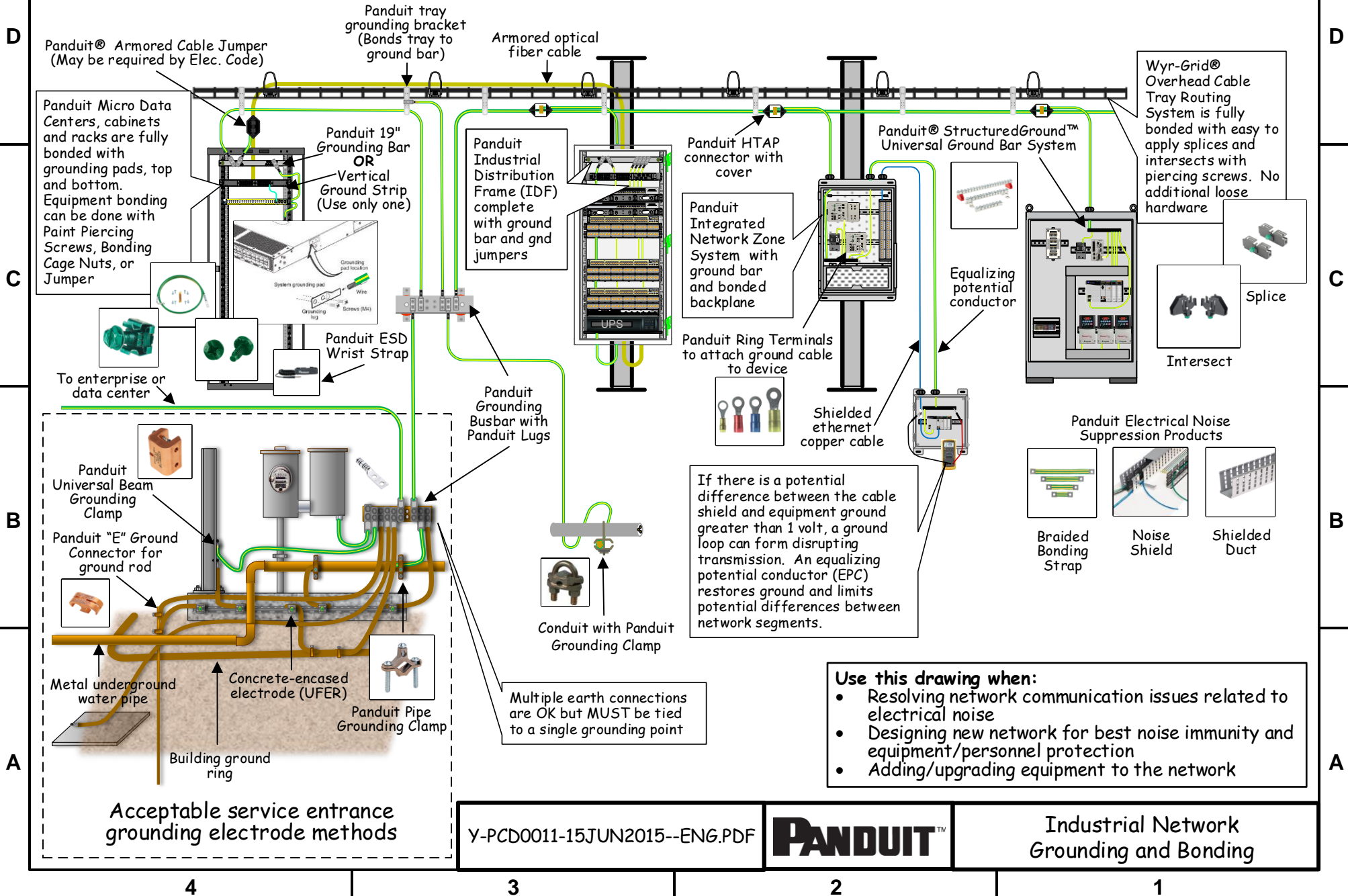


Grounding and Bonding Industrial Network and Connectivity for Personnel Safety, Equipment Protection, and Reliable Network Communication



Panduit® Armored Cable Jumper (May be required by Elec. Code)

Panduit tray grounding bracket (Bonds tray to ground bar)

Armored optical fiber cable

Panduit Micro Data Centers, cabinets and racks are fully bonded with grounding pads, top and bottom. Equipment bonding can be done with Paint Piercing Screws, Bonding Cage Nuts, or Jumper

Panduit 19" Grounding Bar OR Vertical Ground Strip (Use only one)

Panduit Industrial Distribution Frame (IDF) complete with ground bar and gnd jumpers

Panduit HTAP connector with cover

Panduit® StructuredGround™ Universal Ground Bar System

Wyr-Grid® Overhead Cable Tray Routing System is fully bonded with easy to apply splices and intersects with piercing screws. No additional loose hardware

To enterprise or data center

Panduit ESD Wrist Strap

Panduit Integrated Network Zone System with ground bar and bonded backplane

Equalizing potential conductor

Splice Intersect

To enterprise or data center

Panduit Grounding Busbar with Panduit Lugs

Panduit Ring Terminals to attach ground cable to device

Shielded ethernet copper cable

Panduit Electrical Noise Suppression Products

Panduit Universal Beam Grounding Clamp

Panduit "E" Ground Connector for ground rod

Metal underground water pipe

Concrete-encased electrode (UFER)

Panduit Pipe Grounding Clamp

Building ground ring

Conduit with Panduit Grounding Clamp

If there is a potential difference between the cable shield and equipment ground greater than 1 volt, a ground loop can form disrupting transmission. An equalizing potential conductor (EPC) restores ground and limits potential differences between network segments.

Braided Bonding Strap Noise Shield Shielded Duct

Multiple earth connections are OK but MUST be tied to a single grounding point

Use this drawing when:

- Resolving network communication issues related to electrical noise
- Designing new network for best noise immunity and equipment/personnel protection
- Adding/upgrading equipment to the network

Acceptable service entrance grounding electrode methods

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Industrial Network Grounding and Bonding

Panduit Bill of Material

Part Number	Description
Service Entrance	
GCE250-250	"E" Style Grounding Connector for 1/0 STR - 250 kcmil (70 - 120mm ²)
GUBC500-6	Universal Beam Grounding Clamp for #6 AWG - 500 kcmil (16 - 240mm ²)
KP2-L	Bronze Grounding Clamp, 1 1/4" to 2" iron pipe range
GB4B0624TPI-1	Grounding Busbar, 1/4" x 4" x 20"
LCC2/0-14AW-X	Two-hole, Long Barrel Lug with Window, 2/0 AWG wire, 1/4" stud hole, .63" hole spacing
Pathway	
GB2B0306TPI-1	Grounding Busbar, 1/4" x 2" x 12"
LCC6-14JAWH-L	Two-hole, Long Barrel Lug with Window, #6 AWG wire, 1/4" stud hole, .50" - .63" hole spacing, 45° angle tongue
GPL-22-X	Bronze Grounding Clamp, .365-.575" wire dia. range 1 1/4" IPS
HTWC2-2-1	HTAP & CLRCVR2-1 clear cover, code #2 - #6 AWG STR/SOL, flex #2 - #8 AWG or flex #8 - #14 AWG
ACG24K	Armored Cable Jumper #6AWG, 24", LCC6 two-hole copper compression lug, black polypropylene terminal cover
GACB-2	Tray/Wyr-Grid® cable bracket; 1.63" (W), 3.95" (H), 5.22" (D), screw
Micro Data Center, IDF, IZE and Control Panel	
RGRB19Y	Grounding busbar, 19", 14 holes, #12-24 x 1/2" and M6 x 12mm screws
RGS134-1Y	Cabinet/Rack grounding strip; 78.65" (2m) length with screws
RGTBSM6G-C	Green thread-forming bonding screw, #12-24 x 1/2"
CNBK	Green bonding cage nut, includes 50 #12-24 bonding cage nuts
RGEJ657PFY	Equipment Jumper, 6 AWG, 57", bent lug, screws
RGESDWS	ESD wrist strap, 6', banana plug, ESD port, screws, antioxidant
RGESD2-1	
UGB2/0-414-18	StructuredGround™ Universal Ground Bar System, 18 ports, #14 - #4 AWG wire, comp. or mech. Conn., 11.64" (L), 0.62" (W), 0.48" (H)
PNF10-14R-L	Ring Terminal, 12 - 10 AWG, 1/4" stud size, funnel entry, nylon insulated
BS100845	Braided Bonding Strap, one-hole, insulated, 8.00" (L), 1.06" (W)
G2X2LG6EMI	2" x 2" PanelMax™ Shielded Wiring Duct; 6-ft
SD2EMI	EMI noise shield kit, 2" height, two 3-ft sections, bonding clips, paste

Applicable Standards

- NEC Article 250 & 645.15
- TIA 607-B & 1005
- BICSI

Panduit References

StructuredGround™ Telecommunications Bonding Flyer (D-GRFLO2--SA-ENG-StructuredGrndTelecm-W.pdf)

For More Information

For more information, contact your local distributor or Panduit Sales Representative

- www.panduit.com/ia

- www.panduit.com/contact/ia

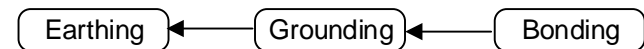
About this Configuration

A proper grounding and bonding system is essential for personnel safety, equipment protection, equipment operation and reliable network communication. An appropriately designed grounding and bonding system is intentional (designed, specified), visually verifiable (e.g., green and yellow cable jacket), and consists of adequately sized conductors to safely handle expected electrical currents and dissipate electrical noise.

Earthing, Grounding and Bonding

The terms earthing, grounding and bonding are often interchanged. However, there are specific meanings:

- **Earthing** - Earth or a conductive body that is connected to earth.
- **Grounding** - The point at which all "Bonded" conductors come together at "Earth".
- **Bonding** - Electrically connecting all exposed metallic items not designed to carry electricity such as enclosures, trays, racks, cable armor, etc. to a ground.



Grounding for Safety

Cable trays, enclosures, communication/control cable, chassis, or metallic surface can be inadvertently energized by a power cable short or lightning, potentially leading to shock causing injury or equipment damage. A dedicated grounding conductor safely directs the hazardous stray electrical current to ground.

Ground Loop

A ground loop is an unwanted current in a conductor connecting two points that should be at the same potential. This is a result of multiple ground connections to earth creating a potential difference. This can be DC voltage, AC voltage, EFI noise, power harmonics, etc.

Grounding and Bonding for Network Communication

Stray electrical noise and ground loops can disrupt electronic equipment, especially Ethernet gear. There are varying methods to suppress. Unshielded Twisted Pair (UTP) Ethernet cable has limited noise cancellation. Shielded Twisted Pair (STP) cable is more effective as it has a metallic sheath that is bonded to dissipate the electrical noise. The challenge is to maintain equipotential (An Equalizing Potential Conductor may be needed). Network cable protected by a grounded noise shield or shielded duct is designed to dissipate electrical noise in an enclosure. Also, a flat, wide bonding strap bonded to the enclosure door and side panels dissipates noise more effectively than standard cable (skin effect of high freq. noise). The goal is to implement a single ground reference throughout.

PANDUIT™