FL ISOLATOR 100(0)-RJ/...

Passive network isolator for electrical isolation in Ethernet networks



Data sheet
104378_en_04

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1 Description

The network isolator is used for electrical isolation in industrial Ethernet data cables.

It enables Ethernet end devices and interfaces to be protected from potential differences and surges. This results in a considerable increase in interference immunity with industrial use.

The device guarantees a high-grade isolation of up to 4 kV. The possible transmission speeds are 10/100 Mbps. The FL ISOLATOR 1000-RJ/RJ is also designed for a maximum transmission speed of 1000 Mbps.

In addition to the individual transmission lines, the cable shielding is also electrically isolated.

The passive device can be used immediately, without power supply. To this end, the network isolator is connected directly in the line upstream from the network device to be protected.

The FL ISOLATOR 100-RJ/SC variant can be used as a mini patch panel with electrical isolation. In addition to the RJ45 socket, the device also has a COMBICON plug-in screw terminal block. This enables a convenient connection with various cable lengths for the field cabling throughout the control cabinet.

Features

- Electrical isolation of data cables and cable shielding
- Protection of industrial Ethernet network components in the control cabinet
- Electric strength up to 4 kV
- Continuous insulation voltage of 250 V_{eff}
- Transmission rate up to 1000 Mbps
- No power supply required
- Can be mounted on EN DIN rails
- Temperature range: -25°C ... +75°C
- Depending on variant, 2x RJ45 or 1x RJ45 connection and COMBICON plug-in screw terminal block
- PCB coated on both sides to protect against aggressive environmental influences in particularly harsh industrial environments
- Approval for railway applications (rolling stock) according to EN 50155 and EN 50121

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

This data sheet is valid for the products listed on the following page:

2 Ordering data

Network isolator	Type	Order No.	Pcs./Pkt.
Passive network isolator for electrical isolation in Ethernet networks			
Up to 1000 Mbps, 2x RJ45 connector	FL ISOLATOR 1000-RJ/RJ	2313915	1
Up to 100 Mbps, 2x RJ45 connector	FL ISOLATOR 100-RJ/RJ	2313931	1
Up to 100 Mbps, 2x RJ45 connector, COMBICON plug-in screw terminal block	FL ISOLATOR 100-RJ/SC	2313928	1
The following network isolator with M12 sockets is described in a separate data sheet. (phoenixcontact.net/product/2902985)			
Up to 100 MBit/s, M12 sockets (D-coded)	FL ISOLATOR 100-M12	2902985	1

Accessories	Type	Order No.	Pcs./Pkt.
Patch cable, CAT5, pre-assembled			
0.3 m	FL CAT5 PATCH 0,3	2832250	10
0.5 m	FL CAT5 PATCH 0,5	2832263	10
1.0 m	FL CAT5 PATCH 1,0	2832276	10
1.5 m	FL CAT5 PATCH 1,5	2832221	10
2.0 m	FL CAT5 PATCH 2,0	2832289	10
3.0 m	FL CAT5 PATCH 3,0	2832292	10
Patch cable, CAT6, pre-assembled			
0.3 m	FL CAT6 PATCH 0,3	2891181	10
0.5 m	FL CAT6 PATCH 0,5	2891288	10
1.0 m	FL CAT6 PATCH 1,0	2891385	10
1.5 m	FL CAT6 PATCH 1,5	2891482	10
2.0 m	FL CAT6 PATCH 2,0	2891589	10
3.0 m	FL CAT6 PATCH 3,0	2891686	10
Patch panel, 10/100/1000 Mbps, DIN rail mounting, IP20			
2x RJ45 socket	PP-RJ-RJ	2703015	1
RJ45 socket on screw terminal blocks	PP-RJ-SC	2703016	1
RJ45 socket on push-in terminal blocks	PP-RJ-SCC	2703018	1
RJ45 socket on IDC terminal blocks	PP-RJ-IDC	2703019	1
Patch panel, 10/100/1000 Mbps, DIN rail mounting, IP20, shield current monitoring, surge protection			
2x RJ45 socket	PP-RJ-RJ-F	2703020	1
RJ45 socket on screw terminal blocks	PP-RJ-SC-F	2703021	1
RJ45 socket on push-in terminal blocks	PP-RJ-SCC-F	2703022	1
RJ45 socket on IDC terminal blocks	PP-RJ-IDC-F	2703023	1

3 Technical data

Supply	
Power supply	Passive module, no power supply required

Ethernet interface	FL ISOLATOR ...		
	...1000-RJ/RJ	...100-RJ/RJ	...100-RJ/SC
Interface standard	According to IEEE 802.3		
Transmission speed	10/100/1000 Mbps	10/100 Mbps	10/100 Mbps
Connection			
Port 1	RJ45, 8-pos., shielded		
Port 2	RJ45, 8-pos., shielded	RJ45, 8-pos., shielded	Plug-in screw terminal block
Conductor cross section solid/stranded	-	-	0.14 mm^2 ... 1.5 mm^2
Conductor cross-section [AWG]	-	-	26 AWG ... 16 AWG
Shielding	No connection to protective earth ground (PE) Capacitive connection between both shield connections		
Protocol	Transparent		
Test voltage	4 kV AC, 50 Hz, 1 min. between Port 1 // Port 2 (EN 60950-1:2006)		
Continuous insulation voltage	250 V_{eff} between Port 1 // Port 2 (EN 60950-1:2006)		
Transmission length	22 m ... 100 m (depends on transmission speed and cable type)		

General data	FL ISOLATOR ...		
	...1000-RJ/RJ	...100-RJ/RJ	...100-RJ/SC
Housing type	ME 22.5 without functional earth ground contact		
Material	PA 6.6, green		
Housing dimensions (H x W x D)	99 mm x 22.5 mm x 92 mm		
Mounting	DIN rail 35 mm		
Degree of protection	IP20		
Vibration resistance in accordance with EN 60068-2-6/ IEC 60068-2-6	5g, 10 ... 150 Hz, 2.5 h, in XYZ direction		
Shock in acc. with EN 60068-2-27/IEC 60068-2-27	25g, 11 ms period, half-sine shock pulse		
MTBF (Mean Time Between Failures)			
Telcordia standard, temperature 25°C, operating cycle 21% (5 days a week, 8 hours a day)	5446 years	7993 years	5575 years
Telcordia standard, 40°C temperature, operating cycle 34.25% (5 days a week, 12 hours a day)	2959 years	4201 years	3094 years

Ambient conditions	
Ambient temperature (operation)	-25°C … +75°C (T3 in acc. with EN 50155)
Ambient temperature (storage)	-25°C … +85°C
Permissible humidity (operation)	10 % ... 95 %
Altitude	5000 m (for restrictions see manufacturer's declaration)

Standards/regulations	
Railway applications	
Electronic devices in rail vehicles	DIN EN 50155
Electromagnetic compatibility	DIN EN 50121
Electromagnetic compatibility	Conformance with EMC directive 2014/30/EU
UL, USA/Canada	Environmental designation: "Open Type Device" "Pollution Degree 2 Installation Environment" Cu Copper Wire, 60/75C
Shipbuilding approval	DNV GL
DNV GL, Temperature	B
DNV GL, Humidity	A
DNV GL, Vibration	A
DNV GL, EMC	B
DNV GL, Enclosure	Required protection according to the Rules shall be provided upon installation on board
Corrosive 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
Electromagnetic HF field	EN 61000-4-3
Fast transients (burst)	EN 61000-4-4

Noise emission in accordance with EN 61000-6-4	
Radio interference voltage according to EN 55011	Class B, industrial and residential applications
Emitted radio interference according to EN 55011	Class B, industrial and residential applications
Noise emission	EN 61000-6-4

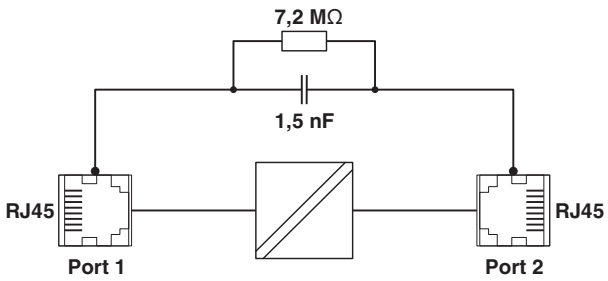


Figure 1 Block diagram

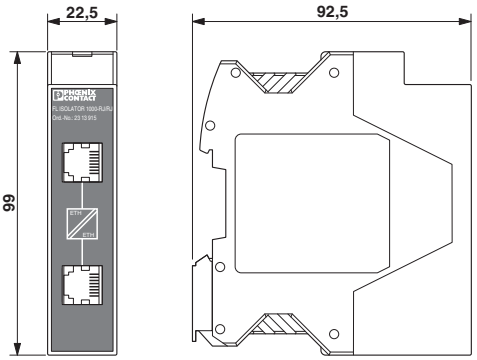


Figure 2 Housing dimensions

3.1 COMBICON connector pin assignment (FL ISOLATOR 100-RJ/SC, Order No. 2313928)

COMBICON	RJ45	Pin
1	RX	1
2	RX	2
3	TX	3
6	TX	6
SH	Shield	

Connection in acc. with TIA 568

TIA 568 A

6 3 2 1



1	WH/GN
2	GN
3	WH/OG
6	OG

TIA 568 B

6 3 2 1



1	WH/OG
2	OG
3	WH/GN
6	GN

PROFINET

6 3 2 1



1	YE
2	OG
3	WH
6	BU

Bridgeable distances

Max. distance [L]	Transmission speed	Cable
100 m	10 Mbps	CAT5
80 m	100 Mbps	CAT5/5e
40 m	1000 Mbps	CAT5 S/FTP CAT6a CAT6e U/UTP

Type CAT5e U/UTP cables are not supported.

In order to electrically isolate differences in potential or disturbances in the field cabling from the two network devices, you can also use two network isolators in a connection.

Here it is important to ensure that the bridgeable distances shown in the table are reduced by 20 meters when using a second device.

4 Application examples

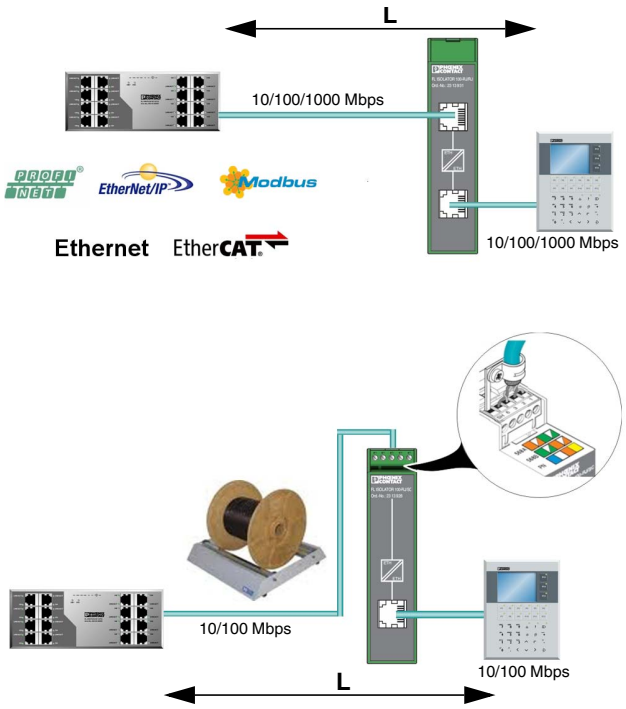


Figure 3 Application examples

The network isolators are **not** suitable for use in PoE connections.