



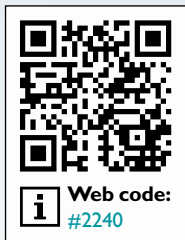
Ethernet finally goes the distance

Connectors for Single Pair Ethernet



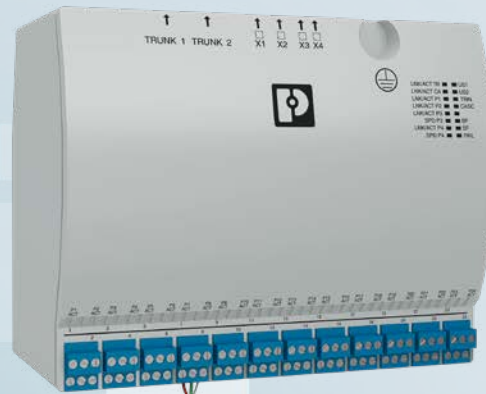
Ethernet finally goes the distance

Ethernet is the leading communications protocol for local data networks (LAN) at the corporate and operational level. With the advent of Single Pair Ethernet, this established protocol is now also moving down to the field level. Single pair data cabling is innovative, efficient, and future-proof. Join us on the journey into the future of the Industrial Internet of Things (IIoT).



Web code:
#2240

- Compact device and cable connectors for Single Pair Ethernet
- Standardized SPE interfaces for secure data transmission in accordance with IEEE standards



- Reliable interfaces for Single Pair Ethernet in process automation
- Versatile device connection technology for Ethernet APL



Connection technology for factory automation

Device and cable connectors for IP20 and IP67 degrees of protection in accordance with IEC 63171.
For further information, see pages 4 and 5.



Connection technology for process automation

PCB terminal blocks and PCB connectors for increased safety requirements (APL – Advanced Physical Layer).
For further information, see pages 8 and 9.



Connection technology for building automation

Potential Single Pair Ethernet applications in building automation.
For further information, see pages 12 and 13.

Connection technology for factory automation

Phoenix Contact has launched compact device and cable connectors for the Single Pair Ethernet standard. The standardized interfaces in accordance with IEC 63171-2 (IP20), IEC 63171-5 (M8/M12), and IEC 63171-7 (M12 HYBRID) offer the right solution for every environment. This application-specific, optimized cabling is therefore the basis for future-proof networking from the sensor to the cloud.

M8, M12/
M12 Hybrid



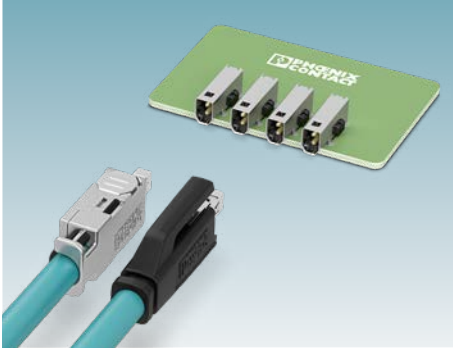
 Web code:
#2670

IP20



 Web code:
#2671

Your advantages



IP20 connectors

Standardized connectors and cables for the control cabinet in accordance with IEC 63171-2 (IP20).



M8 and M12 connectors

Robust and protected connectors in the M8 and M12 industry standard in accordance with IEC 63171-5.



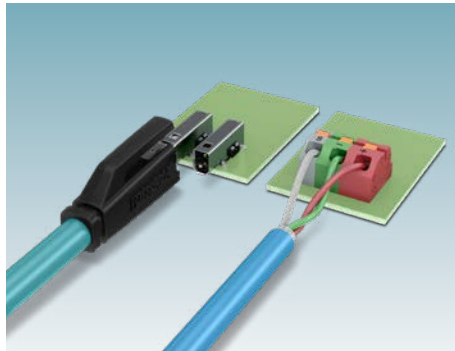
M12 HYBRID connectors

Combined data and power transmission in size M12 in accordance with IEC 63171-7.



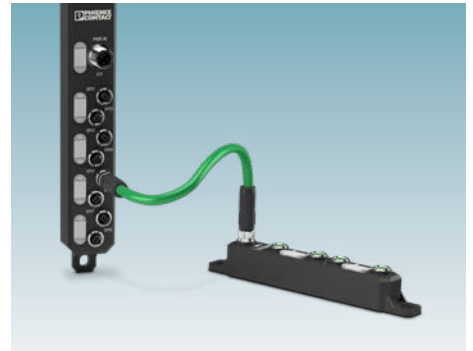
Compact

Miniaturized connectors enable high packing density and compact communication devices for the IIoT.



Cross-application

Ranges of up to 1,000 m, data rates of up to 1 Gbps, and power of up to 50 W.



Easy design-in

Two-piece M8 and M12 device connectors ensure identical mechanical installation conditions and consistent housing designs.

Device and cable connectors

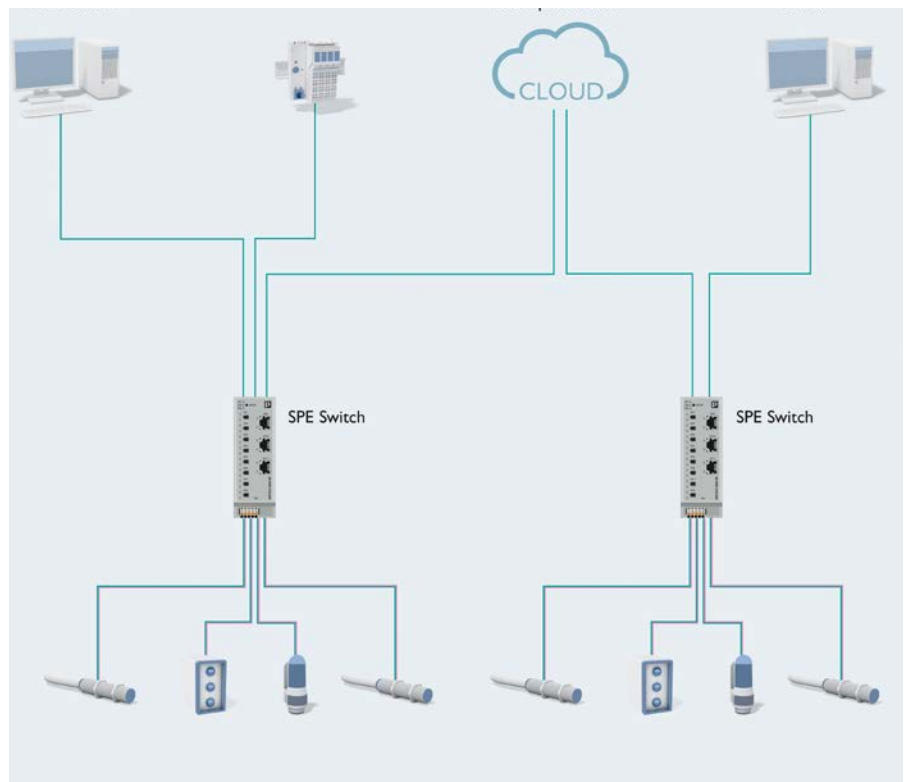
IP20/IP67 degree of protection

The consistent pin connector pattern of IEC 63171-2 and IEC 63171-5 standardizes the SPE interface across applications in the field and is compatible with standardized M8 and M12 threads and push-pull solutions.



Application and product examples




Ethernet has been the established protocol in local data networks at the corporate and control level for decades. With Single Pair Ethernet, you can reduce the data cabling down to just one wire pair and also increase the range. This enables efficient transmission concepts at the field level – right down to the sensors. The star topology with (redundant) active network components can be extended easily, allows high and different data rates, and is reliably protected against the failure of individual components.



Future-proof and compact: Single Pair Ethernet in factory automation

Current IEEE Working Groups for Single Pair Ethernet communication standards

IEEE 802.3	da	cg		bw	dg	bp	ch	cy
Status	Under development	Published		Published	Under development	Published	Published	Under development
Standard	10BASE-T1S (extension)	10BASE-T1S	10BASE-T1L	100BASE-T1	100BASE-T1 (extension)	1000BASE-T1	MultiGig BASE-T1	MultiGig BASE-T1 (extension)
Range of up to	Approx. 50 m unshielded (to be defined)	25 m unshielded	1000 m shielded	40 m shielded 15 m unshielded	Approx. 500 m shielded (to be defined)	40 m shielded 15 m unshielded	15 m shielded	Approx. 11 m unshielded (to be defined)
Communic. type	Multidrop	Multidrop	Point-to-point	Point-to-point	Point-to-point	Point-to-point	Point-to-point	Point-to-point
Data rate of up to	10 Mbps	10 Mbps		100 Mbps	100 Mbps	1 Gbps	2.5 / 5 / 10 Gbps	25 / 50 / 100 Gbps (to be defined)
Target applications	Factory automation Building automation	Factory automation Building automation	Process automation Building automation	Factory automation Automotive industry	Process automation Factory automation Building automation	Factory automation Automotive industry	Automotive industry	Automotive industry



SPE connectors, IP20					
					
Description	SPE PCB connector, 180°	SPE PCB connector, 90°	SPE PCB connector, 90° LED	SPE network cable	SPE-IDC connector
Type of contact	Male			Female	Female
Connection method	THR and wave soldering			-	IDC insulation displacement connection
LED	-		Yes	-	-
Type	SPE-T1-STSM-180	SPE-T1-STSM-90	SPE-T1-STRM-90-LED	SPE-T1-CCP-SF/.../ AWG22/CCP/SF	SPE-T1-CIM-SF
Item no.	1163798	1163797	1215778	1183807 (1 m) 1183808 (2 m) 1183810 (3 m) 1183811 (5 m)	1343953

SPE connectors, IP67 (M8)							
							
Description	SPE device connector, 180°	SPE device connector, 180°	SPE device connector, 90°	SPE network cable, PVC	SPE network cable, PUR	SPE network cable, PVC	SPE network cable, PUR
Type of contact	Male	Male	Male	Female – female Female – male	Female – female Female – male	Male – male	Male – male
Soldering process	THR and wave soldering	SMD soldering	THR and wave soldering	-	-	-	-
Type	SPE-T1-M8 MSM-180	SPE-T1-M8 MSM-180-SMD	SPE-T1-M8 MRM-90	SPE-T1-M8MSM/ 2,0-97B/M8FSF SPE-T1-M8FSF/ 2,0-97B/M8FSF	SPE-T1-M8MSM/ 2,0-99B/M8FSF SPE-T1-M8FSF/ 2,0-99B/M8FSF	SPE-T1-M8MSM/2,0-97B/M8MSM	SPE-T1-M8MSM/2,0-99B/M8MSM
Housing screw connection, front mounting	1412502			-	-	-	-
Housing screw connection, rear mounting	1412505			-	-	-	-
Item no.	1163793	1215777	1163795	1217524 (2 m) 1217530 (2 m)	1150575 (2 m) 1217320 (2 m)	1217526 (2 m)	1217316 (2 m)












SPE connectors, IP67 (M12 HYBRID)				
new				
i Web code: #2670				
Description	SPE M12 hybrid device connectors		SPE M12 hybrid cables	
Standard	IEC 63171-7 (coding 2)			
Version	Female	Male	Female (straight) – free cable end	Male (straight) – free cable end
Number of positions	6 (2x SPE + 4x power) + shielding			
Housing screw connection, front mounting	1420825	1108115 (incl. push-pull) 1420824	-	-
Housing screw connection, rear mounting	1420827	1108101 (incl. push-pull) 1420826	-	-
Type	SPE-T1-M12HC2FSF-180	SPE-T1-M12HC2MSM-180	SPE-T1-2,0-99H/MC2FS	SPE-T1-MC2MS/2,0-99H
Item no.	1439722	1439775	1524235 (2 m)	1524231 (2 m)

SPE connectors, IP67 (M12)									
new									
i Web code: #2670									
Description	SPE M12 device connectors				SPE M12 cables				
Type of contact	Female		Male		Male – female	Female – female	Male – male	Male – free cable end	Female – free cable end
Housing screw connection, front mounting	1027678	1412079	1107999	1027679	-	-	-	-	-
Housing screw connection, rear mounting	1027662	1414021	1107993	1027661	-	-	-	-	-
Type	SPE-T1-M12FSF-180 SPE-T1-M12FRF-90	SPE-T1-M12FSF-180-SMD	SPE-T1-M12MSM-180-SMD SPE-T1-M12MRM-90	SPE-T1-M12MSM-180	SPE-T1-M12MS/2,0-99B/M12FS PUR SPE-T1-M12MS/2,0-97B/M12FS PVC	SPE-T1-M12FS/2,0-99B/M12FS PUR SPE-T1-M12FS/2,0-97B/M12FS PVC	SPE-T1-M12MS/2,0-99B/M12MS PUR SPE-T1-M12MS/2,0-97B/M12MS PVC	SPE-T1-M12MS/2,0-99B PUR	SPE-T1-2,0-99B/M12FS PUR
Item no.	1363337 (180° THR) 1363341 (90° THR)	1363344 (180° SMD)	1363342 (180° SMD) 1363338 (90° THR)	1363336 (180° THR)	1364621 (2 m) 1364626 (2 m)	1364623 (2 m) 1364631 (2 m)	1364622 (2 m) 1364629 (2 m)	1478365 (2 m)	1478369 (2 m)

Managed switches for Single Pair Ethernet

new	
 Web code: #2912	
Description	Managed switches
SPE interfaces	8 x 10 BASE-T1L
RJ45 interfaces	3 x 100 / 1000 BASE-TX
SPE device supply	Optionally via PoDL (Power over Data Line)
PoDL power class	24 V DC power class 11 (IEEE 802.3 cg)
Supply voltage	18 V DC ... 32 V DC
Managed features	Real-time QoS, redundancy, security features
Management interface	Web, SNMP, CLI, PROFINET device
Type	FL SWITCH 2303-8SP1
Item no.	1278397

SPE PCB terminal blocks

 Web code: #3357	2-pole					
	3-pole					
Description						
Conductor cross-section		0.2 mm ² ... 1.5 mm ² AWG 24 ... AWG 16	0.14 mm ² ... 1.5 mm ² AWG 30 ... AWG 14	0.2 mm ² ... 1.5 mm ² AWG 24 ... AWG 16	0.2 mm ² ... 1.5 mm ² AWG 24 ... AWG 16	0.2 mm ² ... 1.5 mm ² AWG 24 ... AWG 16
Connection method		Screw		Push-in		
Pitch		5.08 mm		3.50 mm	5.00 mm	
PCB connection direction		0	45°			90°
Type		MKDSN 1,5/ x -5,08 SPE	SMKDSN 1,5/ x -5,08 SPE	SPTAF 1/ x -3,5-IL SPE	SPTAF 1/ x -5,0-IL SPE	SPT 2,5/ x-V -5,0 SPE
Item no.	2P	1548128	1548130	1548376	1548365	1548361
	3P	1548129	1548131	1548393	1548368	1548363

Connection technology for process automation

Explosion protection and long transmission paths place high demands on network technology. The necessary standards have been collated into the Advanced Physical Layer (APL).

Phoenix Contact provides proven, reliable PCB terminal blocks and PCB connectors as well as RJ45 and circular connectors for switch-based Ethernet networks in process automation.

PCB connection



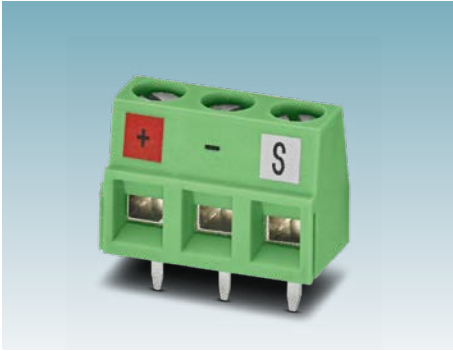
 Web code:
#2390

RJ45/M8/M12



 Web code:
#2839

Your advantages



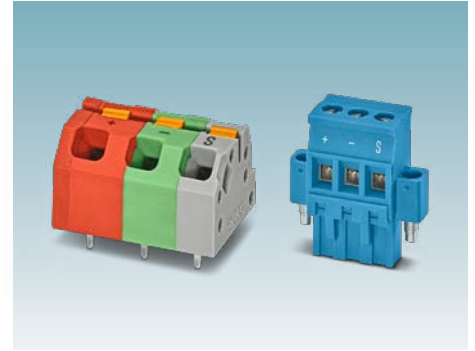
Qualified for Ethernet APL

Items satisfy the requirements of the "APL Port Profile Specification".



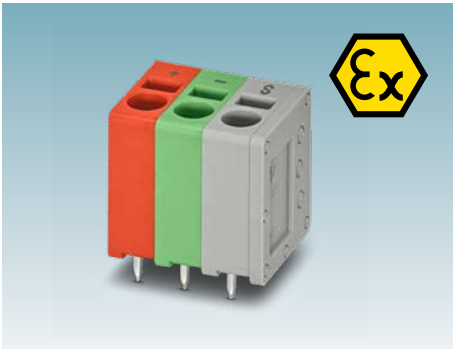
Wide range of possible applications

Horizontal, vertical, and angled conductor connection direction for every device design.



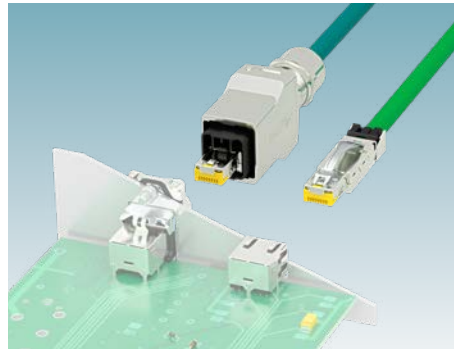
Error-proof conductor connection

Color coding and identification for easy wiring.



Reliable and safe

Items available for increased safety requirements of "Ex e" type of protection in accordance with IEC 60079-7 in potentially explosive areas.



Adaptable

IP20 and IP67 RJ45 connector versions are also suitable for use with Ethernet APL.

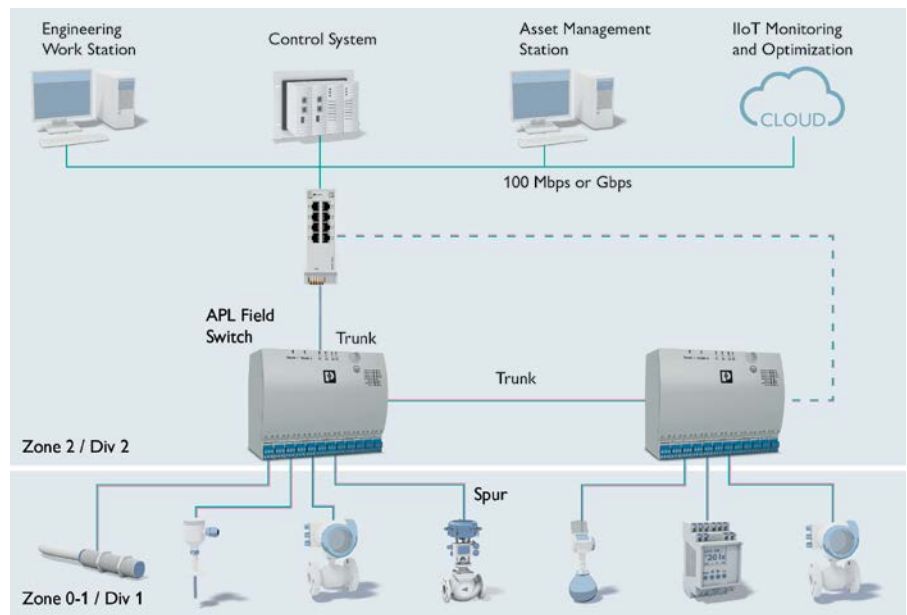


Protected against mismatching







M12 and M8 circular connector versions with Ethernet-APL-specified A-coding.

Application and product examples

The Advanced Physical Layer is suitable for the transmission of data and power over distances of up to 1,000 m – ideal for redundant network structures. This allows power and field switches to be supplied efficiently via trunk lines and sensors, and for actuators to be integrated safely via branch lines (spurs).




APL PCB terminal blocks and PCB connectors

 Web code: #2390						
	3-pos. PCB terminal blocks			3-pos. PCB connectors		
Description	3-pos. PCB terminal blocks			3-pos. PCB connectors		
Conductor cross-section	0.2 mm ² ... 1.5 mm ² AWG 24 ... AWG 16	0.2 mm ² ... 4 mm ² AWG 24 ... AWG 12	0.14 mm ² ... 1.5 mm ² AWG 30 ... AWG 14	0.2 mm ² ... 2.5 mm ² AWG 26 ... AWG 12	0.2 mm ² ... 2.5 mm ² AWG 30 ... AWG 12	
Pitch	5.0 mm			5.08 mm		
Ex versions available¹⁾	Yes			-		
Type	SPTAF 1/ 3-5,0-IL MC RDNGY BD	SPT 2,5/ 3-V-5,0 EX MC RDNGY BD	MKDSN 1,5/ 3-5,08 MCBD:+-S	FKCOR 2,5/ 3-STF-5,08 MCBD:+-S	MVSTBR 2,5/ 3-STF- 5,08 BUDDWH	
Item no.	1161098	1161105	1161119	1161188	1161208	

¹⁾ Ex e type of protection in accordance with IEC 60079-7

Ethernet APL switch

	Description	24-port Ethernet-APL switch
	Uplink ports	2 x 100BASE-TX (RJ45) and 2 x 100/1000Mbps - (SFP – single mode or multi-mode fiber)
	APL ports	24 x 10BASE-T1L
	Conductor cross-section range	0.2 – 2.5mm ² / 24AWG – 12AWG
	Supply voltage	22-30 VDC
	Type	FL SWITCH APL 2224-4A-213-PA
	Item no.	1384244

A strong partnership for the promotion of SPE technology

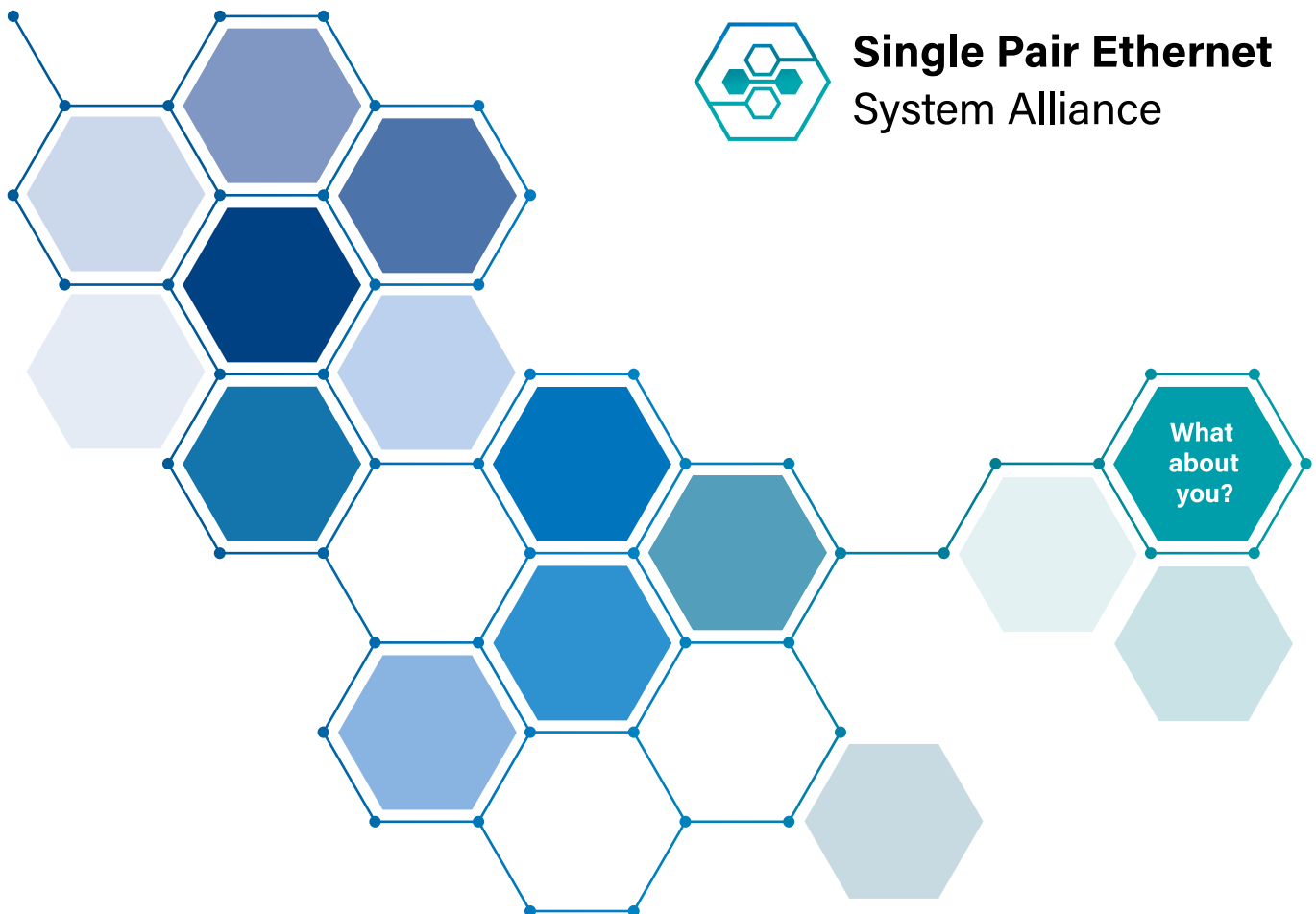
The SPE System Alliance

The SPE System Alliance is an open alliance of leading technology companies from different industries and fields of application. All partners of the SPE System Alliance pursue the joint goal of promoting Single Pair Ethernet for IIoT applications. As part of this, they combine their expertise in the field of SPE and engage in purposeful dialog.

www.singlepairethernet.com



**Single Pair Ethernet
System Alliance**



Connection technology for building automation

Compact, standard-compliant, and easy to maintain – PCB connections and connectors must meet the specific requirements of building automation. Plug-in and permanent connections enable the creation of tailored solutions. Proven contact and connection technologies and additional comfort functions ensure a consistently high level of safety during operation. Rely on intelligent solutions from Phoenix Contact for smart device connections.



Device communication in smart buildings



- Monitoring and display
- Access point
- Window covering control
- Light control
- HVAC



Monitoring and safety technology



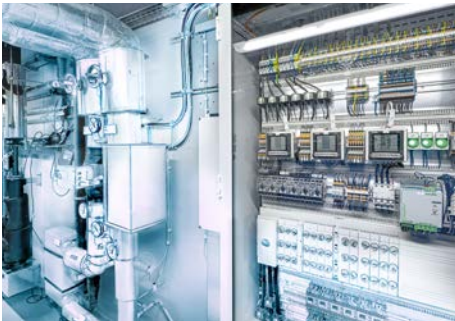
Building control



Lighting systems



Energy management



HVAC technology



Building communication

Excellent services

Throughout your development process, Phoenix Contact will provide excellent services that make a difference. Discover how modern configurators, comprehensive technical data, and free product samples can make your daily work easier. As your partner, we will support you in the design-in process all the way to the development of customized connection and housing solutions.

More choices

Choose online from 60,000 products and find the right solution quickly with:

- Intuitive filter and search functions
- Comprehensive technical data and downloads, such as drawings and 3D models
- Personal on-site consultation

More personalization

Customize your products with colors, printing, and special designs:

- Customer-specific versions
- Customized new products
- Intuitive online configurators





Simple product selection using filters and technical data



A separate detail page for every product



A data sheet is available to download for every item



With our global network, Phoenix Contact is always nearby



Device connection technology can be comprehensively configured



Housing parts and connection technology are easy to compile



Cable and assembly systems can be matched easily



Phoenix Contact supports you from the initial idea through to series production

For more information on Phoenix Contact services, enter the web code in the search field on our website.

 Web code: #2594

Excellent services

Phoenix Contact supports device designers with excellent services, even beyond the design-in process. Benefit from the flexible procurement and global availability of our items. As your trusted partner, our experts will keep you up to date on the latest technologies and trends.

More flexibility

Use our different procurement channels and benefit from worldwide availability:

- All products can be easily ordered online
- Free online sample service
- Globally reliable logistics through direct shipping or distribution

More expertise

Always stay up to date on technologies and trends with us as your reliable partner:

- Technology, industry, and design-in experts at your side
- We will provide you with custom training programs – either on-site or digitally
- Free webinars, seminars, and video tutorials





Our online sample service is available in most countries



Find the desired product quickly with intuitive filters



Product samples are available with free shipping



Reliable logistics worldwide



Stay in the know on new products, trends, and technologies



We will provide you with custom training programs – either on-site or digitally




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 Web code: #2594

