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COMMUNICATIONS SOLUTIONS

Commercial-Industrial Product Overview

Greg MacDonald – Global Distribution Manager

Commercial Industrial Products

July 2024

Commercial Industrial

Commercial Product Group Total Solutions

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ACS
Commercial Products

ACPA — Commercial Industrial

Modular Jacks
- RJ - Standard & Hi Performance

Harsh/Rugged
- IP67 - RJ, USB, D-Sub, HDMI
- MRD – Circular IP67 Latching
- FLH – IP67 WTW

Filtered
- D-Sub, Microribbon
- Terminal Block

Industrial Ethernet
- ix Industrial
- Single Pair Ethernet

LED Lighting
- NEMA
- Zhaga Book18, Book 20

CMIO — Commercial IO

- Mini SAS, Mini SAS HD
- Oculink, SlimSAS
- Mini Cool Edge IO
- Board to board
- USB
- RJMG
- Header, WTB, Fan
- D-Sub, HDMI
- Mini / Micro Power
- Automotive

Power — Power Solutions

- Bus Bar
- Pwr Max
- PwrBlade, Plus & Ultra
- eHPCE, HPCE, Power Card Edge
- PCIe power
- Cool power

SSIO — Storage & Server IO

- SAS, SATA
- PSAS
- Card Edge
- Cool Edge
- DDR4, DDR5
- PCIe 3.0 / 4.0
- SO DIMM
- M.2, mini PCIe

Broad Portfolio

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Industrial Market Segments

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Amphenol Commercial Products address a range of key Industrial markets, where the proliferation of high speed digital controls is driving interconnect needs.

- Automation
- Robotics
- Lighting (LED, PoE)
- Medical
- Energy
- Power Management
- Transportation
- Security
- Mining
- GPS

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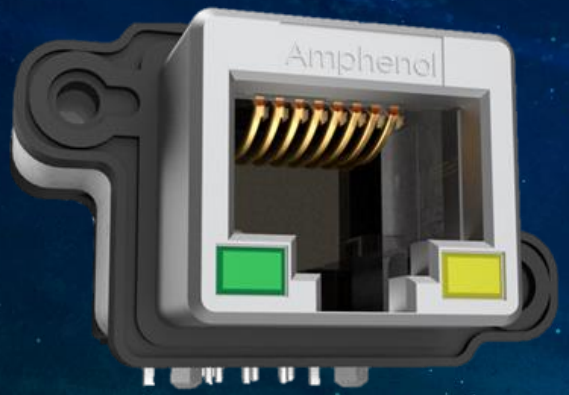
Ruggedized I/O for Harsh Environments



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What are Harsh Environments?

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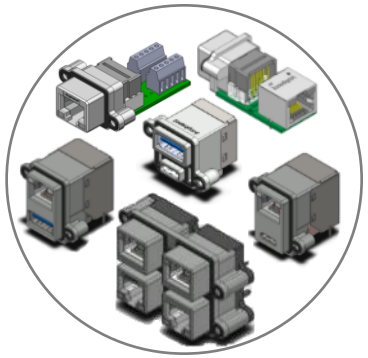
Ruggedized I/O / Harsh Environment

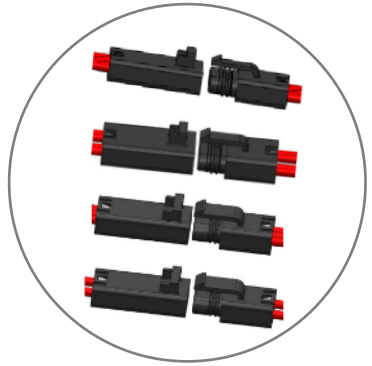
Ruggedized Standard Interfaces

IP67 – internally sealed and flange gaskets
Protects equipment from water ingress
Die cast metal housings
RJ, USB-A, Mini, Micro USB, USB-C, HDMI, D-Sub
Mate to standard connectors



Ruggedized Variants

IP67 sealed, die cast housings
Multiple ports in one housing
Combos (RJ/USB-A, RJ/USB-C, USB3.0/USB-C)
Cat5e/Cat6A RJs, Interposer options



FLH IP67 Wire to Wire

Miniature latching discrete wire interface
2, 3, 4, 6 position, 2.5mm pitch
Crimp contacts, pre-assembled seals
Up to 7 A rating, 250VAC, 22-18AWG wire

MRD Cable to Cable/Panel

IP67 Sealing in mated condition
Positive metal thumb latching
2 to 9 positions in size A and B housings
Metal, plastic body versions
Up to 10A rating, 500VAC

Ruggedized Accessories

Dust caps, port plugs, plug boots
Silicone rubber, metal grommets
IP67 sealing boots for standard RJ, USB cable assemblies

Industrial RJ Plugs

Up to Cat6A performance
Easy Field termination
Ruggedized performance
Adjustable cable exit

Filtered Connectors

D-Sub, Ribbon style, Terminal Blocks
Stress isolated design for filter capacitors
Provides protection against EMI
Variety of configurations, mounting
Can be used in place of non-filtered versions

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What are typical applications for a Ruggedized I/O Connector?

Agricultural Equipment

- I/O on displays
  - Data loggers
    - On-board PCs

Consumer, Commercial products

- Drones
  - Charging docks
    - Tools

Outdoor Equipment

- Solar arrays
  - Batteries
    - Controllers,
      - HVAC

Handheld devices

- Ruggedized tablets, laptops
  - Mobile radios & phones
    - GPS devices

Outdoor Applications

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What are typical applications for a Ruggedized I/O Connector?

Robots

Hand tools

Sensors

Actuators

Valves

Controls

Indoor Industrial Applications

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What are typical applications for a Ruggedized I/O Connector?

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Street Lighting Sensor Connectors

Indoor Lighting

Horticulture Lighting

LED Lighting

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What are typical applications for a Ruggedized I/O Connector?

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Defibrillators

Portable Patient Monitors

MRI Machines

Ultrasound Equipment

Robotic Surgery

Healthcare Applications

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What are typical applications for a Ruggedized I/O Connector?

Radios, Manpacks

Portable Electrical Equipment

Ruggedized Laptops, Tablets

Military Applications

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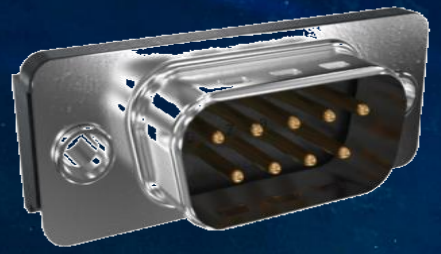
D-Sub Products



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D-Sub Product Overview

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Accessories

- Right Angled, Angled, Straight Type
- Plastic ,Metallic and Metalized Type Hoods
- Locking Devices- Female Screws,, Lever Locks etc

Press Fit Type

- Solderless Board locking .
- 09 to 50 position
- RA and Straight Type.
- Full Power Versions available

Pin-in -Paste Type

- Through hole parts in SMT mfg.
- 09 to 37 positions.
- RA and Straight Versions

High Density Version

- Board and crimp type cable connection.
- 15, 26 & 44 position contacts
- More number of contacts in basic shell sizes

Full/ Mixed Power

- Signal, Power & Coaxial Contacts
- Up to 75Amp contacts
- 2V2 to 36W4 layout options

Cable Connectors

- Crimp & Solder Bucket Type
- Stamped and Formed Contacts

Standard Board Mount Type

- RA and Straight Type
- Stamped & Machined Contacts

- ❑ Customized Dsub Connector Solutions
- ❑ Dsub Cable Assembly Solutions.

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Input Output Connectors- Dsub

Stamped and Formed Contacts

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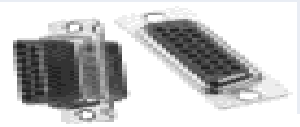
Product Features and Benefits

- Standards: DIN 41652 and MIL-C-24308 (Meet IEC60807)
- Current rating: 3A to 5A for stamped and formed contacts
- Operating Temp.: -55^{0}C to +125^{0}C; Durability: 200, 500+
- Orientation: Straight & Right Angle
- Termination: Solder tail, Press-fit, Pin-in-Paste / SMT (Reflow compatible)for board side; IDC, Solder cup, Crimp for cable side
- RoHS Compliant

Applications

Servo Drives, Test & Measurement Equipment, Access Control, Smart Metering, Portable Device, VTS, Projectors

Cable Side	
Solder Cup	**Crimp**
Standard and High Density	**Standard Density, Housing & Contacts**
SD: 9/15/25/37/50 AWG 20 HD: 15/26/44 AWG 24-28	SD: 9/15/25/37/50 AWG 20-28
	

Board Side					
Solder Tail Straight	**Solder Tail Right Angle**	**Press-fit Straight & Right Angle**	**Pin-in-Paste Straight**	**Pin-in-Paste Right Angle**	**SMT/ Slimline**
Standard and High Density Standard and low profile	**Standard and High Density**	**Standard Density Standard and low profile**	**Standard Density**	**Standard and High Density**	**Standard Density Std & Slim Type**
SD: 9/15/25/37/50 Types: Frugal-D & Delta- D HD: 15/26/44	SD: 9/15/25/37/ 50 Eu Std:FP:10.4 Pitch:2.54 US Std:FP:8.08 Pitch:2.84 HD: 15/26/44	9/15/25/37/50 Eu Std, US Std, Eurostyle	SD: 9/15/25/37/50 Tray / T&E packaging	SD: 9/15/25/37 HD: 15/26/44 Tray / T&E packaging	9 way
Board locks, inserts, female screw locks (UNC, M3)	Board locks, brackets, inserts, female screw locks (UNC, M3)	Board locks, inserts, female screw locks (UNC, M3)	Pegs, inserts, posts, female screw locks (UNC, M3)	Board locks, inserts, female screw locks	Zero or low force insertion, inserts, female screw locks

Input Output Connectors- Dsub
Machined Contacts

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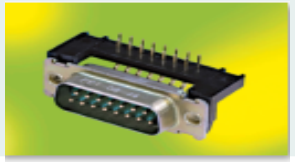
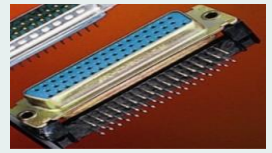
Product Features and Benefits

- Mil-C24308 standard interface & Meet IEC60807
- Current rating: 7.5A for screw machined signal contacts, 10A to 75A for power contacts
- Orientation: Straight & Right Angle
- Operating Temp.: -55^{0}C to +125^{0}C; Durability: 200, 500+, Mil grade
- Wide choices of Hoods and locking devices

Applications

Switching, Transmission & Data centre, Railway, Medical Devices Avionics, Windmills etc..

Industrial grade DP series (Std Density)	Combo DW series Signal, Power and Coaxial Contact (up to 75A)	Military Grade DM series (Std Density)
Solder cup, Solder tail Straight, R/A, Wire Wrap	**Solder cup, Solder Tail Straight, R/A, Wire Wrap**	**Solder cup, Crimp, Solder Tail Straight, R/A, Wire Wrap, Combo**
9/15/25/37/50 Board locks, brackets, inserts, female screw locks (UNC, M3)	2V2 to 36W4 Full Power & Combo layouts Board locks, brackets, inserts, female screw locks (UNC, M3)	9/15/25/37/50 5W1 to 36W4 HE501
		

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Commercial ACPI

Focused Market Segments and Applications.

Factory Automation

Control Systems
PLC, DCS, HMIs, SCADA

Data Communications
Serial Communications

Robotics
Robot Controllers, Drives, End Effectors

Power Supplies
Servo Power Supplies, AC/DC Power Supplies

Test & Measurement

Electronic Test & Measurement
Data Acquisition Systems, Signal Analyzers,

Environmental Test Equip
Temp Chambers, Humidity Chambers

Semiconductor Test Equipment's
Plasma Etching , Batch Processing ,

Non-Destructive Test Equipments

Energy Management

Energy Meters

Building Automation

Renewable Energy

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Industrial Ethernet Next Generation Connections

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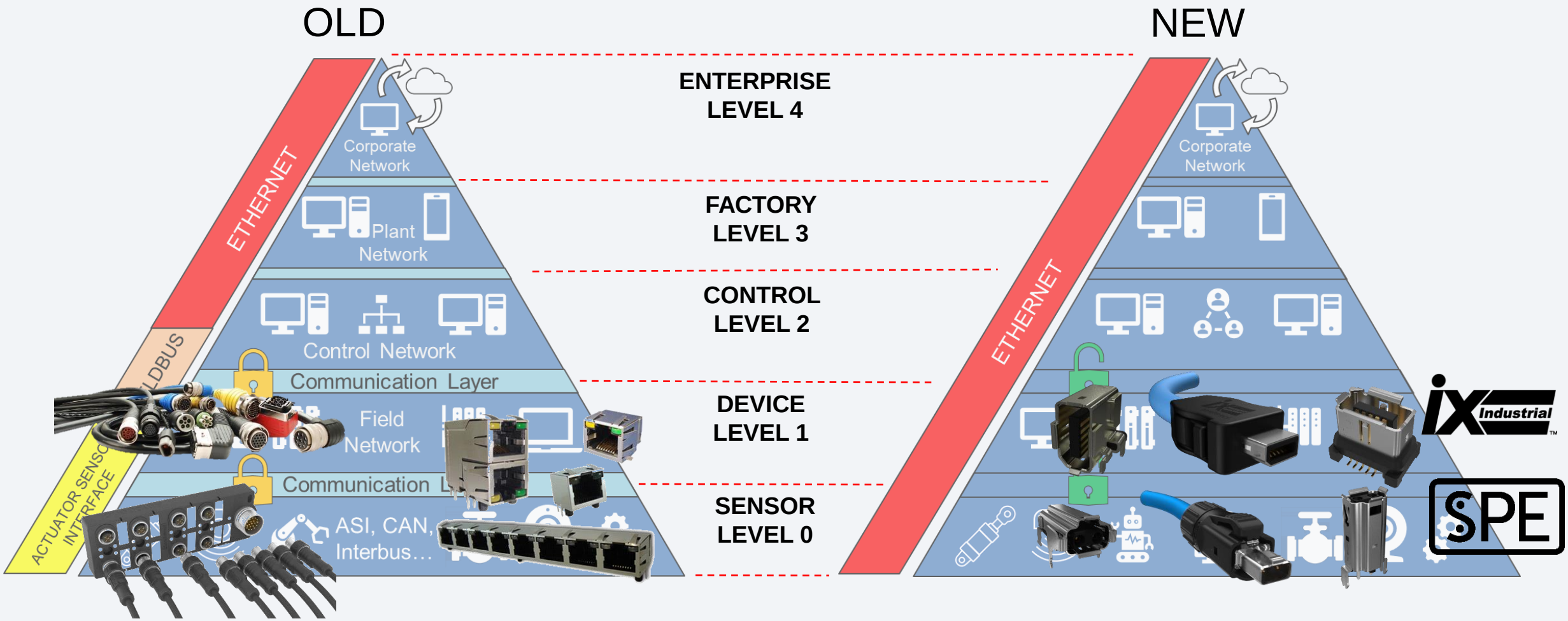
OLD
NEW
ENTERPRISE
LEVEL 4
FACTORY
LEVEL 3
CONTROL
LEVEL 2
DEVICE
LEVEL 1
SENSOR
LEVEL 0
ETHERNET
Corporate
Network
Plant
Network
Control Network
Communication Layer
Field
Network
ASI, CAN,
Interbus…
ACTUATOR SENSOR
INTERFACE
ETHERNET
Corporate
Network
ix Industrial
SPE

ix Industrial IP20, IP6X, ix Mag

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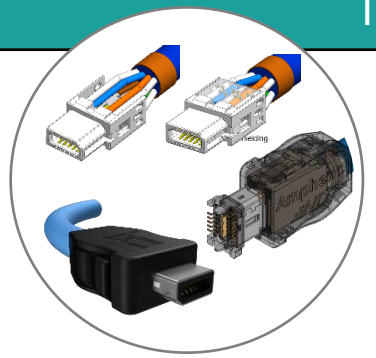
IP20



IP20 Plugs

Rugged 2 point metal latches
Solder for hi volume cable assy
Field installable IDC
Fully shielded throughout
Cat6a performance
Keyed mating

IP20 Receptacles

Vertical, Right angle “Flag”, Right Angle
75% smaller than typical RJ Connector
10mm connector pitch
Robust shield pcb tails

ixMag Receptacles

PCB mount ix Receptacle
Fully integrated magnetics
DC isolation transformers and common mode rejection chokes
PoE++ per IEEE802.3bt

IP20 Cable Assemblies

ix to ix, ix to RJ, ix to M12
Standard and Custom lengths
Tested to meet Cat6A

Features / Benefits

- 75% smaller than RJ45
  Increased density
- Ruggedized design
  Ideal for factory use
- PoE++ compatible
  Data-line powered device expansion
  *1.5A/contact = **200W***
- Fully shielded
  Optimized EMI and SI
- IP6X sealed version
  Protects equipment in wet environments
- Chip-set compatible
  Fully compatible with existing PHY chipsets and magnetics

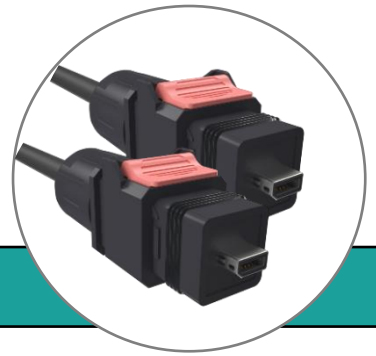
IP6X

NDH series IP6XPlugs

IEC Push-Pull rectangular option for positive secure latching
Sealing O-Rings and gaskets ensure water tight protection
Cat6A performance, field installable IDC or solder pads
Fully shielded throughout entire mated interface

NDH series IP6X Receptacles

Panel Mount bulkhead adapter
Uses standard IP2p pcb receptacle
Provides positive, IP67 sealed latch to plug
Protects equipment and the mated interface



NDH IP6X Cable assemblies

ix to ix, other interfaces possible.
Standard & customer lengths
Variety of cable options (4, 8, 10 conductor, etc)

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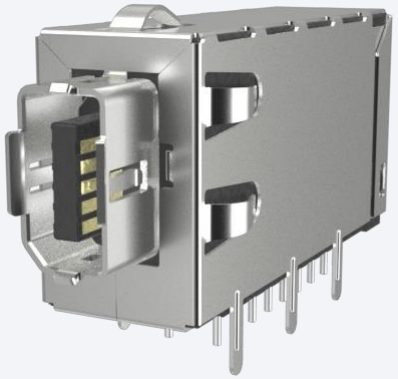
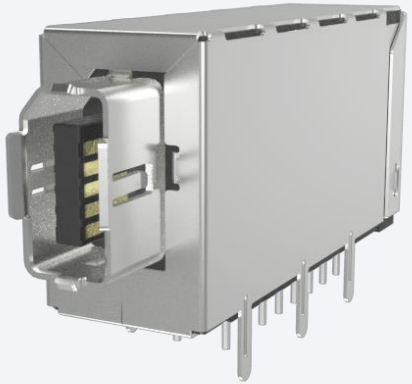
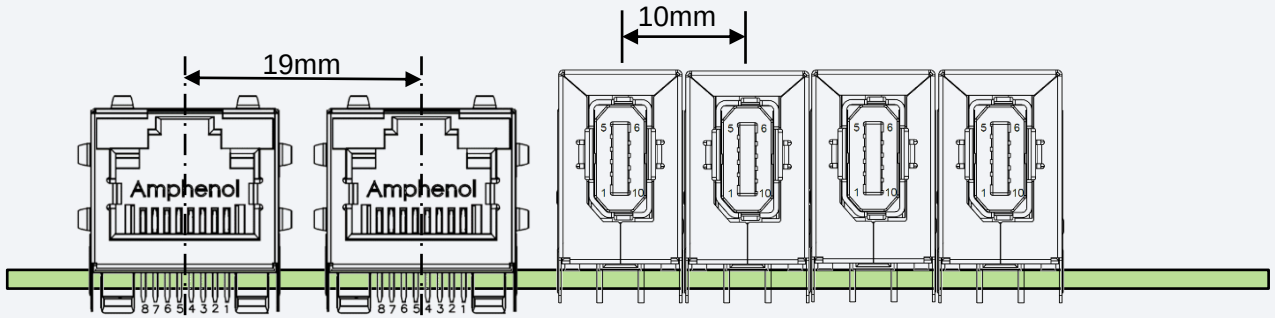
ix-MAG receptacle

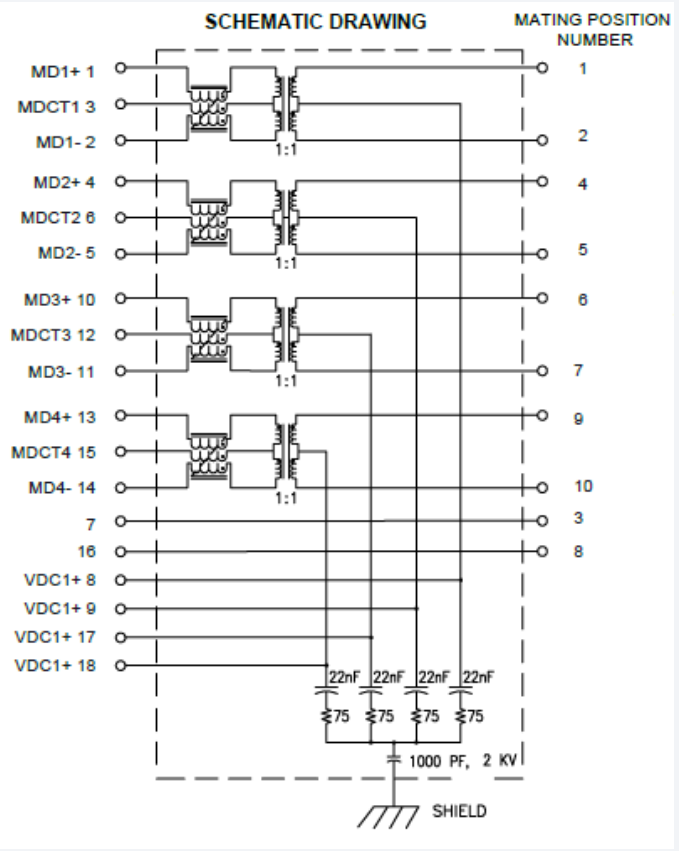
NEW!





Features	Benefits
100BaseT, 1000BaseT, 10GBaseT performance	IEC 61076-3-124 mating interface standard; Direct replacement of larger devices (RJ45) for Ethernet applications.
EMI Shield Options with keyed mating	EMI protection ensures signal integrity, available panel grounding tabs. Keyed housing prevents mis-mating.
Integrated Magnetics	Galvanic isolation and DC biasing from the Ethernet cable; Common Mode noise rejection between PHY chip and cable.
PoE++ Compatible per IEEE 802.3bt	Provides ability to power devices over the Ethernet cable, eliminating separate power supply requirements.
10mm center to center spacing	Consumes the same panel space as the non-magnetics version, allowing high density applications
Gold plating options on contact area	Options available for different applications based on environmental protection and number of mating cycles.





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SPE IP20, IP6X

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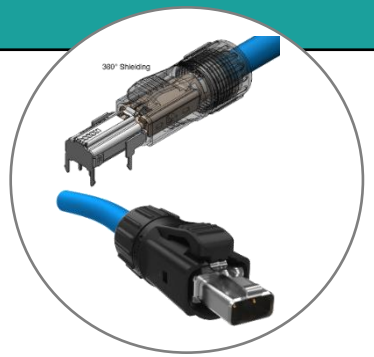
IP20



IP20 Plugs

Rugged metal latch
Solder for hi volume cable assembly
Field installable IDC or crimp contacts
Fully shielded throughout
Cat5 performance
4A rating with 18AWG
PoDL capable

IP20 Receptacles

Vertical, Right angle pcb through hole
Robust shield pcb tails
Small footprint on pcb

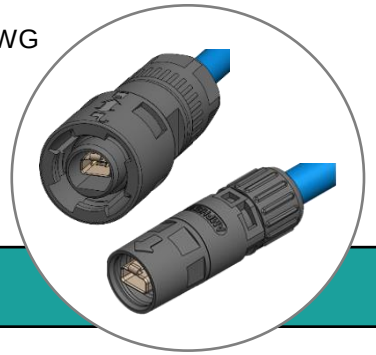
IP20 Cable Assemblies, Pigtails

1000BASE-T1 to 40m IEEE802.3bp
100BASE-T1 to 15m IEEE802.3bw
10BASE-T1 to 1km IEEE802.3cg
Lightweight 2 wire cable

Features / Benefits

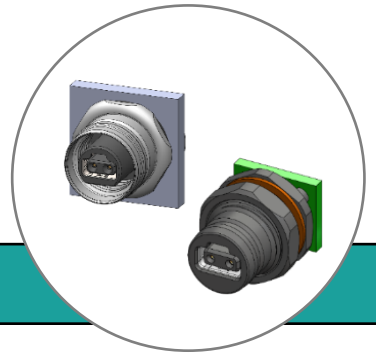
- Small Size
  Suits small devices
- Ruggedized design
  Ideal for factory use
- PoDL capable
  Data-line powered device expansion
  *4A/contact = **150W***
- Fully shielded
  Optimized EMI and SI
- IP6X sealed versions
  Protects equipment in wet environments
- Uses 2 wire cable
  Thinner, lighter
  More flexible
  Tighter bends
  Reduced COST

IP6X



IP6X Plugs

IEC Push-Pull Coupling ring option for positive secure latching
Snap-Lock option for easy mating/unmating
Sealing O-Rings and gaskets ensure water tight protection
Field installable IDC or crimp; Fully shielded



IP6X Receptacles

Panel Mount with sealing gasket
Pcb solder termination, vertical of right angle
Provides positive, IP67 sealed latch to plug
Protects equipment and the mated interface

IP6X Cables, Pigtails

SPE to SPE, SPE to sensor/actuator
Standard & customer lengths
Variety of cable options (4, 8, 10 conductor, etc)

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Benefits of a Small Form Factor

Size – Mating Face, Width and Height

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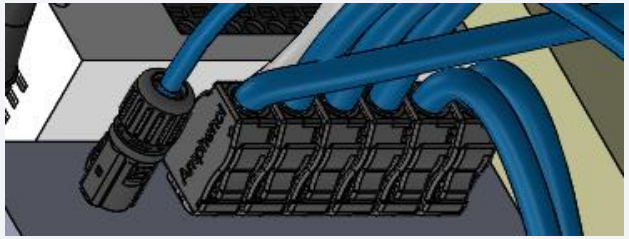
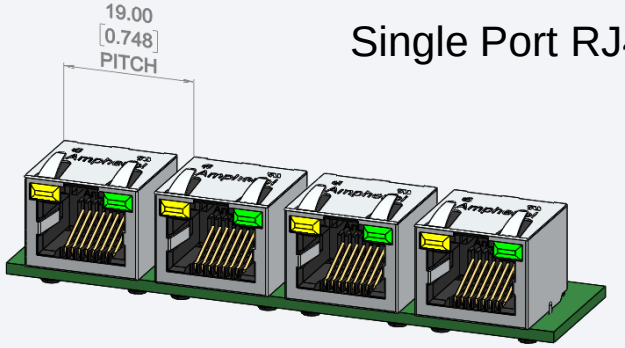
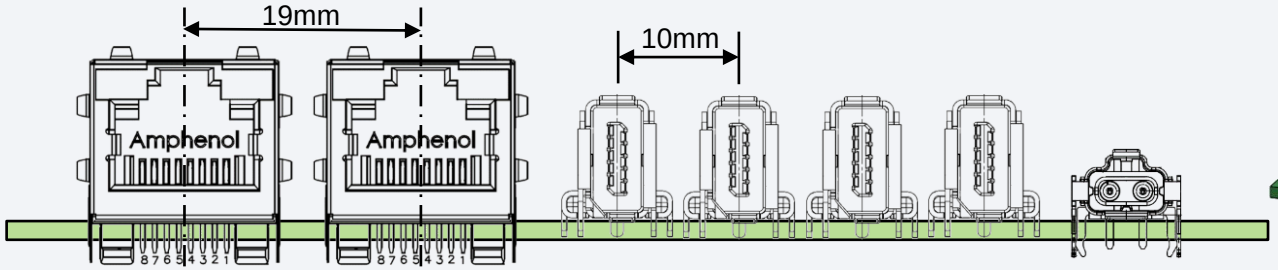
Small Form Factor saves valuable space on a PCB and panel, allowing much greater port density as well as reduced height requirements for constrained applications.

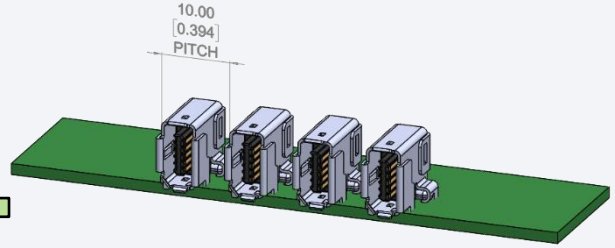


Single Port RJ45

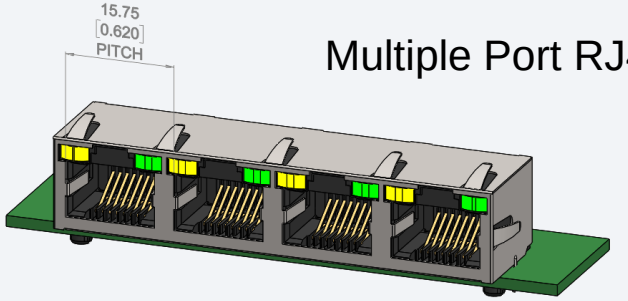




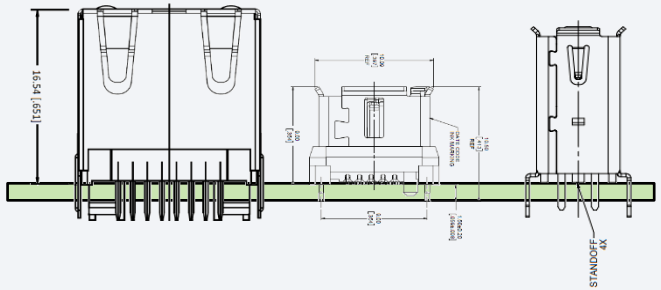
ix Industrial™ Right Angle



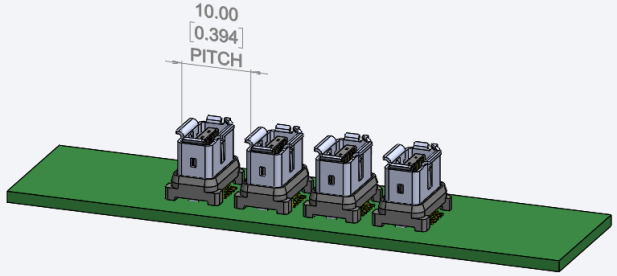
Multiple Port RJ45



ix Industrial™ 40% shorter than vertical mount RJ45



ix Industrial™ Vertical



ix Industrial™ & SPE are 75% smaller than a standard RJ45 Modular Jack

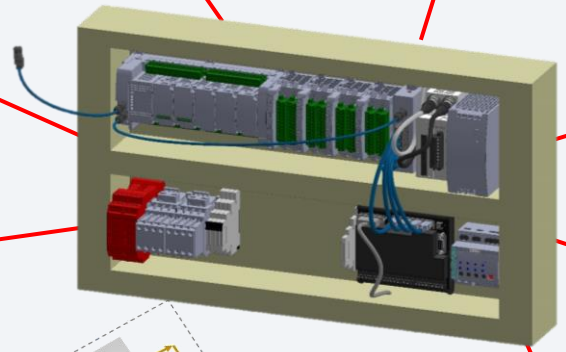
Applications

Typical Device Examples – SPE & ix Interconnects Providing PoDL and PoE++

Actuators
- Valves
- Lift
- Linear drive

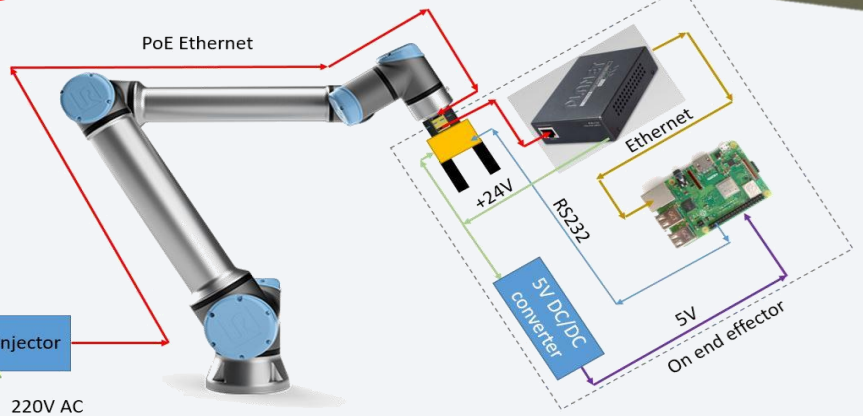
Sensors
- Position
- Motion
- Temperature
- Humidity
- Pressure

Controllers
- Drives
- Pumps
- Fans



HMIs
- Displays
- Inputs
- Controls

Robotics
- Robots
- Cobots
- Servos
- Sensors
- Actuators
- Grippers



Cameras
- Vision System
- Security

Data Loggers
- Temperature
- Humidity
- Count

Lighting Products

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Roadway/Street Dimming & Sensor Connectors

FLA Series - NEMA/ANSI C136.41

- Receptacles, Caps, Bases, Domes, Gaskets
- Fixed, Rotatable, Tool-less receptacles
- Pre-terminated pig-tailed leads
- IP65 sealed to Luminaire and between receptacle and base or cap

FLS Series - Zhaga Book 18

- Receptacles, Caps, Bases, Domes
- Fixed receptacle, IP65 sealed to Luminaire, Cap, Base
- Poke-in wire termination
- DALI interface to Dimming and Sensor modules

- Complete solutions for NEMA/ANSI C136.41 and Zhaga Book 18 Standards
- Provide dimming and sensor functionality to LED Roadway luminaires and for Smart City applications

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Modular Jacks

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Modular Jacks: RJ and RJMAG

High Performance Mod Jacks

15+ Product Series - Cat5e, Cat6, Cat6A
Vertical, R/A; Single, Multiport, Stacked Integrated PCB for standalone capability
No additional compensation required
Standard, Low, Recessed, Profiles
PoE Compatible
Combos (USB)

New RJ Products

RJE1R - Stacked 2x1
Cat5e/Cat6 performance in both ports
RJE4E - Stacked RJ over USB Type C
Cat5e
RJSGE - 2x2 Cat5e, Press-fit
RJE3A - Single port, SMT, Cat5e

RJ Mag - Standard

1G performance
1 port (RA & vert), multiport, stacked,
Stacked USB Combos
Tab up, tab down
Short Body, Long Body (PoE)
Profiles: Standard, Low, Insert
Through Hole, SMT
PoE, PoE++

Standard Modular Jacks (RJ)

30+ Product Series; Single, Multiport, Stacked
Cat3/Cat5 performance, PoE Compatible
Standard, Low, Ultra-low and Recessed, PTH, SMT
Tab-Up, Tab-Down, Shields, LEDs, Vertical, R/A
High temp materials for reflow soldering

RJ Mag – High Performance

2.5G – 1 port, 1x4, 2x4, 2x6, PoE
5G – 1 port, 1x2, 1x4, PoE; 1 port Low profile
10G – 1 port, 1x2, 1x4, tab up/down; PoE++ 90W & 120W
- 1 port RA, Vertical, 45 degree

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Modular Jacks – High Performance Categories

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- High performance connectors are classified as Cat5e, Cat6, and Cat6A

Performance	Standard	Transmission Rate	Max Ethernet Speed	Cable Length	Applications
Category 3	10BASE-T	up to 16MHz	10 Mbps	100m	Phones, Modems, POS terminals
	100BASE-T4				
	100BASE-T2				
Category 5	100BASE-T	up to 100MHz	100 Mbps	100m	Switches, Routers, Hubs
	1000BASE-T				
Category 5e	1000BASE-T	up to 100MHz	1 Gbps	100m	Improved Hubs, switches, fast-Ethernet
	2.5GBASE-T		2.5 Gbps		
Category 6	5GBASE-T	up to 250MHz	5 Gbps	100m	New installations set up with CAT6/Cat6A cabling in preparation for higher speed requirements. Such as data centres, hospitals and medical centres, government facilities, etc.
	10GBASE-T		10 Gbps	Up to 55m	
Category 6A	10GBASE-T	up to 500MHz	10 Gbps	100m	

- Cat5e modular jacks can process 1,000 bytes of data in the same amount of time a standard connector can process 10 bytes.
- Cat6/Cat6A connectors can process 10,000 bytes of data in the same amount of time a Cat 5e connector can process 1,000 bytes.

Amphenol provides Cat5e, Cat6, Cat6A

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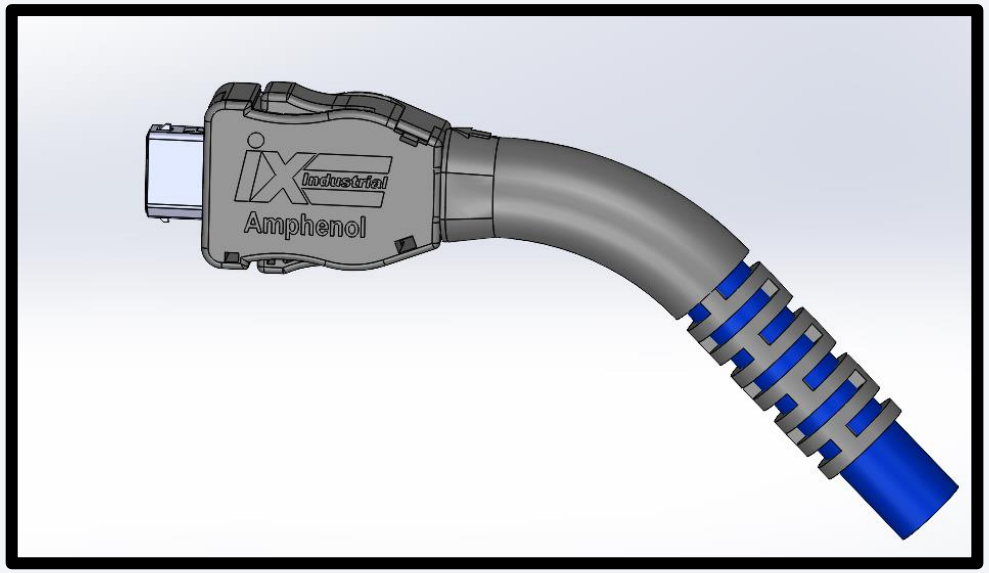
Ix Over molded design tested with special push pull force for healthcare customer (samples can be ordered)

Ix Over molded design with 45 deg angle (samples can be ordered)



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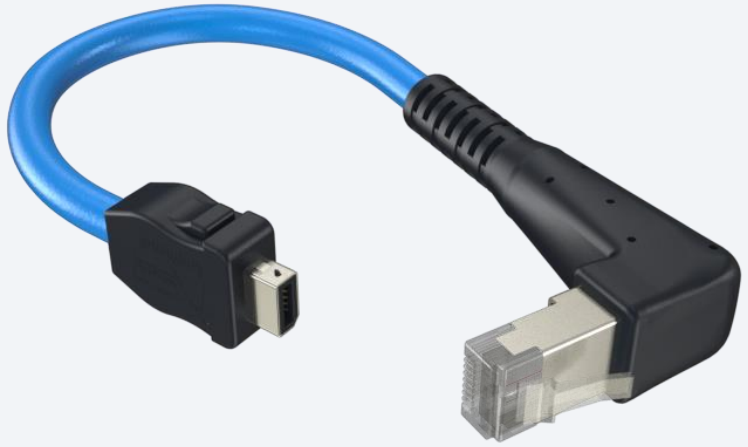
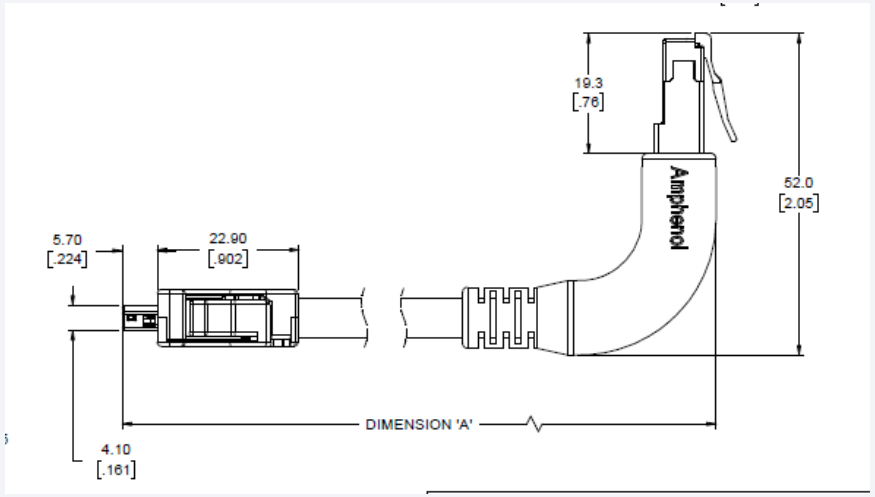


Ix Cable assembly with hard R/A RJ design (samples can be ordered)

Ix Cable assembly with flexible R/A RJ design (samples can be ordered)



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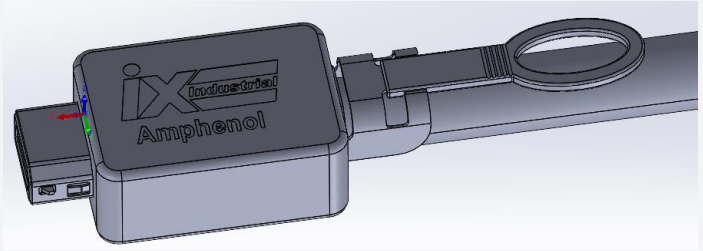
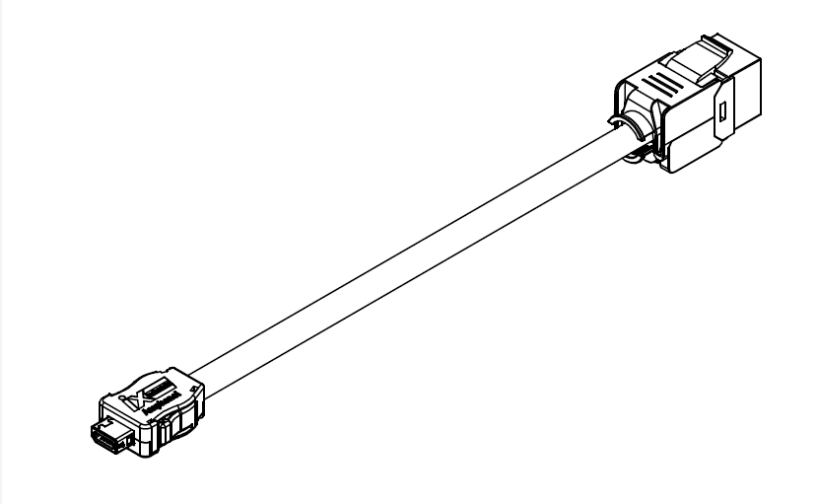


Ix plug with pull tab for latching (design proposed)

Ix Cable assembly to female RJ (design proposed)



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ix Industrial & SPE Engineering Sample Kits

Engineering “Design Kit” for
ix Industrial IP20 applications

- Includes products that can be installed into systems

Engineering “Design Kit” for
SPE IP20 applications

- Includes products that can be installed into systems

All kits contain:

- IDC Plug components
- PCB mount Receptacles
- Full 0.5m Cable Assembly
- Demo Board
- Assembled demo Plug

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Lighting Sample Kits

Engineering “Design Kits” for

- NEMA/ANSI C136.41
- Zhaga Book 18
- Zhaga Nook 20
- Samples that can be installed into systems
- Intended for Design Engineers

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Data Sheets

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Industrial IO & Lighting Solutions

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ix Industrial™ IP20 Connectors

ix Industrial™: Next Generation Industrial IoT Connectivity

ix Industrial™ connectors enable IoT connectivity for Ethernet and other industrial protocols through all levels of an operation from the Enterprise/Cloud to the sensors/actuators at the factory floor. These 10mm pitch connectors featuring 2-point metal latches are just 25% of the size of an RJ45 connector, and as such allow much greater port density and mating security. They are PoE capable, provide data performance to Cat6A level (10GBASE-T), and feature 360° shielding through the mated pair for superior EMI protection.

- Increased port density compared to RJ45
- High data rate performance for 10G Ethernet, with PoE capability
- Excellent EMI protection for noisy environments
- Robust 2 point metal latches for secure mating
- Fully intermateable with ix Industrial™ products from other authorized vendors

TARGET MARKETS

FEATURES	BENEFITS
Complies with IEC61076-3-124	Fully qualified second source intermateable with other vendors' products
75% smaller than RJ45	10mm connector pitch provides greater port density
10 position connector with Cat6A 10GBASE-T perform and PoE capability	
360° shielding through mated pair	
2-point metal latching	
Heavy duty shield solder hold-down tabs on PCB mo receptacles	
5000 mating cycles	
Field terminable IDC plugs with solder options	
Keyed housings (Type-A, -B, -C)	

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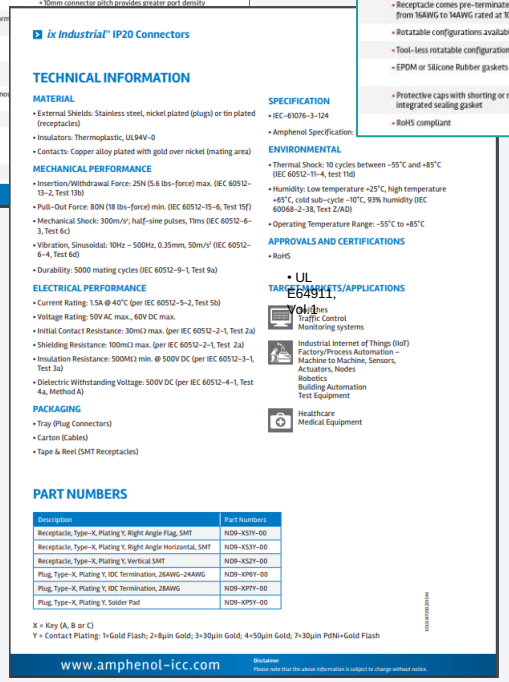
ix Industrial™ IP20 Connectors

TECHNICAL INFORMATION

MATERIAL
- External Shields: Stainless steel, nickel plated (plugs) or tin plated (receptacles)
- Insulators: Thermoplastic, UL94V-0
- Contacts: Copper alloy plated with gold over nickel (mating area)

MECHANICAL PERFORMANCE
- Insertion/Withdrawal Force: 25N (5.6 lbs-force) max. (IEC 60512-13-2, Test 13b)
- Pull-Out Force: 80N (18 lbs-force) min. (IEC 60512-15-6, Test 15f)
- Mechanical Shock: 300m/s², half-sine pulses, 11ms (IEC 60512-6-3, Test 6c)
- Vibration, Sinusoidal: 10Hz – 500Hz, 0.35mm, 50m/s² (IEC 60512-6-4, Test 6d)
- Durability: 5000 mating cycles (IEC 60512-9-1, Test 9a)

ELECTRICAL PERFORMANCE
- Current Rating: 1.5A @ 40°C (per IEC 60512-5-2, Test 5b)
- Voltage Rating: 50V AC max., 60V DC max.
- Initial Contact Resistance: 30mΩ max. (per IEC 60512-2-1, Test 2a)
- Shielding Resistance: 100mΩ max. (per IEC 60512-2-1, Test 2a)
- Insulation Resistance: 500MΩ min. @ 500V DC (per IEC 60512-3-1, Test 3a)
- Dielectric Withstanding Voltage: 500V DC (per IEC 60512-4-1, Test 4a, Method A)

PACKAGING
- Tray (Plug Connectors)
- Carton (Cables)
- Tape & Reel (SMT Receptacles)

SPECIFICATION
- IEC-61076-3-124
- Amphenol Specification:

ENVIRONMENTAL
- Thermal Shock: 10 cycles between -55°C and +85°C (IEC 60512-11-4, test 11d)
- Humidity: Low temperature +25°C, high temperature +65°C, cold sub-cycle -10°C, 93% humidity (IEC 60068-2-38, Test Z/AD)
- Operating Temperature Range: -55°C to +85°C

APPROVALS AND CERTIFICATIONS
- RoHS
- UL E64911, Vol 1

TARGET MARKETS/APPLICATIONS
- Industrial Machines
  Traffic Control
  Monitoring systems
- Industrial Internet of Things (IIoT)
  Factory/Process Automation – Machine to Machine, Sensors, Actuators, Nodes
  Robotics
  Building Automation
  Test Equipment
- Healthcare
  Medical Equipment

PART NUMBERS

Description	Part Numbers
Receptacle, Type-X, Plating Y, Right Angle Flag, SMT	ND9-XSSY-00
Receptacle, Type-X, Plating Y, Right Angle Horizontal, SMT	ND9-XSSY-00
Receptacle, Type-X, Plating Y, Vertical SMT	ND9-XSZY-00
Plug, Type-X, Plating Y, IDC Termination, 26AWG-24AWG	ND9-XP6Y-00
Plug, Type-X, Plating Y, IDC Termination, 28AWG	ND9-XP7Y-00
Plug, Type-X, Plating Y, Solder Pad	ND9-XP5Y-00

X = Key (A, B or C)
Y = Contact Plating: 1=Gold Flash; 2=8µin Gold; 3=30µin Gold; 4=50µin Gold; 7=30µin PdNi+Gold Flash

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FLA Series Dimming Receptacles, Caps and Gaskets

DIMMING RECEPTACLES, CAPS AND GASKETS, FOR ROADWAY AND OUTDOOR LIGHTING

FLA Series Dimming Receptacle – ANSI C136.41 is designed with power and dimming/signal contacts to provide a connection between dimmable photocell and the luminaire for commercial and utility lighting. The locking type receptacles are available in fixed or rotatable configurations and are compliant with ANSI C136.41 FLA Dimming Receptacles feature UL94V-0 high temperature resistant housings and are rated up to 15A per power contact. NEMA/ANSI FLA-C Caps are available with open circuit, short circuit and short circuit with MOV function. FLA-2N Series mounting gaskets are also available in EPDM or Silicone Rubber versions for better water protection.

- 0, 2 or 4 dimming contacts options
- RoHS Compliant
- UL94V-0 high temperature resistant housing
- Operating temperature range from -40°C to +85°C

TARGET MARKETS

FEATURES	BENEFITS
0, 2 or 4 dimming contacts options	Supports Power only, or power plus 1 or 2 sets of dimming and/or additional control functions
UL94V-0 rated high temperature resistant housing	Ensures application safety
Receptacle comes pre-terminated with power wire ranging from 16AWG to 14AWG rated at 105°C or 150°C	Ease of integration into new or existing light fixtures
Rotatable configurations available	Enhanced 360-degree alignment capability
Tool-less rotatable configurations available	Spring mounted, no tools required to install or adjust
EPDM or Silicone Rubber gaskets available	Silicone gasket provides higher temperature capability and enhanced set resistance
Protective caps with shorting or non-shorting function and integrated sealing gasket	Ensure environmental protection in absence of a dimming/photocell module.
RoHS compliant	RoHS compliant

Lighting Solutions

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18 Compliant FLS Series

RECEPTACLES, BASES AND DOMES

The FLS Series products are compliant with Zhaga Book 18. The FLS Receptacle is designed with 4 contacts for Power, DALI and Digital I/O, and mounts on a Luminaire. The mating FLS Base /Extension Module and Dome together form the housing for a Photocell/Sensor Module assembly.

The receptacle is compatible with and mates to all Photocells built with an Amphenol Book 18 Base/Extension Module which is available in both 40mm and 80mm diameters, as well as any certified Zhaga Book 18 extension module.

A Zhaga Book 18 protective cap is also available for receptacles which do not have a photocell connected to them. Typical applications are for roadway and smart city lighting. Sensor modules manufactured with the Amphenol Zhaga Book 18 Base and Dome are used to provide dimming control, wireless connectivity, a variety sensing and other functions.

- Receptacle has tool-less wire termination (poke home wire termination)
- Receptacle mounts to luminaire in a single hole with mounting nut and gasket
- Receptacle mated with Photocell is IP65/IP66 rated

TARGET MARKETS

FEATURES	BENEFITS
Compliant with Zhaga Specification Book 18	Compatible with Zhaga luminaires and fixtures, and mating products
4 contacts for Power and DALI	Supports functionality for smart lighting controls, sensor applications, and wireless communication
Single-hole-mount with gasket and nut	Easy and simple installation, seals to IP65/IP66
Tool-less Receptacle contacts for 20AWG -16AWG wire with poke-in wire termination	Easy installation
Base available in 40mm and 80mm diameters	Application flexibility
Strong polycarbonate domes snap onto Base with integral sealing O-Ring	Domes provide rugged, sealed protection to module electronics, ensuring reliable operation in harsh environments
UL94-V0 high temperature material	Wide operating temperature range from -40°C to +105°C
RoHS compliant	Meets environmental, health and safety requirements

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Zhaga Book 20 Compliant – FLM Series

DALI INTERFACE CONNECTORS FOR INDOOR LUMINAIRES

The FLM Series products are compliant with the Zhaga Book 20. Zhaga Book 20 specifies 2 position connectors identified as Luminaire Extension Module Receptacles (LEX-MR) and Luminaire Plugs (LEX-LP), used for DALI-2 (Digital Addressable Lighting Interface) applications. DALI-2 is a smart interface protocol between indoor luminaires and sensors and communication modules.

Amphenol's standardized Book 20 FLM Series connectors allow modules to connect to the LED driver and control system. The modules can be easily field serviced and replaced when necessary. The FLM Series connectors are available in Wire-to-Wire and Wire-to-Board configurations. The pin contact connectors (LEX-MR receptacles) are available as right angle or vertical PCB mount with SMT tails, or as wire termination housings for use with crimp contacts (purchased separately). The socket contact connectors (LEX-LP plugs) are available for use with wire crimp contacts (purchased separately), or with integrated contacts with poke-in wire termination.

- Dimple latching with Poka-Yoke mating alignment feature
- DALI-2 bus enables bi-directional communication between luminaires and modules
- Plug available with tool-less poke-in termination
- [illegible]k-20 applications
- [illegible]-proof contact protection

TARGET MARKETS

	BENEFITS
h Poka Yoke features	Enables DALI-2 protocol and ensures correct mating alignment
ch feature provides 5N	Provides secure mating, with easy unmating
Right Angle and Vertical	Versatile design options
) shaped molded	Holds SMT connectors to board in secure orientation during soldering process
contacts (available on options	Options allow high volume assembly, or easy field assembly/servicing
proof design	Housing protects contacts in unmated condition

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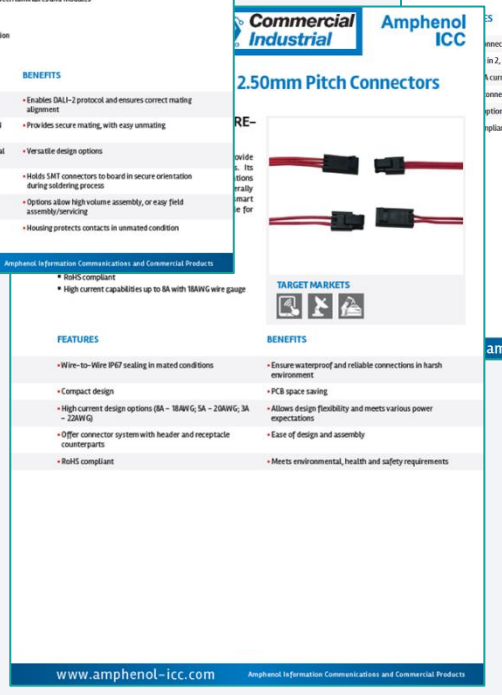
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2.50mm Pitch Connectors

RE-

- RoHS compliant
- High current capabilities up to 8A with 18AWG wire gauge

TARGET MARKETS

FEATURES	BENEFITS
Wire-to-Wire IP67 sealing in mated conditions	Ensure waterproof and reliable connections in harsh environment
Compact design	PCB space saving
High current design options (8A – 18AWG; 5A – 20AWG; 3A – 22AWG)	Allows design flexibility and meets various power expectations
Offer connector system with header and receptacle counterparts	Ease of design and assembly
RoHS compliant	Meets environmental, health and safety requirements

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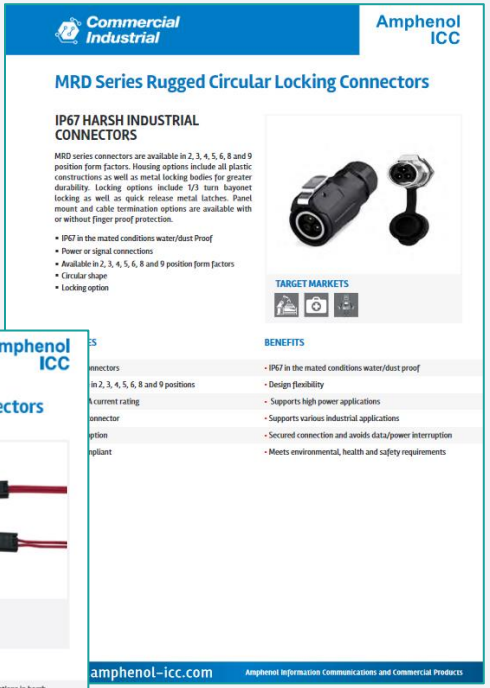
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MRD Series Rugged Circular Locking Connectors

IP67 HARSH INDUSTRIAL CONNECTORS

MRD series connectors are available in 2, 3, 4, 5, 6, 8 and 9 position form factors. Housing options include all plastic constructions as well as metal locking bodies for greater durability. Locking options include 1/3 turn bayonet locking as well as quick release metal latches. Panel mount and cable termination options are available with or without finger proof protection.

- IP67 in the mated conditions water/dust Proof
- Power or signal connections
- Available in 2, 3, 4, 5, 6, 8 and 9 position form factors
- Circular shape
- Locking option

TARGET MARKETS

	BENEFITS
nnectors	IP67 in the mated conditions water/dust proof
in 2, 3, 4, 5, 6, 8 and 9 positions	Design flexibility
A current rating	Supports high power applications
onnector	Supports various industrial applications
ption	Secured connection and avoids data/power interruption
pliant	Meets environmental, health and safety requirements

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Key Resources

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Available on AICC Web Site:

- https://www.amphenol-icc.com
- Customer Drawings
- 3D Model files
- Engineering product Specs
- Product Data Sheets
- Cross References to Competitor Part Numbers

Harsh Environment:
https://www.amphenol-icc.com/connectors/rugged-io.html

Lighting Connectors
https://www.amphenol-icc.com/connectors/lighting.html

ix Industrial:
https://www.amphenol-icc.com/product-series/ix-industrial-ip20.html/

Single Pair Ethernet:
https://www.amphenol-icc.com/product-series/single-pair-ethernet-ip20.html

Modular Jacks:
https://www.amphenol-icc.com/connectors/modular-magnetic-jacks.html

Visit our New Lighting Application Resource
https://www.amphenol-icc.com/applications/lighting.html

Visit our New Lighting Industrial Ethernet Application Resource
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Amphenol is a member of the SPE
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