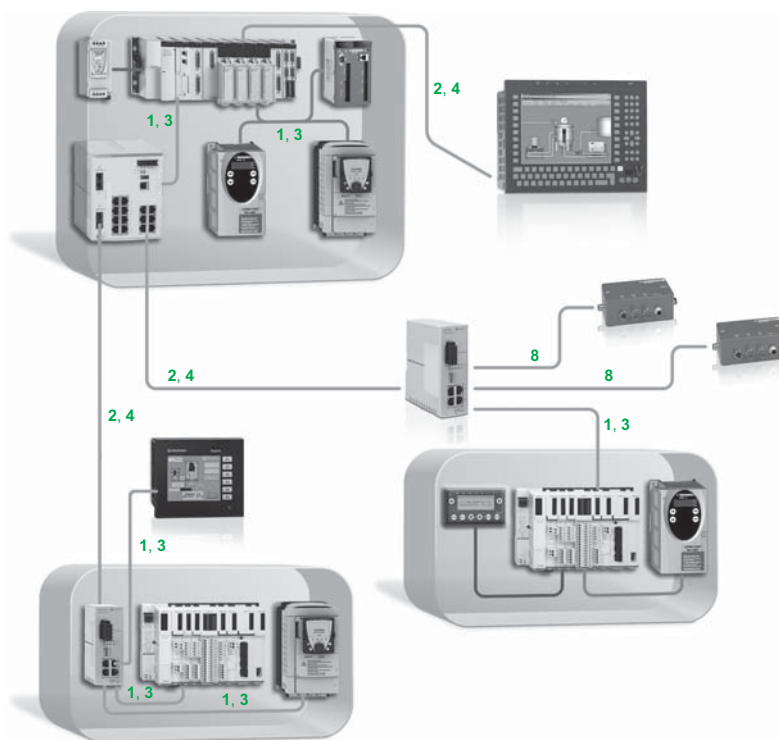


Presentation

The Schneider Electric offers copper and fiber optic Ethernet cables for wiring your IP 20 and IP 67 devices.

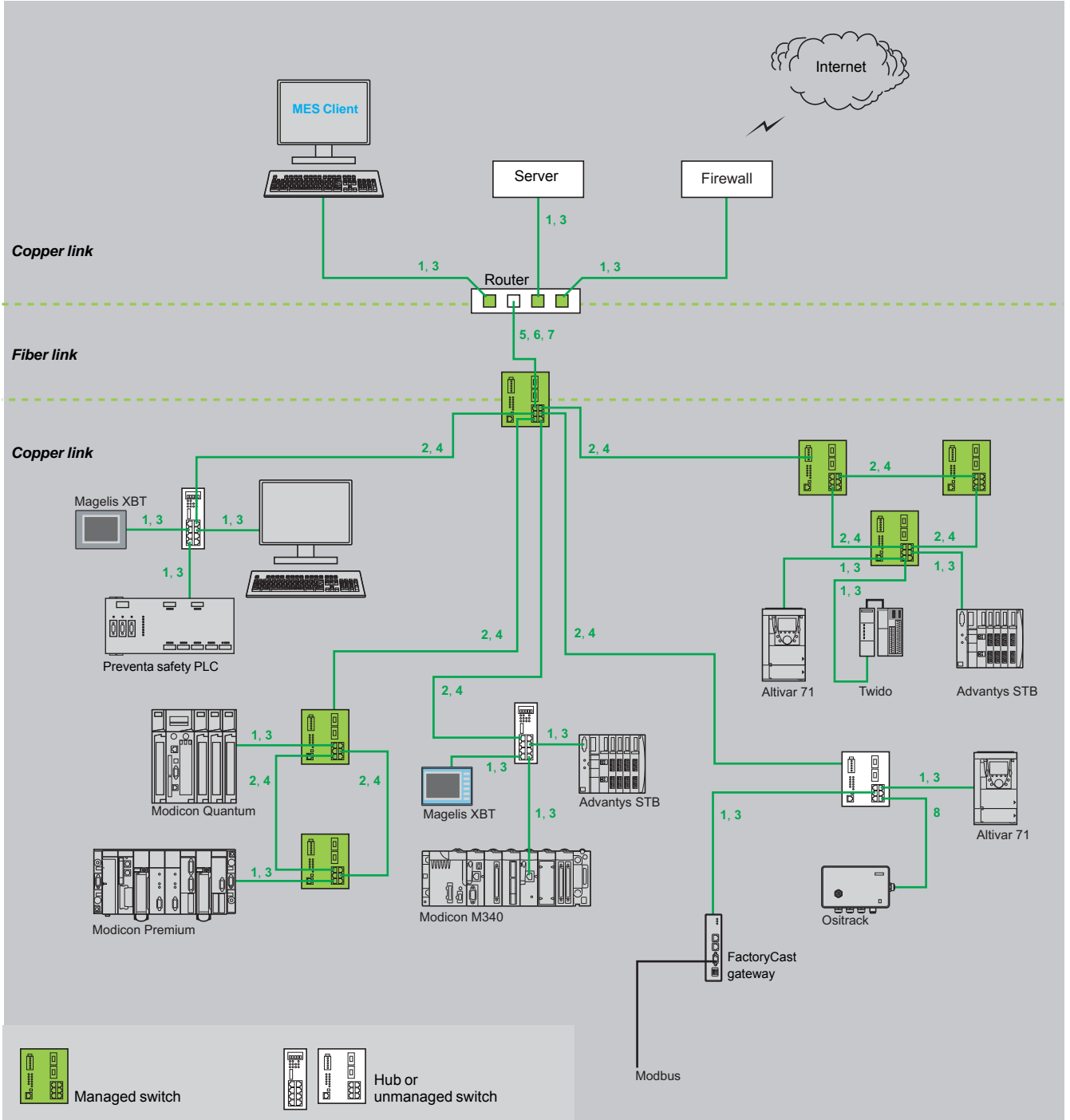
Examples

Combined IP 20 and IP 67 wiring (copper)



For key:
1, 3: Straight copper cordsets,
2, 4: Crossed copper cordsets,
8: Cables with IP 67 connector,
see pages 48332-EN/4 and 48332-EN/5.

Examples (continued)
Combined Copper and Fiber wiring



For key:
1, 3: Straight cables,
2, 4: Crossed cord cables,
5, 6, 7: Fiber optic cables,
8: Cables with IP 67 connector,
 see pages 48332-EN/4 and 48332-EN/5.

Shielded copper connection cables

ConneXium shielded connection cables are available in two versions to meet the various current standards and approvals:

■ **EIA/TIA 568 shielded twisted pair cables for C€ market**

These cables conform to:

- EIA/TIA-568 standard, category CAT 5E,
- IEC 11801/EN 50173 standard, class D.

Their fire resistance conforms to:

- NF C32-070# C2 classification
- IEC 322/1 standards
- Low Smoke Zero Halogen (LSZH).

■ **EIA/TIA 568 shielded twisted pair cables for UL market**

The cable material is:

- CEC type FT-1
- NEC type CM.



490 NT● 000●●

EIA/TIA 568 shielded twisted pair cables for C€ market

Description	Preformed at both ends	Rep.	Length m (ft)	Reference	Weight kg
Straight cables	2 RJ45 connectors For connection to terminal devices (DTE)	1	2 (6.6)	490 NTW 000 02	—
			5 (16.4)	490 NTW 000 05	—
			12 (39.4)	490 NTW 000 12	—
			40 (131.2)	490 NTW 000 40	—
			80 (262.5)	490 NTW 000 80	—
Crossed cord cables	2 RJ45 connectors For connections between hubs, switches and transceivers	2	5 (16.4)	490 NTC 000 05	—
			15 (49.2)	490 NTC 000 15	—
			40 (131.2)	490 NTC 000 40	—
			80 (262.5)	490 NTC 000 80	—

EIA/TIA 568 shielded twisted pair cables for UL market

Description	Preformed at both ends	Rep.	Length m (ft)	Reference	Weight kg
Straight cables	2 RJ45 connectors For connection to terminal devices (DTE)	3	2 (6.6)	490 NTW 000 02U	—
			5 (16.4)	490 NTW 000 05U	—
			12 (39.4)	490 NTW 000 12U	—
			40 (131.2)	490 NTW 000 40U	—
			80 (262.5)	490 NTW 000 80U	—
Crossed cord cables	2 RJ45 connectors For connections between hubs, switches and transceivers	4	5 (16.4)	490 NTC 000 05U	—
			40 (131.2)	490 NTC 000 40U	—
			80 (262.5)	490 NTC 000 80U	—

“Do it Yourself” cable and connectors

The “Do It Yourself” offer is comprised of 2 references for “field installable” connectors (M12 and RJ45) and one reference for spooled cable measuring 300 m. The product are intended for use in industrial Ethernet networks supporting transmission rates up to 100 Mbit/s over the combined maximum cable length up to 80 m.

Quick on the floor assembly with only a knife and pliers.

Description	According to	Length m (ft)	Reference	Weight kg
Ethernet copper cable 2 shielded twisted pairs 24 AWG	EIA/TIA-568 (80 m max. link length) UL 508-CM, C€ EN 50173 Class D	300 m (1000)	TCS ECN 300R2	—
RJ45 connector IP 20	EIA/TIA-568-D, category CAT 5E, C€	—	TCS EK3 MDS	—
M12 connector D-Code, IP 65/67	IEC 60176-2-101, EN 50173 Class D	—	TCS EK1 MDRS	—

(1) For key to numbers, see pages 48332-EN/2 and 48332-EN/3.



490 NOC 000 05



490 NOT 000 05



490 NOR 000 05



TCS EAA F1LF● 00

Glass fiber optic cables

These glass fiber optics are for making connections:

- To a terminal device (DTE)
- Between hubs, transceivers and switches

Description	Preformed at both ends	Rep.	Length m (ft)	Reference	Weight kg
Glass fiber optic cables	1 SC connector 1 MT-RJ connector	5	5 (16.4)	490 NOC 000 05	–
	1 ST connector (BFOC) 1 MT-RJ connector	6	5 (16.4)	490 NOT 000 05	–
	2 MT-RJ connectors	7	3 (9.8)	490 NOR 000 03	–
			5 (16.4)	490 NOR 000 05	–

Separate parts for TCS ESM switches

Description	Optical fiber	Type	Reference	Weight kg
Fiber optic modules for Gigabit ports with LC connector (1)	Multimode 50/125 µm or 62.5/125µm	1000BASE-SX	TCS EAA F1LFU00	0.040
	Single mode 9/125 µm	1000BASE-LH	TCS EAA F1LFH00	0.040
	Multimode 50/125 µm or 62.5/125 µm Single mode 62.5/125 µm	1000BASE-LX	TCS EAA F1LFS00	0.040
Configuration backup key	Via the USB port on the front of the switch, used to: - save and retrieve the switch configuration - update the internal software		TCS EAM 0100	–

(1) Dimensions W x H x D = 20 x 18 x 50 mm.

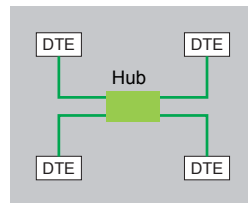
Connection components for IP 67 switch

Description	Preformed at both ends	Rep.	Length m (ft)	Reference	Weight kg
Copper cables	1 IP 67 4-way M12 connector and 1 RJ45 connector	8	1 (3.3)	TCS ECL 1M3M 1S2	–
			3 (9.8)	TCS ECL 1M3M 3S2	–
			10 (32.8)	TCS ECL 1M3M 10S2	–
			25 (82)	TCS ECL 1M3M 25S2	–
			40 (131.2)	TCS ECL 1M3M 40S2	–
	2 IP 67 4-way M12 connectors	–	1 (3.3)	TCS ECL 1M1M 1S2	–
			3 (9.8)	TCS ECL 1M1M 3S2	–
			10 (32.8)	TCS ECL 1M1M 10S2	–
			25 (82)	TCS ECL 1M1M 25S2	–
			40 (131.2)	TCS ECL 1M1M 40S2	–
Power cables	Female M12 straight connector	–	2 (6.6)	XZC P1164L2	–
			5 (16.4)	XZC P1164L5	–
	Female M12 elbowed connector	–	2.5 (8.2)	XZC P1264L2	–
			5 (16.4)	XZC P1264L5	–
Power connectors	Female M12 straight connector	–	–	XZC C12 FDM 50B	–
	Female M12 elbowed connector	–	–	XZC C12 FCM 50B	–
M12/RJ45 adaptor	IP 67 female 4-way M12 connector and female RJ45 connector	–	–	TCS EAA F11F13F00	–

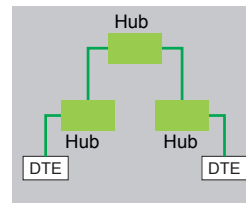
Presentation

Hubs (*concentrators*) are used for transmitting signals between several media (ports). Hubs are “plug and play” devices that do not need any configuration. The use of hubs makes it possible to create the following topologies:

- Star topology using hubs
- Tree topology using hubs



Star topology



Tree topology

Characteristics and reference

Transparent Ready.



Hubs			
Interfaces	Copper cable ports	Number and type	4 x 10BASE-T ports
		Shielded connectors	RJ45
		Medium	Shielded twisted pair, category CAT 5E
		Total length of pair	100 m
	Fiber optic ports	Number and type	–
Topology	Number of cascaded hubs		max. 4
	Number of hubs in a ring		–
Redundancy			P1 and P2 redundant power supplies
Power supply	Voltage		24 V (18...32) ---, safety extra low voltage (SELV)
	Power consumption		80 mA (130 max. at 24 V ---)
	Removable connector		5-way
Operating temperature			0...+ 60 °C
Relative humidity			10...95% non condensing
Degree of protection			IP 30
Dimensions	W x H x D		40 x 125 x 80 mm
Mounting			On symmetrical DIN rail, 35 mm wide
Weight			0.530 kg
Conformity to standards			cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 Class 1 Division 2, CE, GL, C-Tick FM 3810, FM 3611 Class 1 Division 2
LED indicators			Power supply, activity, link
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (1 A max. volt-free contact at 24 V ---)
Reference			499 NEH 104 10

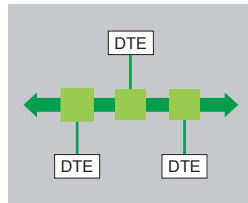
Presentation

The use of ConneXium transceivers makes it possible to perform the following:

- Creation of linear fiber optic bus topologies, for products with twisted pair cable Ethernet connection.
- Interfacing products with twisted pair cable Ethernet connection with a fiber optic cable.

Transceivers are “plug and play” devices that do not need any configuration.

ConneXium transceivers provide fiber optic connections for transmission in areas subject to interference (high levels of electromagnetic interference) and for long distance communications.



Linear topology on optical fiber

Characteristics and reference

Transparent Ready.



Transceivers			
Interfaces	Copper cable ports	Number and type	1 x 100BASE-TX port
		Shielded connectors	RJ45
		Medium	Shielded twisted pair, category CAT 5E
		Total length of pair	100 m
	Fiber optic ports	Number and type	1 x 100BASE-FX port
		Connectors	SC
		Medium	Multimode optical fiber
		Length of optical fiber	
		50/125 µm fiber	3000 m (1)
		62.2/125 µm fiber	3000 m (1)
Attenuation analysis	50/125 µm fiber	8 dB	
	62.2/125 µm fiber	11 dB	
Redundancy			P1 and P2 redundant power supplies
Power supply	Voltage		24 V (18...32) ---, safety extra low voltage (SELV)
	Power consumption		160 mA (190 max. at 24 V ---)
	Removable connector		5-way
Operating temperature			0...+ 60 °C
Relative humidity			10...95% non condensing
Degree of protection			IP 20
Dimensions	W x H x D		47 x 135 x 111 mm
Mounting			On symmetrical DIN rail, 35 mm wide
Weight			0.230 kg
Conformity to standards			cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 Class 1 Division 2, CÉ, GL, C-Tick
LED indicators			P1 and P2 power supplies, Ethernet link/port status
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (1 A max. volt-free contact at 24 V ---)
Reference			499 NTR 101 00

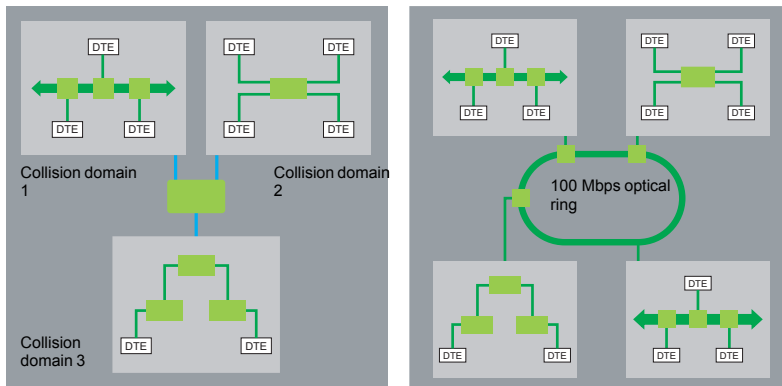
(1) Length dependent on the attenuation analysis and attenuation of the optical fiber (typical value: 2000 m).

Ethernet network

Cabling system

ConneXium unmanaged switches

Presentation



Switches are used to increase the limits of architectures based on hubs or transceivers, by separating collision domains. Higher layer communication is provided between the ports, and collisions at link layer are not propagated (filtering). They therefore improve performance by better allocation of the pass band due to the reduction of collisions and the network load. Certain Connexium switch models also enable redundant architectures to be created on twisted pair copper ring or fiber optic.

Switches are “plug & play” devices that do not need any configuration. They can also be managed remotely via the SNMP or HTTP protocols for monitoring and diagnostics purposes.

Characteristics and references: twisted pair

Transparent Ready.



Switches			Copper twisted pair, unmanaged			
Interfaces	Copper cable ports	Number and type	5 x 10BASE-T/ 100BASE-TX ports		8 10BASE-T/100BASE-TX ports	
		Shielded connectors	M12 (type D)		RJ45	
		Medium	Shielded twisted pair, category CAT 5E			
		Total length of pair	100 m			
		Ethernet services	Storage and re-routing of received data, auto MDI/MDX, automatic negotiation of 10/100 Mbit/s and duplex mode (on all ports), automatic change of polarity			-
Topology	Number of switches	Cascaded	Unlimited			
		Redundant in a ring	-			
Redundancy			-		P1 and P2 redundant power supplies	
Power supply	Voltage	24 V ~ (18...32) safety extra low voltage (SELV)				
	Power consumption	mA max.	100	125 (290 max.)		
	Removable connector	5-way M12 (type A, male)		5-way		
Operating temperature			0...+ 60 °C			
Relative humidity			-		10...95% non condensing	
Degree of protection			IP 67		IP 20	
Dimensions		W x H x D	60 x 126 x 31 mm		47 x 135 x 111 mm	
Mounting			On symmetrical DIN rail, 35 mm wide			
Weight			0.210 kg		0.230 kg	
Conformity to standards			cUL 508 and CSA 22.2 No. 142		cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 Class 1 Division 2, CE, GL, C-Tick	
LED indicators			Power supply, link status, line activity		P1 and P2 power supplies, Ethernet link/port status	
Alarm relay			-		Power supply fault, Ethernet network fault or communication port fault (1 A max. volt-free contact at 24 V ~)	
Reference			TCS ESU 051F0		499 NES 181 00	
IP 67 cordsets						
Ethernet cordsets			Preformed at each end, see page 48332-EN/5			
Power supply cables			Preformed at each end with M12 female straight connectors		Preformed at each end with female M12 angled connectors	
			Length 2 m	Length 5 m	Length 2 m	Length 5 m
Reference			XZC P1164L2	XZC P1164L5	XZC P1264L2	XZC P1264L5
Spare power connectors			Female M12 straight connector		Female M12 angled connector	
Reference			XZC C12 FDM 50B		XZC C12 FCM 50B	

Characteristics and references : 3, 4 and 5 ports, twisted pair, fiber optic



Switches		Copper twisted pair, unmanaged				
Interfaces	Copper cable ports	Number and type	3 x 10BASE-T/ 100BASE-TX ports	4 x 10BASE-T/ 100BASE-TX ports	5 x 10BASE-T/ 100BASE-TX ports	
		Shielded connectors	RJ45			
		Medium	Shielded twisted pair, category CAT 5E			
		Total length of pair	100 m			
	Fiber optic ports	Number and type	–	1 x 100BASE-FX ports	–	
		Connectors	–	Duplex SC	–	
		Medium	–	Multimode optical fiber	–	
		Length of optical fiber	50/125 µm fiber	–	5000 m (1)	–
			62,2/125 µm fiber	–	4000 m (1)	–
		Attenuation analys	50/125 µm fiber	–	8 dB	–
62,2/125 µm fiber	–		11 dB	–		
Ethernet services	Storage and re-routing of received data, auto MDI/MDX (automatic switching depending on whether cables are straight or crossed), automatic negotiation of 10/100 Mbit/s and duplex mode (on all ports), automatic change of polarity					
Topology	Number of switches	Cascaded	Unlimited			
		Redundant in a ring	–			
Redundancy		–				
Power supply	Voltage, safety extra low voltage (SELV)		~ 24 V (~ 9,6...32 V)			
	Power consumption		Max. 2,2 W	Max. 3,9 W	Max. 2,2 W	
	Connector	3 way removable connector				
Operationg température		0...+ 60°C				
Relative humidity		Max. 95 % non condensing				
Degree of protection		IP 30				
Dimensions	W x H x D	25 x 114 x 79 mm				
Weight		0,113 kg	0,120 kg	0,113 kg		
Conformity to standards		UL 508 and CSA 22.2 No.142 IEC/EN 61131-2, IEC 60825-1 class 1, CISPR 11A				
LED indicators		Power supply, copper port activity, 10 or 100 Mbit/s data rate				
		–	Fiber port state and activity	–		
Alarm relay		–				
Référence		TCS ESU 033FN0	TCS ESU 043F1N0	TCS ESU 053FN0		

(1) Length dependent on the attenuation analysis and attenuation of the fiber optic (typical value: 2,000 m).

Ethernet network

Cabling system

ConneXium unmanaged switches

Characteristics and references: 5 ports, twisted pair and fiber optic



Switches			Copper twisted pair and fiber optic, unmanaged			
Interfaces	Copper cable ports	Number and type	4 x 10BASE-T/ 100BASE-TX ports	3 x 10BASE-T/ 100BASE-TX ports	4 x 10BASE-T/ 100BASE-TX ports	3 x 10BASE-T/ 100BASE-TX ports
		Shielded connectors	RJ45			
		Medium	Shielded twisted pair, category CAT 5E			
		Total length of pair	100 m			
	Fiber optic ports	Number and type	1 x 100BASE-FX port	2 x 100BASE-FX ports	1 x 100BASE-FX port	2 x 100BASE-FX ports
		Connectors	SC			
		Medium	Multimode optical fiber		Single mode optical fiber	
		Length of optical fiber				
		50/125 µm fiber	5,000 m (1)		–	
		62.2/125 µm fiber	4,000 m (1)		–	
Attenuation analysis	9/125 µm fiber	–		32,500 m (2)		
	50/125 µm fiber	8 dB		–		
	62.2/125 µm fiber	11 dB		–		
	9/125 µm fiber	–		16 dB		
Topology	Number of switches	Cascaded	Unlimited			
		Redundant in a ring	–			
Redundancy		P1 and P2 redundant power supplies				
Power supply	Voltage	24 V $\overline{\text{DC}}$ (18...32), safety extra low voltage (SELV)				
	Power consumption	mA max.	200	240	200	240
	Removable connector	5-way				
Operating temperature		-40...+70 °C				
Relative humidity		10...95% non condensing				
Degree of protection		IP 20				
Dimensions		W x H x D	47 x 135 x 111 mm			
Mounting		On symmetrical DIN rail, 35 mm wide				
Weight			0.330 kg	0.335 kg	0.330 kg	0.335 kg
Conformity to standards		cUL 60950, cUL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 Class 1 Division 2, CE, GL, C-Tick				
LED indicators		P1 and P2 power supplies, Ethernet link status, transmission activity				
Alarm relay		Activity, power supply fault, Ethernet network fault or communication port fault (1 A max. volt-free contact at 24 V $\overline{\text{DC}}$)				
Reference		499 NMS 251 01	499 NMS 251 02	499 NSS 251 01	499 NSS 251 02	

(1) Length dependent on the attenuation analysis and attenuation of the fiber optic (typical value: 2,000 m).

(2) Length dependent on the attenuation analysis and attenuation of the fiber optic (typical value: 15,000 m).

Characteristics and references: 4 ports, twisted pair and fiber optic

Transparent
Ready.



Switches			Copper twisted pair and fiber optic, managed				
Interfaces	Copper cable ports	Number and type	3 x 10/100BASE-TX ports	2 x 10/100BASE-TX ports	3 x 10/100BASE-TX ports	2 x 10/100BASE-TX ports	
		Shielded connectors	RJ45				
		Medium	Shielded twisted pair, category CAT 5E				
			Total length of pair	100 m			
	Fiber optic ports	Number and type	1 x 100BASE-FX port	2 x 100BASE-FX ports	1 x 100BASE-FX port	2 x 100BASE-FX ports	
		Connectors	Duplex SC				
		Medium	Multimode optical fiber		Single mode optical fiber		
		Length of optical fiber					
		50/125 µm fiber	5,000 m (1)		–		
		62.2/125 µm fiber	4,000 m (1)		–		
9/125 µm fiber		–		32,500 m (2)			
	Attenuation analysis						
	50/125 µm fiber	8 dB		–			
	62.2/125 µm fiber	11 dB		–			
	9/125 µm fiber	–		16 db			
	Ethernet services	FDR, SMTP V3, SNMP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access VLAN, IGMP Snooping, RSTP (<i>Rapid Scanning Tree Protocol</i>), priority port, data stream control, secure port					
Topology	Number of switches	Cascaded	Unlimited				
		Redundant in a ring	max. 50				
Redundancy			Redundant power supplies, redundant single ring, ring coupling				
Power supply	Voltage	Operation	9.6...60 V $\overline{\text{---}}$ /18...30 V \sim , safety extra low voltage (SELV)				
	Power consumption		6.5 W	7.3 W	6.5 W	7.3 W	
	Removable connector		6-way				
Operating temperature			0...+ 60 °C				
Relative humidity			10...90% non condensing				
Degree of protection			IP 20				
Dimensions		W x H x D	47 x 131 x 111 mm				
Mounting			On symmetrical DIN rail, 35 mm wide				
Weight			0.400 kg				
Conformity to standards			IEC/EN 61131-2, IEC 61850-3, UL 508, UL 1604 Class 1 Division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 Class 1 Division 2 (cUL), CE, GL, C-Tick				
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, copper port status and copper port activity				
Alarm relay			Power supply fault, Ethernet network fault, communication port fault, redundancy fault (1 A max. volt-free contact at 24 V $\overline{\text{---}}$)				
Reference			TCS ESM 043F1CU0	TCS ESM 043F2CU0	TCS ESM 043F1CS0	TCS ESM 043F2CS0	

(1) Length dependent on the attenuation analysis and attenuation of the fiber optic (typical value: 2,000 m).

(2) Length dependent on the attenuation analysis and attenuation of the fiber optic (typical value: 15,000 m).

Characteristics and references: 4 and 8 ports, twisted pair

Transparent
Ready.



Switches			Copper twisted pair, managed	
Interfaces	Copper cable ports	Number and type	4 x 10/100BASE-TX ports	8 x 10/100BASE-TX ports
		Shielded connectors	RJ45	
		Medium	Shielded twisted pair, category CAT 5E	
		Total length of pair	100 m	
	Fiber optic ports	Number and type	–	
		Connectors	–	
		Medium	–	
		Length of optical fiber	–	
		50/125 µm fiber	–	
		62.2/125 µm fiber	–	
		9/125 µm fiber	–	
	Ethernet services	Attenuation analysis	–	
		50/125 µm fiber	–	
62.2/125 µm fiber		–		
	9/125 µm fiber	–		
Topology	Number of switches	Cascaded	Unlimited	
		Redundant in a ring	max. 50	
Redundancy			Redundant power supplies, redundant single ring, ring coupling	
Power supply	Voltage	Operation	9.6...60 V $\overline{\text{---}}$ /18...30 V \sim , safety extra low voltage (SELV)	
	Power consumption		5.3 W	5.3 W
	Removable connector		6-way	
Operating temperature			0...+60 °C	
Relative humidity			10...90% non condensing	
Degree of protection			IP 20	
Dimensions		W x H x D	47 x 131 x 111 mm	74 x 131 x 111 mm
Mounting			On symmetrical DIN rail, 35 mm wide	
Weight			0.400 kg	0.410 kg
Conformity to standards			IEC/EN 61131-2, IEC 61850-3, UL 508, UL 1604 Class 1 Division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 Class 1 Division 2 (cUL), CE, GL, C-Tick	
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, copper port status and copper port activity	Power supply status, alarm relay status, active redundancy, redundancy management, fiber port status and fiber port activity
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (1 A max. volt-free contact at 24 V $\overline{\text{---}}$)	
Reference			TCS ESM 043F23F0	TCS ESM 083F23F0

Characteristics and references: 8 ports, twisted pair and fiber optic



Switches			Copper twisted pair and fiber optic, managed			
Interfaces	Copper cable ports	Number and type	7 x 10/100BASE-TX ports	6 x 10/100BASE-TX ports	7 x 10/100BASE-TX ports	6 x 10/100BASE-T ports
		Shielded connectors	RJ45			
		Medium	Shielded twisted pair, category CAT 5E			
		Total length of pair	100 m			
	Fiber optic ports	Number and type	1 x 100BASE-FX port	2 x 100BASE-FX ports	1 x 100BASE-FX port	2 x 100BASE-FX ports
		Connectors	Duplex SC			
		Medium	Multimode optical fiber		Single mode optical fiber	
		Length of optical fiber	50/125 μm fiber		–	
			62.2/125 μm fiber		–	
			9/125 μm fiber		32,500 m (2)	
	Attenuation analysis	50/125 μm fiber		–		
		62.2/125 μm fiber		–		
		9/125 μm fiber		16 dB		
	Ethernet services	FDR, SMTP V3, SNMP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access VLAN, IGMP Snooping, RSTP (<i>Rapid Spanning Tree Protocol</i>), priority port, data stream control, secure port				
Topology	Number of switches	Cascaded	Unlimited			
		Redundant in a ring	max. 50			
Redundancy		Redundant power supplies, redundant single ring, ring coupling				
Power supply	Voltage	Operation	9.6...60 V $\overline{\text{---}}$ /18...30 V \sim , safety extra low voltage (SELV)			
	Power consumption		6.5 W	7.3 W	6.5 W	7.3 W
	Removable connector		6-way			
Operating temperature		0...+60 °C				
Relative humidity		10...90% non condensing				
Degree of protection		IP 20				
Dimensions	W x H x D	74 x 131 x 111 mm				
Mounting		On symmetrical DIN rail, 35 mm wide				
Weight		0.410 kg				
Conformity to standards		IEC/EN 61131-2, IEC 61850-3, UL 508, UL 1604 Class 1 Division 2, CSA 22.2 No. 214 (cUL), CSA 22.2 No. 213 Class 1 Division 2 (cUL), CE, GL, C-Tick				
LED indicators		Power supply status, alarm relay status, active redundancy, redundancy management, fiber port status and fiber port activity				
Alarm relay		Power supply fault, Ethernet network fault or communication port fault (1 A max. volt-free contact at 24 V $\overline{\text{---}}$)				
Reference		TCS ESM 083F1CU0	TCS ESM 083F2CU0	TCS ESM 083F1CS0	TCS ESM 083F2CS0	

(1) Length dependent on the attenuation analysis and attenuation of the fiber optic (typical value: 2,000 m).

(2) Length dependent on the attenuation analysis and attenuation of the fiber optic (typical value: 15,000 m).

Characteristics and references: 16 and 24 ports, twisted pair, fiber optic

Transparent
Ready



Switches			Copper twisted pair, managed	Copper twisted pair and fiber optic, managed		
Interfaces	Copper cable ports	Number and type	16 x 10/100BASE-TX ports	14 x 10/100BASE-TX ports	22 x 10/100BASE-TX ports	
		Shielded connectors	RJ45			
		Medium	Shielded twisted pair, category CAT 5E			
		Total length of pair	100 m			
	Fiber optic ports	Number and type	–	2 x 100BASE-FX ports		
		Connectors	–	Duplex SC		
		Medium	–	Multimode optical fiber		
		Length of optical fiber	–	–		
		50/125 µm fiber	–	5,000 m (1)		
		62.2/125 µm fiber	–	4,000 m (1)		
Ethernet services	Attenuation analysis	–	–			
	50/125 µm fiber	–	8 dB			
	62.2/125 µm fiber	–	11 dB			
	9/125 µm fiber	–	–			
Topology	Number of switches	Cascaded	Unlimited			
		Redundant in a ring	max. 50			
Redundancy			Redundant power supplies, redundant single ring, ring coupling			
Power supply	Voltage	Operation	9.6...60 V $\overline{\text{---}}$ /18...30 V \sim , safety extra low voltage (SELV)			
	Power consumption		9.4 W	11.8 W	15.5 W	
	Removable connector		6-way			
Operating temperature			0...+ 60 °C			
Relative humidity			10... 90% non condensing			
Degree of protection			IP 20			
Dimensions		W x H x D	111 x 131 x 111 mm			
Mounting			On symmetrical DIN rail, 35 mm wide			
Weight			0.600 kg		0.650 kg	
Conformity to standards			cUL 60950, UL 508 and CSA 22.2 No 142, UL 1604 and CSA 22.2 No 213 Class 1 Division 2, CE, GL, C-Tick			
LED indicators			Redundant power supplies, single ring	Redundant power supplies, single ring, double ring		
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (1 A max. volt-free contact at 24 V $\overline{\text{---}}$)			
Reference			TCS ESM 163F23F0	TCS ESM 163F2CU0	TCS ESM 243F2CU0	

(1) Length dependent on the attenuation analysis and attenuation of the fiber optic (typical value: 2,000 m).

Characteristics and references: 8 ports and 2 Gigabit ports, twisted pair, fiber optic

Transparent
Ready



Switches			Copper twisted pair and fiber optic, managed			Copper twisted pair, managed
Interfaces	Copper cable ports	Number and type	8 x 10/100BASE-TX ports			8 x 10/100BASE-TX ports and 2 x 10/100/1000BASE-TX ports (Gigabit)
		Shielded connectors	RJ45			
		Medium	Shielded twisted pair, category CAT 5E			
		Total length of pair	100 m			
	Gigabit ports fiber optic (with SFP fiber module to be mounted on SFP connector)	Number and type	2 x 1000BASE-SX ports (1)	2 x 1000BASE-LH ports (2)	2 x 1000BASE-LX ports (3)	–
		Connectors	LC			–
		Medium	Multimode optical fiber	Single mode optical fiber	Single mode and multimode optical fiber	–
		Length of optical fiber				
		50/125 µm fiber	550 m	–	550 m	–
		62.2/125 µm fiber	275 m	–	550 m	–
9/125 µm fiber	–	8 -72,000 m	20,000 m	–		
Attenuation analysis						
50/125 µm fiber	7.5 dB	–	11 dB	–		
62.2/125 µm fiber	7.5 dB	–	11 dB	–		
9/125 µm fiber	–	6 - 22 dB	11 dB	–		
Ethernet services		FDR, SMTP V3, SNMP client, multicast filtering for optimization of the Global Data protocol, configuration via Web access VLAN, IGMP Snooping, RSTP (<i>Rapid Scanning Tree Protocol</i>), priority port, data stream control, secure port				
Topology	Number of switches	Cascaded	Unlimited			
		Redundant in a ring	max. 50			
Redundancy			Redundant power supplies, redundant single ring, ring coupling			
Power supply	Voltage	Operation	9.6...60 V $\overline{\text{---}}$ /18...30 V \sim , safety extra low voltage (SELV)			
	Power consumption		8.9 W + 1 W per SFP fiber module			8.3 W
	Removable connector		6-way			
Operating temperature			0...+ 60 °C			
Relative humidity			10... 90% non condensing			
Degree of protection			IP 20			
Dimensions		W x H x D	111 x 131 x 111 mm			
Mounting			On symmetrical DIN rail, 35 mm wide			
Weight			0.410 kg			
Conformity to standards			cUL 60950, UL 508 and CSA 22.2 No. 142, UL 1604 and CSA 22.2 No. 213 Class 1 Division 2, C _E , GL			
LED indicators			Power supply status, alarm relay status, active redundancy, redundancy management, fiber port status and fiber port activity			
Alarm relay			Power supply fault, Ethernet network fault or communication port fault (1 A max. volt-free contact at 24 V $\overline{\text{---}}$)			
Reference			TCS ESM 103F2LG0		TCS ESM 103F23G0	

(1) With TCS EAA F1LFU00 fiber optic module to be ordered separately, see page 48332-EN/5.
(2) With TCS EAA F1LFH00 fiber optic module to be ordered separately, see page 48332-EN/5.
(3) With TCS EAA F1LFS00 fiber optic module to be ordered separately, see page 48332-EN/5.