

Industrial Ethernet Next Generation Connections



Dwayne Williams

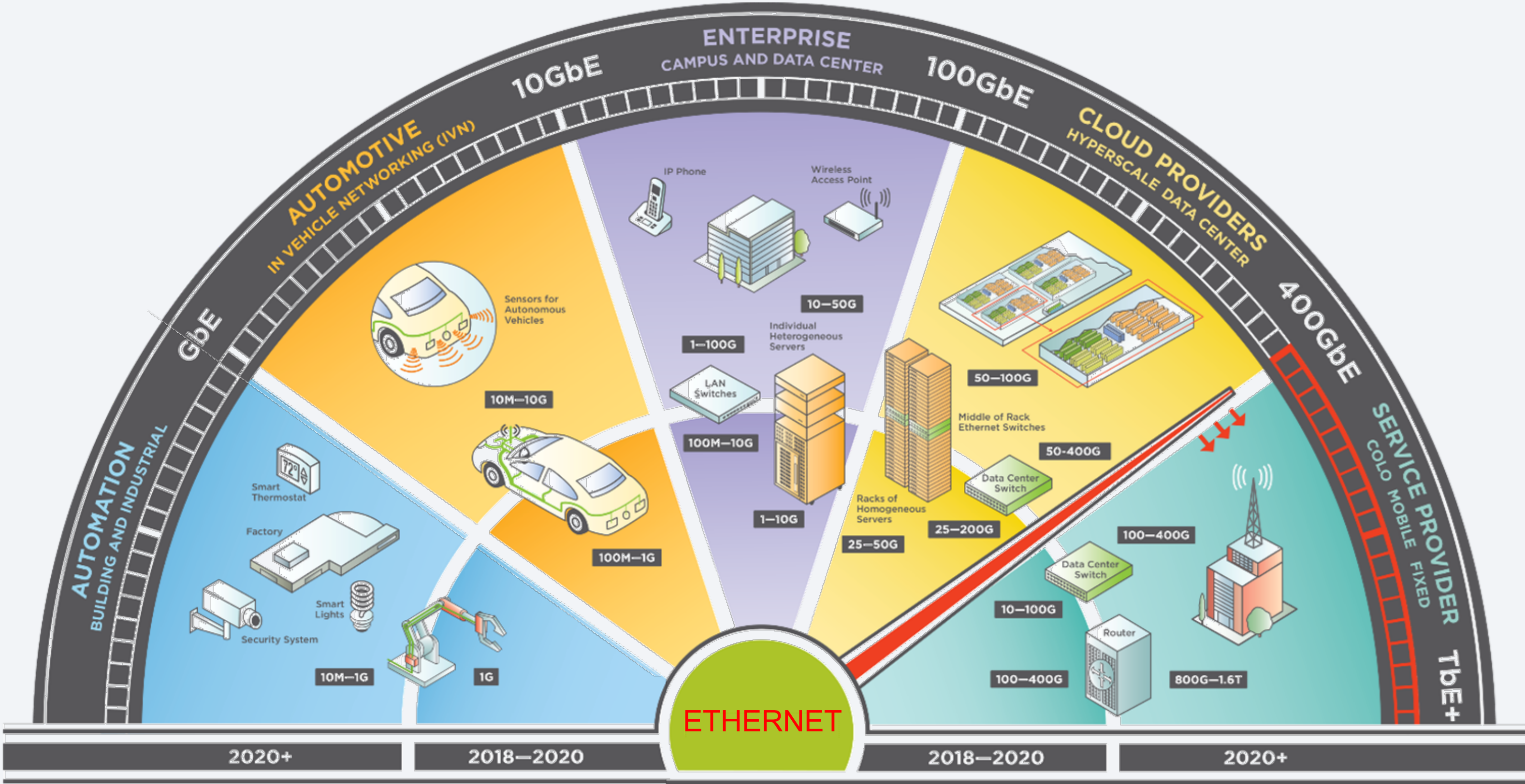


Amphenol

Enabling the Electronics Revolution

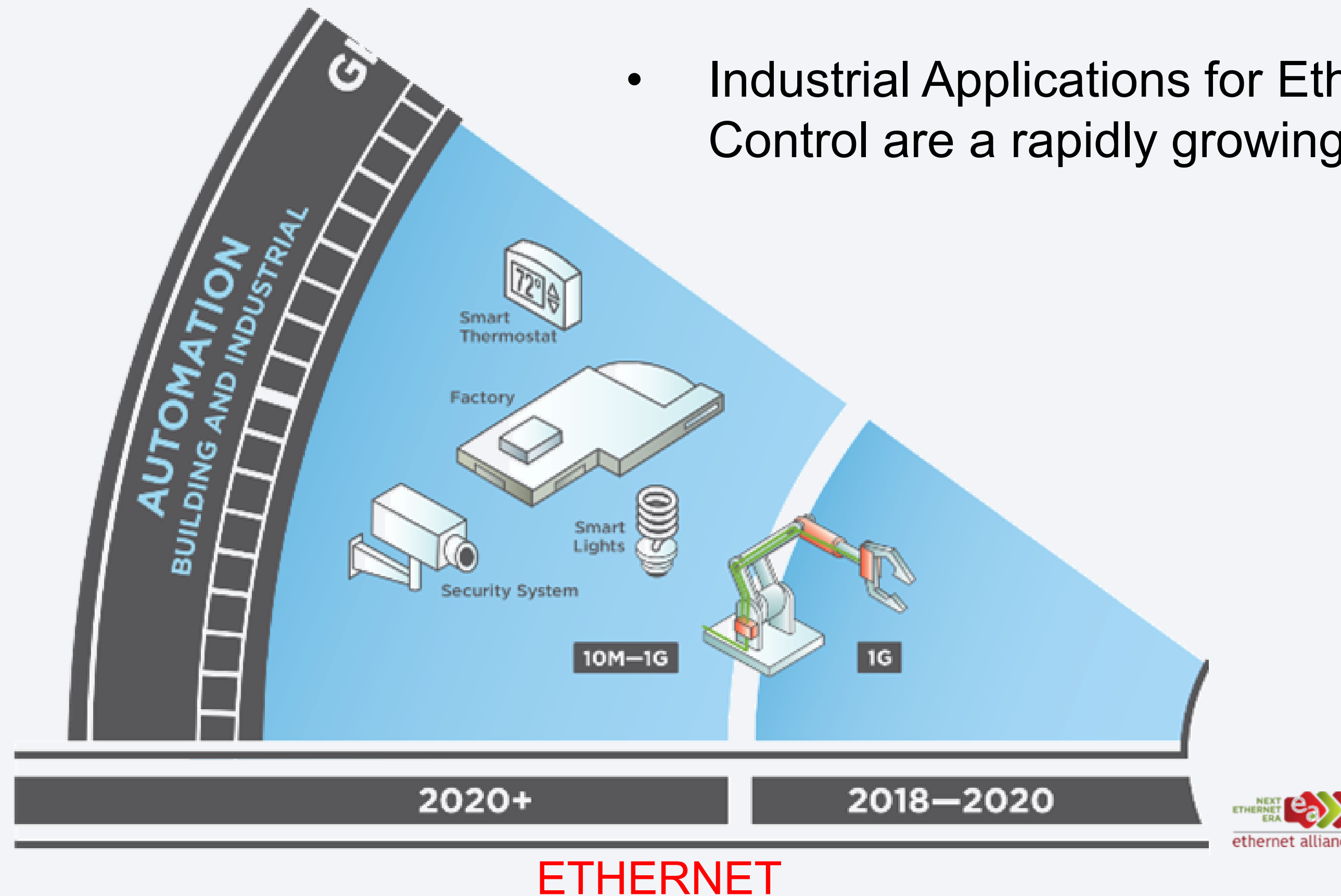
- ✓ IIoT – Industrial Internet Of Things – Industry 4.0
- ✓ Desire/Drive for Single Protocol
- ✓ Requirements for Higher Speeds, Data Rates and Scalability
- ✓ Need For Greater Port Density
- ✓ Industrial (Rugged) Specific Form Factors
- ✓ Need For Power To The Device (PoE++, PoDL)
- ✓ Need for Factory/Data Analytics
- ✓ Ability To Connect New Factory Automation With Heritage (Old) Equipment

Industrial **ETHERNET** is the protocol to enable
and sustain these drivers and trends



Ethernet protocol is used in a broad spectrum of industries and applications





Creativity

- Hand Made



Materials

- Iron Industry



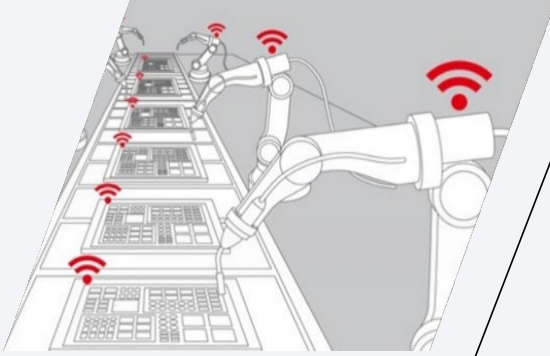
Volume

- Assembly Line



Automation

- Sensors



Communication

- Internal Networking



Standardization

- Scale, Growth, Quality



Machines

- Textiles



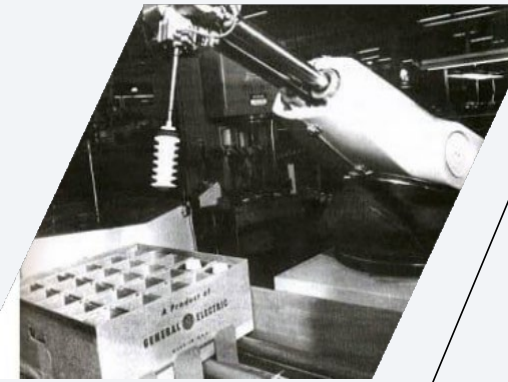
Power

- Steam Engine



Consistency

- Robotics



Computers

- Complexity



Internet

- External Networking



ETHERNET Created

Many, Many Industrial Communication Interfaces

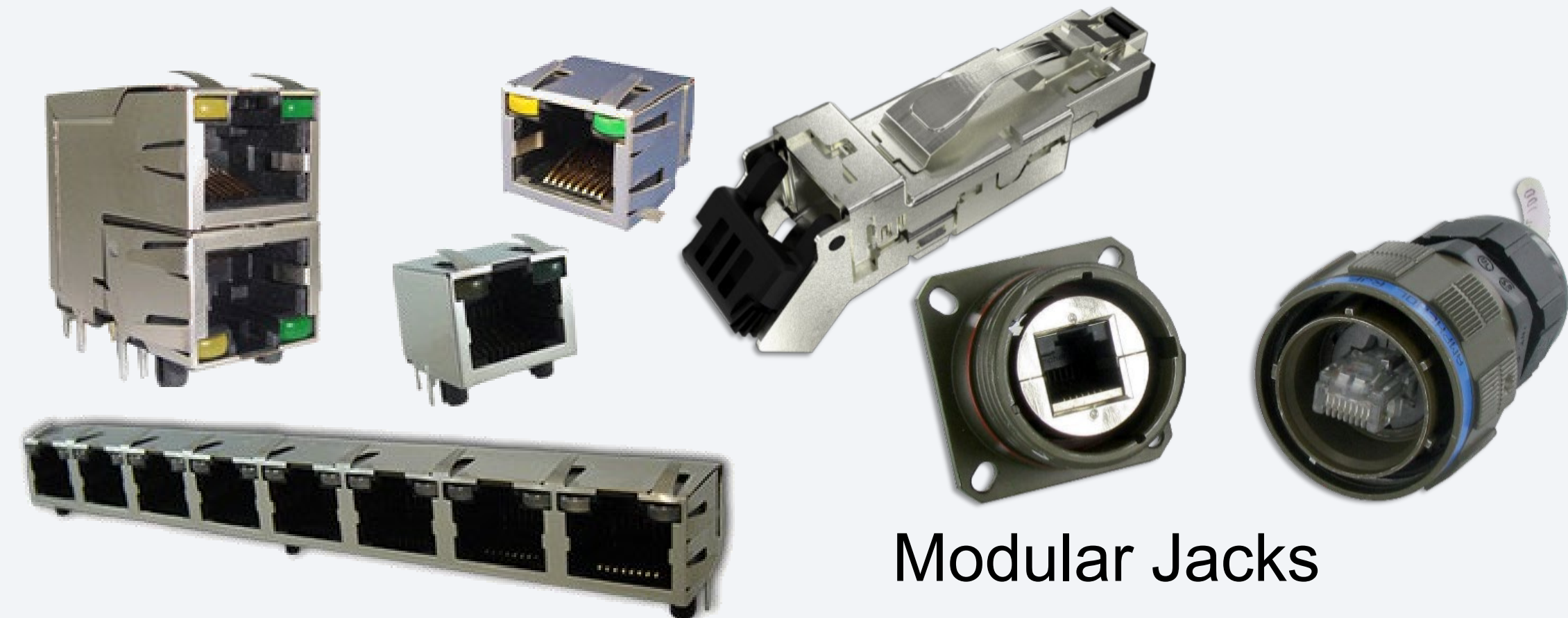
Amphenol



Huge variety of connector styles used for a variety of Industrial interconnect applications



M12

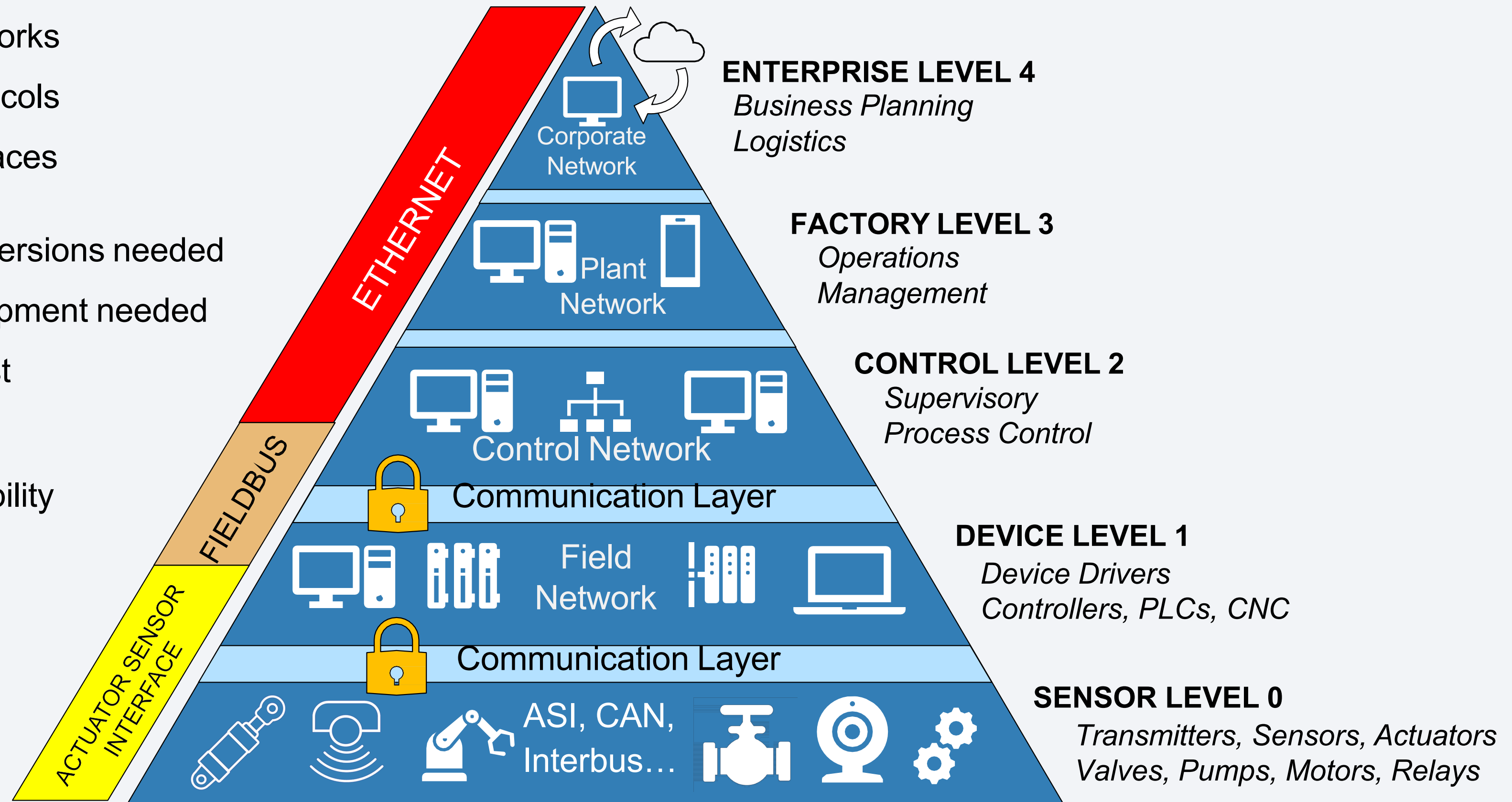


Modular Jacks

Traditional Factory Automation Communication Hierarchy

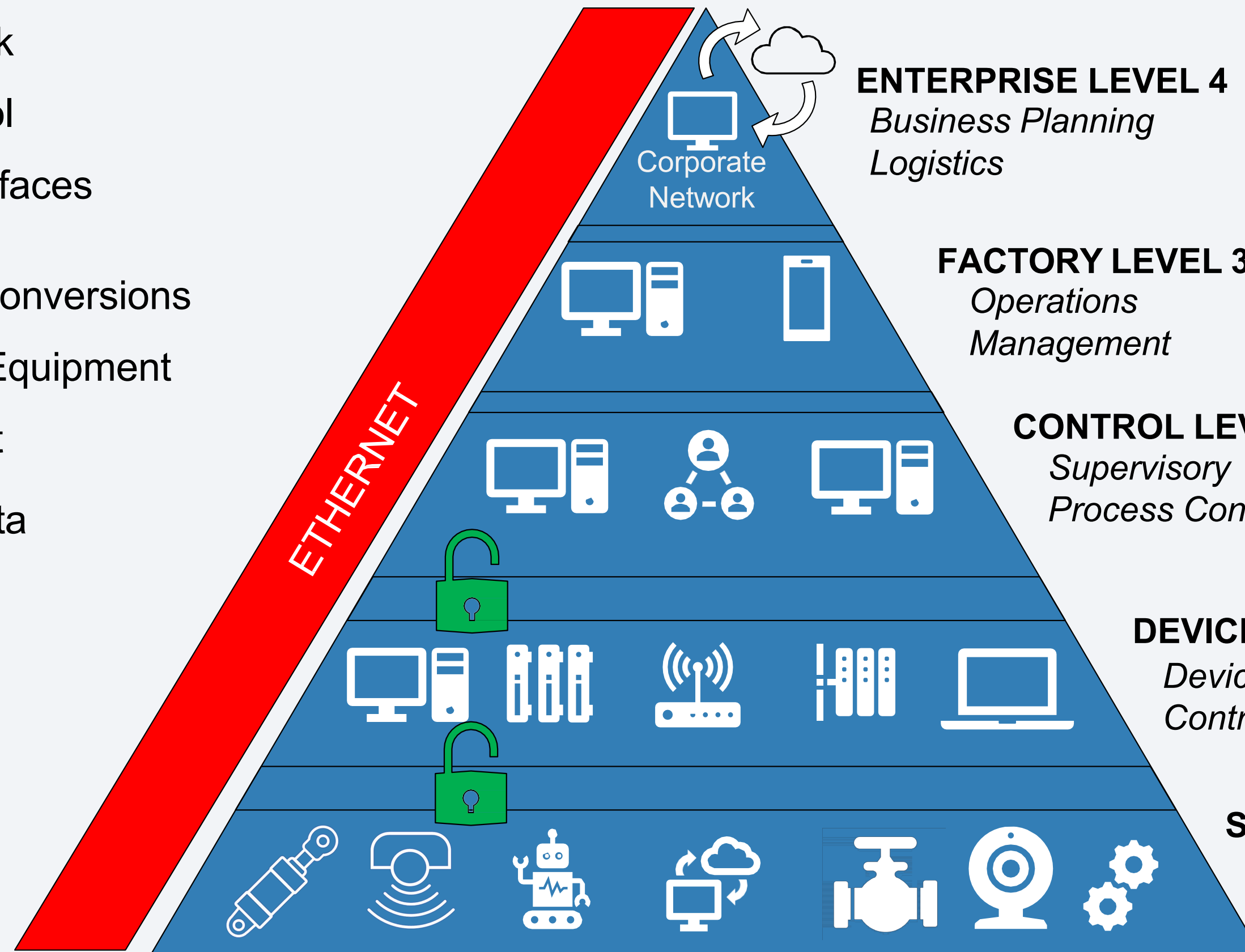
Multiple Networks
Multiple Protocols
Multiple Interfaces

Protocol Conversions needed
Gateway Equipment needed
Additional Cost
Data Latency
Limited Scalability



Single Network
Single Protocol
Common Interfaces

No Protocol Conversions
No Gateway Equipment
Reduced Cost
Real Time Data
Scalable



ENTERPRISE LEVEL 4
Business Planning
Logistics

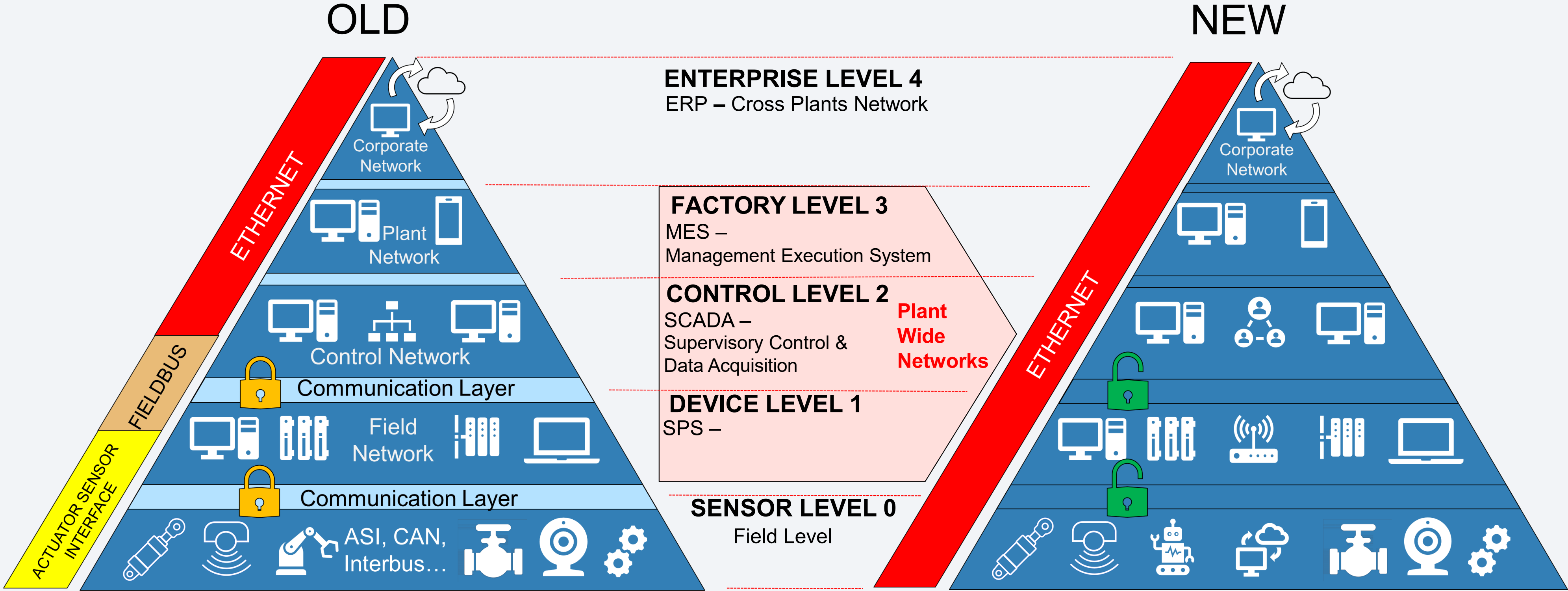
FACTORY LEVEL 3
Operations
Management

CONTROL LEVEL 2
Supervisory
Process Control

DEVICE LEVEL 1
Device Drivers
Controllers, PLCs, CNC

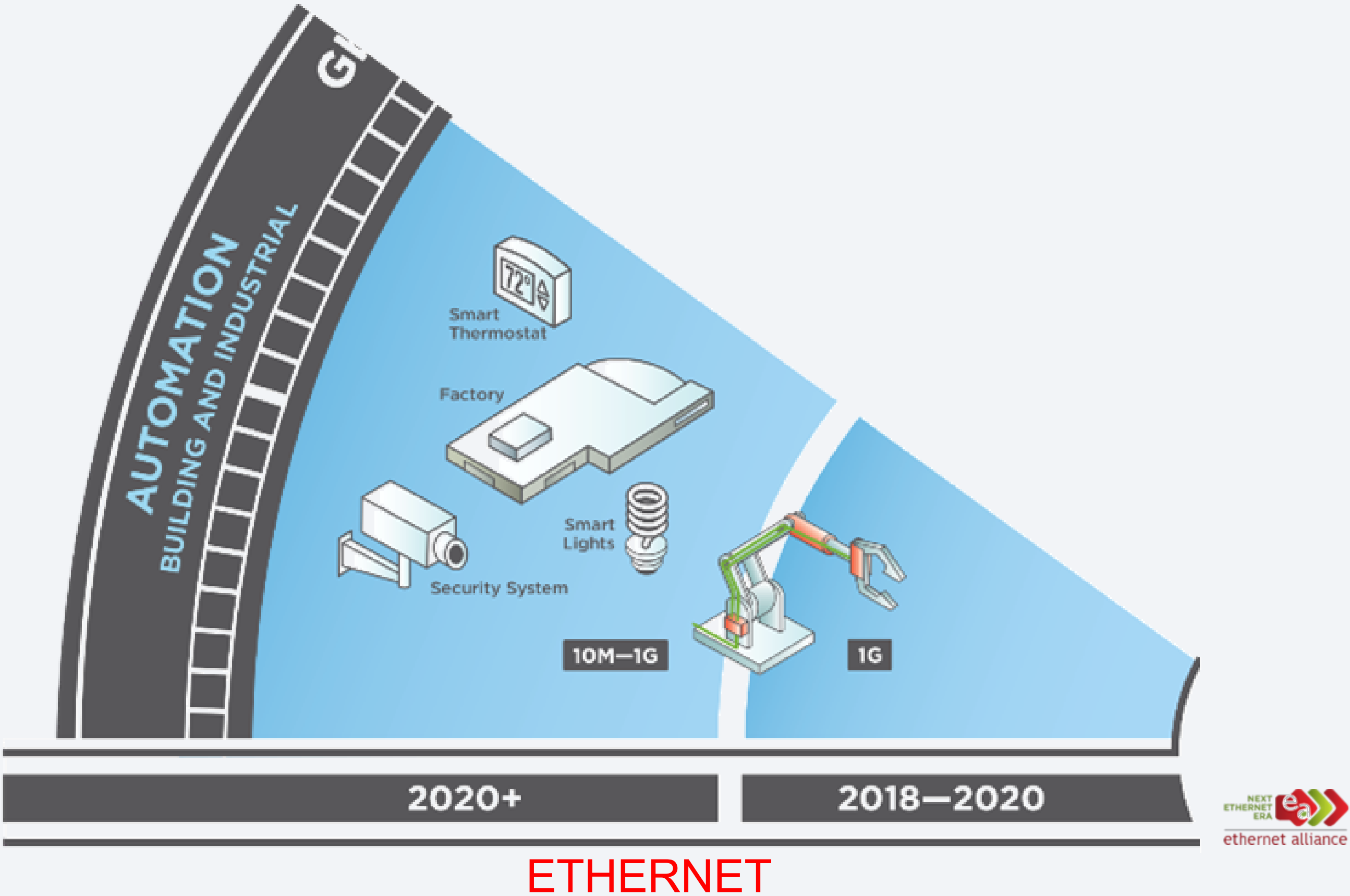
SENSOR LEVEL 0
Transmitters, Sensors, Actuators
Valves, Pumps, Motors, Relays

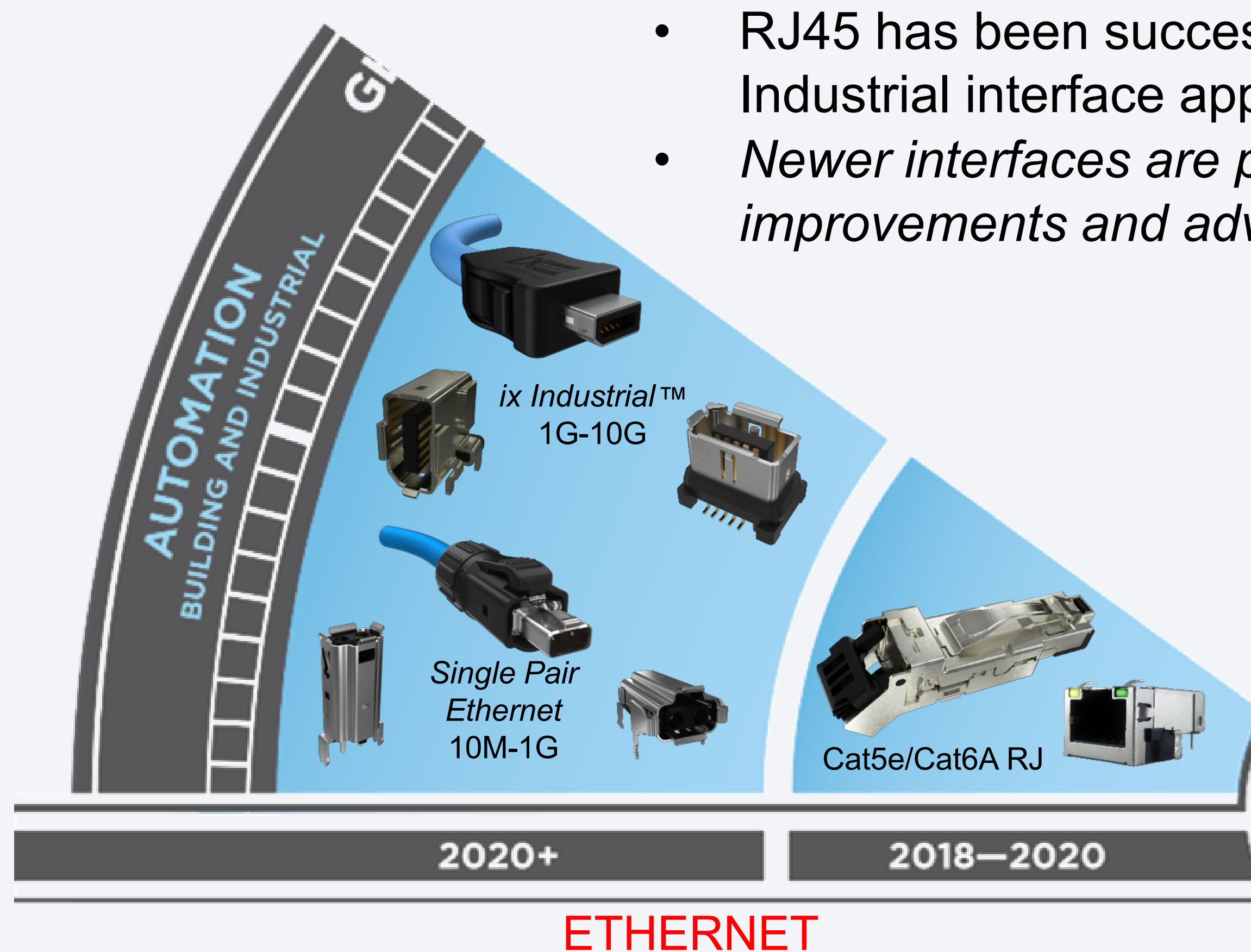
- Every device is addressed and available on the network
- Enables Virtual Factory “Digital Twin”
- Sensor Data collection & communication
- Monitor, Analyze, Diagnose & Predict



Hierarchical Automation model using independent communication systems at the Device, Cell, Control and Enterprise Levels

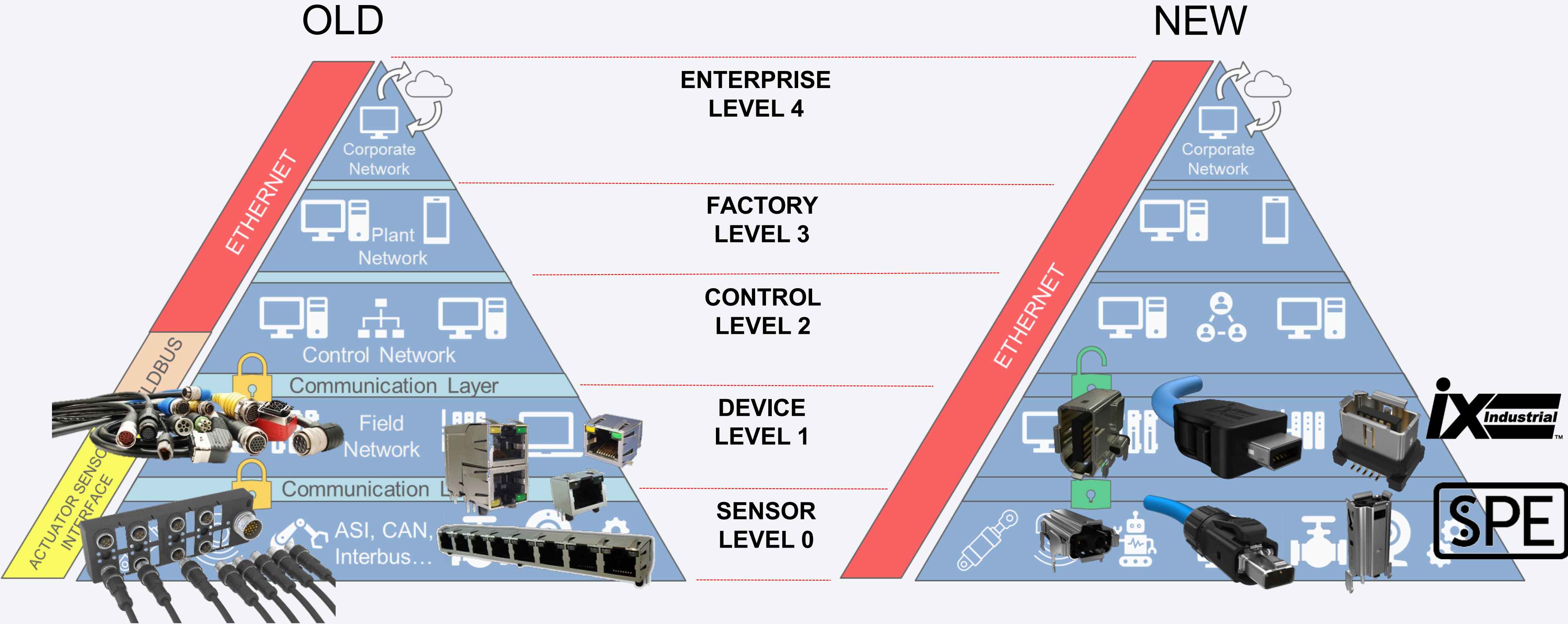
Single Network Automation model
All devices have IP addresses, connected with **ETHERNET** protocol





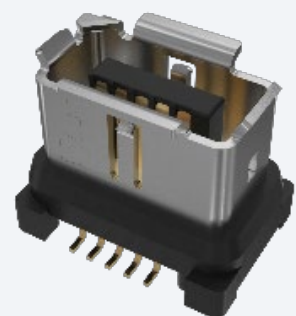
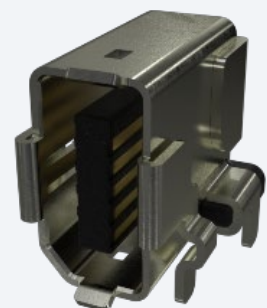
- RJ45 has been successfully adapted for many Industrial interface applications.
- *Newer interfaces are providing significant improvements and advantages.*





Next Generation Interfaces for Industrial Ethernet

Ideal for Data Networks, Robotics, Automation, Edge Equipment and various other Industrial Applications. High Performance, Robust, Compact Design and Standardized Interface for a variety of Industrial Environments.



- **Small Form Factor** – High Port Density for device proliferation and Scalability; Perfect for Small Devices (Sensors, Cameras & More)
- **Speed / EMI** – Supports & Protects Operating speeds in complex network environments
- **Ethernet Protocol** – Eliminates Protocol conversions, for Factory Automation & Robotics
- **Familiarity / Ease-Of-Design** - Same Silicon & Magnetics As Mod-Jacks
- **Supports Power to Devices** – Eliminating the need for power outlets
- **Standards Group Acceptance** – Meets Cat6a Per TIA568.2-D & Profinet Standards
- **Data Analytics** – Facilitates [Cloud-To-Sensor](#) Data Analytics For The IIoT Factory
- **IP-Rated** – Both IP20 Touchproof and IP67 Dust & Moisture Compliant Solutions
- **Rugged / Field Terminable** – Designed Specifically For Industrial Applications
- **Broad Solution Portfolio** – Vertical & R/A Board Connectors, Cables & More
- **Multi-Sourced** – Assures Continuity Of Supply
- **Two-Wire Solution** – Reduces Cable Bulk, Lighter, Facilitates Tighter Bends, [Lowers Cost!!!](#)

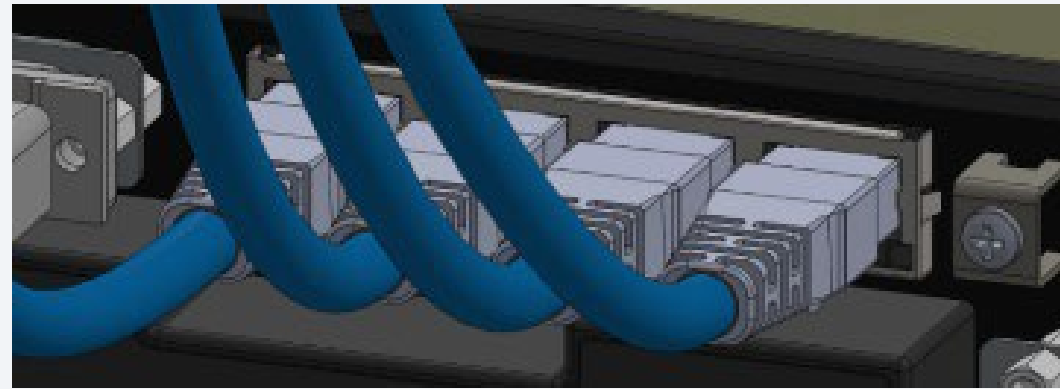


Benefits of a Small Form Factor

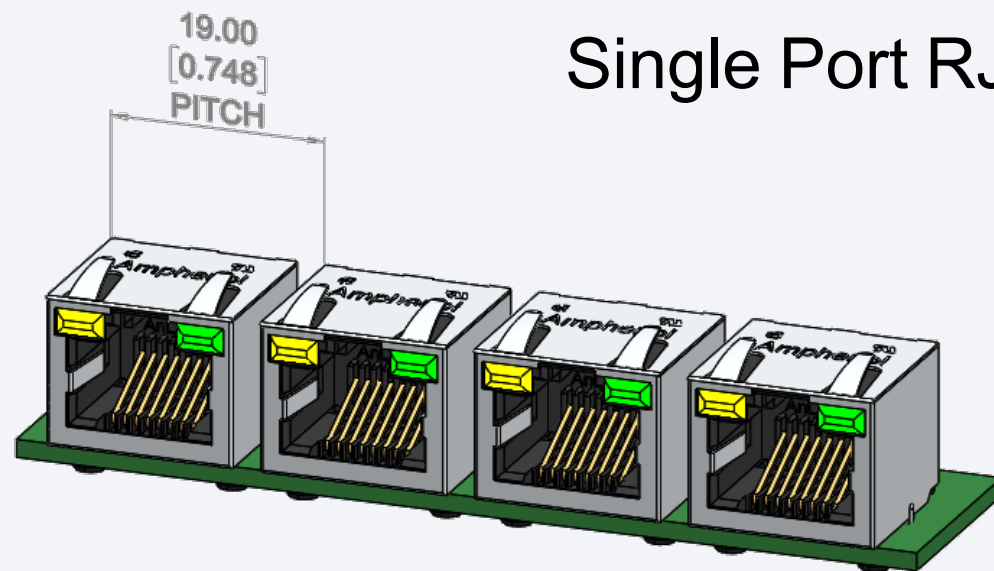
Size – Mating Face, Width and Height

Amphenol

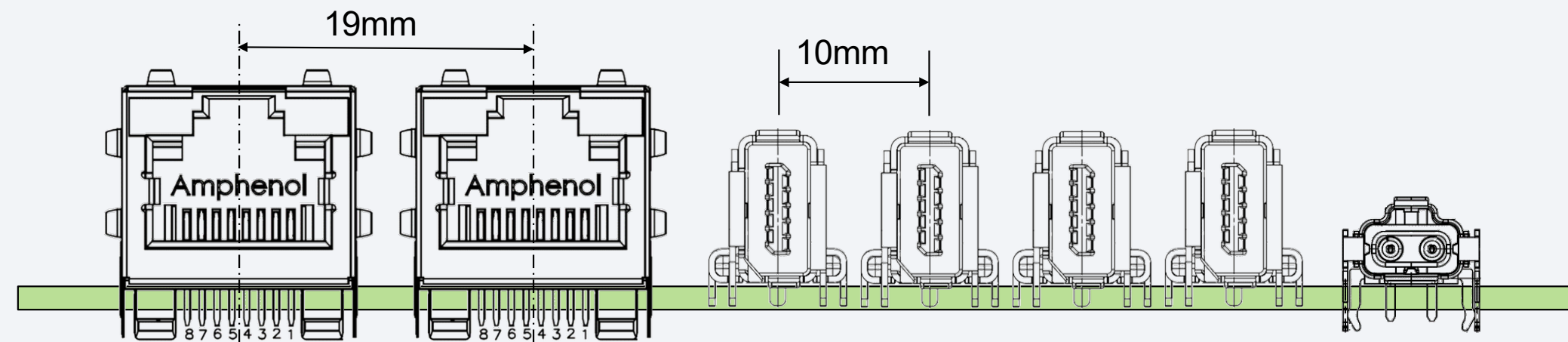
Small Form Factor saves valuable space on a PCB and panel, allowing much greater port density as well as reduced height requirements for constrained applications.



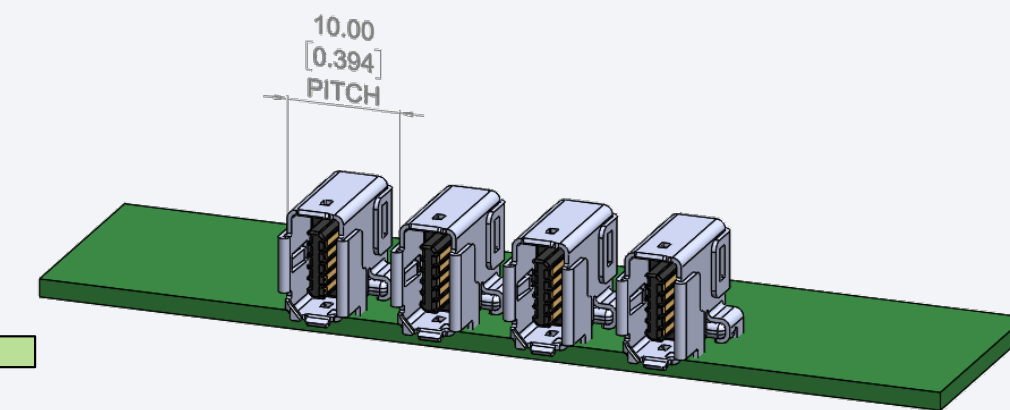
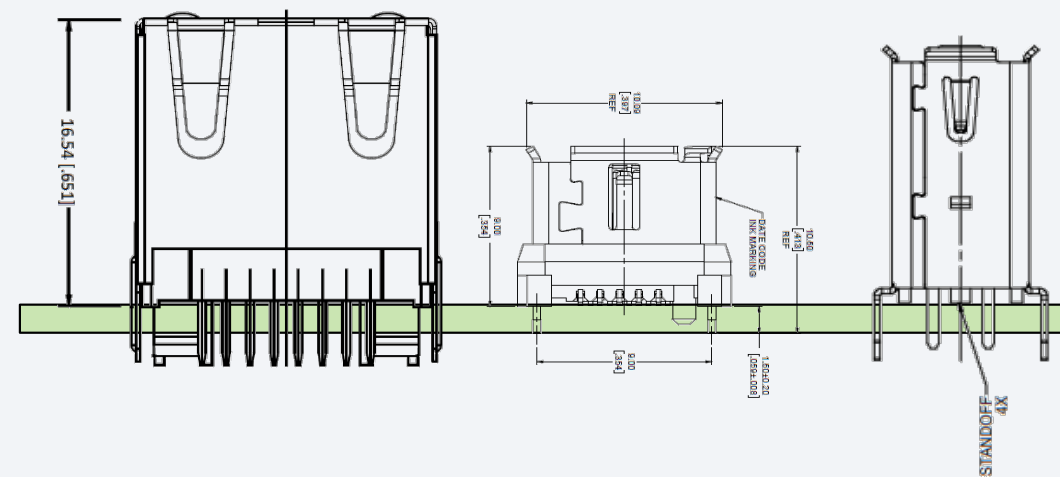
Single Port RJ45



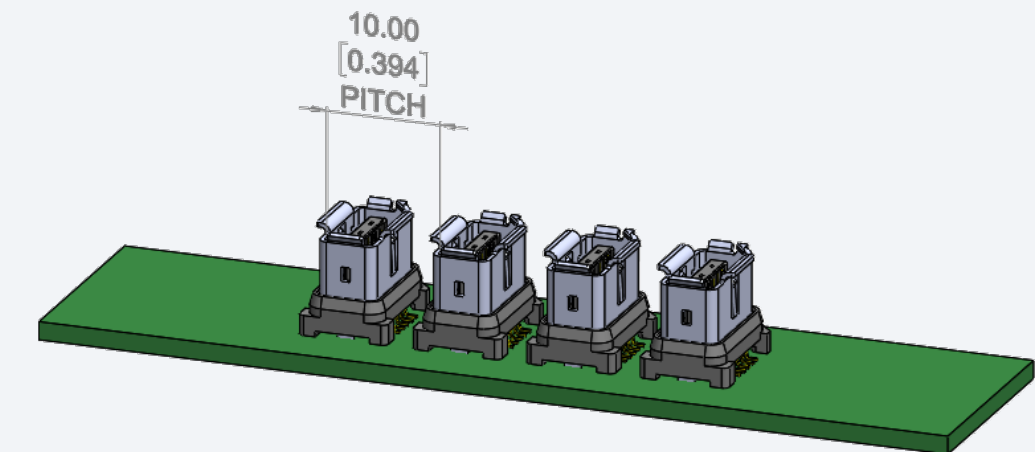
ix Industrial™ Right Angle



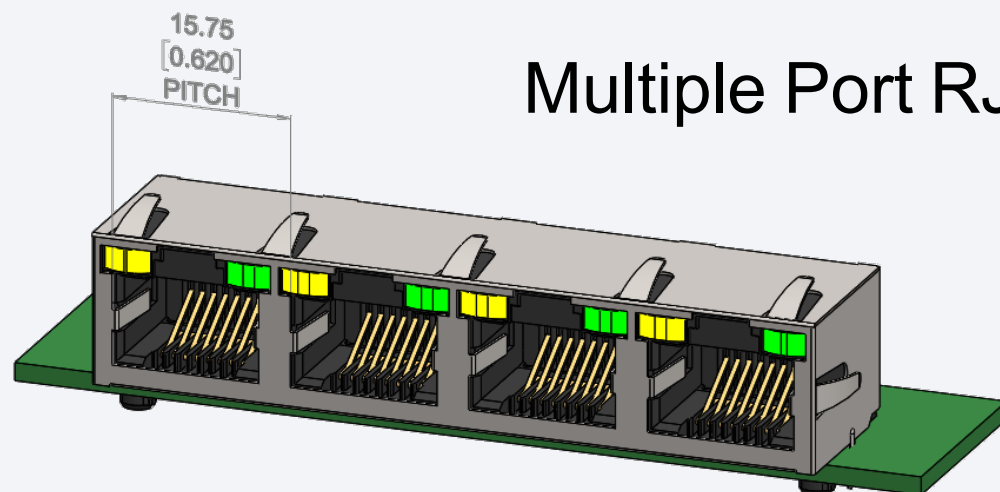
ix Industrial™ 40% shorter than vertical mount RJ45



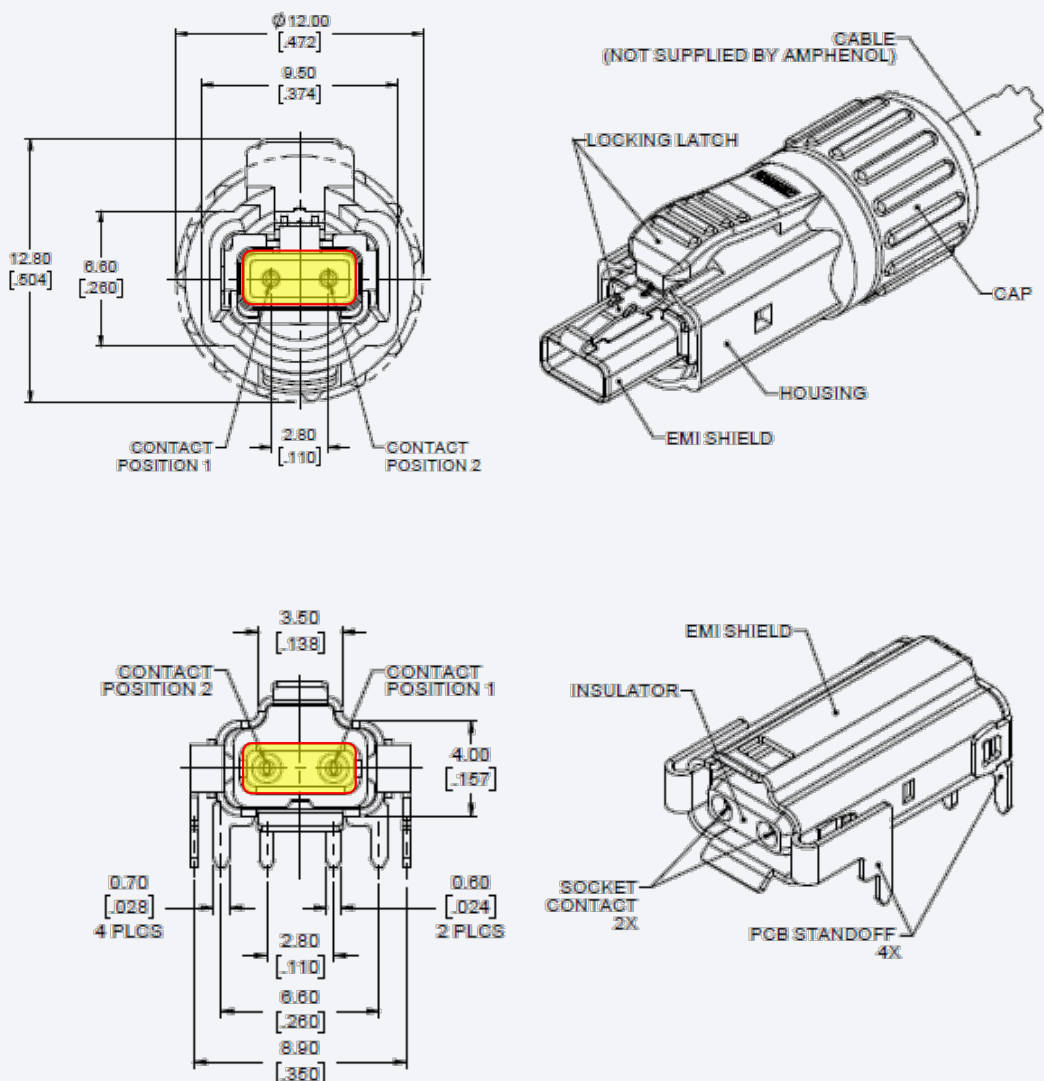
ix Industrial™ Vertical



Multiple Port RJ45



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

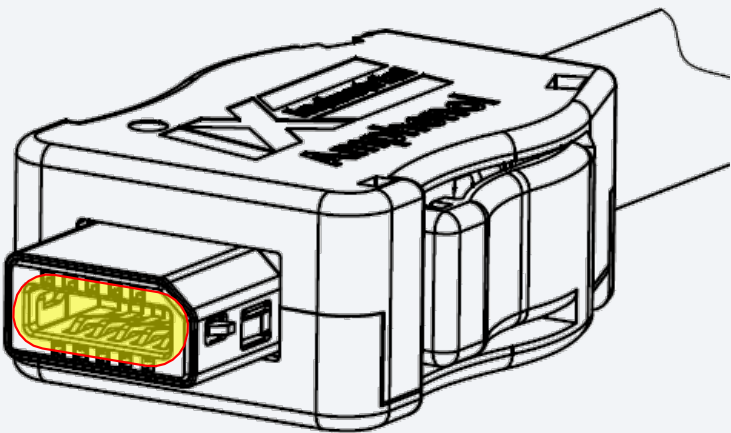
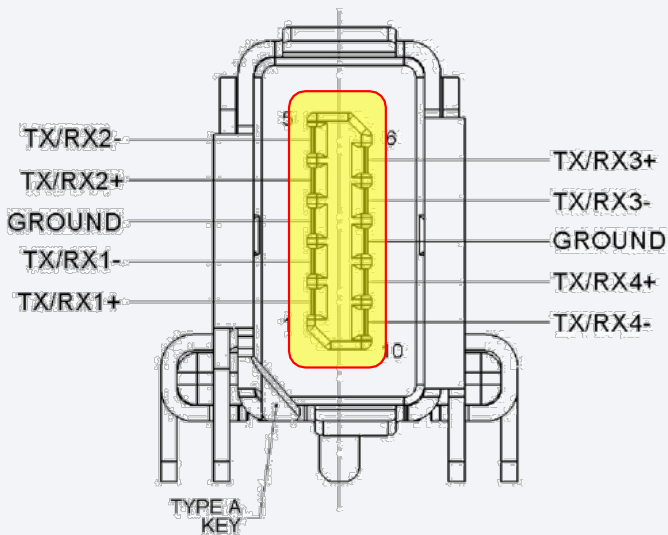


- Single pair = 2 wires
- Reduced cable size, weight, cost
- Lower speed for single devices

Product Series

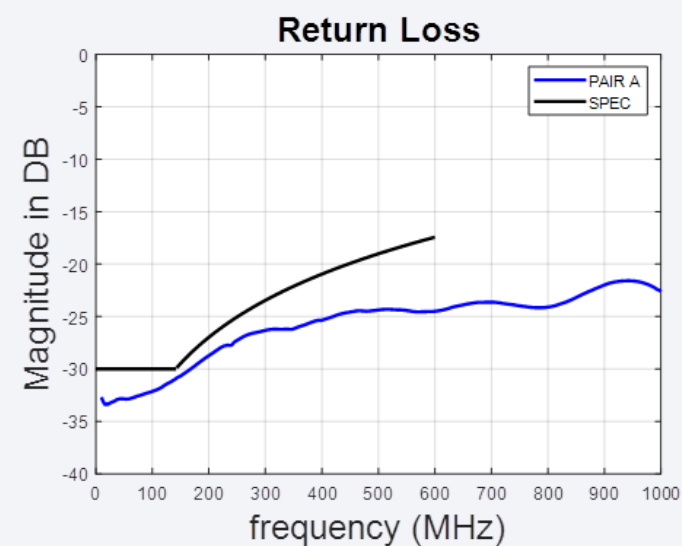


	SPE IP20	ix Industrial™ IP20
Pairs of Cable	1	4
Bandwidth	600 MHz	500 MHz
Performance / Cable length	IEEE802.3bp 1000BASE-T1 up to 40m IEEE802.3bw 100BASE-T1 up to 15m IEEE802.3cg 10BASE-T1 up to 1km	10GBASE-T up to 100m 5GBASE-T up to 100m 2.5GBASE-T up to 100m 1000BASE-T up to 100m 10/100 BASE-T up to 100m
Max. Voltage per pin	60VDC	50VAC / 60VDC
Max. Current per pin	4A	1.5A
PoE capability	IEEE802.3bu (PoDL) 50W	IEEE802.3af (PoE) 15.4W IEEE802.3at (PoE+) 30W IEEE 802.3bt (PoE++) 100W
RoHS compliant	Yes	Yes
Standards	IEC 63171-6	IEC61076-3-124
Shielding	360 degrees (fully shielded)	360 degrees (fully shielded)
Mating Cycles	1,000 minimum	5,000 minimum
Operating Temp Range	-40°C to +85°C	-55°C to +85°C
Ingress Protection Level	IP20	IP20
Latch Retention Force	50N minimum	80N minimum



ix has 10 positions, 5 pair capability

- 4 pairs = 8 wires
- Supports 4 pair Ethernet
- High speed multiple devices



- 600 MHz bandwidth, Cat 5e
- 1Gbps up to 40m
- 10Mbps up to 1km

Product Series



SPE IP20

ix Industrial™ IP20

Pairs of Cable

1

4

Bandwidth

600 MHz

500 MHz

Error Free Performance

Max. Voltage per pin

60VDC

50VAC / 60VDC

Max. Current per pin

4A

1.5A

PoE capability

IEEE802.3bu (PoDL) 50W

IEEE802.3af (PoE) 15.4W
IEEE802.3at (PoE+) 30W
IEEE 802.3bt (PoE++) 100W

RoHS compliant

Yes

Yes

Standards

IEC 63171-6

IEC61076-3-124

Shielding

360 degrees (fully shielded)

360 degrees (fully shielded)

Mating Cycles

1,000 minimum

5,000 minimum

Operating Temp Range

-40°C to +85°C

-55°C to +85°C

Ingress Protection Level

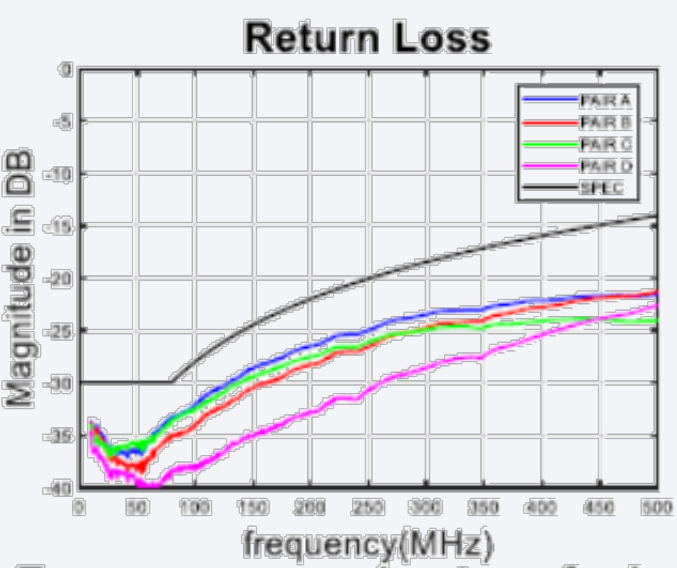
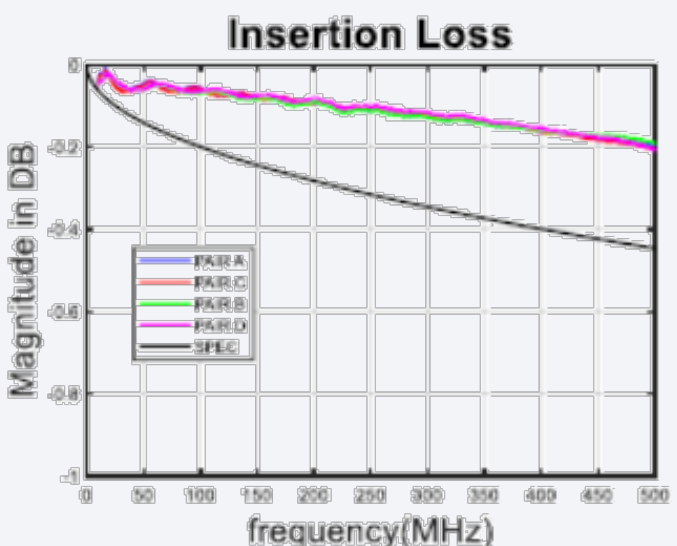
IP20

IP20

Latch Retention Force

50N minimum

80N minimum



- 500 MHz bandwidth, Cat 6A
- 10Gbps up to 100m
- 1Gbps up to 100m



• Power Over Data Link (PoDL)

	IEEE 802.3cg						Units
Class	24 V			55 V			
Class #	10	11	12	13	14	15	
V _{PSE(max)}	30			58			V
V _{PSE(min)}	20			50			V
I _{PI(max)}	92	240	632	231	600	1579	mA
P _{PD(max)}	1,23	3,2	8,3	7,7	20	52	W
Link length	1000	400	150	1000	400	150	m

- 1.2W over 1km
- 50W over 150m (at 1.6A)
- SPE rated to 4A with 18 AWG, can accommodate more power

Product Series



SPE IP20

Pairs of Cable

1

Bandwidth

600 MHz

Performance / Cable length

IEEE802.3bp 1000BASE-T1 up to 40m
IEEE802.3bw 100BASE-T1 up to 15m
IEEE802.3cg 10BASE-T1 up to 1km

Max. Voltage per pin

60VDC

Max. Current per pin

4A

PoE capability

IEEE802.3bu (PoDL) 50W

RoHS compliant

Yes

Standards

IEC 63171-6

Shielding

360 degrees (fully shielded)

Mating Cycles

1,000 minimum

Operating Temp Range

-40°C to +85°C

Ingress Protection Level

IP20

Latch Retention Force

50N minimum



ix Industrial™ IP20

4

500 MHz

10GBASE-T up to 100m
5GBASE-T up to 100m
2.5GBASE-T up to 100m
1000BASE-T up to 100m
10/100 BASE-T up to 100m

50VAC / 60VDC

1.5A

IEEE802.3at (PoE) 15.4W
IEEE802.3at (PoE+) 30W
IEEE 802.3bt (PoE++) 100W

Yes

IEC61076-3-124

360 degrees (fully shielded)

5,000 minimum

-55°C to +85°C

IP20

80N minimum

Plug & Play



• Power Over Ethernet (PoE++)

Release	2018			
Standard	IEEE 802.3bt			
Type	3		4	
Class	5	6	7	8
PoE Energized Pairs	4			
Name	PoE++, 4PPoE, UPoE		PoE++, High-Power PoE	
Source Current (max. per pair set)	450mA	600 mA	721 mA	865-961 mA
Source Voltage (min.)	50 V	50V	52 V	52 V
Source Power from PSE (Max)	45 W	60 W	75 W	90-100 W
Delivered Voltage to PD (min.)	44.4 V	42.5V	42.3 V	41-45.5 V
Delivered Power to PD (Max)	40W	51 W	62 W	71-87 W
Typical Applications	P Mgmt Devices	Sensors	LED Lighting	Actuators

- PoE Std is 100W over 40m
- ix Connector rated at 1.5A per contact, up to 200W



COMMITTED TO

IEC 63171-6

INDUSTRIAL PARTNER NETWORK

- IEC 63171-6: preferred standard for Industrial applications
- Supported by multiple suppliers

Product Series		
	SPE IP20	ix Industrial™ IP20
Pairs of Cable	1	4
Bandwidth	600 MHz	500 MHz
Performance / Cable length	IEEE802.3bp 1000BASE-T1 up to 40m IEEE802.3bw 100BASE-T1 up to 15m IEEE802.3cg 10BASE-T1 up to 1km	10GBASE-T up to 100m 5GBASE-T up to 100m 2.5GBASE-T up to 100m 1000BASE-T up to 100m 10/100 BASE-T up to 100m
Max. Voltage per pin	60VDC	50VAC / 60VDC
Max. Current per pin	4A	1.5A
PoE capability	IEEE802.3bu (PoDL) 50W	IEEE802.3af (PoE) 15.4W IEEE802.3at (PoE+) 30W IEEE 802.3bt (PoE++) 100W
RoHS compliant	Yes	Yes
Standard	Reliable Performance	
Shielding	360 degrees (fully shielded)	360 degrees (fully shielded)
Mating Cycles	1,000 minimum	5,000 minimum
Operating Temp Range	-40°C to +85°C	-55°C to +85°C
Ingress Protection Level	IP20	IP20
Latch Retention Force	50N minimum	80N minimum

Amphenol

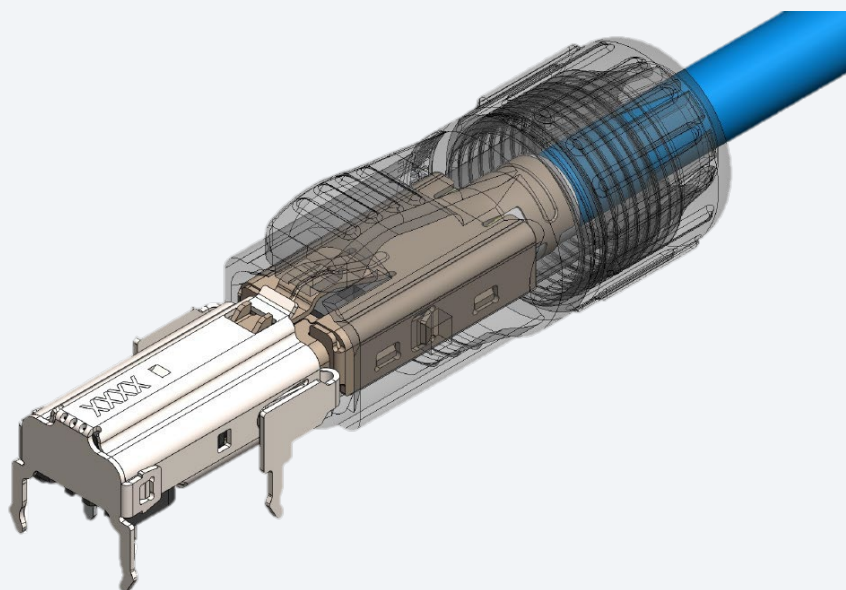
Next Generation Industrial Ethernet Connectors

ix Industrial™: IEC 61076-3-124 compliant, 10-way, 10G ruggedized Industrial Ethernet connectors



ix Industrial™

- IEC 61076-3-124: established standard with intermatable products from multiple suppliers



Product Series

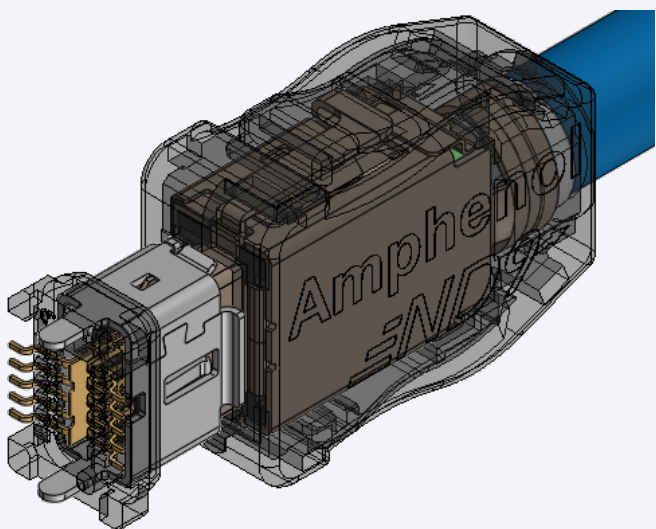


SPE IP20

Pairs of Cable	1	4
Bandwidth	600 MHz	500 MHz
Performance / Cable length	IEEE802.3bp 1000BASE-T1 up to 40m IEEE802.3bw 100BASE-T1 up to 15m IEEE802.3cg 10BASE-T1 up to 1km	10GBASE-T up to 100m 5GBASE-T up to 100m 2.5GBASE-T up to 100m 1000BASE-T up to 100m 10/100 BASE-T up to 100m
Max. Voltage per pin	60VDC	50VAC / 60VDC
Max. Current per pin	4A	1.5A
PoE capability	IEEE802.3bu (PoDL) 50W	IEEE802.3af (PoE) 15.4W IEEE802.3at (PoE+) 30W IEEE 802.3bt (PoE++) 100W
RoHS compliant	Yes	Yes
Standards	IEC 63171-6	IEC61076-3-124
Shielding	360 degree shield	360 degree (fully shielded)
Mating force	1,000 lbf	5,000 lbf
Operating Temp Range	-40°C to +85°C	-55°C to +85°C
Ingress Protection Level	IP20	IP20
Latch Retention Force	50N minimum	80N minimum

Superior EMI Control

- Full metal shield through the mated pair ensures protection from radiated emissions and maintains signal integrity
- Contact design ensures long mating life



- Full metal shield through the mated pair prevents any radiated emissions from impacting nearby equipment
- Unique ribbon style contacts with low normal forces mean extended life



- IP20 finger-proof design with recessed pins and sockets ensures safety and protects contacts from damage over entire temperature range
- IP6X versions also available

Product Series



SPE IP20

Pairs of Cable

1

Bandwidth

600 MHz

Performance / Cable length

IEEE802.3bp 1000BASE-T1 up to 40m
IEEE802.3bw 100BASE-T1 up to 15m
IEEE802.3cg 10BASE-T1 up to 1km

Max. Voltage per pin

60VDC

Max. Current per pin

4A

PoE capability

IEEE802.3bu (PoDL) 50W

RoHS compliant

Yes

Standards

IEC 63171-6

Shielding

360 degrees (fully shielded)

Mating Cycles

1,000 minimum

Operating Temp Range

-40°C to +85°C

Ingress Protection

IP20

Latch Retention Force

50N minimum



ix Industrial™ IP20

4

500 MHz

10GBASE-T up to 100m
5GBASE-T up to 100m
2.5GBASE-T up to 100m
1000BASE-T up to 100m
10/100 BASE-T up to 100m

50VAC / 60VDC

1.5A

IEEE802.3af (PoE) 15.4W
IEEE802.3at (PoE+) 30W
IEEE 802.3bt (PoE++) 100W

Yes

IEC61076-3-124

360 degrees (fully shielded)

5,000 minimum

-55°C to +25°C

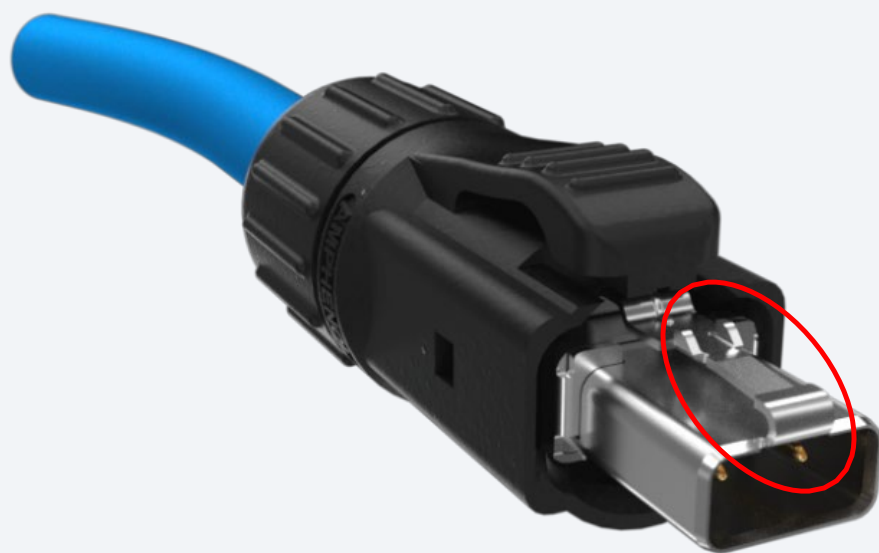
IP20

80N minimum



- IP20 design with overmolded ribbon contacts prevents damage and ensures safety over entire extended temperature range
- IP6X versions also available

Finger Proof Protection



- Heavy duty single metal latch engages with mating receptacle preventing accidental unmating.
- Impervious to damage such as on a plastic-latched RJ45

Product Series



SPE IP20

Pairs of Cable

1

Bandwidth

600 MHz

Performance / Cable length

IEEE802.3bp 1000BASE-T1 up to 40m
IEEE802.3bw 100BASE-T1 up to 15m
IEEE802.3cg 10BASE-T1 up to 1km

Max. Voltage per pin

60VDC

Max. Current per pin

4A

PoE capability

IEEE802.3bu (PoDL) 50W

RoHS compliant

Yes

Standards

IEC 63171-6

Shielding

360 degrees (fully shielded)

Mating Cycles

1,000 minimum

Latch Retention Force

50N minimum



ix Industrial™ IP20

4

500 MHz

10GBASE-T up to 100m
5GBASE-T up to 100m
2.5GBASE-T up to 100m
1000BASE-T up to 100m
10/100 BASE-T up to 100m

50VAC / 60VDC

1.5A

IEEE802.3af (PoE) 15.4W
IEEE802.3at (PoE+) 30W
IEEE 802.3bt (PoE++) 100W

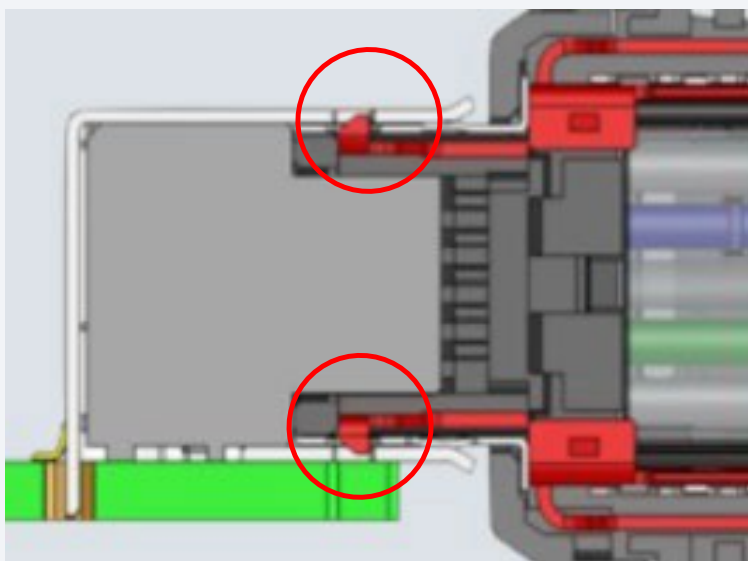
Yes

IEC61076-3-124

360 degrees (fully shielded)

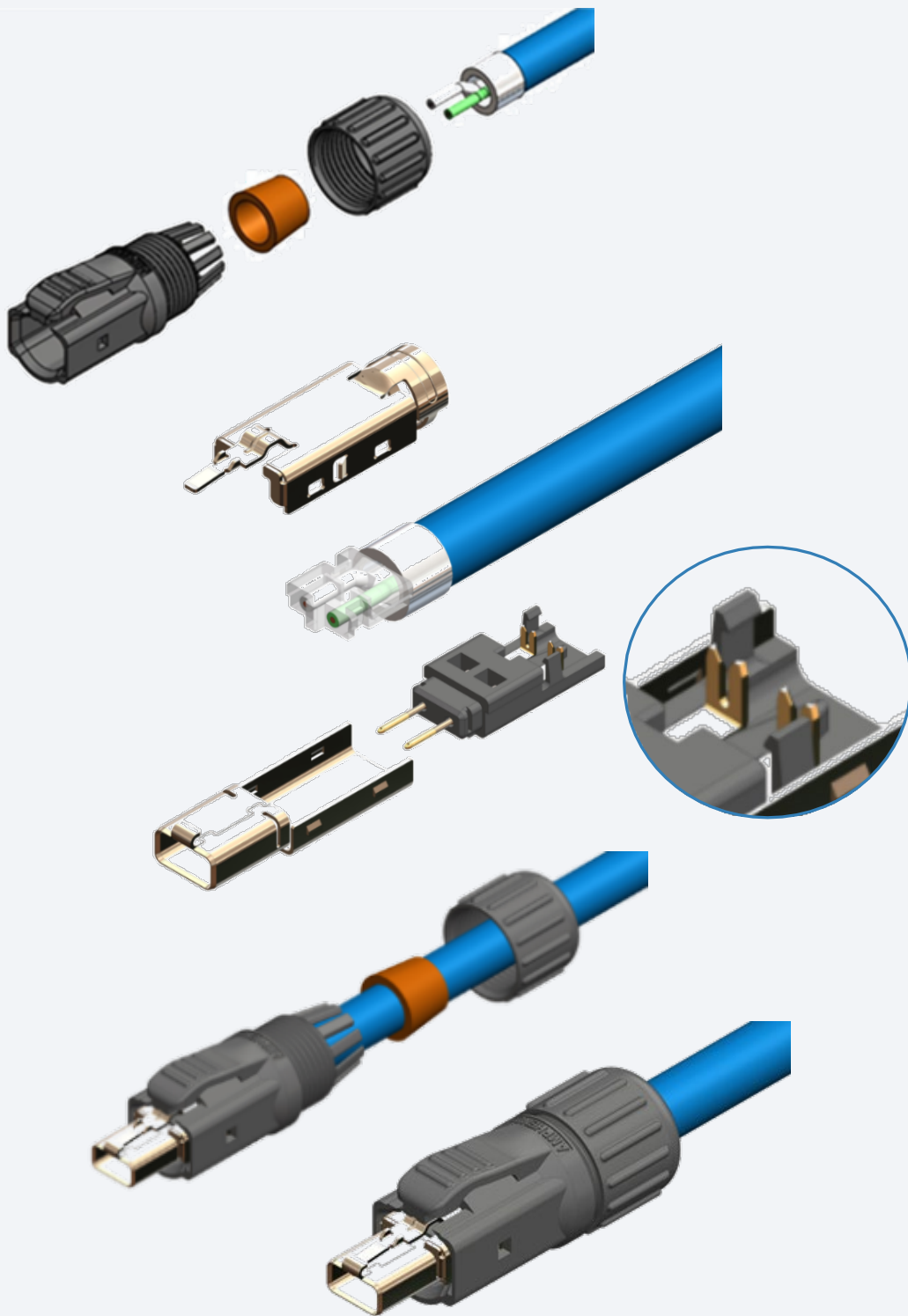
5,000 minimum

80N minimum

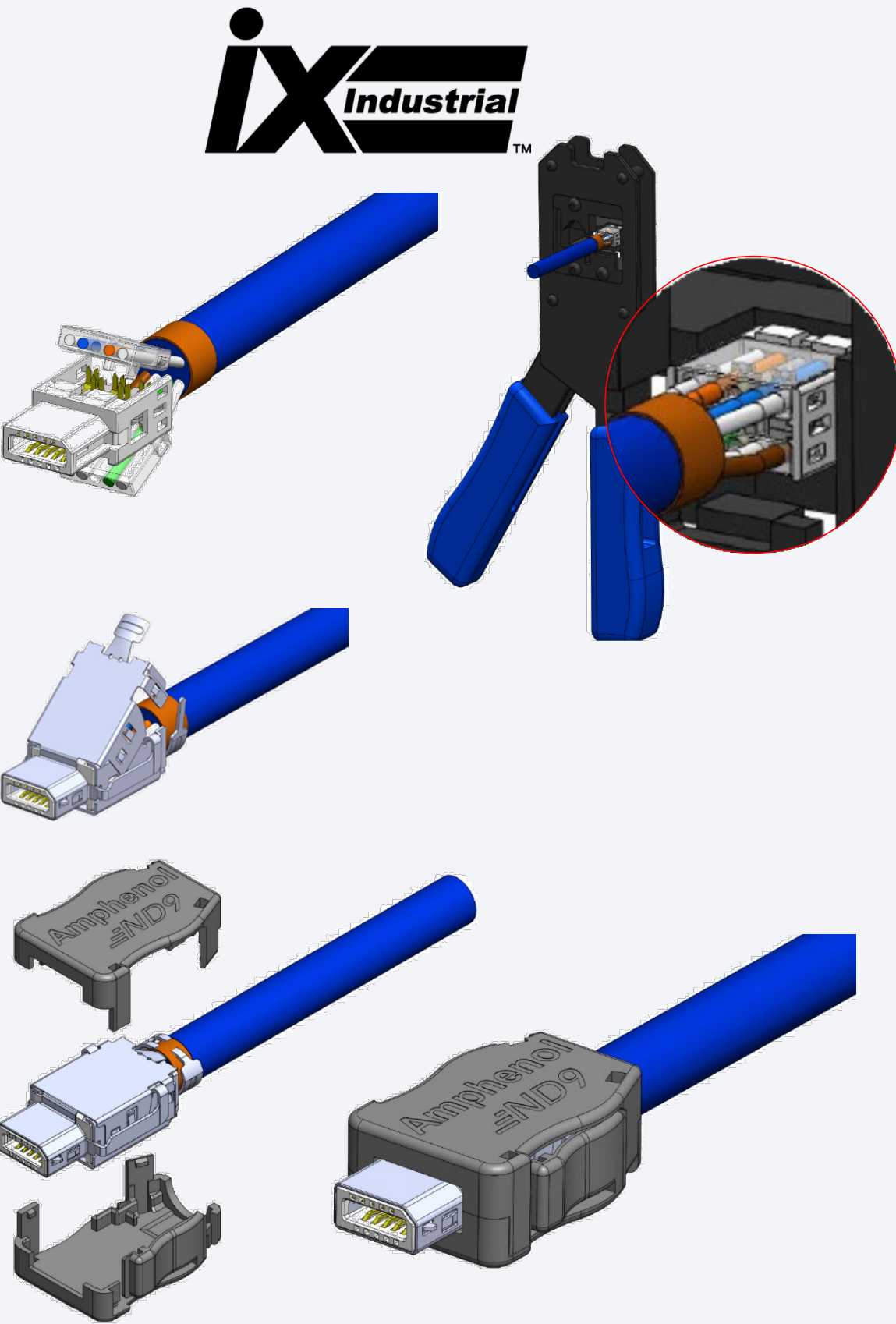


- Dual metal latches on opposite sides provide ultimate security against unintended unmating, while ensuring easy operation to unlatch when needed.

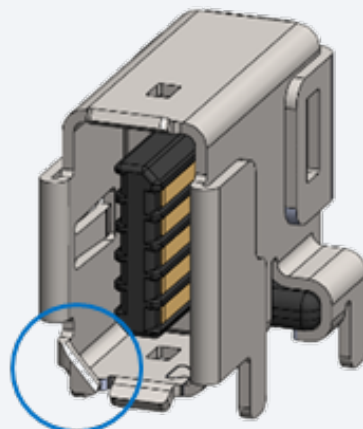
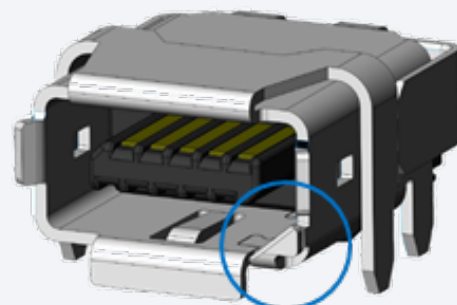
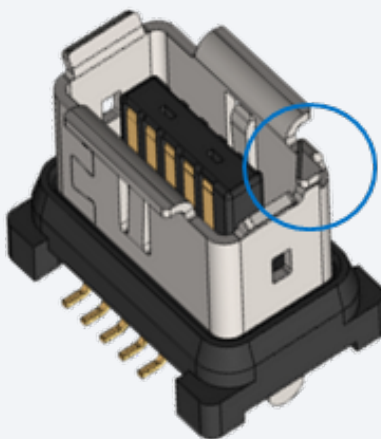
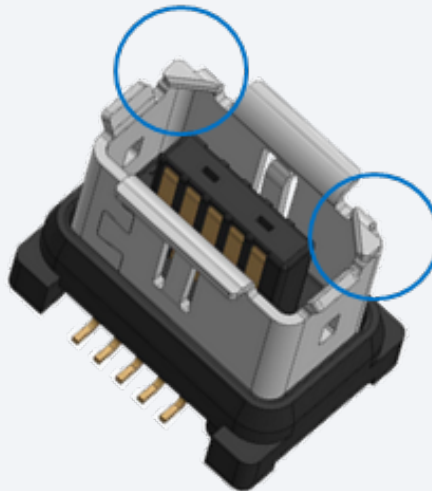
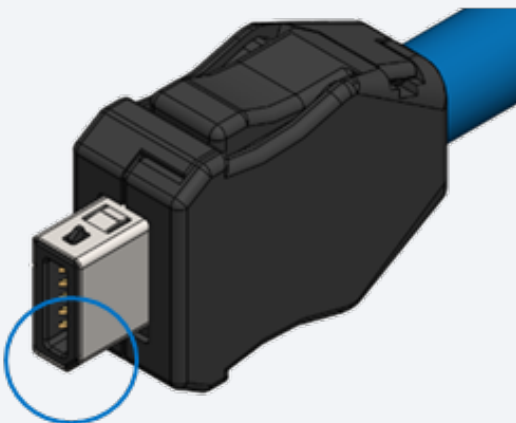
Strong Reliable Latching



Product Series	Amphenol™ IP20	
	600 MHz	500 MHz
Pairs of Cable	4	4
Bandwidth	600 MHz	500 MHz
Performance Category	IEEE 802.3ab 10GBASE-T up to 100m IEEE 802.3at PoE up to 100m	10GBASE-T up to 100m 1000BASE-T up to 100m 10/100 BASE-T up to 100m
Max. Voltage per pin		
Max. Current per pin	4A	1.5A
PoE capability	IEEE802.3bu (PoE) 100W	IEEE802.3af (PoE) 15.4W IEEE802.3at (PoE) 30W IEEE 802.3bt (PoE) 96W
RoHS compliant	Yes	Yes
Standards	IEC 631	IEC61076-3-124
Shielding	360 degrees (fully shielded)	360 degrees (fully shielded)
Mating Cycles	1,000 minimum	1,000 minimum
Operating Temp Range	-40°C to +85°C	-40°C to +85°C
Ingress Protection Level	IP20	IP20
Latch Retention Force	50N minimum	80N minimum



Keyed Housings

Receptacle Connectors			Plug Connector	
Vertical Right Angle SMT ("Flag")	Horizontal Right Angle SMT	Vertical SMT		IDC/Solder
 Type-A Key Shown	 Type-A Key Shown	 Type-B Key Shown	 Type-C Key Shown	 Type-A Key Shown

- Type-A: CAT6A Ethernet, Single Key
- Type-B: Signal and Bus Communication, Single Key
- Type-C: CAT6A Ethernet, Dual Key

Rectangular Push-Pull



Plugs



- Push-Pull latching rectangular design
- Sealing O-Rings and gaskets
- Cat6A performance
- Field installable IDC or solder pads
- Fully shielded throughout entire mated interface

Receptacles



- Panel Mount bulkhead adapter
- Uses standard IP20 pcb receptacle
- Provides positive, IP67 sealed latch to plug
- Protects equipment and the mated interface

Cables

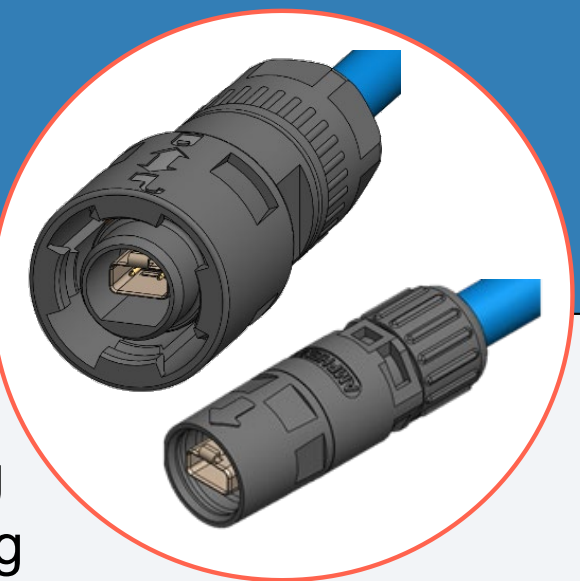


- ix to ix, or to other interfaces
- Standard & customer lengths
- Variety of cable options

Circular Push-Pull



Plugs



- IEC M12 form factor
- Push-Pull Coupling ring for positive latching
- Snap-Lock option for easy mating/un-mating
- Sealing O-Rings and gaskets ensure water tight protection
- Cat5e performance
- Field installable IDC or crimp
- Fully shielded

Receptacles



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

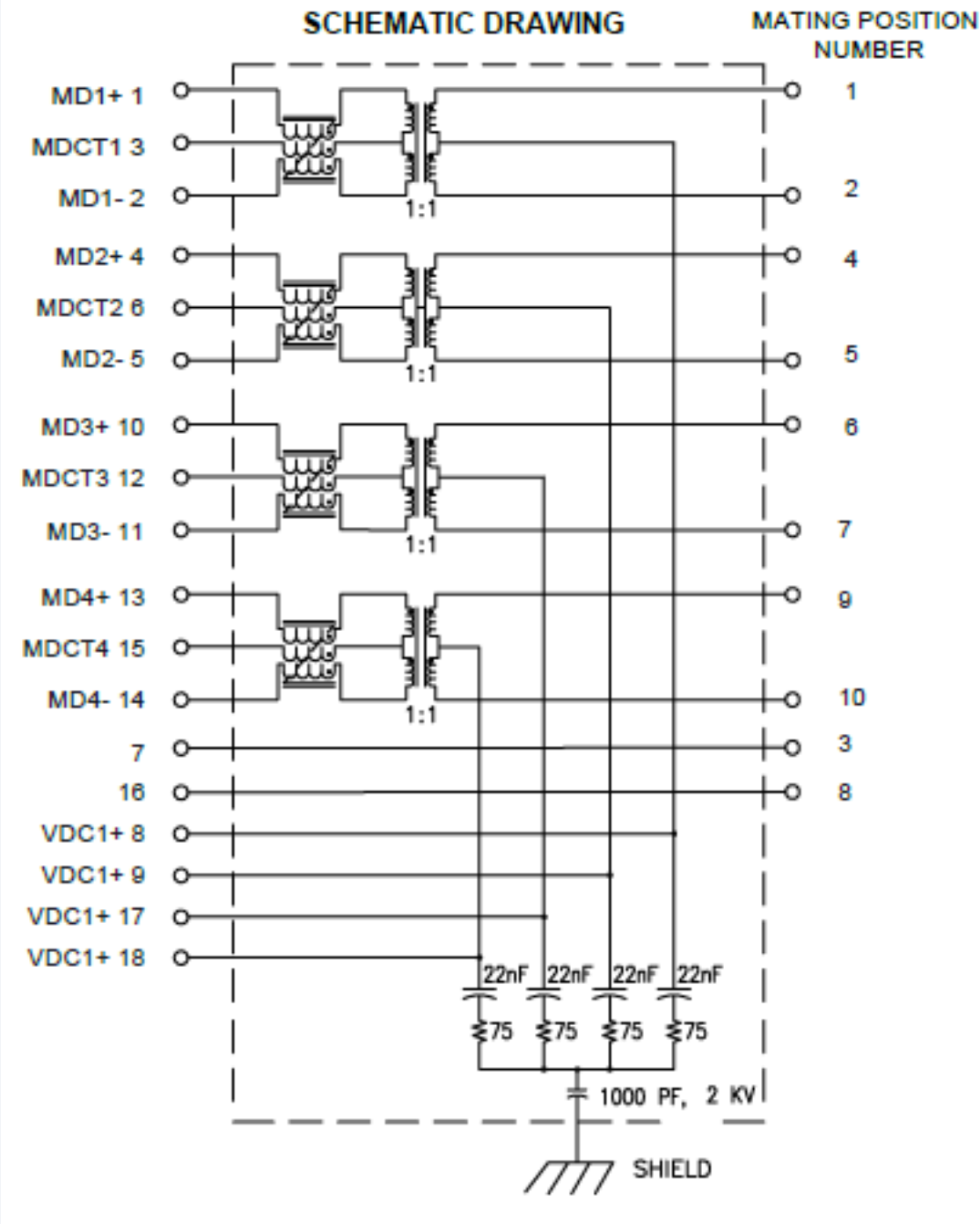
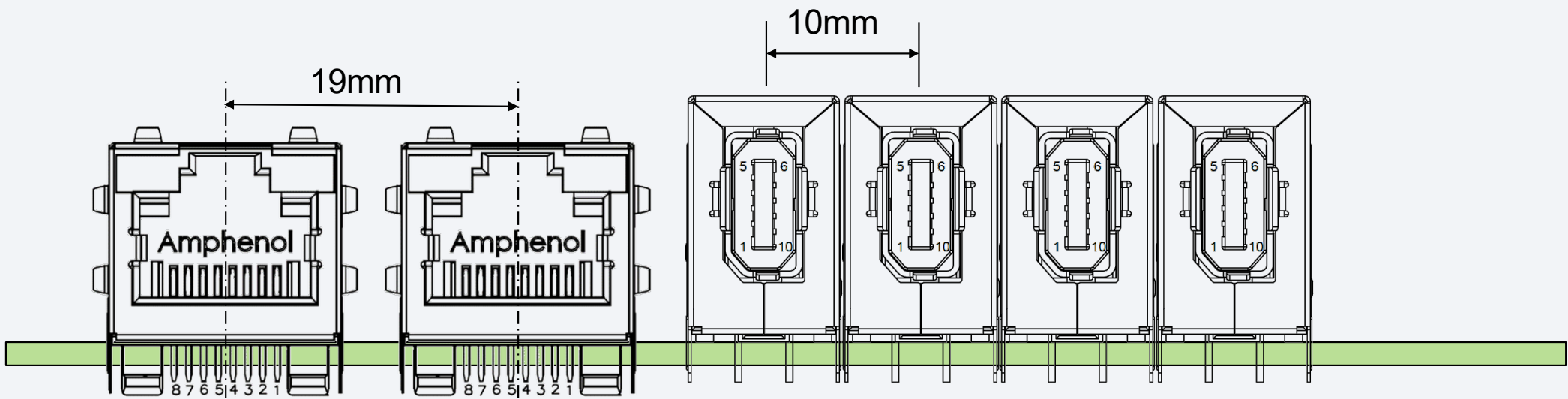
Cables



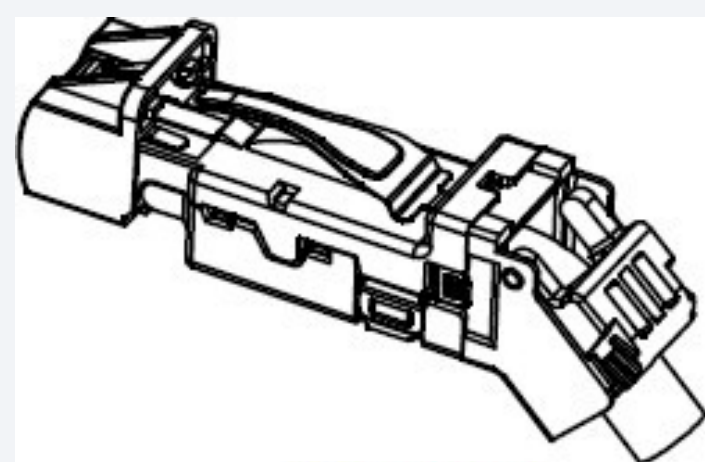
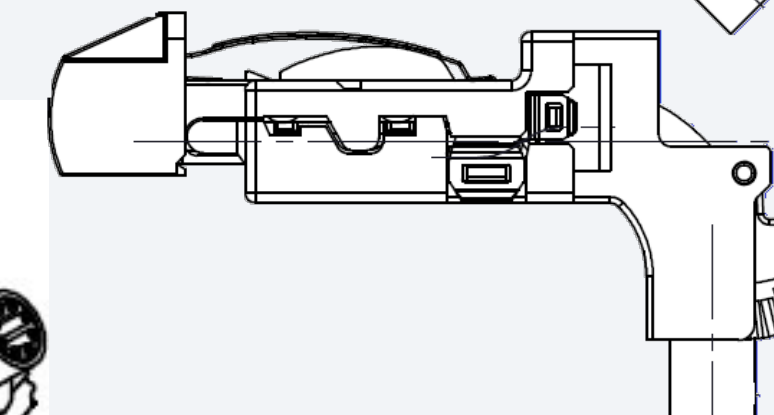
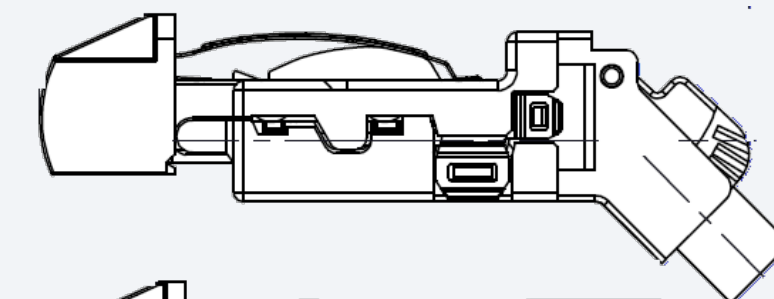
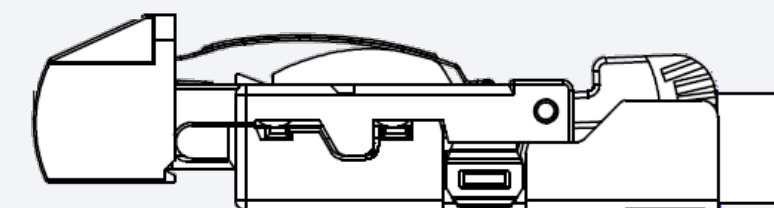
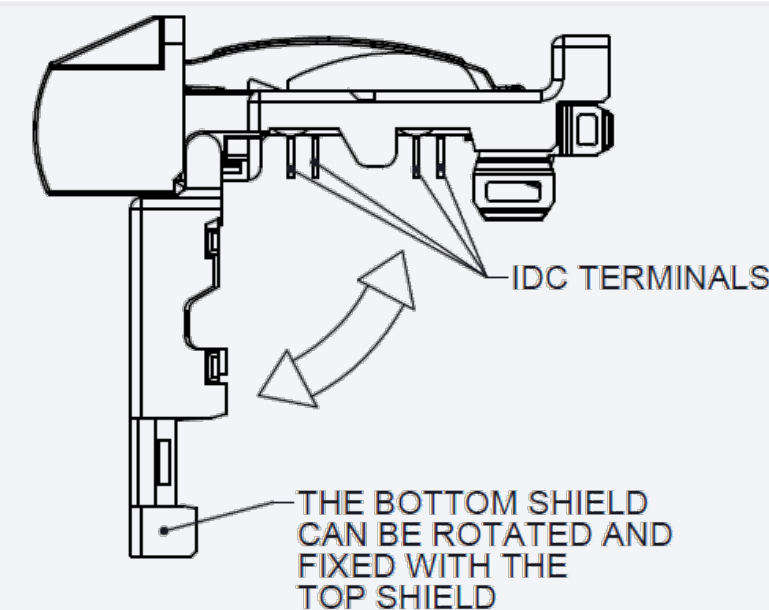
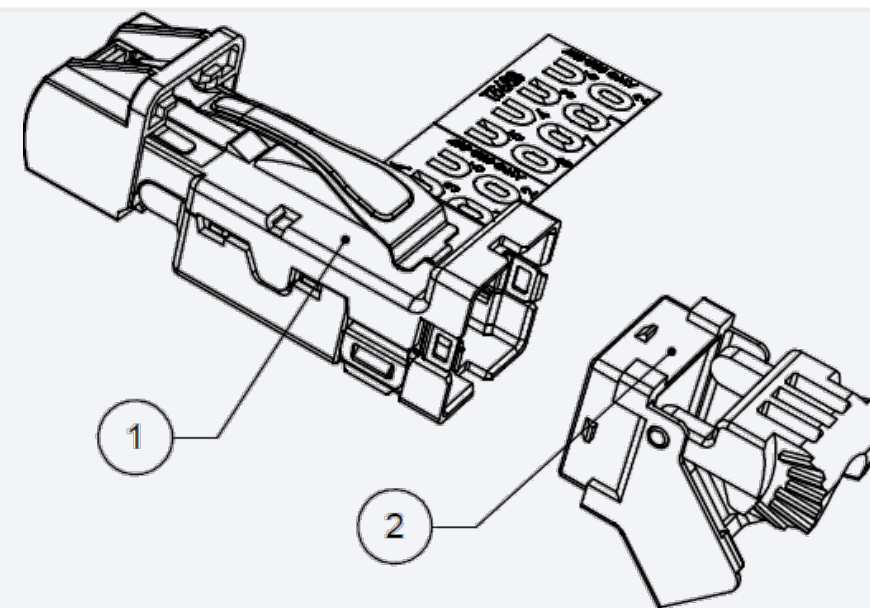
- SPE to SPE
- SPE to sensor/actuator
- Standard & customer lengths
- Variety of cable options



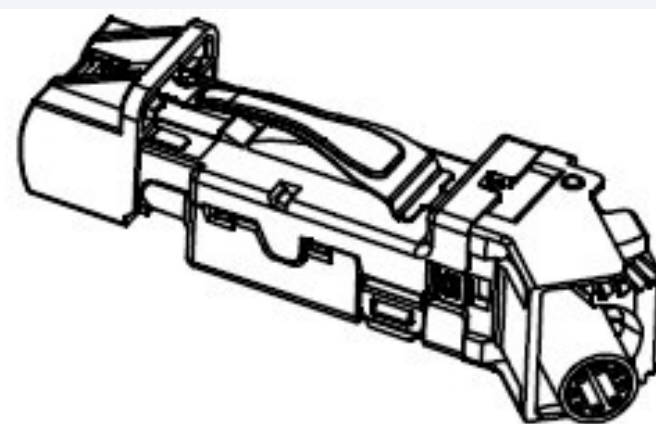
Features	Benefits
100BaseT, 1000BaseT, 10GBaseT performance	IEC 61076-3-124 mating interface standard; Direct replacement of larger devices (RJ45) for Ethernet applications.
EMI Shield Options with keyed mating	EMI protection ensures signal integrity, available panel grounding tabs. Keyed housing prevents 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.



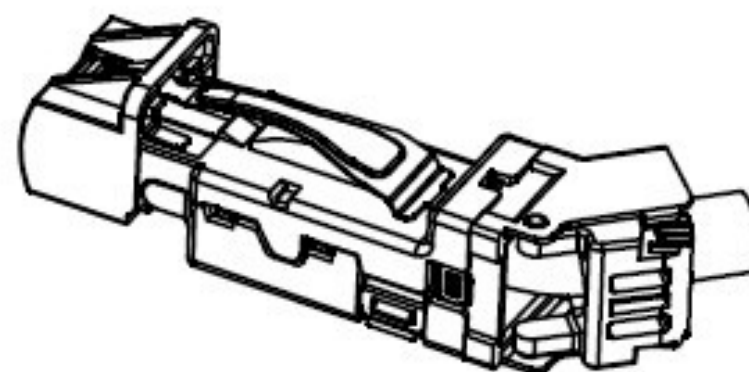
- Die Cast metal shell
- Hinged clam-shell design
- IDC termination
- Cat6A performance
- 0°, 45° and 90° cable exit options
- Cable exit can be set in 4 different directions
- Field installable
- Cable assemblies available



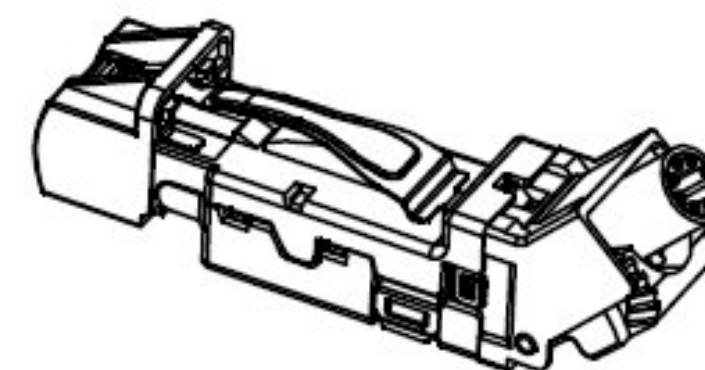
BOTTOM



LEFT



RIGHT



TOP

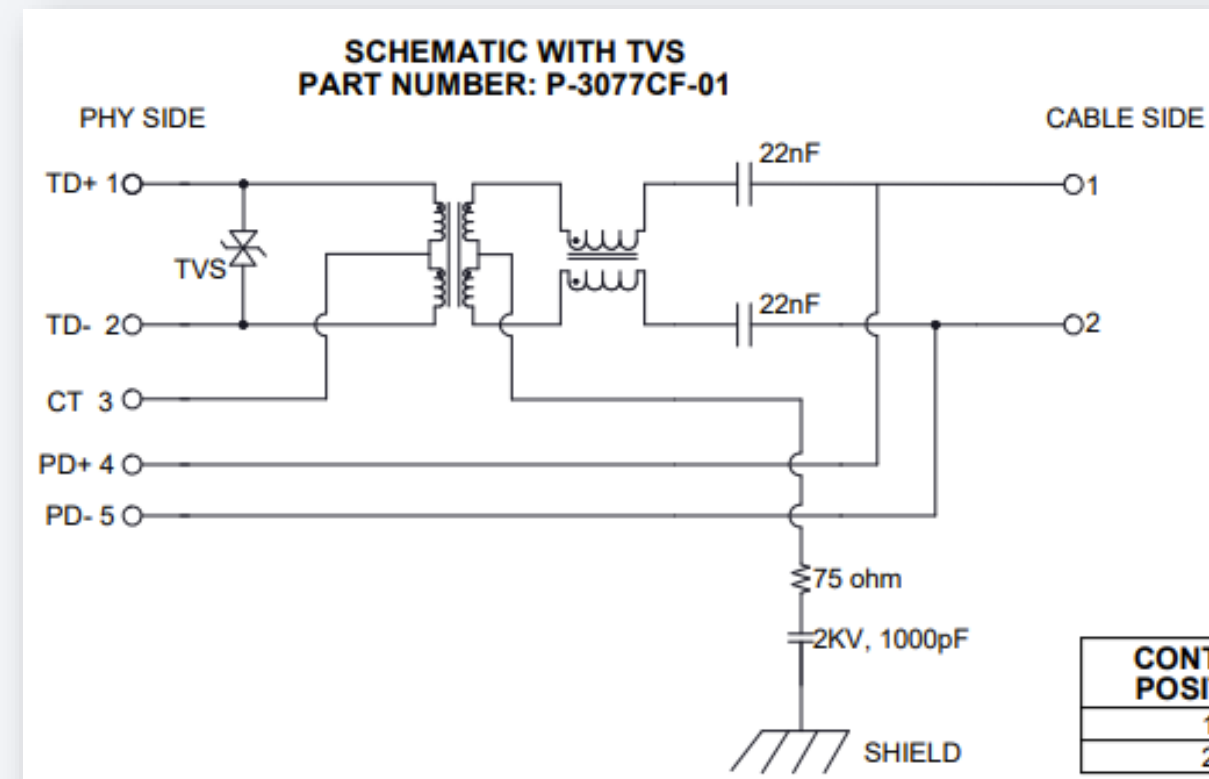
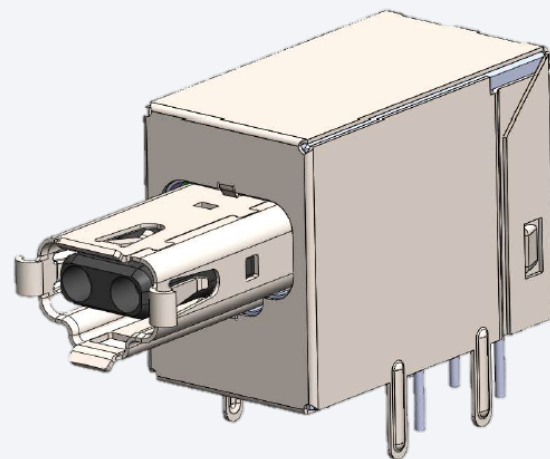
OPTIONAL CABLE EXITS

- Support for 10BASE-T1S (Power excluded)
 - A. T-spitter for individual data drops.

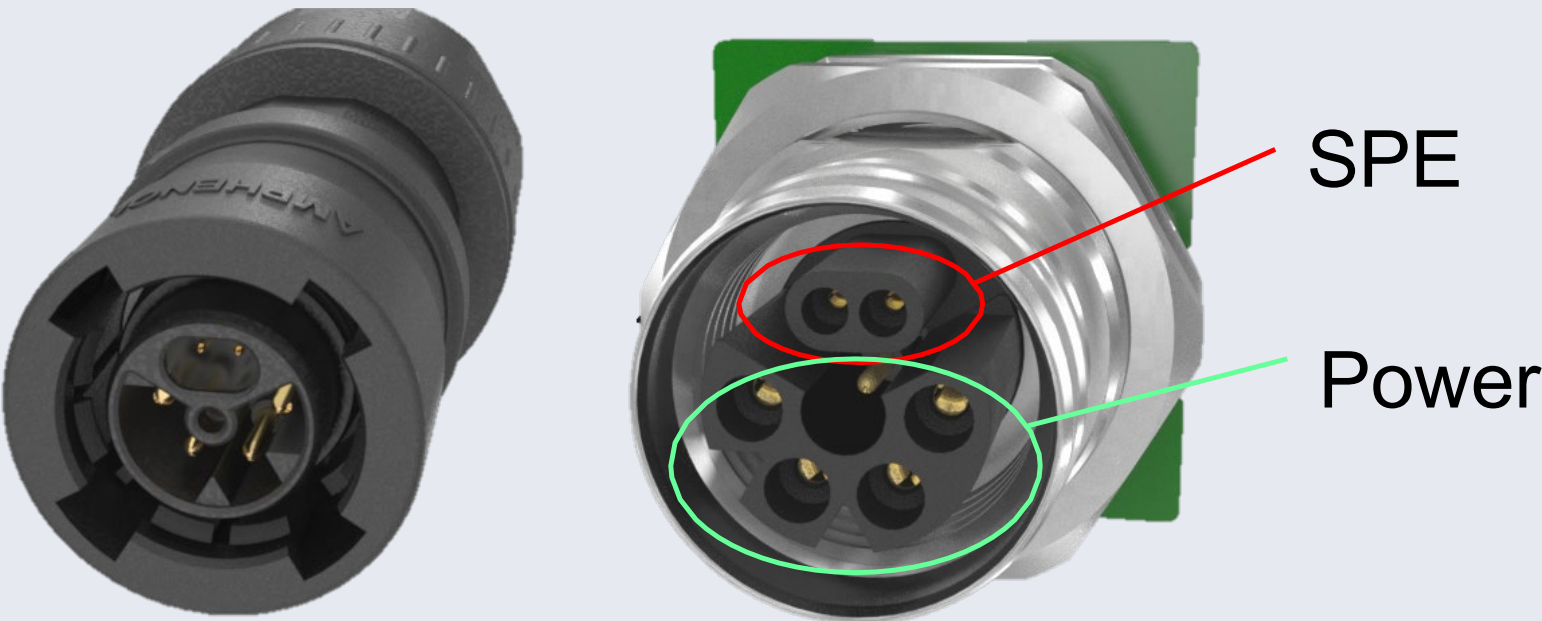


Integrated IEC63171-6 receptacle connectors as specified in IEEE 802.3cg for supporting 10Mb.

- B. SPE MAG (Magnetics)



- IEC 63171-7 Type 2 Interface carrying two pairs of power pins and one SPE pair for data.



POWER	2-Phase				3-Phase	2-Phase	
	< 50 VAC ≤ 63 VDC			≤ 600V AC ≤ 600V DC	≤ 480V AC.	≤ 50 VAC ≤ 63 VDC	≤ 600V AC ≤ 600V DC
	12A Max.	2x 8A Max.	8A Max.	8A Max.	8A Max.	16A Max.	16A Max.
	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7
MALE							



Low Smoke Zero Halogen ix Cables

New
Q4'24



Amphenol



Features	Benefits
Zero Halogen content	Free from harmful halogen compounds, these cables are safer for both the environment and human health
Low smoke emission	LSZH cables release minimal smoke, enhancing visibility and reducing inhalation risks for personnel
Improved operations	Reduces risk of downtime associated with fire hazards, leading to increased continuity in operations.
Flame resistance	Provide safety assurance in applications where fire hazards are a concern, contributing to overall building safety
PoE++ Compatible per IEEE 802.3bt	Provides ability to power devices over the Ethernet cable, eliminating separate power supply requirements
10 position connector with Cat6A 10GBASE-T rating	Supports Ethernet/IP common protocols including Profinet, DeviceNet, EtherCAT, Modbus and others

MPN	Description
ND9ACB250G	ix Industrial Cable, ix to ix, Type A, 0.5m, 26AWG 8 Wire LSZH Cable, Cat 6A, Gold 8u"
ND9ACB2A0G	ix Industrial Cable, ix to ix, Type A, 1.0m, 26AWG 8 Wire LSZH Cable, Cat 6A, Gold 8u"
ND9ACB2B0G	ix Industrial Cable, ix to ix, Type A, 2.0m, 26AWG 8 Wire LSZH Cable, Cat 6A, Gold 8u"
ND9ACB2C0G	ix Industrial Cable, ix to ix, Type A, 3.0m, 26AWG 8 Wire LSZH Cable, Cat 6A, Gold 8u"
ND9ACB2E0G	ix Industrial Cable, ix to ix, Type A, 5.0m, 26AWG 8 Wire LSZH Cable, Cat 6A, Gold 8u"

Lower friction jacket
Cost efficiency
Regulatory Compliance
Robust Design

PVC

LSZH



<https://www.hegelengineering.com/single-post/low-smoke-zero-halogen-wire-and-cable>

ix Industrial Right Angle 90-Deg Cables

New
Q2'25



Amphenol

Features		Benefits
Space-Saving Design		Right angle cabling allows for more compact routing of cables. This is especially important in environments with limited space
Improved Airflow		Proper cabling management helps maintain good airflow around equipment and within cabinets, which can reduce overheating and enhance device performance
Better Signal Integrity		Minimizing bends and kinks in cables can help maintain signal quality, which is critical in high-speed data transmission environments
Simplified Maintenance		Easier access to connections and organized cabling simplifies troubleshooting and maintenance, reducing downtime
Modular Design		Many right angle cabling solutions are designed to be modular, allowing for easy upgrades and modifications as system requirements change
Reduced EMI/RFI		Proper routing and separation of electrical signals can reduce electromagnetic interference (EMI) and radio frequency interference (RFI)
MPN	Description	
ND9ACJ250AE	ix Industrial Cable, ix to ix RA Plug, Downward Cabling, Type A, 0.5m,26AWG 8 Wire Cable, PVC, Cat 6A, Gold 8u"	
ND9ACJ250AF	ix Industrial Cable, ix Right Angle pigtail, Upward Cabling, Type A, 0.5m, 26AWG 8 Wire, PVC, Cat 6A, Gold 8u"	
ND9ACJ250AJ	ix Industrial Cable, ix RA Plug to RJ45, Downward Cabling, Type A, 0.5m, 26AWG 8 Wire Cable, PVC, Cat 6A, Gold 8u	
ND9AN620A	ix Industrial Plug, Type A, Upward Cabling, IDC, 24-25 AWG, Gold 8u"	

Reduced Cable Stress
Versatile Routing Options
Improved Accessibility
Robust Design

PVC 8-wire cable



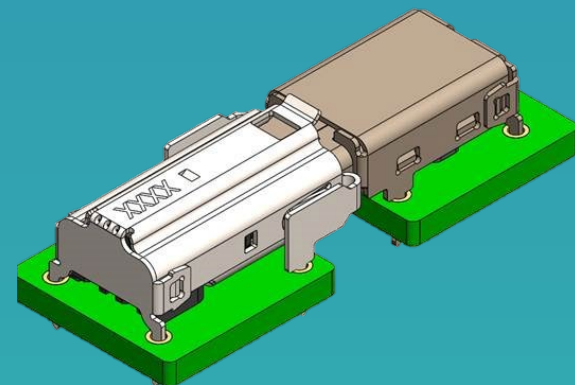


Product: Field Installable SPE

Offering: Plug

Status: Design complete, initial engineering samples in Q3 2023

Target Applications: Automation

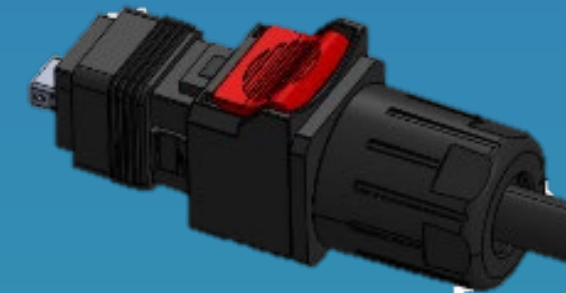


Product: SPE PCB mounted plug

Offering: cables

Status: Design phase, development customer interest driven

Target Applications: Automation

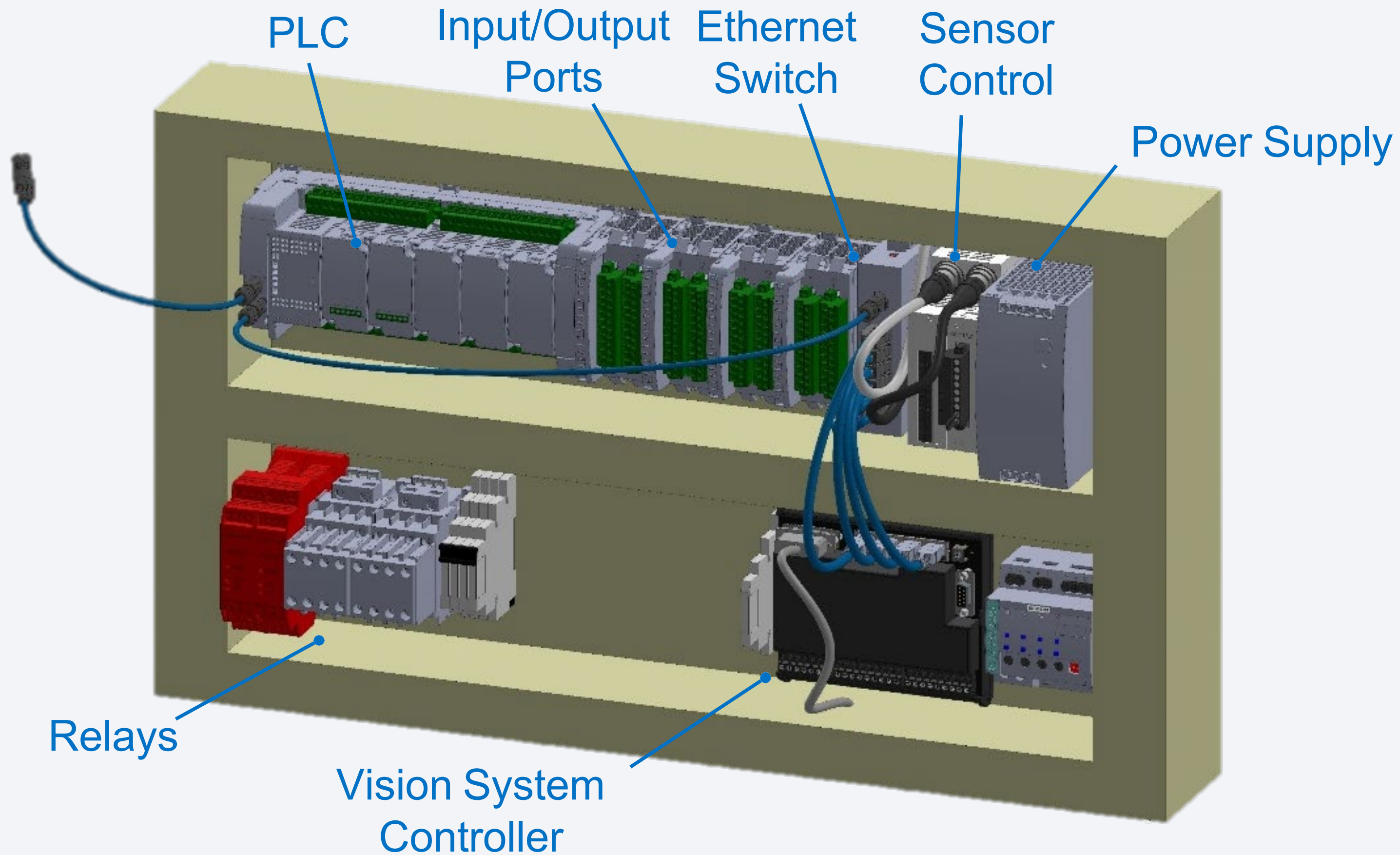


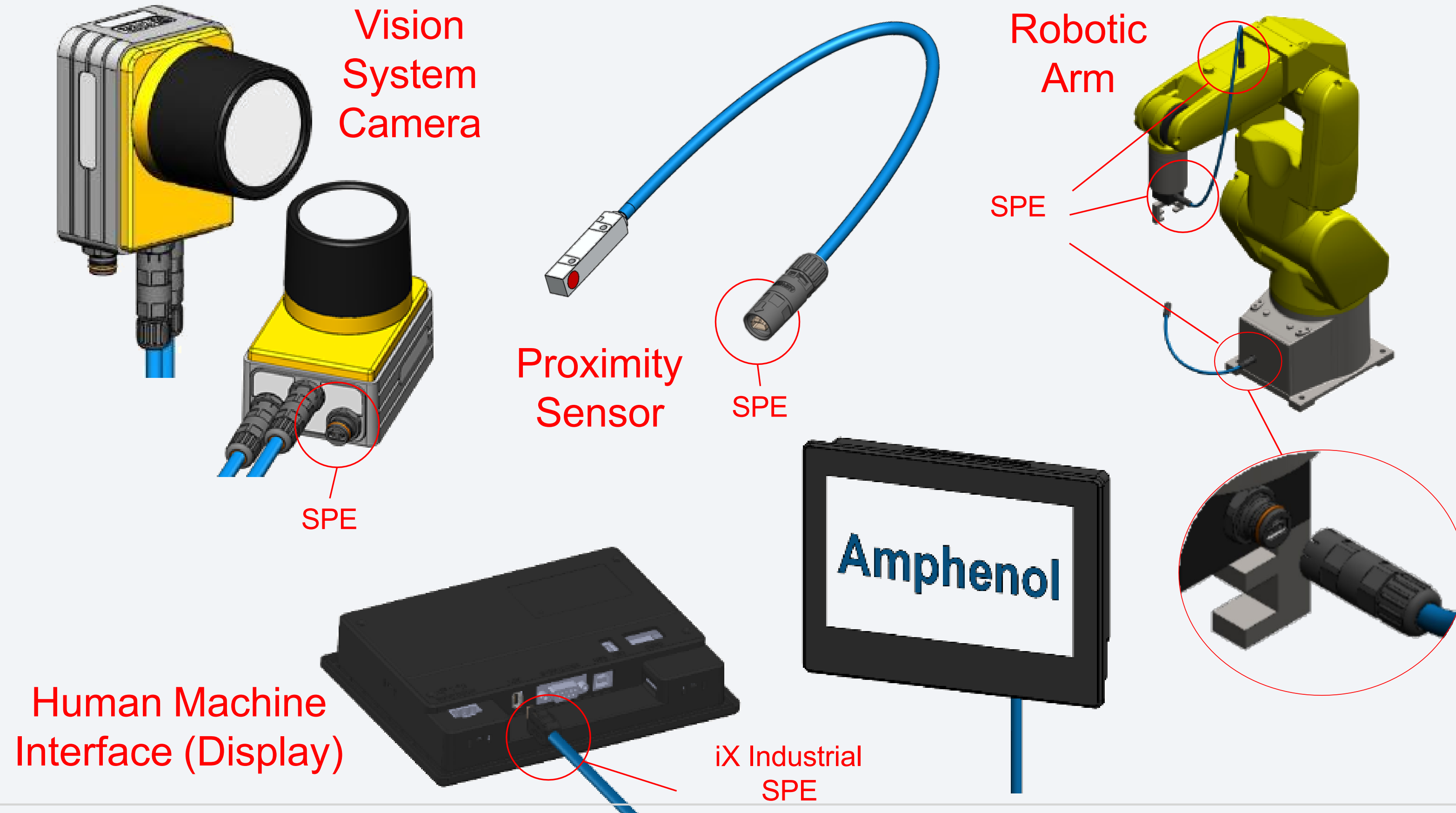
Product: SPE Rectangular Push Pull IP67

Offering: Plugs and cables

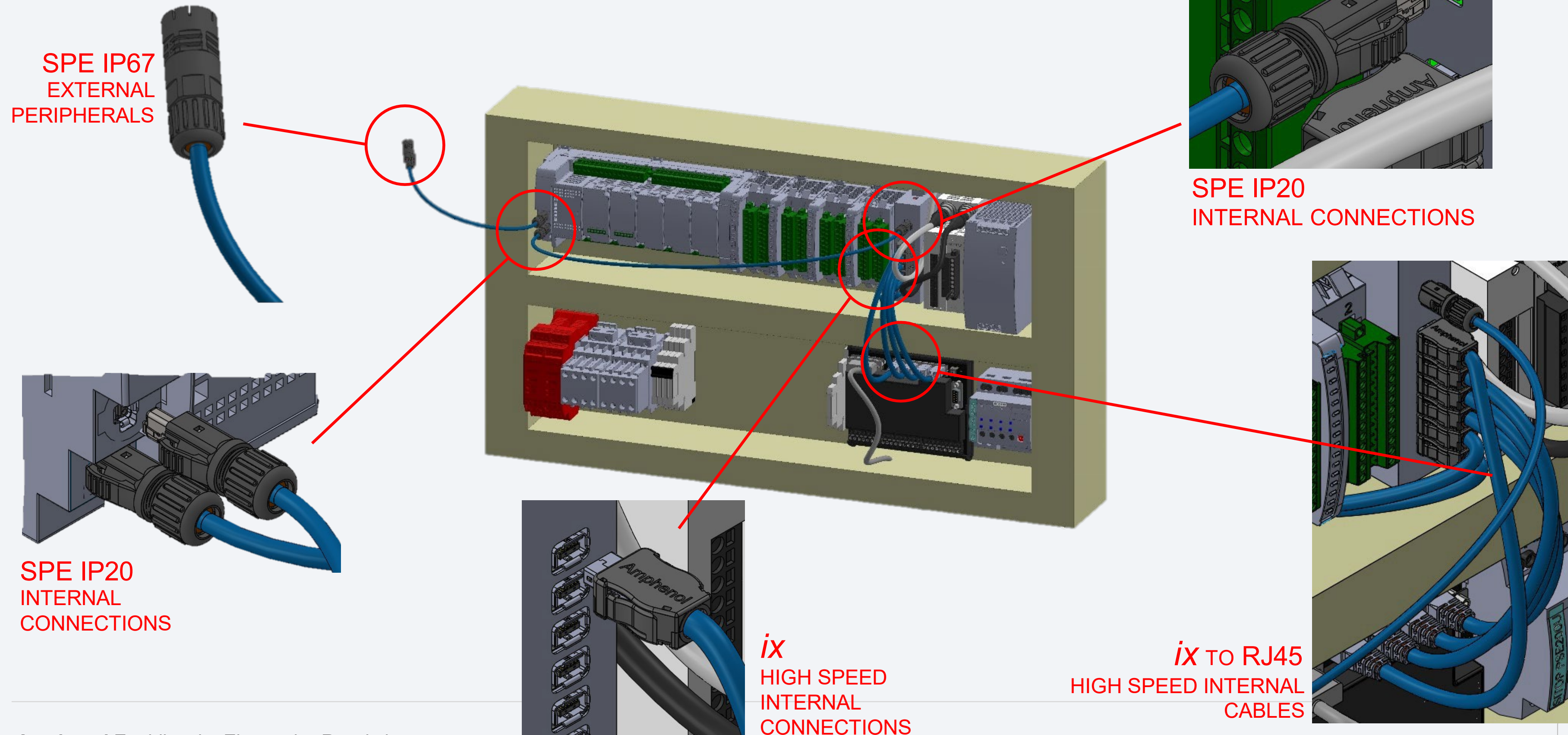
Status: Design phase

Target Applications: Automation (Harsh)





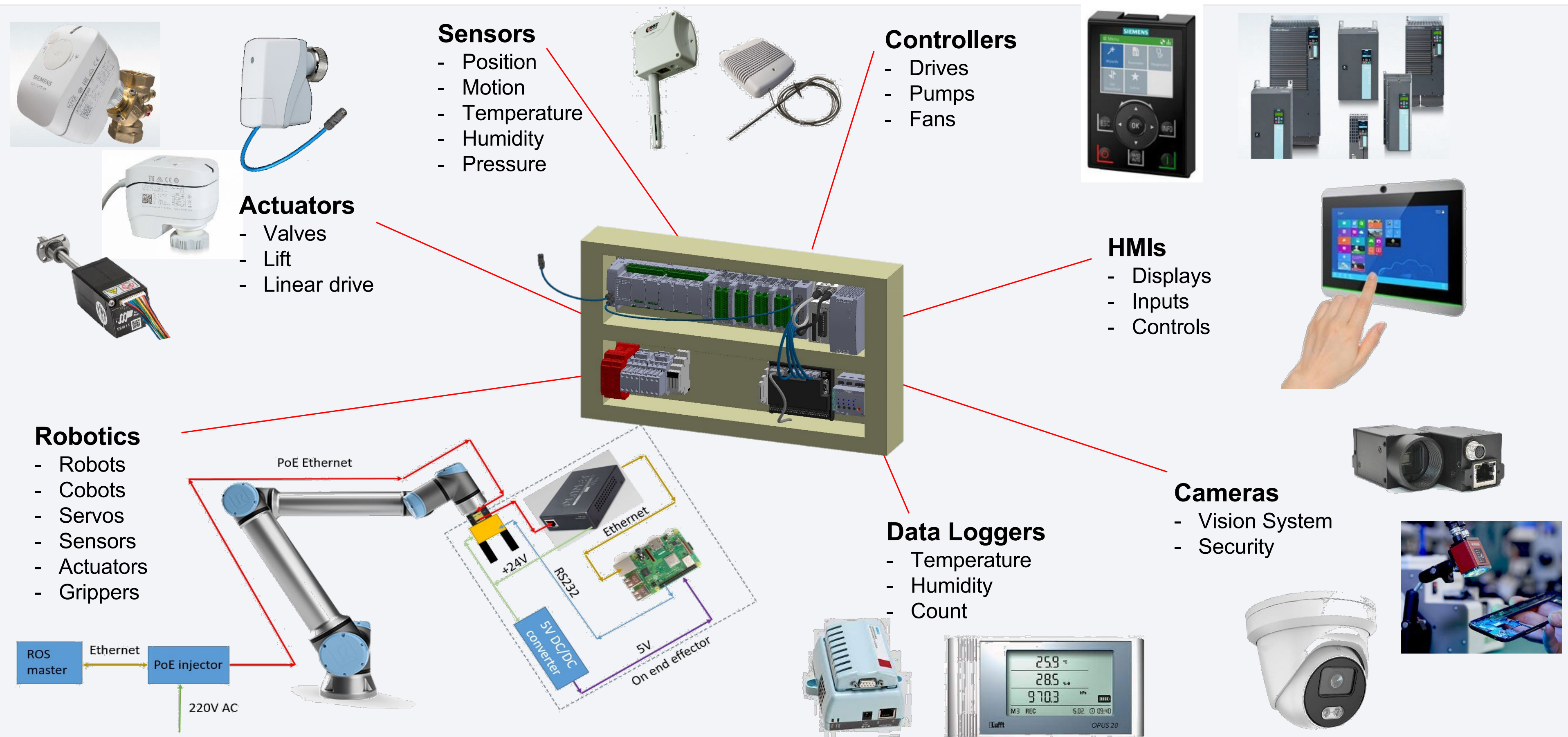
Typical Industrial Control Cabinet Interconnects



Applications

Amphenol

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



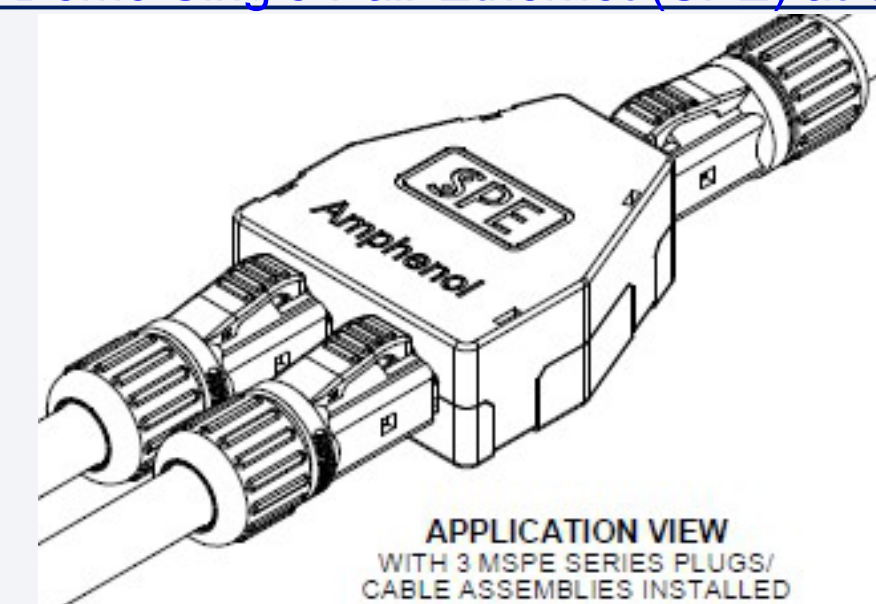
Multi-Drop SPE Implementation 10BASE-T1S demonstrator

Amphenol



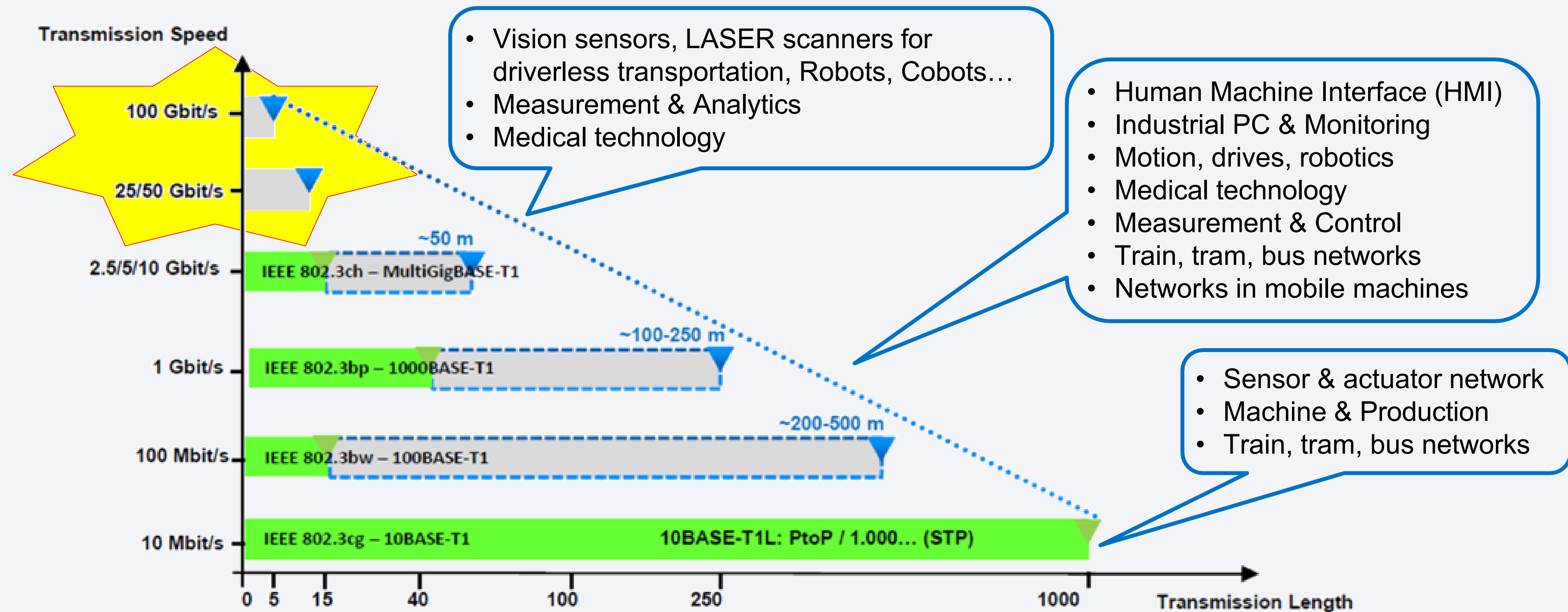
- On Display At SPS-2023 and 2024 Nov.12-14, 2024
- Utilizes Standard IEC 63171-6 SPE Cables
- Eliminates Switch and Fieldbus Gateways
- Can Unplug Node without taking down the System
- BUS structure over at least 25m and 8 devices/nodes
- Amphenol Partnered with Microchip for this demonstrator

[Product Demo Single Pair Ethernet \(SPE\) at SPS 2023 | Amphenol](#)



INTERNATIONAL STANDARDIZATION PROCESS

IEEE802.3 SPE protocols – Possible future SPE landscape up to 2024/25



source: HARTING

Industrial Ethernet Portfolio Overview

Find Amphenol Industrial Ethernet Products on the web

Amphenol
COMMUNICATIONS SOLUTIONS

	 SPE IP20	 SPE IP67	 ix Industrial™ IP20	 ix Industrial™ Magnetics	 ix Industrial™ IP67	 Industrial RJ Plug	 RJ45 IP67
Pairs of Wire	1	1	4	4	4	4	4
No. of Positions	2	2	10	10	10	8	8
Bandwidth	600 MHz	600 MHz	500 MHz	500 MHz	500 MHz	500 MHz	100 MHz
Performance / Cable length	IEEE802.3bp 1000BASE-T1 up to 40m IEEE802.3bw 100BASE-T1 up to 15m IEEE802.3cg 10BASE-T1 up to 1km	IEEE802.3bp 1000BASE-T1 up to 40m IEEE802.3bw 100BASE-T1 up to 15m IEEE802.3cg 10BASE-T1 up to 1km	10GBASE-T up to 100m 5GBASE-T up to 100m 2.5GBASE-T up to 100m 1000BASE-T up to 100m 10/100 BASE-T up to 100m	10GBASE-T up to 100m 5GBASE-T up to 100m 2.5GBASE-T up to 100m 1000BASE-T up to 100m 10/100 BASE-T up to 100m	10GBASE-T up to 100m 5GBASE-T up to 100m 2.5GBASE-T up to 100m 1000BASE-T up to 100m 10/100 BASE-T up to 100m	10GBASE-T up to 100m	1000BASE-T up to 100m
Specified Voltage	60VDC	60VDC	50VAC, 60VDC	60VDC	50VAC, 60VDC	60VDC	125VAC
Specified Current	4A	4A	1.5A	960mA	1.5A	1.5A	1.5A
PoE capability	IEEE802.3bu (PoDL) 50W	IEEE802.3bu (PoDL) 50W	IEEE802.3af (PoE) 15.4W IEEE802.3at (PoE+) 30W IEEE 802.3bt (PoE++) 100W	IEEE802.3af (PoE) 15.4W IEEE802.3at (PoE+) 30W IEEE 802.3bt (PoE++) 100W	IEEE802.3af (PoE) 15.4W IEEE802.3at (PoE+) 30W IEEE 802.3bt (PoE++) 100W	IEEE802.3af (PoE) 15.4W	N/A
RoHS compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standards	IEC 63171-6	IEC 63171-6	IEC61076-3-124	IEC61076-3-124	IEC61076-3-124	ANSI/TIA-568.2-D	IEC60603-7
Shielding	360 degrees (fully shielded)	360 degrees (fully shielded)	360 degrees (fully shielded)	360 degrees (fully shielded)	360 degrees (fully shielded)	Fully shielded	Unshielded
Mating Cycles	1,000 minimum	100 minimum	5,000 minimum	5,000 minimum	100 minimum	750 minimum	100 minimum
Operating Temp Range	-40°C to +85°C	-40°C to +85°C	-55°C to +85°C	-40°C to +85°C	-55°C to +105°C	-45°C to +85°C	-40°C to +85°C
Ingress Protection Level	IP20	IP67	IP20	IP20	IP67	IP20	IP20
Latch Retention Force	50N minimum	100N minimum	80N minimum	80N minimum	100N minimum	36N minimum	100N minimum
	View Product	View Product	View Product	View Product	View Product	View Product	View Product

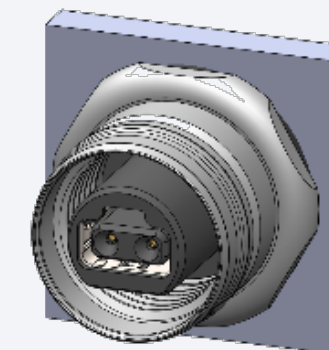
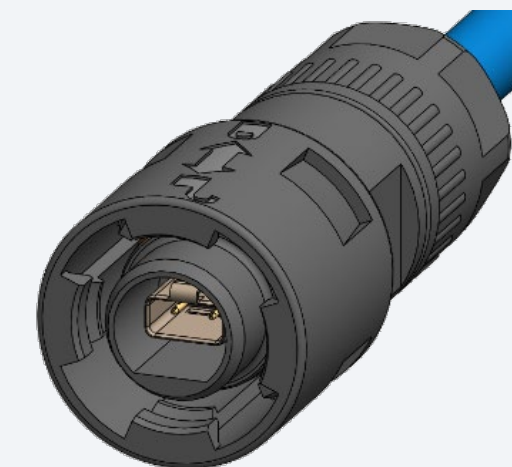
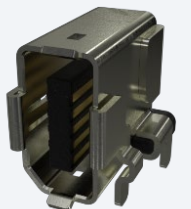
<https://www.amphenol-cs.com/industrial-ethernet>



Why Amphenol for Industrial Ethernet Solutions?

Amphenol

- Amphenol is committed to being one of the premier suppliers offering Industrial Ethernet Interconnect Solutions
- Amphenol has a strong product portfolio that is expanding to keep up with the rapidly growing Industrial Ethernet market
- Amphenol has a proven record of being first to market with products for evolving industry standards, and with innovative solutions for future needs of the industry
- Amphenol offers competitive pricing with shorter lead times and lower MOQs than our largest competitors



Thank You!



Amphenol

Enabling the Electronics Revolution