

## ix Industrial™ IP20 Connectors



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**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

### 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 performance and PoE capability	• Supports Ethernet/IP and common protocols including Profinet, DeviceNet, EtherCAT, Modbus and others
• 360° shielding through mated pair	• Provides excellent EMI immunity for use in electrically noisy environments
• 2-point metal latching	• Extremely robust mating to prevent accidental disconnection, and more durable than RJ45 latch
• Heavy duty shield solder hold-down tabs on PCB mount receptacles	• Provides secure connection to the PCB protecting SMT joint integrity under mechanical stresses
• 5000 mating cycles	• High durability
• Field terminable IDC plugs with solder options	• Ease of custom cabling or repair in the field with IDC contacts • Solder version for high volume assembly
• Keyed Housings (Type-A, -B, -C)	• Controlled mating for Ethernet, Signal/Bus, other ports

## ix Industrial™ IP6X Rectangular Push-Pull Connectors and Cables, NDH Series



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**SEALED IX INDUSTRIAL™ LATCHING INTERFACE FOR RUGGED APPLICATIONS** The ix Industrial™ IP6X Rectangular Push-Pull connector and cable solution provides Cat6A Ethernet connectivity using the IEC 61076-3-124 mating interface, and full sealing to IP65, IP66 and IP67 specifications. Intended for use in industrial ethernet applications requiring additional environmental protection, it is suitable for any indoor and outdoor rugged/harsh environments.

- Weather proof - IP6X, UV resistant
- Push-Pull positive locking latch
- Small, lightweight, ergonomic form factor
- Field terminable plug kits or pre-made cable assemblies
- Mates with standard IP20 ix Industrial™ receptacles

## FEATURES

## BENEFITS

• IEC 61076-3-124 mating interface	• Meets all performance parameters of standard Industrial interconnect
• IP6X sealed	• Protects the mated interface and equipment from dust and water ingress
• 2 Stage locking latch	• Lock engages to prevent unlatching for extra security
• Robust, ergonomic design	• Impact and vibration resistant; easy to operate
• Small, lightweight form factor	• Minimal space required in both vertical and horizontal directions; easy to install and use and does not add excess weight to equipment
• Mates to IP20 receptacle	• Easy integration for designers
• Cable termination	• Field installable or factory certified cable assembly

## D-Sub Waterproof Connectors

### WATERPROOF D-SUBMINIATURE CONNECTORS

- Mating interface according to MIL C24308
- Up to 44 contacts of B shell size
- Available in standard and high density options
- Current rating of 5A max.
- Meets RoHS and IP67 ratings
- IP67 Hood is available



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Amphenol's IP67 Waterproof D-Subminiature product line offers the terminations for board and cable ends, bringing down the overall cost of cable assembly and connectors significantly. The terminations include Straight and Right Angle for board side and Solder Cup for cable side. Each termination variant has both socket and plug connectors.

The mating area contact finish is always gold with choice of three basic thicknesses: gold flash, 15µ", and 30µ", according to the adequate number of mating cycles desired. And the soldering area contact finish is always gold. The machined contacts provide robustness and reliability.

Two kinds of Jackscrew heights 4.7mm and 5.7mm offer panel mounting options for different panel thickness 2.0mm max.

## FEATURES

## BENEFITS

• Standard D shape connectors	• Ensures proper mating orientation
• Metal shells for EMI	• Suitable for applications requiring high reliability
• Grounding dimples for plug	
• Inserts are made of flame-retardant thermoplastic	• UL #E232356 certified
• High reliability machined contacts are available	• Suitable for high end applications
• Variants with a comprehensive range of terminations	• Meets industry standards
• Both socket and plug are available for each termination variant	• Supports various customer needs



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## FLH Series Mini Sealed 2.50mm Pitch Connectors

### IP67 SEALED WATERPROOF WIRE-TO-WIRE CONNECTOR

FLH Series Mini Sealed 2.50mm pitch connectors provide a wire-to-wire IP67 sealing in mated conditions. Its waterproof characteristics make it ideal for applications in harsh environments. These connectors can generally be used in industrial, lighting appliances, HVAC and smart home. The compact design of FLH series is suitable for space-saving applications.

- Wire-to-wire IP67 sealing in mated and unmated conditions
- Compact design
- Easy installation
- RoHS compliant
- High current capabilities up to 7A with 18AWG wire gauge

### FEATURES

- Wire-to-Wire IP67 sealing in mated conditions
- Compact design
- High current design options (7A - 18AWG; 5A - 20AWG; 3A - 22AWG)
- Offer connector system with header and receptacle counterparts
- RoHS compliant

### BENEFITS

- Ensure waterproof and reliable connections in harsh environment
- PCB space saving
- Allows design flexibility and meets various power expectations
- Ease of design and assembly
- Meets environmental, health and safety requirements



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## LUSB (Lockable USB) Connector Series

**LOCKABLE AND HIGHLY RELIABLE RUGGED USB SOLUTION** Amphenol's LUSB series Lockable USB Connectors serve many markets and applications across the globe including Automotive, Communications, Consumer, Data, Industrial and Medical.

- LUSB series is offered in USB 2.0 and USB 3.0 connector interface
- Locking latch locks USB connector in position
- Ensure secured data transmission
- Easy to install and remove
- RoHS to meet environmental standards

### FEATURES

- Standard USB connector interface with unique latching mechanism
- USB 2.0 and USB 3.0 right angle configurations available
- Locking latch must be intentionally raised to remove plug
- Performs up to 1500 mating cycles
- RoHS compliant

### BENEFITS

- Stable and reliable USB mating interface
- Suitable for most applications with USB ports
- Prevent accidental disconnection
- High durability which translates into cost savings for customers
- Meets environmental, health and safety requirements



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## Modular Jack - Rugged

**Rugged RJ Panel Mount connector IP67 Sealing** Ruggedized RJ connectors with die cast housings and IP67 sealing for Harsh Environment applications, provide reliable performance in extreme conditions for the most demanding applications, and mate with standard RJ plugs.

- Cat6A Harsh RJ45 available, both in Right Angle and Vertical
- IP67 sealing protects against water, dust
- Die cast metal housings protect against mechanical damage
- Wide variety of mounting and termination options
- Operating temperature range from -40°C to +105°C for extreme conditions
- RoHS for environmental compliance

## FEATURES

## BENEFITS

<ul style="list-style-type: none"> <li>• Internal and external seals made with flexible silicone rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent sealing to IP67 and higher over wide temperature range, protects equipment from water and dust incursion</li> </ul>
<ul style="list-style-type: none"> <li>• Standard RJ interface where Ethernet/IP Protocol is used</li> </ul>	<ul style="list-style-type: none"> <li>• Can be used in wide variety of applications where standard RJs would be used</li> </ul>
<ul style="list-style-type: none"> <li>• Die Cast metal housing</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanically rugged and stable protects against shock, vibration and impact and prevents distortion</li> </ul>
<ul style="list-style-type: none"> <li>• Mates with existing standard connectors</li> </ul>	<ul style="list-style-type: none"> <li>• Can be used with wide variety of readily available mating connectors</li> </ul>
<ul style="list-style-type: none"> <li>• Comparable in size to standard equivalents</li> </ul>	<ul style="list-style-type: none"> <li>• Can usually replace existing standard parts with little to no changes or additional space required</li> </ul>
<ul style="list-style-type: none"> <li>• Wide variety of mounting and termination options</li> </ul>	<ul style="list-style-type: none"> <li>• Replace virtually any existing standard connector using standard footprints and mounting hardware</li> </ul>



### Rugged D-Sub

#### RUGGED D-SUB PANEL MOUNT CONNECTOR IP67 SEALING

Ruggedized D-sub connectors with die cast housings and IP67 sealing for Harsh Environment applications, provide reliable performance in extreme conditions for the most demanding applications, and mate with standard connectors.

- IP67 sealing protects against water, dust
- Die cast metal housings protect against mechanical damage
- Standard Density 9 pins to High Density 15 & 26 pins replace standard equivalents
- Operating temperature range from -44°C to +105°C for extreme conditions
- RoHS for environmental compliance

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## FEATURES

## BENEFITS

<ul style="list-style-type: none"> <li>• Internal and external seals made with flexible silicone rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent sealing to IP67 and higher over wide temperature range, protects equipment from water and dust incursion</li> </ul>
<ul style="list-style-type: none"> <li>• Die Cast metal housing</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanically rugged and stable protects against shock, vibration and impact and prevents distortion</li> </ul>
<ul style="list-style-type: none"> <li>• Mates with existing standard connectors</li> </ul>	<ul style="list-style-type: none"> <li>• Can be used with wide variety of readily available mating connectors</li> </ul>
<ul style="list-style-type: none"> <li>• In size to comparable standard equivalents</li> </ul>	<ul style="list-style-type: none"> <li>• In many cases can replace existing standard parts with little to no changes or additional space required</li> </ul>
<ul style="list-style-type: none"> <li>• Machined contacts plated with 30µ" gold</li> </ul>	<ul style="list-style-type: none"> <li>• Extremely durable for demanding applications</li> </ul>
<ul style="list-style-type: none"> <li>• Wide variety of mounting and termination options</li> </ul>	<ul style="list-style-type: none"> <li>• Replace virtually any existing standard connector using standard footprints and mounting hardware</li> </ul>



### Rugged MRD Series Circular Locking Connectors

**IP67 HARSH INDUSTRIAL CONNECTORS** MRD series connectors are available in 2, 3, 4, 5, 6, 7, 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.

Other than connectors, we also provide standard Harsh MRD Cable Assembly (2, 3, 4 pin for now), including double end termination and pigtail version.

- IP67 Water/Dust Proof
- Power or signal connections
- Available in 2, 3, 4, 5, 6, 7, 8 and 9 position form factors
- Circular shape
- Locking option

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## FEATURES

## BENEFITS

- |                                                    |                                                         |
|----------------------------------------------------|---------------------------------------------------------|
| • Sealed connectors                                | • IP67 water/dust proof                                 |
| • Available in 2, 3, 4, 5, 6, 7, 8 and 9 positions | • Design flexibility                                    |
| • Up to 10A current rating                         | • Supports high power applications                      |
| • Circular connector                               | • Supports various industrial applications              |
| • Locking option                                   | • Secured connection and avoids data/power interruption |
| • RoHS compliant                                   | • Meets environmental, health and safety requirements   |

## Rugged USB 2.0



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**RUGGED USB CONNECTOR FOR HARSH ENVIRONMENT APPLICATION, GENERATION 2** Amphenol's MUSBR series USB Connectors is a line of Generation 2 ruggedized USB connectors with die cast housings and IP67 sealing, designed for Harsh Environment applications. Rugged series provide reliable performance in extreme conditions for the most demanding applications, and mate with standard USB plugs. Rugged USB Connector Series serve many markets and applications across the globe including Automotive, Communications, Consumer, Data, Industrial and Medical.

- MUSBR series is offered in Type A, Mini B, Mini AB and Type C connector interface
- IP67 sealing protects against water and dust
- Die cast metal housings protect against mechanical damage
- Compact design saves panel space
- Operating temperature range from -55°C to +105°C for extreme conditions
- RoHS compliant to meet environmental standards

## FEATURES

## BENEFITS

- |                                                                      |                                                                                                     |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| • Internal and external seals made with flexible silicone rubber     | • Excellent sealing to IP67 and higher protection over wide temperature range                       |
| • Die cast metal housings                                            | • Protects equipment from water and dust incursion                                                  |
| • Multiple options including USB 3.0, Type A, Mini B, Mini AB series | • Mechanically rugged and stable protects against shock, vibration and impact                       |
| • Non-polarized Type C connector interface                           | • Prevents distortion                                                                               |
| • Low profile shell design available for Type A and Type C series    | • Suitable for a wide variety of mating connectors which are readily available                      |
| • Similar in size compared to standard equivalents                   | • Allows mating plug to be inserted in either orientation to ease mating                            |
| • Wide variety of mounting and termination options                   | • Eliminates potential damage due to accidental mismatching                                         |
| • RoHS compliant                                                     | • Compact design saves panel space                                                                  |
|                                                                      | • Able to replace existing standard parts with little to no changes                                 |
|                                                                      | • Replace virtually any existing standard connector using standard footprints and mounting hardware |
|                                                                      | • Meets environmental, health and safety requirements                                               |

## Rugged USB 3.0



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**RUGGED USB CONNECTOR FOR HARSH ENVIRONMENT APPLICATION** Amphenol's Product Line of Rugged USB3.0 connectors serve many markets and applications cross the globe including Medical, Industrial, Telecommunication, DataComm, etc.

- Ideal options to seal connection interface
- Available with Right Angle or Vertical on PCB
- Available in Single Port or Stacked Version
- Operating temperature range from -55°C to +105°C for extreme conditions
- RoHS compliant to meet environmental standards

## Rugged USB Type C



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**RUGGED USB TYPE C CONNECTOR FOR HARSH ENVIRONMENT APPLICATION, GENERATION 2** Amphenol's MUSBR series USB Type C Connectors serve many markets and applications across the globe including Automotive, Communications, Consumer, Data, Industrial and Medical.

MUSBR series is a line of Generation 2 ruggedized USB Type C connectors with die cast housings and IP67 sealing, designed for Harsh Environment applications. MUSBR series USB Type C Connectors provide reliable performance in extreme conditions for the most demanding applications, and mate with standard USB Type C plugs.

- IP67 sealing protects against water and dust
- Die cast metal housings protect against mechanical damage
- Compact design saves panel space
- Operating temperature range from -55°C to +105°C for extreme conditions
- RoHS compliant to meet environmental standards

### FEATURES

### BENEFITS

<ul style="list-style-type: none"> <li>• Internal and external seals made with flexible silicone rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent sealing to IP67 and higher protection over wide temperature range</li> <li>• Protects equipment from water and dust incursion</li> </ul>
<ul style="list-style-type: none"> <li>• Die cast metal housings</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanically rugged and stable protects against shock, vibration and impact</li> <li>• Prevents distortion</li> </ul>
<ul style="list-style-type: none"> <li>• Non-polarized Type C connector interface</li> </ul>	<ul style="list-style-type: none"> <li>• Allows mating plug to be inserted in either orientation to ease mating</li> <li>• Eliminates potential damage due to accidental mismatching</li> </ul>
<ul style="list-style-type: none"> <li>• Right angle and vertical configurations available</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable for a wide variety of application requirements</li> </ul>
<ul style="list-style-type: none"> <li>• Low profile shell design available</li> </ul>	<ul style="list-style-type: none"> <li>• Compact design saves panel space</li> </ul>
<ul style="list-style-type: none"> <li>• RoHS compliant</li> </ul>	<ul style="list-style-type: none"> <li>• Meets environmental, health and safety requirements</li> </ul>

## Single Pair Ethernet (SPE) IP20 Connectors

### NEXT GENERATION IEC63171-6 COMPLIANT INDUSTRIAL ETHERNET CONNECTORS



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Single Pair Ethernet (SPE) connectors for Industrial applications bring direct Ethernet connectivity to peripheral devices like sensors, actuators, and vision system cameras that operate at speeds up to 1Gb/s. SPE eliminates slow expensive and complex fieldbus protocols and connections by simplifying and standardizing existing and new industrial network systems.

Robust right angle and vertical PCB mount SPE jacks mate to field terminable plugs, providing a complete shielded interface with metal latching features. Current handling up to 4A supports PoDL (Power over Data Link) capability up to 1km.

- Fully compatible with IEC 63171-6 interconnects from other authorized vendors ensuring future compatibility and investment security
- Single pair cable reduces cost, weight and space requirements compared to 2 and 4 pair cabling
- Mechanically robust and secure latching with 360° shielding for excellent performance in harsh environments
- Field terminable IDC plugs provide installation flexibility
- SPE eliminates the need for costly protocol conversion gateways

## FEATURES

## BENEFITS

• Two way 600MHz data transmission	• Supports Ethernet protocols of 1Gb/s up to 40m, and 10Mb/s up to 1km
• 2 contacts and 2 wire cable for single pair ethernet	• Minimizes connector and cabling cost, increases cabling density and ease of installation
• 4A current rating	• Supports PoDL, up to 1km cable lengths with no signal degradation
• PCB mount jack shields have robust integrated solder tails with available board-locks	• Suitable for Pin-in-Paste assembly and prevents damage from mechanical stresses
• Mated pair maintains 360° shielding for the signal contacts	• Provides excellent EMI immunity
• Positive latching with robust thumb-actuated metal latch	• Prevents accidental unmating
• IDC (Insulation Displacement) termination plugs	• Easier field installation and service

## Single Pair Ethernet (SPE) IP67 Circular Push-Pull Connectors and Cables

### NEXT GENERATION IEC63171-6 (M12 PUSH-PULL FORM FACTOR) COMPLIANT SEALED INDUSTRIAL ETHERNET CONNECTORS



Single Pair Ethernet (SPE) connectors for Industrial applications bring direct Ethernet connectivity to peripheral devices like sensors, actuators, and vision system cameras that operate at speeds up to 1Gb/s. SPE eliminates slow expensive and complex fieldbus protocols and connections by simplifying and standardizing existing and new industrial network systems.

IP67 rated with M12 size circular form factor. Robust right angle and vertical PCB mount, and solder cup SPE jacks mate to field terminable plugs, providing a complete shielded interface with latching features. Current handling up to 4A supports PoDL (Power over Data Link) capability up to 1km.

- Fully compatible with IEC 63171-6 interconnects from other authorized vendors ensuring future compatibility and investment security
- Single pair cable reduces cost, weight, and space requirements compared to 2 and 4 pair cabling
- Mechanically robust and secure latching with 360° shielding for excellent performance in harsh environments
- Field terminable IDC plugs provide installation flexibility
- IP67 sealing provides protection from water ingress including full immersion in mated conditions
- High strength plastic plug housing and coupling mechanism reduces weight and cost

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## VerIO™ Connector

**VERSATILE, ROBUST IO FOR INDOOR AND OUTDOOR APPLICATIONS** VerIO™ Connector is a versatile, robust and compact I/O system featuring multiple standard connector interfaces such as RJ45, PoE (Power over Ethernet), Signal, Power and Hybrid. It is easy to install and operate with a swift push pull type movement. VerIO connector is ideal for industrial applications as well as harsh indoor or outdoor environments.

- Multiple standard IO connector interfaces enable greater choice
- Easy to install and operate
- Weather proof; IP67 resistant
- Small form factor enable greater port to port density



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