



SINGLE-PAIR ETHERNET

SPE SOLUTIONS – IDEAL FOR
INDUSTRIAL DATA COMMUNICATION



DATWYLER

SINGLE-PAIR ETHERNET (SPE)





Single Pair Ethernet
System Alliance

SINGLE-PAIR ETHERNET

THE NETWORK INFRASTRUCTURE FOR THE INDUSTRIAL IOT

The increasing digitalisation of industrial systems requires further development of existing Ethernet cabling. Especially when it comes to sensors and local, modular control devices, conventional cabling concepts are no longer able to cope with the new challenges in terms of space requirements and installation effort.

Single-Pair Ethernet (SPE) was developed to simplify and improve data transmission in industrial applications. It offers a simple and cost-effective way to build Ethernet networks using the existing cabling infrastructure.

CONSISTENT NETWORK CONNECTIONS UP TO THE FIELD LEVEL

Single-Pair Ethernet (SPE) is an Ethernet standard for data transmission over a single pair of wires (2-wire Ethernet) and is perfect for integrating intelligent sensors, RFID systems or high-resolution cameras into the existing industrial IP network.

When developing new industry standards, Datwyler and its partners rely on innovative Single-Pair Ethernet technology. SPE enables the consistent and economical connection of a large number of end devices in the Industrial IoT – from sensors in the field to the cloud.

SINGLE-PAIR ETHERNET (SPE) CABLE

ETHERNET CABLES FROM THE SPECIALIST

One of Datwyler's core competencies is the development and manufacture of high-quality copper data cables, including Single-Pair Ethernet cables, in order to offer complete solutions for building and factory automation.

All SPE cables from Datwyler are compatible with today's SPE connectors according to IEC 63171 and support current and future SPE transmission protocols.

Selection of SPE solutions

Standard IEC 61156	Category/ Class	Cable type	Cores	Dimensions n x n x AWG	Application (type) ¹⁾	Flexibility	UL Approval	PoDL IEEE 802.3	CPR	Flame propagation
Single-pair Ethernet (SPE) Cables IEC 61156	IEC 61156-11	Single-pair installation cable with transmission properties up to 600 MHz (fixed installation)	1 pair	1 x 2 x AWG22/1	A	fixed	✗	✓	✓	✓
					B	flexible				
					C	drag chain				
					R	torsion				
					A	fixed				
	IEC 61156-12	Single-pair connection/patch cable with transmission properties up to 600 MHz (flexible)	1 pair	1 x 2 x AWG22/7	B	flexible	UL 444 CMG	✓	✓	✓
				1 x 2 x AWG22/7			UL AWM 758	✓	✓	✓
				1 x 2 x AWG26/7			UL AWM 758	✓	✓	✓
				1 x 2 x AWG22/19	C	drag chain	UL AWM 758	✓	✓	✓
				1 x 2 x AWG22/19	R	torsion	UL AWM 758	✓	✓	✓
	IEC 61156-13	Single-pair installation cable with transmission properties up to 20 MHz (fixed installation)	1 pair	1 x 2 x AWG22/1	A	fixed	✗	✓	✓	✓
				1 x 2 x AWG18/1			✗	✓	✓	✓
					B	flexible				
					C	drag chain				
					R	torsion				
	IEC 61156-14	Single-pair connection/patch cable with transmission properties up to 20 MHz (flexible)	1 pair		A	fixed				
				1 x 2 x AWG22/7	B	flexible	✗	✓	✓	✓
				1 x 2 x AWG22/7			UL 444 CMG	✓	✓	✓
				1 x 2 x AWG22/7			UL AWM 758	✓	✓	✓
				1 x 2 x AWG26/7			UL AWM 758	✓	✓	✓

¹⁾ Definition of cable types in accordance with current Profinet guidelines
<https://www.profinet.com/download/profinet-cabling-and-interconnection-technology>



THIS IS WHAT MAKES OUR ETHERNET CABLES SO UNIQUE:

- Datwyler produces more than 120,000 km of Ethernet cables per year in Switzerland
- Specialized manufacturer of Ethernet-based data technology
- Development partner for Cat.5/5e to Cat.6_A and Cat.7 products including Single-Pair Ethernet (SPE)
- Cost savings thanks to an optimised design
- Highest quality: We test our materials and cables in our own laboratory
- UL and CSA approved for worldwide use

As a member of the SPE System Alliance, Datwyler offers a wide SPE cable portfolio: all of our cables meet the SPE transmission properties according to IEC 61156-11 and -12, from AWG 18 to AWG 26, in rigid and flexible versions as well as with various sheaths in PUR and LSOH.

The products are available with both UL/CSA certification and the necessary fire resistance rating (CPR).

Datwyler IT Infra is currently in the process of further completing the SPE cable portfolio in the direction of factory automation and, for example, developing versions with a PVC jacket and a highly flexible product.

Zero halogen	Outdoor	Sheath material	Shielding	Max. bandwidth	Max. length	Typical application	Unique feature	Availability	Compatible connectors	Article number
✓	✗	LSZH FRNC	S/FTP	1000 Mbit/s	40 m	Horizontal wiring building	High flame retardance	available	IEC 63171	19143100DK
								not provided		
								not provided		
								not provided		
								not provided		
✓	✗	LSZH FRNC	S/FTP	1000 Mbit/s	40 m	Industrial communication machinery cabling	Space saving	available	IEC 63171	19471300EK
✓	✗	TPU	S/FTP	1000 Mbit/s	40 m	Industrial communication machinery cabling	Space saving	available	IEC 63171	19468300EK
✓	✗	TPU	S/FTP	1000 Mbit/s	40 m	Industrial communication machinery cabling	Space saving	available	IEC 63171	19468400EK
✓	✗	TPU	S/FTP	1000 Mbit/s	40 m	Industrial communication machinery cabling	Highly flexible design	on request	IEC 63171	-
✓	✗	TPU	S/FTP	1000 Mbit/s	40 m	Industrial communication machinery cabling	Highly flexible design	on request	IEC 63171	-
✓	✗	LSZH FRNC	S/FTP	10 Mbit/s	1000 m	Horizontal wiring building	High flame retardance	available	IEC 63171	19143100DK
✓	✗	LSZH FRNC	S/FTP	10 Mbit/s	1000 m	Horizontal wiring building	Long distance reach	on request	IEC 63171	-
								not provided		
								not provided		
								not provided		
								not provided		
✓	✗	LSZH FRNC	S/FTP	10 Mbit/s	1000 m	Horizontal wiring building	High flame retardance	available	IEC 63171	19463000DK
✓	✗	LSZH FRNC	S/FTP	10 Mbit/s	1000 m	Industrial communication machinery cabling	Space saving	available	IEC 63171	19471300EK
✓	✗	TPU	S/FTP	10 Mbit/s	1000 m	Industrial communication machinery cabling	Space saving	available	IEC 63171	19468300EK
✓	✗	TPU	S/FTP	10 Mbit/s	1000 m	Industrial communication machinery cabling	Space saving	available	IEC 63171	19468400EK

SINGLE-PAIR ETHERNET (SPE) COMPONENTS

SPE TRANSMISSION CLASSES

The IEEE 802.3 has already published various SPE standards that can be used for applications with SPE.
The standard ISO/IEC 11801-1 specifies the requirements for the SPE transmission classes T1-A, T1-B and T1-C (generic SPE cabling).

Application IEEE 802.3	Standards ISO/IEC 11801-1 AMD1 ED1	SPE transmis- sion classes	SPE transmis- sion classes (Channel)	Frequency	Datwyler CU SPE 1P / SPE 1P flex AWG22	Datwyler CU SPE 1P flex AWG26	Datwyler CU SPE 1P AWG18	PoDL (Power- over Data Line) possible
10BASE-T1	IEEE 802.3cg	T1-A-1000	1000 m	20 MHz			✓	✓
		T1-A-400	400 m	20 MHz	✓		✓	✓
		T1-A-100	100 m	20 MHz	✓		✓	✓
100BASE-T1	IEEE 802.3bw (supported transmission distance max. 15 m)	T1-B-100	100 m	600 MHz	✓		N/A	✓
		T1-B-40	40 m	600 MHz	✓	✓	N/A	✓
		T1-B-15	15 m	600 MHz	✓	✓	N/A	✓
1000BASE-T1	IEEE 802.3bp (supported transmission distance max. 40 m)	T1-C-100	100 m	1250 MHz (under review)	✓		N/A	✓
100BASE-T1	IEEE 802.3dg	(at IEEE in progress)	500 m					

The table shows which Datwyler CU SPE 1P cable type can be used to achieve the maximum intended transmission distance (Channel).
When using PoDL at the same time over the same pair of wires, the transmission length must, among other things, be shortened depending on the remote power supply class.

OUR CURRENT PORTFOLIO FOR YOU

Explore the comprehensive world of Single-Pair Ethernet with our SPE components that optimise your industrial network infrastructure. By supplementing our cables with other passive components such as field connectors, adapters and patch cables, we offer you consistent solutions.

SPE connectors and patch cords

	Article	Description	Connector Standard	Part number
	SPE patch cable, PVC, plug/plug	IP20, 1 m	63171-2	65540100ZY
		IP20, 2 m		65540200ZY
		IP20, 3 m		65540300ZY
		IP20, 5 m		65540400ZY
		IP20, 10 m		65540500ZY
		IP20, 15 m		65540600ZY
	Patchkabel SPE, PVC, jack/jack	IP67, 2 m	63171-5	65540700ZY
		IP67, 5 m		65540800ZY
		IP67, 10 m		65540900ZY
		IP67, 15 m		65541000ZY
	SPE plug for field assembly	IP20, straight	63171-2	65544500ZY
	SPE adapter	IP65, angled	63171-2/63171-5	65544600ZY
	SPE rail adapter	IP30, straight	63171-2	65544700ZY



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