FL-PP-RJ45... / FL CAT5...

Ethernet patch panel

Data Sheet
104622_en_04

1 Description

The patch panels **FL-PP-RJ45... / FL CAT5...** provide the transition from the field cabling to the cabling inside the control cabinet.

The connection from the patch panel to the termination device takes place via the RJ45 socket. Pre-assembled patch cables in different connection lengths from 0.24 m to 20 m are available for this.

The field cabling is applied easily to spring-cage, screw, or LSA connection terminal blocks, depending on the version. The individual terminal blocks are clearly labeled for connection according to Ethernet standard TIA 568 A and B as well as PROFINET. There is no longer any need to spend time and effort crimping an RJ45 connector to the field line.

Features

– CAT5e
– 8-pin assignment: 1:1
– 10/100/1000 Mbps
– Mounting on a DIN rail
– Safe connection to ground potential
– FL-PP-RJ45/RJ45-B with extended temperature range -40 °C ... 85 °C
– Several modes for attaching field cables:
    – Spring-cage connection terminal blocks
    – Screw connection terminal blocks
    – LSA connection terminal blocks
    – RJ45-RJ45 transition
– ATEX approval for the following patch panels:
    – FL-PP-RJ45-SCC
    – FL-PP-RJ45-SC
    – FL-PP-RJ45/RJ45
– Shipbuilding approval according to DNV for the following patch panel:
    – FL-PP-RJ45-SCC
    – FL-PP-RJ45-SC
    – FL-PP-RJ45-LSA
    – FL-PP-RJ45/RJ45
    – FL CAT5 TERMINAL BOX

> **i** Make sure you always use the latest documentation.
> It can be downloaded at phoenixcontact.net/products.

> **i** This data sheet is valid for all products listed on the following page:

PHŒNIX CONTACT

INSPIRING INNOVATIONS

2 Table of contents

3   Ordering data

Products

Description	Type	Order No.	Pcs. / Pkt.
Patch panel, one RJ45 socket to 8 spring-cage connection terminal blocks (1:1 assignment), CAT5e, 10/100/1000 Mbps, DIN rail mounting, IP20, option of shield contacting on DIN rail via jumpers	FL-PP-RJ45-SCC	2901642	1
Patch panel, one RJ45 socket to 8 screw connection terminal blocks (1:1 assignment), CAT5e, 10/100/1000 Mbps, DIN rail mounting, IP20, option of shield contacting on DIN rail via jumpers	FL-PP-RJ45-SC	2901643	1
Patch panel, one RJ45 socket to 8 LSA connection terminal blocks (1:1 assignment), CAT5e, 10/100/1000 Mbps, DIN rail mounting, IP20, option of shield contacting on DIN rail via jumpers	FL-PP-RJ45-LSA	2901645	1
Patch panel, two RJ45 sockets (1:1 assignment), CAT5e, 10/100/1000 Mbps, DIN rail mounting, IP20, option of shield contacting on DIN rail via jumpers	FL-PP-RJ45/RJ45	2901646	1
Patch panel, slim design width, extended temperature range, two RJ45 sockets, 1:1 assignment, continuous shield, CAT5, 10/100/1000 Mbps, DIN rail mounting, IP20	FL-PP-RJ45/RJ45-B	2904933	1
Patch panel, one RJ45 socket to 4 screw connection terminal blocks (assignment 1, 2, 3, 6), CAT5, 10/100 Mbps, DIN rail mounting, IP20, shield contacting on DIN rail	FL CAT5 TERMINAL BOX	2744610	1

Accessories

Description	Type	Order No.	Pcs. / Pkt.
Network isolators			
Passive network isolator for electrical isolation in Ethernet networks. For the protection of Ethernet devices against potential differences up to 4 kV. Can be used for transmission speeds of up to 100 Mbps. Connection via RJ45 and COMBICON plug-in screw terminal block.	FL ISOLATOR 100-RJ/SC	2313928	1
Passive network isolator for electrical isolation in Ethernet networks. For the protection of Ethernet devices against potential differences up to 4 kV. Can be used for transmission speeds of up to 100 Mbps. Connection for two RJ45 connectors possible.	FL ISOLATOR 100-RJ/RJ	2313931	1
Passive network isolator for electrical isolation in Ethernet networks. For the protection of Ethernet devices against potential differences up to 4 kV. Can be used for transmission speeds of up to 1 Gbps. Connection for two RJ45 connectors possible.	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 up to 4 kV. Can be used for transmission speeds up to 100 Mbps. Ethernet connection via two M12 sockets (D-coded).	FL ISOLATOR 100-M12	2902985	1
Passive network isolator with pre-installed adapter for mounting on a DIN rail. Electrical isolation in Ethernet networks. For protection against potential differences up to 4 kV. Transmission speed of up to 100 Mbps. M12 socket (D-coded).	FL ISOLATOR 100-M12 RMS	2904671	1
Patch cables, CAT5			
Pre-assembled, 0.24 m	FL CAT5 PATCH 0.24	2700301	10
Pre-assembled, 0.3 m	FL CAT5 PATCH 0.3	2832250	10
Pre-assembled, 0.5 m	FL CAT5 PATCH 0.5	2832263	10
Pre-assembled, 1.0 m	FL CAT5 PATCH 1.0	2832276	10
Pre-assembled, 1.5 m	FL CAT5 PATCH 1.5	2832221	10
Pre-assembled, 2.0 m	FL CAT5 PATCH 2.0	2832289	10
Pre-assembled, 3.0 m	FL CAT5 PATCH 3.0	2832292	10
Pre-assembled, 5.0 m	FL CAT5 PATCH 5.0	2832580	10
Pre-assembled, 7.5 m	FL CAT5 PATCH 7.5	2832616	10
Pre-assembled, 10.0 m	FL CAT5 PATCH 10.0	2832629	10

Description	Type	Order No.	Pcs. / Pkt.
Patch cables, CAT6			
Pre-assembled, 0.3 m	FL CAT6 PATCH 0.3	2891181	10
Pre-assembled, 0.5 m	FL CAT6 PATCH 0.5	2891288	10
Pre-assembled, 1.0 m	FL CAT6 PATCH 1.0	2891385	10
Pre-assembled, 1.5 m	FL CAT6 PATCH 1.5	2891482	10
Pre-assembled, 2.0 m	FL CAT6 PATCH 2.0	2891589	10
Pre-assembled, 3.0 m	FL CAT6 PATCH 3.0	2891686	10
Pre-assembled, 5.0 m	FL CAT6 PATCH 5.0	2891783	10
Pre-assembled, 7.5 m	FL CAT6 PATCH 7.5	2891880	10
Pre-assembled, 10 m	FL CAT6 PATCH 10	2891877	10
Pre-assembled, 12.5 m	FL CAT6 PATCH 12.5	2891369	5
Pre-assembled, 15.0 m	FL CAT6 PATCH 15.0	2891372	5
Pre-assembled, 20.0 m	FL CAT6 PATCH 20.0	2891576	5
CAT5-SF/UTP cables			
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 mm², solid conductor, shielded, outer sheath: 7.8 mm diameter, inner sheath: 5.75 mm ± 0.15 mm diameter, (length in meters according to customer requirements)	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 mm², solid conductor, shielded, outer sheath: 7.8 mm diameter, inner sheath: 5.75 mm ± 0.15 mm diameter, pre-assembled on both sides with RJ45 connector, crossover or line (length in meters according to customer requirements)	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 mm², fine strand, shielded, outer sheath: 5.75 mm ± 0.15 mm diameter (length in meters according to customer requirements)	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 mm², fine strand, shielded, outer sheath: 5.75 mm ± 0.15 mm diameter, pre-assembled on both sides with RJ45 connector, crossover or line assignment (length in meters according to customer requirements)	FL CAT5 FLEX CONF/	2744843	1
Tools			
Crimping pliers, for assembling the RJ45 connectors FL PLUG RJ45..., for onsite assembly	FL CRIMPTOOL	2744869	1
Actuation tool, for ST terminal blocks, also suitable for use as a flat-bladed screwdriver, size: 0.4 x 2.5 x 75 mm, 2-component handle, with non-slip grip	SZF 0-0.4X2.5	1204504	1
Punch tool for connecting cables to LSA-Plus terminal strips	CT-WZ/A	2765505	1
Stripping tool, for the multi-stage stripping of shielded cables	VS-CABLE-STRIP-VARIO	1657407	1

4 Technical data

Ethernet interface	FL-PP-RJ45-SCC	FL-PP-RJ45-SC	FL-PP-RJ45-LSA	FL-PP-RJ45/RJ45	FL-PP-RJ45/RJ45-B	FL CAT5 TERMINAL BOX
Connection	Spring connection	Screw connection	LSA	RJ45	RJ45	Screw connection
Cable diameter	6 ... 10 mm	6 ... 10 mm	6 ... 10 mm	-	-	6 ... 10 mm
Conductor cross section, solid	0.2 ... 1.5 mm^2	0.14 ... 1.5 mm^2	0.128...0.325 mm^2	-	-	0.14 ... 1.5 mm^2
Conductor cross section, stranded	0.2 ... 1.0 mm^2	0.14 ... 1.0 mm^2	0.128...0.325 mm^2	-	-	0.14 ... 1.0 mm^2
AWG	24 ... 16	26 ... 16	26 ... 22	-	-	26 ... 16
Pin assignment	1 :1	1 :1	1 :1	1 :1	1 :1	1, 2, 3, 6
Connection	RJ45 CAT5 e				RJ45 CAT5	
Transmission speed	10/100/1000 Mbps				10/100 Mbps	
Transmission length	100 m (incl. patch cables)					
Cable impedance	100 Ω					
Insertion/withdrawal cycles	≤ 2500					

General data						
Degree of protection	IP20					
Weight	45 g	55 g	55 g	39 g	33 g	39 g
Dimensions W / H / D	29 x 90 x 53 mm	29 x 90 x 53 mm	29 x 90 x 53 mm	29 x 90 x 53 mm	22.5 x 78 x 44 mm	25 x 90 x 52 mm
Housing material	PVC/PA					
Current consumption	< 1 A					

Ambient conditions						
Ambient temperature (operation)	-25 °C ... 70 °C				-40 °C ... 85 °C	-25 °C ... 70 °C
Ambient temperature (installation)	-10 °C ... 70 °C				-40 °C ... 85 °C	-10 °C ... 70 °C
Ambient temperature (storage/transport)	-25 °C ... 85 °C				-40 °C ... 85 °C	-25 °C ... 85 °C
Max. permissible relative humidity (operation)	25 % ... 95 % (non-condensing)					
Vibration resistance according to IEC 60068-2-6	5g, 150 Hz, 2.5 h, in XYZ direction					
Shock test according to IEC 60068-2-27	25g, 11 ms period, half-sine shock pulse					

5 Safety regulations and installation notes

WARNING:
Observe the following safety notes when using the device.

- Only qualified specialist personnel may install, start up, and operate the device.
- National safety and accident prevention regulations must be observed.
- Installation should be carried out as described in the installation notes.
- Access to circuits within the device is not permitted.
- The device is maintenance-free. Repairs may only be carried out by the manufacturer.
- The device is a built-in device.

5.1 Safety regulations for installation in potentially explosive areas (only FL-PP-RJ45-SCC, FL-PP-RJ45-SC, and FL-PP-RJ45/RJ45)

The following devices have ATEX approval:

Type	Order No.	ATEX approval
FL-PP-RJ45-SCC	2901642	Ⓔ II 3 G Ex nA IIC Gc U
FL-PP-RJ45-SC	2901643	Ⓔ II 3 G Ex nA IIC Gc U
FL-PP-RJ45/RJ45	2901646	Ⓔ II 3 G Ex nA IIC Gc U

WARNING: Explosion hazard when used in potentially explosive areas
Make sure that the following notes and instructions are observed.

- The category 3 device is designed for installation in zone 2 potentially explosive areas. It meets the requirements of EN 60079-0:2012 and EN 60079-15:2010.
- Observe the specified conditions for use in potentially explosive areas! Install the device in suitable approved housing (with IP54 protection, minimum) that meets the requirements of EN 60079-15. Also observe the requirements of EN 60079-14.
- Only devices which are designed for operation in Ex zone 2 and are suitable for the conditions at the installation location may be connected to the circuits in zone 2.

- In potentially explosive areas, always disconnect the power before snapping the device onto the DIN rail or removing it from the DIN rail, or connecting or disconnecting the cables or the jumper.
- For reliable operation, the RJ45 connector needs to have a fully functioning locking clip. Repair any damaged connectors immediately.
- The device must be stopped and immediately removed from the hazardous area if it is damaged, was subjected to an impermissible load, stored incorrectly, or if it malfunctions.
- The DIN rail must be connected to protective ground.
- Due to self-heating during operation, the Ethernet patch panels may be used with the current value specified in the technical data and at operating temperatures of –25°C... +70°C at the installation location of operating equipment, primarily control cabinets, for temperature class T4. When using the components in equipment of temperature classes T3 through T1, ensure that the highest temperature on the components does not exceed the operating temperature range.

6 Patch panel FL-PP-RJ45-SCC with spring-cage connection terminal blocks

6.1 Design
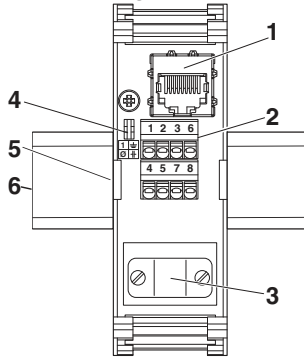
1 RJ45 socket (TP port)

2 Spring-cage connection terminal blocks for field cabling

3 Strain relief with shield connection

4 Jumper for selecting shield grounding

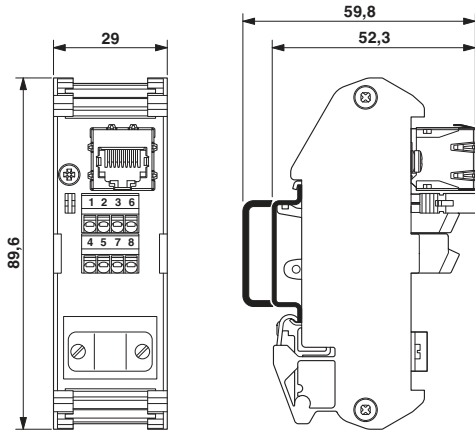**5** Universal snap-on foot for DIN rails

6 DIN rail

6.2 Dimensions

Figure 1   Dimensions of FL-PP-RJ45-SCC

6.3 Connecting the Ethernet network

Twisted pair interface (TP port)

> **i** Only use shielded twisted pair cables and corresponding shielded RJ45 connectors.

• Take the Ethernet patch cable which leads to the termination device and has a RJ45 connector, and push this into the RJ45 socket (TP port) until the connector audibly snaps in.

Pin assignment and color coding

Figure 2   Ethernet (IEC 80.3u: TIA 568 A, TIA 568 B) and PROFINET

– YE = yellow
– OG = orange
– WH = white
– BU = blue
– GN = green
– BN = brown

Spring-cage connection terminal blocks
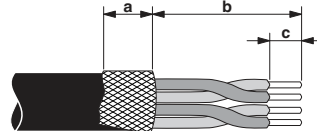
Figure 3   Required stripping lengths

– a = 10 mm
– b = 40 mm
– c = 8 mm

• Remove cable sheath in accordance with length B.
• Fold back 10 mm of the braided shield over the outer sheath.
• Remove the aluminum foil.
• Shorten wires 4, 5, 7, and 8 by 10 mm as required for the lower terminal block.
• Strip 8 mm off each single wire.
• Lay the shielding under the clip bracket of the strain relief and screw tight.
• Connect all single wires to the spring-cage connection terminal blocks. If possible, make sure the single wires remain twisted up to the connection terminal blocks.

7 Patch panel FL-PP-RJ45-SC with screw connection terminal blocks

7.1 Design
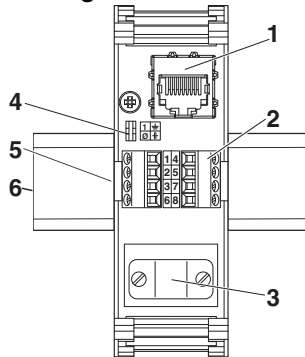
1 RJ45 socket (TP port)
2 Screw connection terminal blocks for field cabling
3 Strain relief with shield connection
4 Jumper for selecting shield grounding
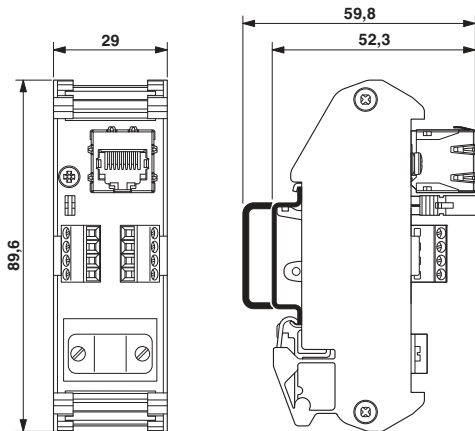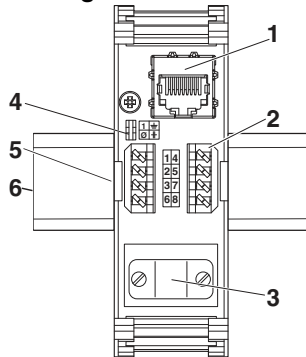5 Universal snap-on foot for DIN rails
6 DIN rail

7.2 Dimensions

Figure 4   Dimensions of FL-PP-RJ45-SC

7.3 Connecting the Ethernet network

Twisted pair interface (TP port)

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

- Take the Ethernet patch cable which leads to the termination device and has a RJ45 connector, and push this into the RJ45 socket (TP port) until the connector audibly snaps in.

Pin assignment and color coding

Figure 5   Ethernet (IEC 80.3u: TIA 568 A, TIA 568 B) and PROFINET

– YE = yellow
– OG = orange
– WH = white
– BU = blue
– GN = green
– BN = brown
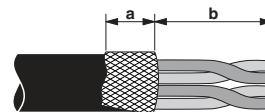
Screw connection terminal blocks
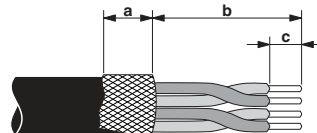
Figure 6   Required stripping lengths

– a = 10 mm
– b = 35 mm
– c = 5 mm

- Remove cable sheath in accordance with length B.
- Fold back 10 mm of the braided shield over the outer sheath.
- Remove the aluminum foil.
- Strip 5 mm off each single wire.
- Lay the shielding under the clip bracket of the strain relief and screw tight.
- Connect the single wires to the screw terminal blocks. If possible, make sure the single wires remain twisted up to the connection terminal blocks.

8 Patch panel FL-PP-RJ45-LSA with LSA connection terminal blocks

8.1 Design

1 RJ45 socket (TP port)
2 LSA connection terminal blocks for field cabling
3 Strain relief with shield connection
4 Jumper for selecting shield grounding
5 Universal snap-on foot for DIN rails
6 DIN rail

8.2 Dimensions
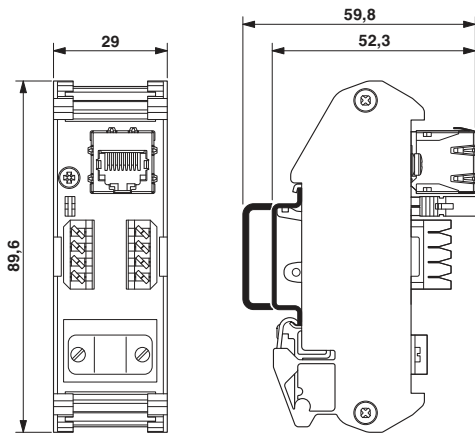
Figure 7   Dimensions of FL-PP-RJ45-LSA

8.3 Connecting the Ethernet network

Twisted pair interface (TP port)

| **i** | Only use shielded twisted pair cables and corresponding shielded RJ45 connectors. |

- Take the Ethernet patch cable which leads to the termination device and has a RJ45 connector, and push this into the RJ45 socket (TP port) until the connector audibly snaps in.

Pin assignment and color coding

Figure 8   Ethernet (IEC 80.3u: TIA 568 A, TIA 568 B) and PROFINET

- YE = yellow
- OG = orange
- WH = white
- BU = blue
- GN = green
- BN = brown

### LSA connection terminal blocks

Figure 9   Required stripping lengths

- a = 10 mm
- b = 50 mm

- Remove cable sheath in accordance with length B.
- Fold back 10 mm of the braided shield over the outer sheath.
- Remove the aluminum foil.
- Lay the shielding under the clip bracket of the strain relief and screw tight.
- Connect the wire pairs to the LSA terminal strip with the help of the LSA connector punch tool. If possible, make sure the single wires remain twisted up to the terminal strips.
- Make sure that the wires are flush with the terminal strip.

9 Patch panel FL-PP-RJ45/RJ45 with RJ45 socket

9.1 Design
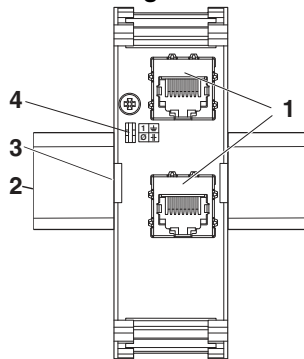
1 RJ45 socket (TP port)
2 DIN rail
3 Universal snap-on foot for DIN rails
4 Jumper for selecting shield grounding
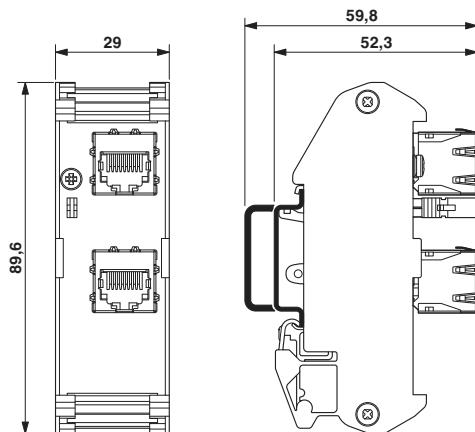
9.2 Dimensions

Figure 10   Dimensions of FL-PP-RJ45/RJ45

9.3 Connecting the Ethernet network

The device is equipped with two RJ45 Ethernet interfaces for connection of twisted-pair cables.

> **ℹ** Only use shielded twisted pair cables and corresponding shielded RJ45 connectors.

- Take the Ethernet patch cable which leads to the termination device and has a RJ45 connector, and push this into the RJ45 socket (TP port) until the connector audibly snaps in.
- Push the field cable with the RJ45 connector into the second RJ45 socket until the connector audibly snaps in.

> **ℹ** In regard to the correct function of the device, it is not important which port is assigned for incoming and outgoing lines.

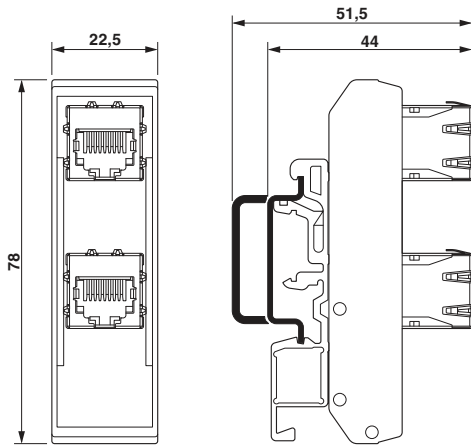# 10 Patch panel FL-PP-RJ45/RJ45-B with RJ45 socket, slim design width

10.1 Dimensions

Figure 11   Dimensions of FL-PP-RJ45/RJ45-B

10.2 Connecting the Ethernet network

The device is equipped with two RJ45 Ethernet interfaces for connection of twisted-pair cables.

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

• Take the Ethernet patch cable which leads to the termination device and has a RJ45 connector, and push this into the RJ45 socket (TP port) until the connector audibly snaps in.

• Push the field cable with the RJ45 connector into the second RJ45 socket until the connector audibly snaps in.

> ℹ In regard to the correct function of the device, it is not important which port is assigned for incoming and outgoing lines.

11 Patch panel FL CAT5 TERMINAL BOX with screw connection terminal blocks

11.1 Design
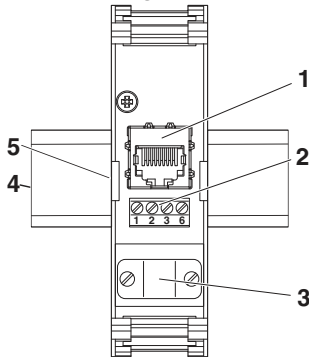
1 RJ45 socket (TP port)
2 Screw connection terminal blocks
3 Strain relief with shield connection
4 DIN rail
5 Universal snap-on foot for DIN rails
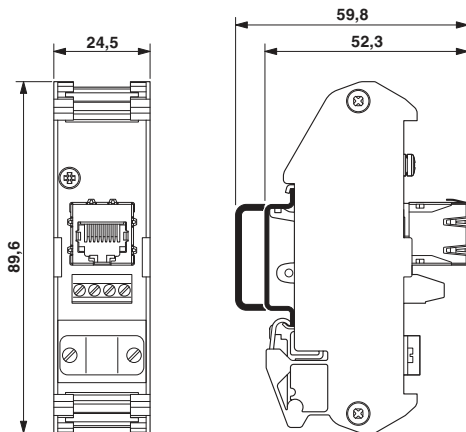
11.2 Dimensions

Figure 12   Dimensions of FL CAT5 TERMINAL BOX

11.3 Connecting the Ethernet network

Twisted pair interface (TP port)

> **i** Only use shielded twisted pair cables and corresponding shielded RJ45 connectors.

• Take the Ethernet patch cable which leads to the termination device and has a RJ45 connector, and push this into the RJ45 socket (TP port) until the connector audibly snaps in.

Pin assignment and color coding

Figure 13   Ethernet (IEC 80.3u: TIA 568 A, TIA 568 B) and PROFINET

– YE = yellow
– OG = orange
– WH = white
– BU = blue
– GN = green

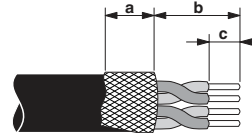**Screw connection terminal blocks**

Figure 14   Required stripping lengths

– a = 10 mm
– b = 10 mm
– c = 5 mm

• Remove cable sheath in accordance with length B.
• Fold back 10 mm of the braided shield over the outer sheath.
• Remove the aluminum foil.
• Strip 5 mm off each single wire.
• Lay the shielding under the clip bracket of the strain relief and screw tight.
• Connect the single wires to the screw terminal blocks. If possible, make sure the single wires remain twisted up to the connection terminal blocks.

12   Shield grounding selection

With the following patch panels you can select the type of shielding with a jumper:

– FL-PP-RJ45-SCC

– FL-PP-RJ45-SC

– FL-PP-RJ45-LSA

– FL-PP-RJ45/RJ45

By default upon delivery, the jumper is inserted and the shield is positioned directly on the ground potential (PE). With this arrangement, there is a low-ohmic electrical connection between the shield and the ground potential.

If the jumper is removed, the shield is connected to the ground potential via an RC combination. A high-ohmic resistance parallel to a capacitor ensures that high-frequency disturbances are delivered effectively to the ground potential without the presence of a low-ohmic electrical connection.

A single-sided grounding of the shield between two patch panels is best suited for suppressing electrical fields and ground loops.

Shield connection direct to PE (default setting)
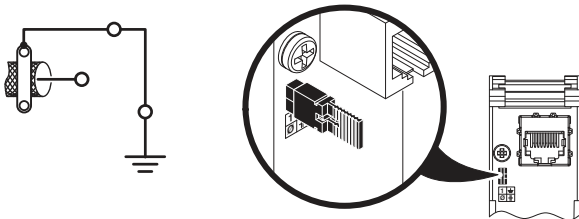
Shield connection to PE via RC element
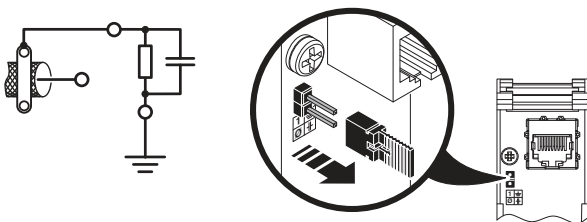
With FL-PP-RJ45/RJ45-B, the shielding is **not** connected with the DIN rail.

With FL CAT5 TERMINAL BOX, the shielding is fundamentally connected to the DIN rail via the universal snap-on foot.

13   Circuit diagrams
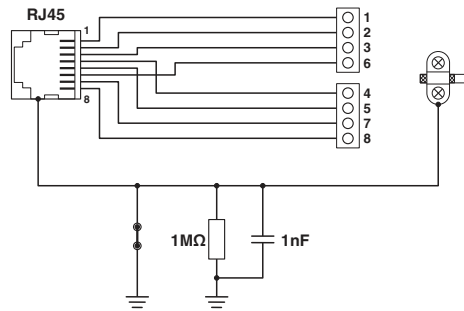

Figure 15   FL-PP-RJ45-SCC (2901642)
               FL-PP-RJ45-SC (2901643)
               FL-PP-RJ45-LSA (2901645)
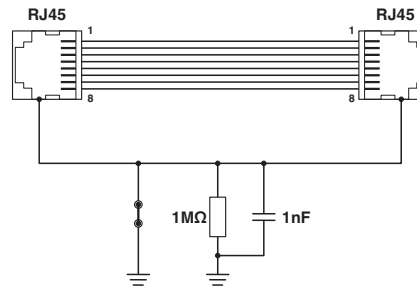

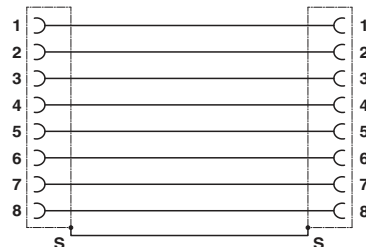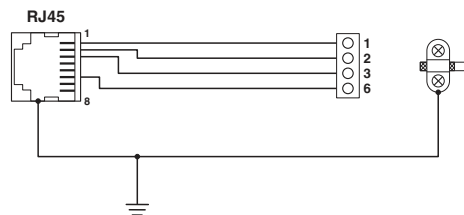Figure 16   FL-PP-RJ45/RJ45 (2901646)

Figure 17   FL-PP-RJ45/RJ45-B (2904933)

Figure 18   FL CAT5 TERMINAL BOX (2744610)