

INJ 1...

PoE injector

Data sheet
107973_en_01

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1 Description

The injectors connect Ethernet devices without PoE (e.g. switches) with PoE-ready end devices (e.g. IP cameras). The injector as power sourcing equipment (PSE) provides the required power to a powered device (PD) by way of the data cable.

The injector and end device negotiate the electrical power requirements autonomously. Ensure that end devices with an electrical power requirement of up to 30 W fulfill the requirements of IEEE 802.3af and at.

Features

- Compliant with IEEE 802.3 af (PoE) and IEEE 802.3 at (PoE+) up to 30 W
- Product versions up to 60 W for 4-pair PoE (PoE++)
- Automatic detection of IEEE 802.3at or 802.3af PD
- DIP switch for selecting the cable pairs for the transfer of energy in mode A or B
- Extended supply voltage range of 18 V DC ... 57 V DC, redundant
- 10/100/1000 Mbps
- Extended temperature range of -40 °C ...+75 °C
- Safe shield connection to ground potential
- Mounting on a DIN rail



Make sure you always use the latest documentation.
It can be downloaded from the product at phoenixcontact.net/products.
This document is valid for the products listed in 3 „Ordering data“.

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3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
PoE injector, 30 W, two RJ45 sockets, 10/100/1000 Mbps, DIN rail mounting, IP20	INJ 1000	2703005	1
PoE injector, 30 W, two RJ45 sockets, 10/100/1000 Mbps, DIN rail mounting, IP20, expanded temperature range of -40°C ... 75°C	INJ 1000-T	2703006	1
PoE injector, 60 W, two RJ45 sockets, 10/100/1000 Mbps, DIN rail mounting, IP20	INJ 1010	2703007	1
PoE injector, 60 W, two RJ45 sockets, 10/100/1000 Mbps, DIN rail mounting, IP20, expanded temperature range of -40°C ... 75°C	INJ 1010-T	2703008	1
Accessories	Type	Order No.	Pcs./Pkt.
Patch panel, two RJ45 sockets, 10/100/1000 Mbps, DIN rail mounting, IP20	PP-RJ-RJ	2703015	1
Patch panel, RJ45 socket on screw terminal blocks, 10/100/1000 Mbps, DIN rail mounting, IP20, shield contacting with strain relief	PP-RJ-SC	2703016	1
Patch panel, RJ45 socket on Push-in terminal blocks, 10/100/1000 Mbps, DIN rail mounting, IP20, shield contacting with strain relief	PP-RJ-SCC	2703018	1
Patch panel, RJ45 socket on IDC terminal blocks, 10/100/1000 Mbps, DIN rail mounting, IP20, shield contacting with strain relief	PP-RJ-IDC	2703019	1
Patch panel, two RJ45 sockets, 10/100/1000 Mbps, DIN rail mounting, IP20, shield current monitoring, surge protection	PP-RJ-RJ-F	2703020	1
Patch panel, RJ45 socket on screw terminal blocks, 10/100/1000 Mbps, DIN rail mounting, IP20, shield contacting with strain relief, shield current monitoring, surge protection	PP-RJ-SC-F	2703021	1
Patch panel, RJ45 socket on Push-in terminal blocks, 10/100/1000 Mbps, DIN rail mounting, IP20, shield contacting with strain relief, shield current monitoring, surge protection	PP-RJ-SCC-F	2703022	1
Patch panel, RJ45 socket on IDC terminal blocks, 10/100/1000 Mbps, DIN rail mounting, IP20, shield contacting with strain relief, shield current monitoring, surge protection	PP-RJ-IDC-F	2703023	1
Crimping pliers, for assembling the RJ45 plugs FL PLUG RJ45..., for assembly on site	FL CRIMPTOOL	2744869	1

Accessories	Type	Order No.	Pcs./Pkt.
CAT5-SF/UTP cable (J-02YS(ST)C HP 2 x 2 x 24 AWG), heavy-duty installation cable, 2 x 2 x 0.22 mm ² , solid conductor, shielded, outer sheath: 7.8 mm diameter, inner sheath: 5.75 mm ±0.15 mm diameter cable, Ethernet CAT5 (100 Mbps), 4-position, Halogen-free compound, HM 2 in acc. with VDE 0207, water blue RAL 5021, cable length: Free input (0.25 ... 1000.0 m)	FL CAT5 HEAVY	2744814	1
CAT5-SF/UTP cable (J-02YS(ST)C HP 2 x 2 x 24 AWG), heavy-duty installation cable, 2 x 2 x 0.22 mm ² , solid conductor, shielded, outer sheath: 7.8 mm diameter, inner sheath: 5.75 mm ±0.15 mm diameter, preassembled on both sides with RJ45 plug, crossover or line network cable, number of positions: 4, 100 Mbps, CAT5	FL CAT5 HEAVY CONF/	2744827	1
CAT5-SF/UTP cable (J-LI02YS(ST)C H 2 x 2 x 26 AWG), light-duty, flexible installation cable 2 x 2 x 0.14 mm ² , stranded, shielded, outer sheath: 5.75 mm ±0.15 mm diameter	FL CAT5 FLEX	2744830	1
CAT5-SF/UTP cable (J-LI02YS(ST)C H 2 x 2 x 26 AWG), light-duty, flexible installation cable 2 x 2 x 0.14 mm ² , stranded, shielded, outer sheath: 5.75 mm ±0.15 mm diameter, preassembled on both sides with RJ45 plug, crossover or line assignment network cable, number of positions: 4, 100 Mbps, CAT5	FL CAT5 FLEX CONF/	2744843	1
Passive network isolator for electrical isolation in Ethernet networks. This protects Ethernet devices from potential differences of up to 4 kV. Can be used for transmission speeds of up to 100 Mbps. Connection using RJ45 and COMBICON plug-in screw terminal block.	FL ISOLATOR 100-RJ/SC	2313928	1
Passive network isolator for electrical isolation in Ethernet networks. This protects Ethernet devices from potential differences of up to 4 kV. Can be used for transmission speeds of up to 100 Mbps. Possible to connect two RJ45 plugs.	FL ISOLATOR 100-RJ/RJ	2313931	1
Passive network isolator for electrical isolation in Ethernet networks. This protects Ethernet devices from potential differences of up to 4 kV. Can be used for transmission speeds of up to 1 Gbps. Possible to connect two RJ45 plugs.	FL ISOLATOR 1000-RJ/RJ	2313915	1
Passive network isolator for electrical isolation in Ethernet networks. For the protection of Ethernet devices against potential differences of up to 4 kV. Can be used for transmission speeds of up to 100 Mbps. Ethernet connection via two M12 sockets (D-coded).	FL ISOLATOR 100-M12	2902985	1
Patch cable, CAT5, assembled, 0.3 m	FL CAT5 PATCH 0,3	2832250	10
Patch cable, CAT5, assembled, 0.5 m	FL CAT5 PATCH 0,5	2832263	10
Patch cable, CAT5, assembled, 1 m	FL CAT5 PATCH 1,0	2832276	10
Patch cable, CAT5, assembled, 1.5 m	FL CAT5 PATCH 1,5	2832221	10
Patch cable, CAT5, assembled, 2 m	FL CAT5 PATCH 2,0	2832289	10
Patch cable, CAT5, assembled, 3 m	FL CAT5 PATCH 3,0	2832292	10

Accessories	Type	Order No.	Pcs./Pkt.
Patch cable, CAT6, pre-assembled, 0.3 m	FL CAT6 PATCH 0,3	2891181	10
Patch cable, CAT6, pre-assembled, 0.5 m	FL CAT6 PATCH 0,5	2891288	10
Patch cable, CAT6, pre-assembled, 1.0 m	FL CAT6 PATCH 1,0	2891385	10
Patch cable, CAT6, pre-assembled, 1.5 m	FL CAT6 PATCH 1,5	2891482	10
Patch cable, CAT6, pre-assembled, 2.0 m	FL CAT6 PATCH 2,0	2891589	10
Patch cable, CAT6, pre-assembled, 3.0 m	FL CAT6 PATCH 3,0	2891686	10
Patch cable, CAT6, pre-assembled, 5.0 m	FL CAT6 PATCH 5,0	2891783	10
Patch cable, CAT6, pre-assembled, 7.5 m	FL CAT6 PATCH 7,5	2891880	10
Patch cable, CAT6, pre-assembled, 10 m	FL CAT6 PATCH 10	2891877	10
Patch cable, CAT6, pre-assembled, 12.5 m	FL CAT6 PATCH 12,5	2891369	5
Patch cable, CAT6, pre-assembled, 15.0 m	FL CAT6 PATCH 15,0	2891372	5
Patch cable, CAT6, pre-assembled, 20.0 m	FL CAT6 PATCH 20,0	2891576	5
Stripping tool, for the multi-level stripping of shielded cables	VS-CABLE-STRIP-VARIO	1657407	1
RJ45 connector, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: PA, connection method: IDC fast connection, connection cross section: AWG 26- 23, cable outlet: straight, color: traffic grey A RAL 7042	VS-08-RJ45-5-Q/IP20	1656725	1
RJ45 connector, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: PA, connection method: IDC fast connection, connection cross section: AWG 26- 23, cable outlet: straight, color: black	VS-08-RJ45-5-Q/IP20 BK	1658008	1
Actuation tool, for ST terminal blocks, also suitable for use as a bladed screwdriver, size: 0.4 x 2.5 x 75 mm, 2-component grip, with non-slip grip	SZF 0-0,4X2,5	1204504	10
Electronic diagonal cutter , tapered head, angled (21°), without chamfer, with opening spring	MICROFOX-SP	1212488	1
Network cable, Ethernet CAT6 _A (10 Gbps), 8-position, PUR halogen-free, water blue RAL 5021, shielded, free cable end, on free cable end, cable length: Free entry (0.5 ... 400 m)	VS-OE-OE-94F/...	1417359	1
Primary-switched UNO POWER power supply for DIN rail mounting, input: 1-phase, output: 24 V DC/60 W	UNO-PS/1AC/24DC/ 60W	2902992	1
Primary-switched TRIO POWER power supply with push-in connection for DIN rail mounting, input: 1-phase, output: 24 V DC/3 A C2LPS	TRIO-PS-2G/1AC/24DC/3/ C2LPS	2903147	1
Primary-switched power supply unit, QUINT POWER, Push-in technology, DIN rail mounting, input: 1-phase, output: 24 V DC / 2.5 A	QUINT4-PS/1AC/24DC/2.5/ PT	2909576	1



Please observe section 6.1 „Accessories: power supply“ when selecting the power supply.

4 Technical data

Supply	INJ 1000 INJ 1000-T	INJ 1010 INJ 1010-T
Supply voltage range	18 V DC ... 57 V DC (Ordinary locations) 24 V DC ... 48 V DC (Hazardous locations)	18 V DC ... 57 V DC (Ordinary locations) 24 V DC ... 48 V DC (Hazardous locations)
Nominal supply voltage	24 V DC 48 V DC	24 V DC 48 V DC
Max. current consumption	2.1 A	4.2 A
Maximum current consumption (Ex areas)	1.4 A (24 V DC) 0.7 A (48 V DC)	2.73 A (24 V DC) 1.34 A (48 V DC)
Power consumption	≤ 75 W	≤ 75 W
Protective circuit	Reverse polarity protection	Reverse polarity protection
Conductor cross section, flexible	0.75 mm ² ... 4.00 mm ²	0.75 mm ² ... 4.00 mm ²
Conductor cross section, solid	0.75 mm ² ... 4.00 mm ²	0.75 mm ² ... 4.00 mm ²
Conductor cross section AWG	20 AWG ... 12 AWG	20 AWG ... 12 AWG
Ethernet	INJ 1000 INJ 1000-T	INJ 1010 INJ 1010-T
Connection method	RJ45 CAT5e	RJ45 CAT5e
Output power	30 W	60 W
Output nominal voltage	54 V DC (PoE)	54 V DC (PoE)
Serial transmission speed	10/100/1000 Mbps	10/100/1000 Mbps
Transmission length	100 m (including patch cables)	100 m (including patch cables)
Connection line	twisted pair, shielded, CAT5 or better	twisted pair, shielded, CAT5 or better
Pin assignment	1:1	1:1
General data		
Basic functions	PSE/Midspan, compliant with IEEE 802.3af, at	
Degree of protection	IP20 (Non-certificated by UL)	
Mounting position	vertical	
Mounting type	DIN rail mounting	
Dimensions (W/H/D)	30.2 mm x 130 mm x 120 mm	
External cable diameter	5.5 mm ... 6.5 mm	
Housing material	Plastic gray	
Vibration resistance in acc. with EN 60068-2-6/ IEC 60068-2-6	10 Hz ... 57 Hz, amplitude ±3.5 mm, 57 Hz ... 150 Hz, 5g	
Shock in acc. with EN 60068-2-27/IEC 60068-2-27	25g for 11 ms, three shocks in each direction	
Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU	

Ambient conditions	INJ 1000 INJ 1010	INJ 1000-T INJ 1010-T
Ambient temperature (operation)	0 °C ... 60 °C	-40 °C ... 75 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C	-40 °C ... 85 °C
Permissible humidity (operation)	10 % ... 95 % (non-condensing)	10 % ... 95 % (non-condensing)
Altitude	5000 m (for restrictions see manufacturer's declaration) 2000 m (with UL approval)	5000 m (for restrictions see manufacturer's declaration) 2000 m (with UL approval)

Approvals / Certificates	
Conformance	CE-compliant
UL, USA/Canada	Class I, Div. 2, Groups A, B, C, D, T4
Noxious gas test	ISA-S71.04-1985 G3 Harsh Group A

Conformance with EMC Directive 2014/30/EU

Noise immunity according to EN 61000-6-2

Electrostatic discharge	EN 61000-4-2	
	Contact discharge	± 6 kV (Test Level 3)
	Discharge in air	± 8 kV (Test Level 3)
	Indirect discharge	± 6 kV
	Comments	Criterion B
Electromagnetic HF field	EN 61000-4-3	
	Frequency range	80 MHz ... 3 GHz (Test Level 3)
	Field intensity	10 V/m
	Comments	Criterion A
Fast transients (burst)	EN 61000-4-4	
	Input	± 2.2 kV (1 minute)
	Signal	± 2.2 kV (1 minute)
	Comments	Criterion B
Surge current loads (surge)	EN 61000-4-5	
	Input	± 0.5 kV
	Signal	± 1 kV (Data line, asymmetrical) ± 2 kV (I/O cable on field side only, asymmetric)
	Comments	Criterion B
Conducted interference	EN 61000-4-6	
	Frequency range	0.15 MHz ... 80 MHz
	Voltage	10 V
	Comments	Criterion A

Emitted interference in acc. with EN 61000-6-4

Interference emission	EN 61000-6-4, Class A, industrial applications
	EN 61000-6-3, Class B, domain of use: residential and small commercial

5 Safety regulations and installation notes



CAUTION:

Observe the following safety notes when using the device.

- Installation, operation, and maintenance may only be carried out by qualified electricians. Follow the installation instructions as described.
- When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as general technical regulations, must be observed. The technical data is provided in this package slip and on the certificates (conformity assessment, additional approvals where applicable).
- The device must not be opened or modified. Do not repair the device yourself, replace it with an equivalent device. Repairs may only be carried out by the manufacturer. The manufacturer is not liable for damage resulting from violation.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- The IP20 protection (IEC 60529/EN 60529) of the device is intended for use in a clean and dry environment. The device must not be subject to mechanical strain and/or thermal loads, which exceed the limits described (non-certificated by UL).
- This device may be powered with a SELV/PELV power supply unit. A SELV power supply provides additional protection in the event of an Ethernet cable failure.

5.1 UL notes

- Do not block the device's ventilation holes.
- Suitable for indoor use only.
- Altitude up to 2000 m
- The equipment shall only be used in an area of not more than pollution degree 2, as defined in IEC/EN 60664-1.
- Use qualified power supply by SELV or double insulation of UL 60950 or UL 61010-1 or UL 61010-2-201 standards.
- The devices are open-type and are required to be installed in an enclosure suitable for the environment and that can only be accessed with the use of a tool.
- The equipment is suitable for use in Class I, Division 2, Groups A, B, C, and D or non-hazardous locations only.



WARNING: Explosion hazard

Do not disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations.



Power wiring information:

- The rating of the power wire used must be at least 82°C.
- Use copper conductor only.
- Wire Range: 20-12 AWG

6 Product description

Product variants					
Order No.	Designation	Power	Port 2	Temperature range	Function
2703005	INJ 1000	30 W	RJ45 socket	0 °C ... 60 °C	
2703006	INJ 1000-T			-40 °C ... 75 °C	
2703007	INJ 1010	60 W		0 °C ... 60 °C	
2703008	INJ 1010-T			-40 °C ... 75 °C	
The following product versions are described in a separate data sheet:					
2703009	INJ 1100-T	30 W	RJ45 socket	-40 °C ... 75 °C	Electrical isolation
2703010	INJ 1110-T	60 W			
The following product versions with advanced functions are described in a separate data sheet:					
2703011	INJ 2101-T	30 W	Screw terminal blocks	-40 °C ... 75 °C	Potential separation, surge protection and shield current monitoring
2703012	INJ 2102-T		IDC terminal blocks		
1004065	INJ 2103-T		Push-in terminal blocks		
2703013	INJ 2111-T	60 W	Screw terminal blocks		
2703014	INJ 2112-T		IDC terminal blocks		
1004066	INJ 2113-T		Push-in terminal blocks		

6.1 Accessories: power supply

INJ 1000, INJ 1000-T

PoE output 0 W ... 30 W	
2902992	UNO-PS/1AC/24DC/ 60W
2903147	TRIO-PS-2G/1AC/24DC/3/C2LPS
2909576	QUINT4-PS/1AC/24DC/2.5/PT

INJ 1010, INJ 1010-T

PoE output 0 W ... 30 W	
2902992	UNO-PS/1AC/24DC/ 60W
2903147	TRIO-PS-2G/1AC/24DC/3/C2LPS
2909576	QUINT4-PS/1AC/24DC/2.5/PT
PoE output 31 W ... 60 W	
2902994	UNO-PS/1AC/24DC/90W/C2LPS
2903148	TRIO-PS-2G/1AC/24DC/5
2909577	QUINT4-PS/1AC/24DC/3.8/PT

6.2 Dimensions

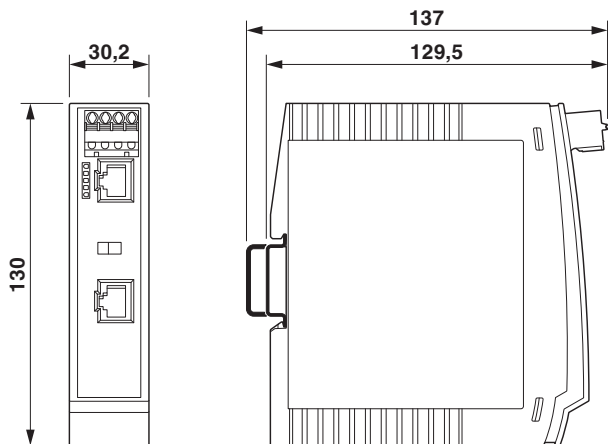


Figure 1 Dimensions

6.3 Function elements

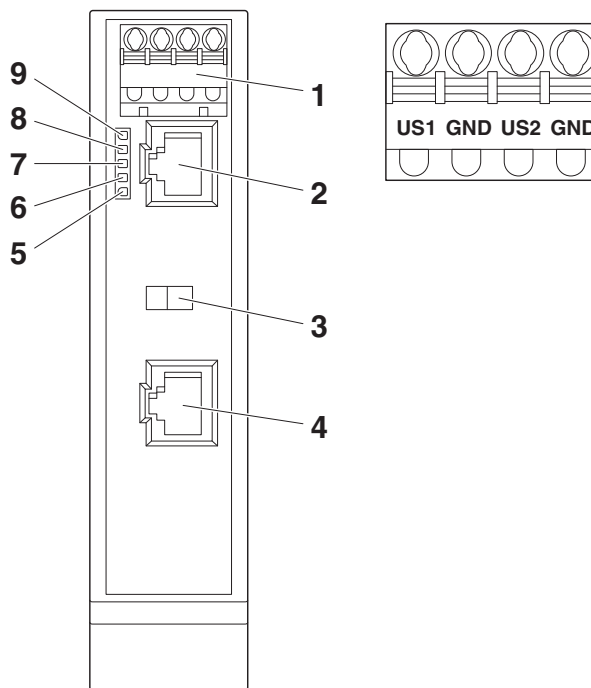


Figure 2 Function elements

1	US1 GND	Supply voltage
	US2 GND	Redundant supply voltage
2	RJ45 socket	Data
3	DIP switch	
4	RJ45 socket	Data + PoE
5	LED	No function
6	LED S2	Status Mode B 4, 5, 7, 8
	On	Power supply PD OK
	Flashing	Overload mode B, short circuit, startup failed, cable under load isolated
	OFF	PD not supplied or no PD connected
7	LED S1	Status Mode A 1, 2, 3, 6
	On	Power supply PD OK
	Flashing	Overload mode A, short circuit, startup failed
	S1 + S2 flashing	Internal error, PoE chip too hot
8	LED U2	Supply voltage US2
9	LED U1	Supply voltage US1

6.4 Setting the DIP switches

INJ 1000, INJ 1000-T

DIP	ON	OFF (default)
1	Mode B wires 4, 5, 7, 8	Mode A wires 1, 2, 3, 6
2	not connected	

By default upon delivery, PoE is modulated on data cables 1, 2, 3, 6.

The cables 4, 5, 7, 8 are not used at a transmission with 100 Mbps (spare pairs). If you set DIP 1 to ON, PoE is modulated on these spare pairs.

- Use DIP 1 to select over which two wire pairs the PoE feed is to be transmitted.
- Restart the device to adopt these settings.

INJ 1010, INJ 1010-T

DIP	ON	OFF (default)
1	back-off	back-off disabled
2	4 pairs	2 x 2 pairs

Guideline IEEE 802.3bt for end devices with an electrical power requirement greater than 30 W has not yet been published. For this reason, the injector and end device may not be able to negotiate the electrical power requirements autonomously in rare cases.

This can occur in particular when the PSE and PD chips are from different manufacturers.

- Check the cabling.
- If the devices do not automatically mediate the power requirement, switch DIP 1 to ON.
- Restart the device to adopt these settings.
- If this is not successful, switch DIP 2 to ON also. DIP 1 no longer has a function.
- Restart the device to adopt these settings.



Contact Phoenix Contact when these measures do not help.
Keep the documentation of your end device ready.

7 Installation

7.1 Mounting

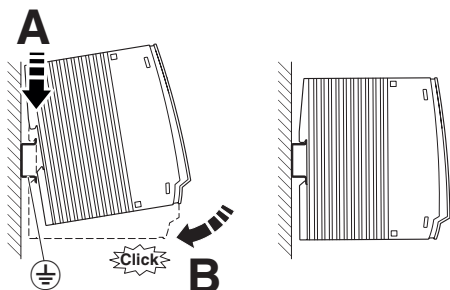


Figure 3 Mounting on a DIN rail

The device is intended for installation in a control cabinet.

- Connect a 35 mm EN DIN rail to the protective earth via a grounding terminal block. The device is grounded by snapping it onto the DIN rail.
- Snap the device onto the DIN rail.

7.2 Removal

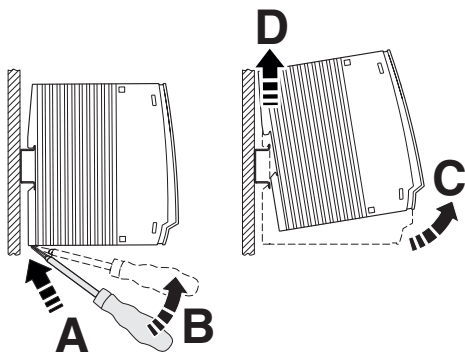


Figure 4 Removal

- Push down the locking tab with a screwdriver, needle-nose pliers or similar.
- Slightly pull the bottom edge of the device away from the mounting surface.
- Pull the device away from the DIN rail.

7.3 RJ45 interface



NOTE: Interference

Only use shielded twisted pair cables and corresponding shielded RJ45 connectors.

- Only twisted pair cables with an impedance of 100 Ω can be connected to the RJ45 Ethernet interface.
- Insert the Ethernet cable with the RJ45 plug into the TP interface until the plug engages audibly. Observe the plug keying.

7.4 Power Supply Voltage

- Connect the supply voltage to US1 and GND.
- Optionally, you can connect a redundant supply voltage to US2 and GND.