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Surge Protection and Power Supply Units

2013 / 2014

6





1 PCB connection technology and electronics housing

- PCB terminal blocks and plug-in connectors
- Electronics housing



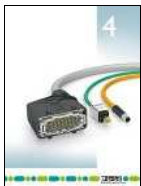
2 Connection technology for field devices

- Plug-in connectors
- Cables and connectors



3 Modular terminal blocks

- Modular terminal blocks



4 Sensor/actuator cabling and industrial plug-in connectors

- Sensor/actuator cabling
- Cables and connectors
- Plug-in connectors



5 Marking systems, tools, and mounting material

- Marking and labeling
- Tools
- Installation and mounting material



6 Surge protection and power supply units



7 Interface technology and switching devices

- Electronic switching devices and motor control
- Measurement and control technology • Monitoring
- Relay modules • System cabling for controllers



8 Control technology, I/O systems and automation infrastructure

- Ethernet networks • Functional safety • HMIs and industrial PCs • I/O systems
- Industrial lighting and signaling • Industrial communication technology
- Fieldbus components and systems • Wireless data communication
- Process infrastructure • Software • Controllers

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UPS with integrated power supply unit
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UPS for 19" rack/tower

Protective devices



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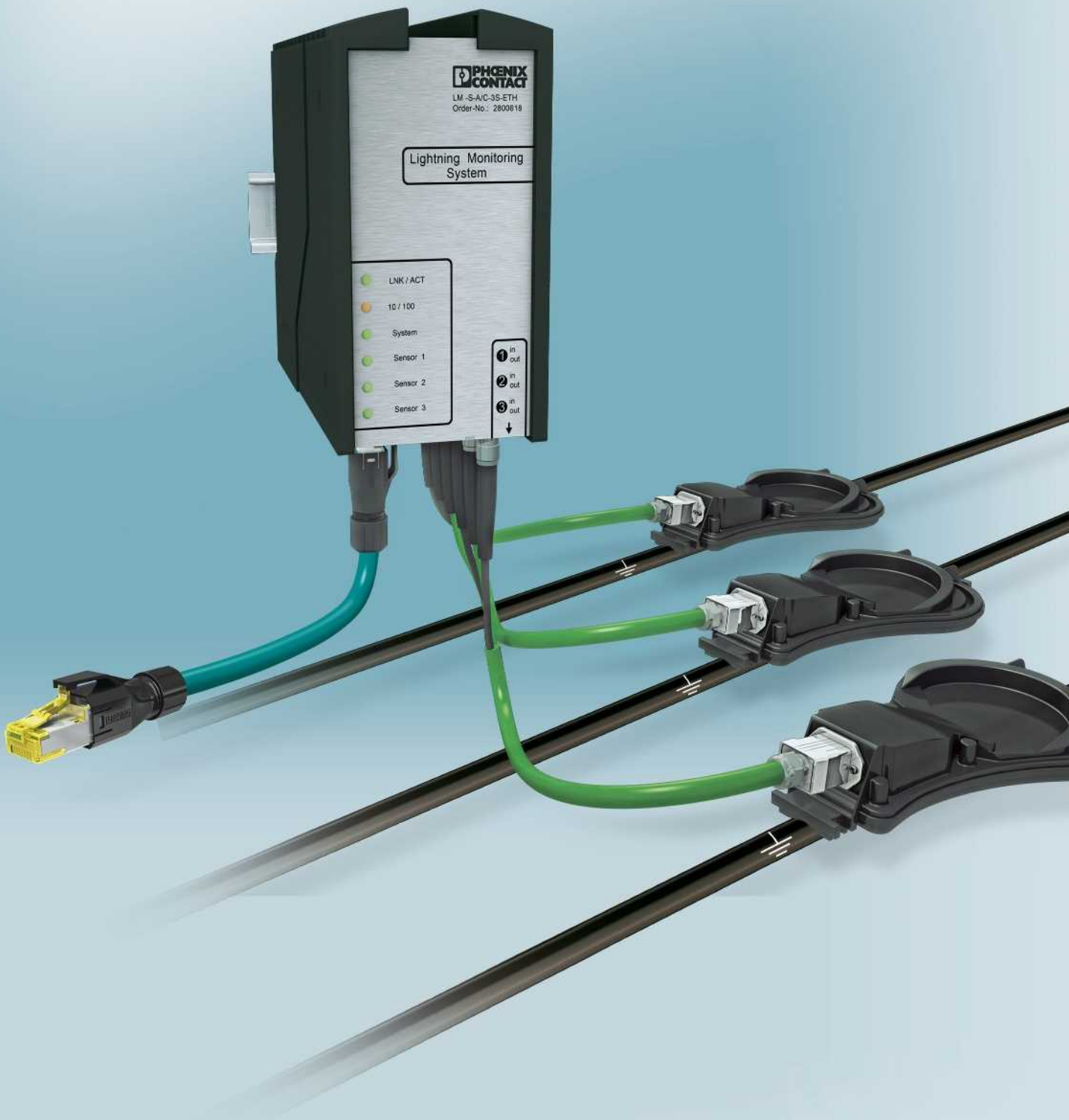
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LM-S lightning monitoring system

Lightning strikes are a particular hazard for exposed structures such as offshore wind parks, radio masts, leisure facilities or high buildings.

The LM-S lightning current measuring system can detect, evaluate, and remotely monitor lightning strikes in realtime. This means that information about the actual load on the system from lightning strikes is available at all times. The findings obtained regarding the load on a system enable optimized maintenance planning.

Lightning monitoring system

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LM-S

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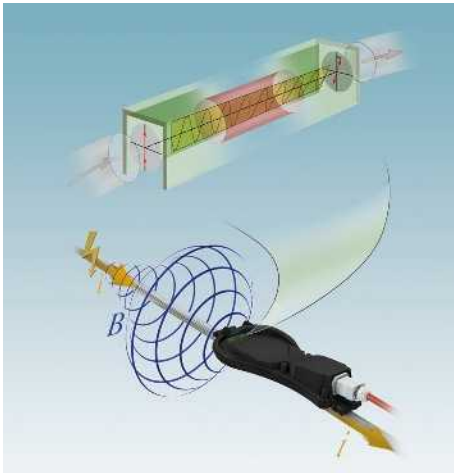
Lightning strikes cause devastating damage to buildings and systems. It is practically impossible for employees to continuously monitor exposed or large-scale systems, which means that damage is detected too late.

Detecting lightning with the lightning monitoring system

The LM-S lightning monitoring system supports continuous monitoring. Lightning events are detected, evaluated, and remotely monitored via network access. This means that information about the actual load on the system from lightning strikes is available at all times. The findings obtained regarding the load on a system enable optimized maintenance planning.

The LM-S lightning current measuring system consists of the following components:

- Sensor
- Connecting cable
- O/E module
- Evaluation unit

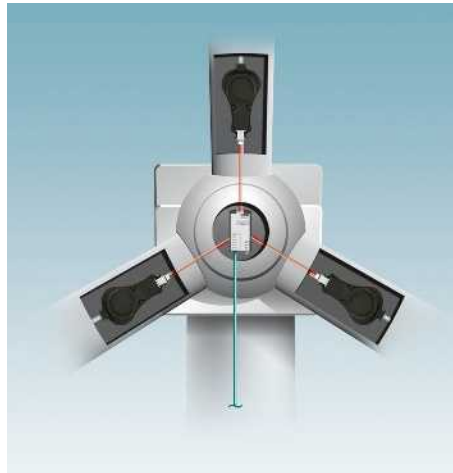


Faraday effect as a reliable measuring method

The internal measuring principle of the LM-S is based on the Faraday effect. Polarized light in a specific medium is rotated through a magnetic field over a defined length and measured.

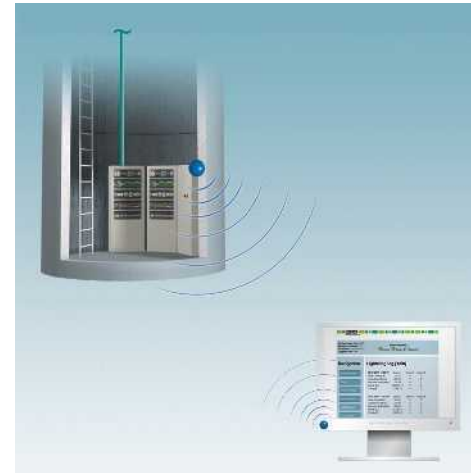
The higher the amperage (i) generated by a lightning strike the greater the magnetic flux density (B) and, therefore, the rotation of the polarized light.

The lightning monitoring system detects this change in the light signal and uses this as the basis for the corresponding measured value results.



Detection and evaluation

The sensors are mounted on the lightning arrester cables. They record the magnetic field that occurs around the conductor due to the lightning surge current. The measured result is transmitted via fiber optics to the O/E module of the evaluation unit, where the optical signal is converted into an electrical signal. Based on the values obtained, the evaluation unit determines the lightning characteristics with their typical parameters, including, for example, the maximum lightning current strength, lightning current rate of rise, charge, and energy. These results can be forwarded to an available management system via the Ethernet interface.



Remote monitoring in realtime

The evaluation unit can be easily integrated into standard network systems via the RJ45 Ethernet interface. An internal web server is used as the basis for accessing recorded data and configuring the system. The web interface is opened via the Internet browser of a PC connected to the system using IP addressing.

Lightning current measuring system

LM-S

Sensor

- Optical lightning sensor for measuring current strength of lightning surge currents
- Subsequent mounting is possible
- Rugged design
- Resistant to vibrations, temperature, and humidity
- Good UV resistance
- Good oil resistance



Sensor

Detectable values	
Maximum current strength	250 kA
FO interface	
Connection method	SCRJ socket with push/pull connector, IP67
General data	
Ambient temperature (operation)	-30 °C ... 60 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Degree of protection	IP67

Technical data

Detectable values	
Maximum current strength	250 kA
FO interface	
Connection method	SCRJ socket with push/pull connector, IP67
General data	
Ambient temperature (operation)	-30 °C ... 60 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Degree of protection	IP67

Description	
Sensor	

Ordering data

Type	Order No.	Pcs. / Pkt.
LM-S-LS-H	2800616	1

Connecting cable

- HCS cable for connecting LM-S sensors to the O/E module
- Robust cable for use in harsh environments
- Good UV resistance
- Good oil resistance

Notes:
The specified plug configuration (see ordering example) must be used in order to use the connecting cable in the LM-S lightning monitoring system. Recommended length: 10 to 200 m



Connecting cable for LM-S

Ordering example for LM-S connecting cable with variable cable length:

Assembled connecting cable for the LM-S lightning monitoring system, with a metal push/pull plug-in connector, a B-FOC plug, and a cable length of 10 m.

Order No.	Length [m] Max. 200 m
1408480 / FOC-HCS-BFOC/1018B/PPCME	10.0
Increments: 10.0 m ... 200 m = 1.0 m	

General data	
Ambient temperature (operation)	-40°C ... 70°C
Ambient temperature (storage/transport)	-40°C ... 70°C
Degree of protection	IP20 (B-FOC)/IP67 (PPCME)

Technical data

General data	
Ambient temperature (operation)	-40°C ... 70°C
Ambient temperature (storage/transport)	-40°C ... 70°C
Degree of protection	IP20 (B-FOC)/IP67 (PPCME)

Description	
Connecting cable	
Variable	

Ordering data

Type	Order No.	Pcs. / Pkt.
FOC-HCS-BFOC/1018B/PPCME/...	1408480	1

Evaluation unit

- Complete module including O/E module for connecting up to three LM-S sensors
- Evaluation and storage of amperage, current increase rate, charge, and specific energy
- Realtime analysis and exact time allocation
- Status and diagnostic indicators
- Communication via Ethernet
- Operation and configuration via web interface
- Mounting on a DIN rail



Evaluation unit with O/E module

Technical data	
Supply voltage	24 V DC \pm 4 V
Ethernet interfaces	
Connection method	RJ45
Transmission speed	10/100 Mbps
FO interface	
Interface	B-FOC (ST®)
Number of ports	3
Sensor interfaces	
Connection method	Rack for plug-in I/O module
Remote indication contact	
Connection method	M12 D-coded
Max. operating voltage	- / 60 V DC
General data	
Ambient temperature (operation)	-30 °C ... 60 °C
Degree of protection	IP20

Ordering data		
Type	Order No.	Pcs. / Pkt.
LM-S-A/C-3S-ETH	2800618	1

Description
Evaluation unit with O/E module

Optoelectronic module

- O/E module replacement for evaluation unit
- Connection of up to three LM-S sensors
- Status and diagnostic display via evaluation unit



O/E module

Technical data	
FO interface	
Interface	B-FOC (ST®)
Number of ports	3
General data	
Ambient temperature (operation)	-40 °C ... 60 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Degree of protection	IP20

Ordering data		
Type	Order No.	Pcs. / Pkt.
LM-S-C-3LS	2800617	1

Description
Optoelectronic module



Surge protection and interference filters

Damage caused by surge voltages

The number of electrical devices damaged or destroyed by surge voltages is increasing year on year. This can prove expensive in terms of repairs and downtimes. In an industrial environment, the hazards are not only restricted to systems and devices. Building technology applications and even residential buildings may be affected.

Interference voltages

Switching operations triggered mechanically or electronically generate pulse-like and high-frequency interference voltages. These voltages spread in an unimpeded manner across the cable network. All the devices within this cable network are affected. Data errors, uncontrolled functions, and system crashes can result, with electronic and data processing devices at particular risk.

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Surge protection and interference filters

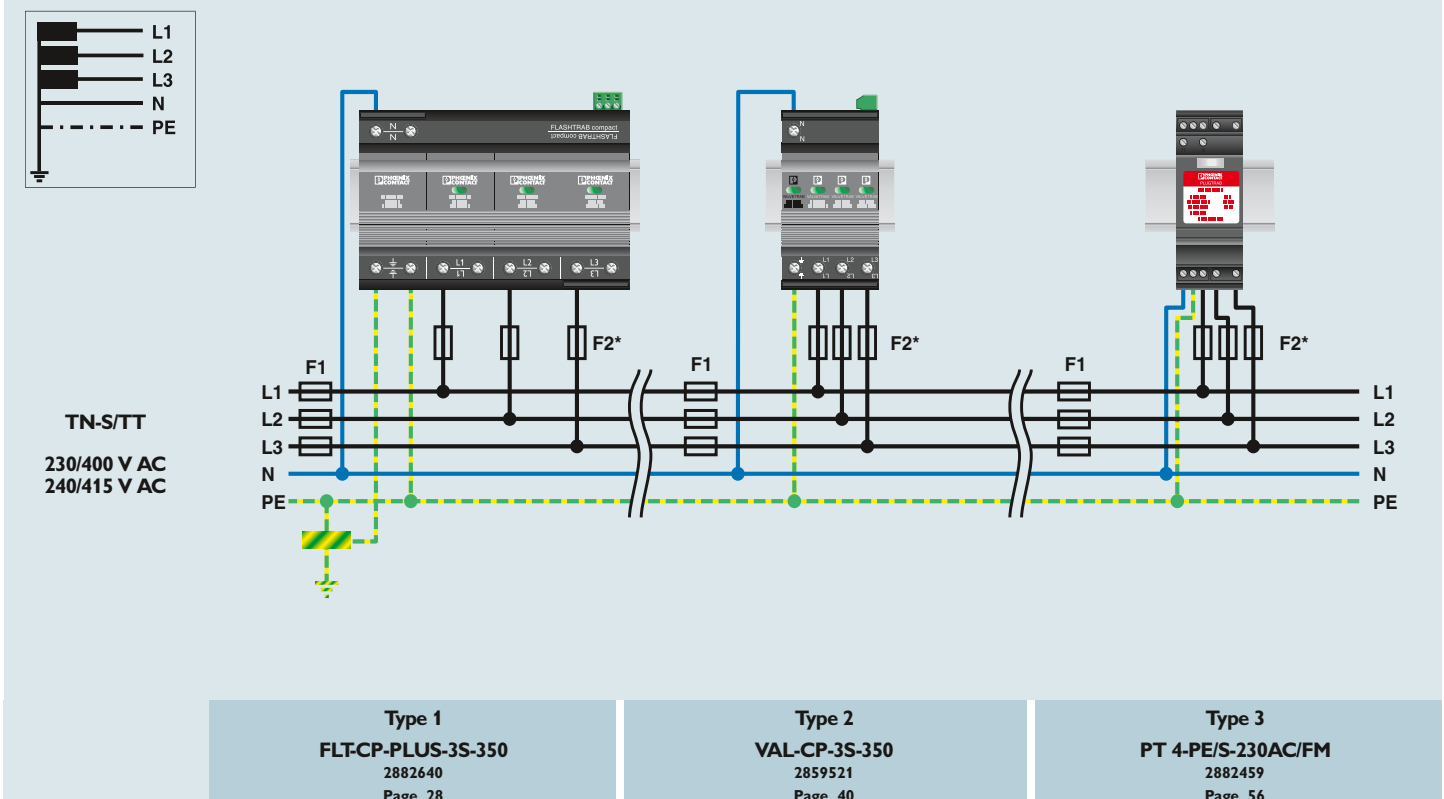
Selection guide and applications

General information on the application drawings below

- The example illustrations are intended to help you select the right surge protection. They make no claim to be complete with regard to the prescribed safety measures.
- The illustrated connection diagrams do not replace standard-compliant planning of a protection concept by an electrical or lightning protection specialist.
- The fixed electrical installation may only be accessed by trained specialist personnel.
- In order to ensure the correct and appropriate use of products, the relevant installation notes must be observed prior to installation or startup.
- All information/notes can be downloaded under the relevant product documentation at www.phoenixcontact.net/products.

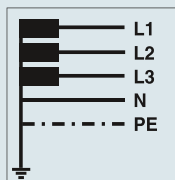
Distinguishing features of the protective devices for the power supply					
	Type 1	Type 1+2	Type 1/2	Type 2	Type 3
Lightning protection zone transition	0-1	0-2	0-1/1-2	1-2	2-3
Without detailed calculation of the lightning surge current at the installation location can be used at Lightning Protection Level	I - IV	I - IV	III - IV		
Type 1 and type 2 combined in a single device Can be used universally		☑			

Three-stage protection for the power supply, type 1 and type 2 installed separately + type 3

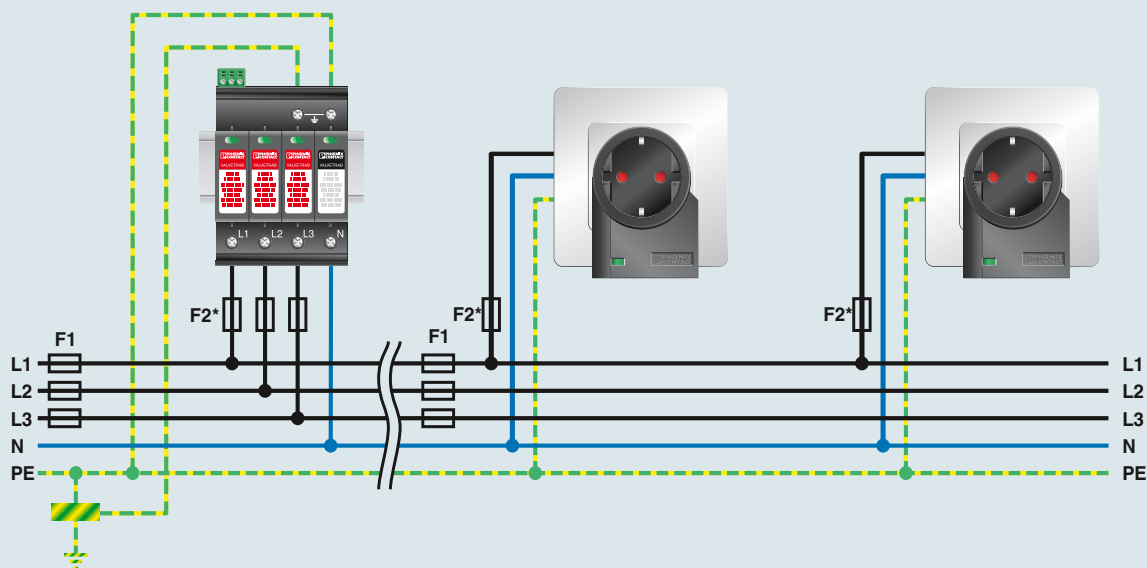


* F2 is not needed if $F1 \leq$ maximum backup fuse according to IEC

Two-stage protection for the power supply, type 1/2 combination based on varistor + type 3



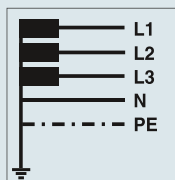
TN-S/TT
 230/400 V AC
 240/415 V AC



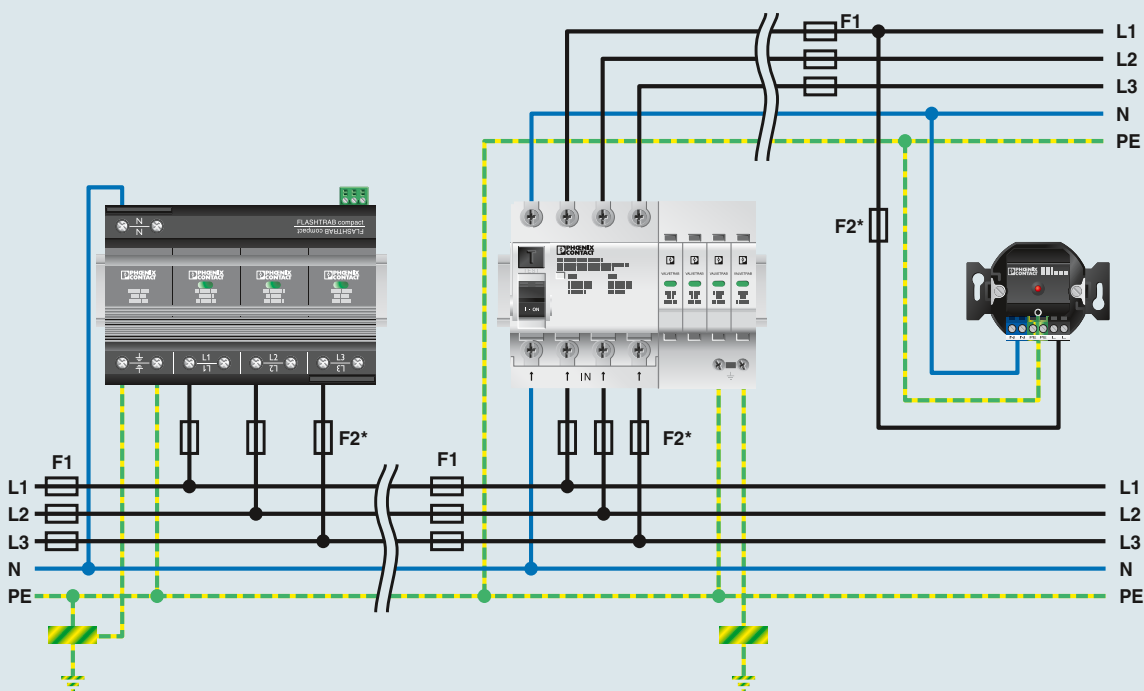
Type 1/2
VAL-MS-T1/T2 335/12.5/3+1-FM
 2800183
 Page 34

Type 3
MNT-1 D
 2882200
 Page 60

Three-stage protection for the power supply, type 1 and type 2 installed separately + type 3



TN-S/TT
 230/400 V AC
 240/415 V AC



Type 1
FLT-CP-PLUS-3S-350
 2882640
 Page 28

Type 2
VAL-CP-RCD-3S/40/0.3/SEL
 2808001
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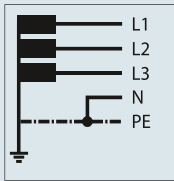
Type 3
PRT-CD-AD1 + PRT-S-230/FM
 2749673 + 2749686
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* F2 is not needed if $F1 \leq$ maximum backup fuse according to IEC

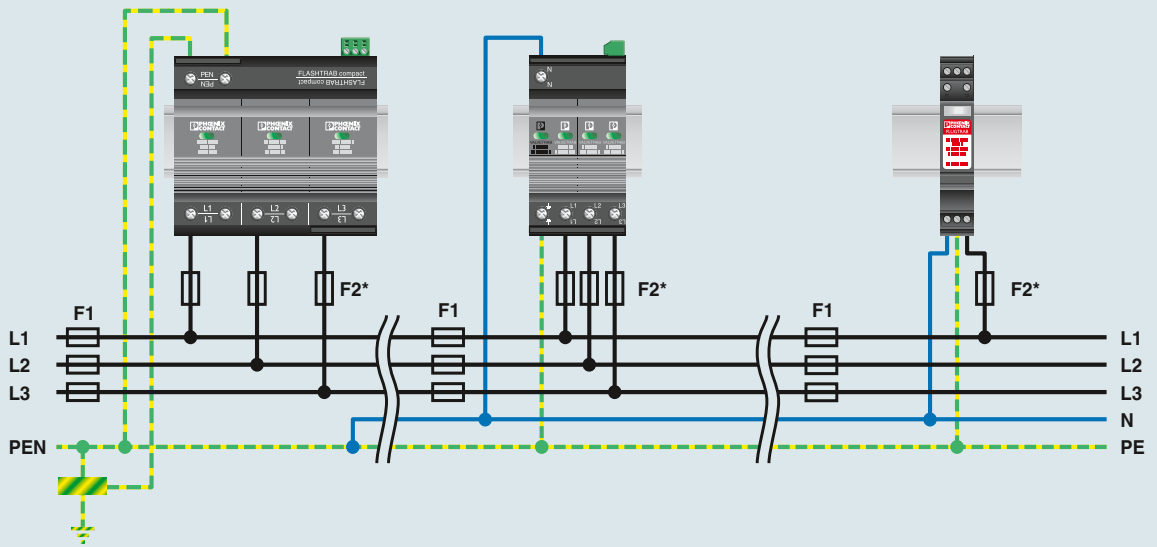
Surge protection and interference filters

Selection guide and applications

Three-stage protection for the power supply, type 1 and type 2 installed separately + type 3



TN-C-S
230/400 V AC
240/415 V AC



Type 1
FLT-CP-PLUS-3C-350
2882653
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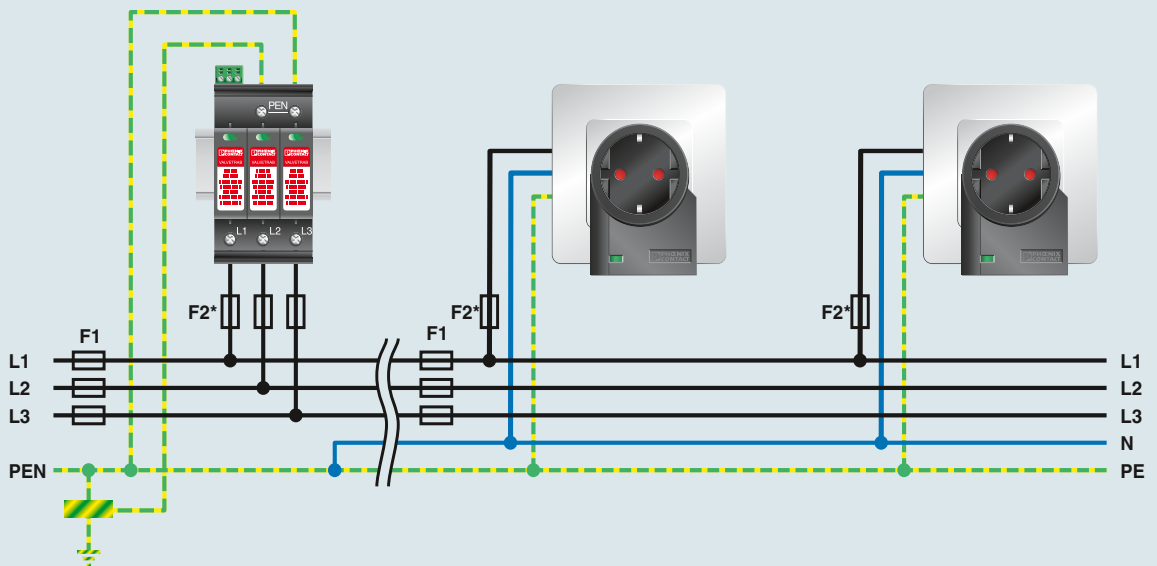
Type 2
VAL-CP-3S-350
2859521
Page 40

Type 3
PT 2-PE/S-230AC/FM
2858357
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Two-stage protection for the power supply, type 1/2 combination based on varistor + type 3



TN-C-S
230/400 V AC
240/415 V AC

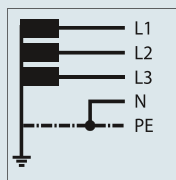


Type 1/2
VAL-MS-T1/T2 335/12.5/3+0-FM
2800188
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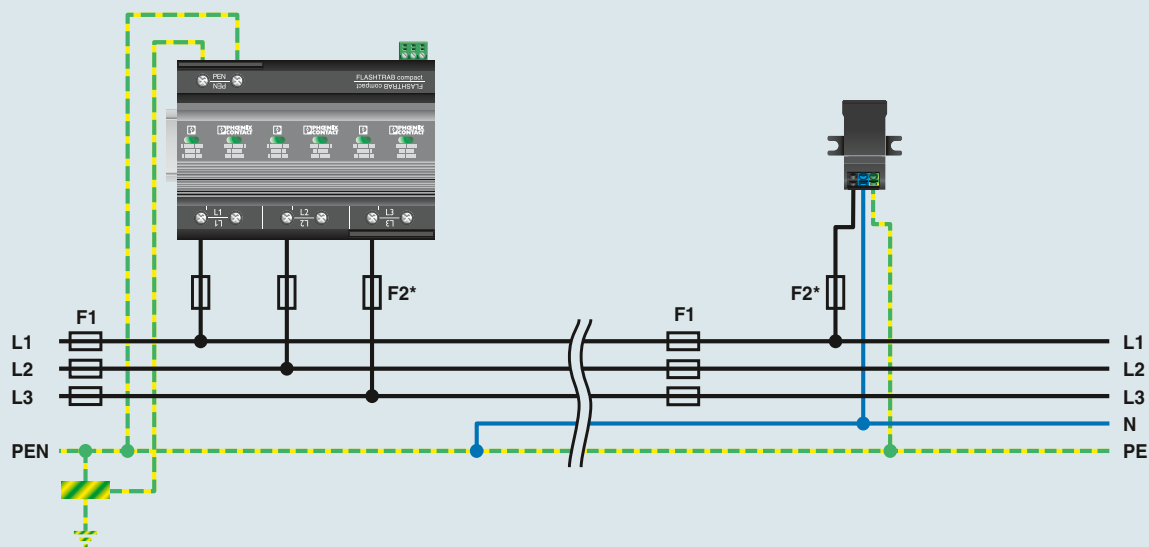
Type 3
MNT-1 D
2882200
Page 60

* F2 is not needed if $F1 \leq$ maximum backup fuse according to IEC

Three-stage protection for the power supply, type 1 and type 2 combined in a single device + type 3



TN-C-S
230/400 V AC
240/415 V AC



Type 1+2
FLT-CP-3C-350
2859725
Page 36

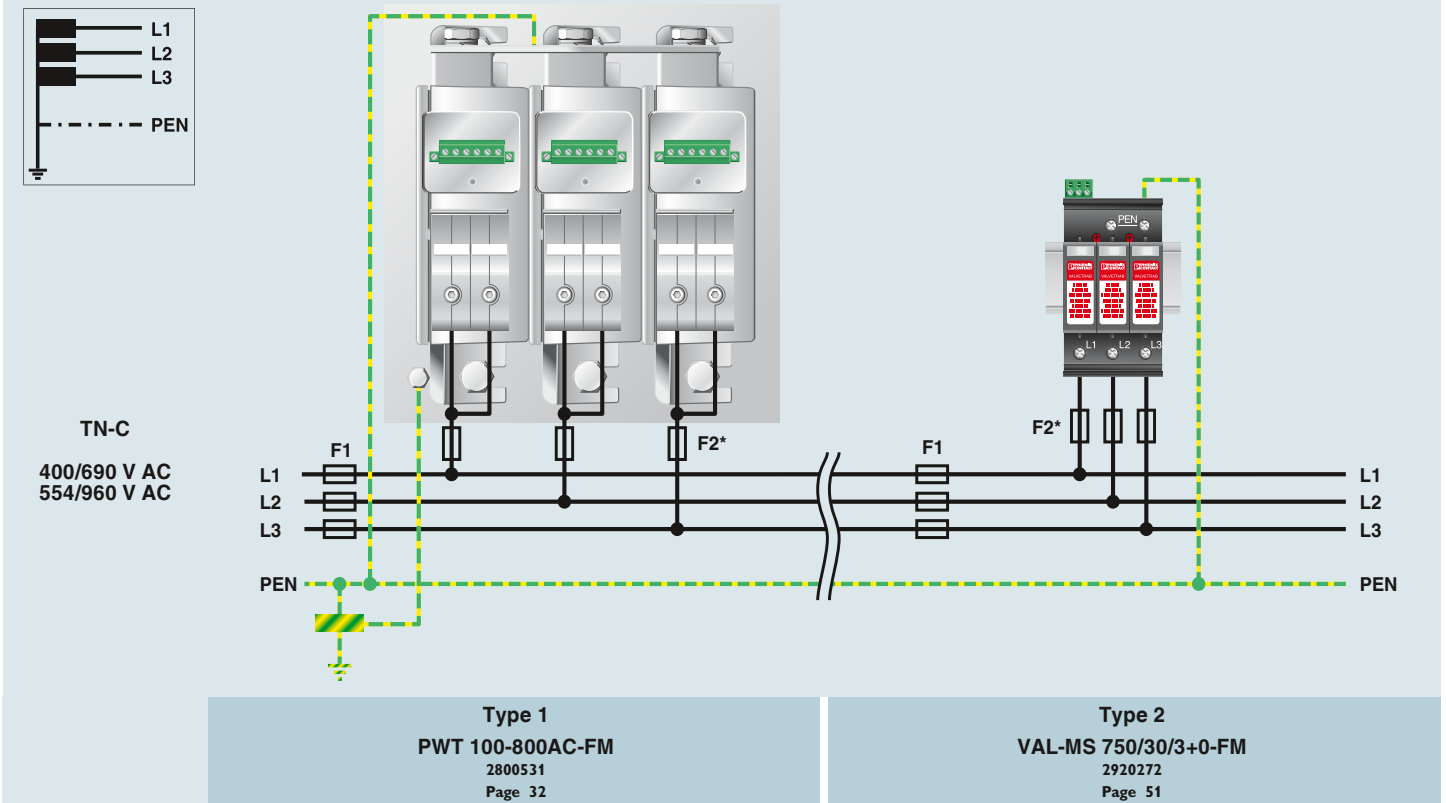
Type 3
BT-1S-230AC/A
2803409
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* F2 is not needed if $F1 \leq$ maximum backup fuse according to IEC

Surge protection and interference filters

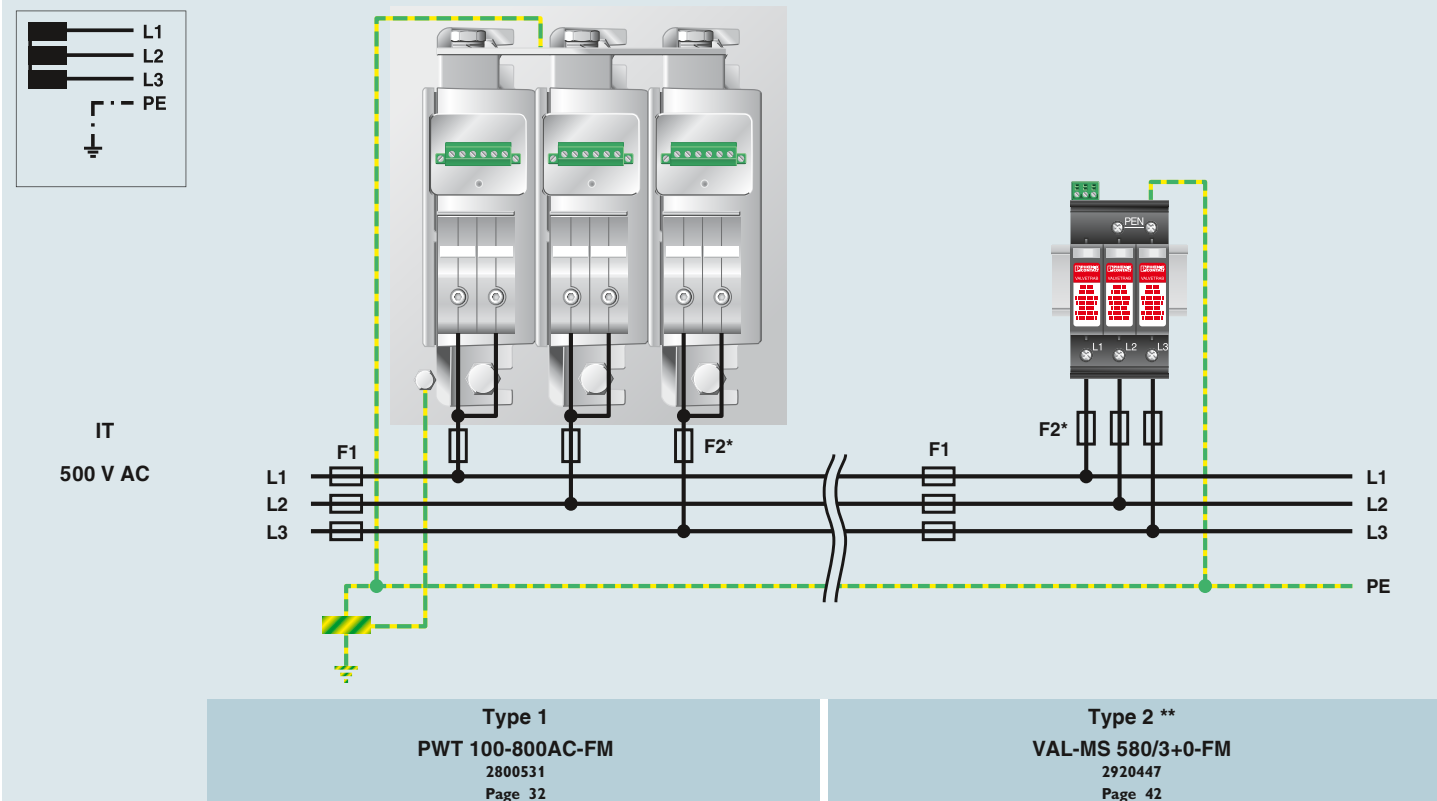
Selection guide and applications

Two-stage protection for the power supply, type 1 and type 2 installed separately

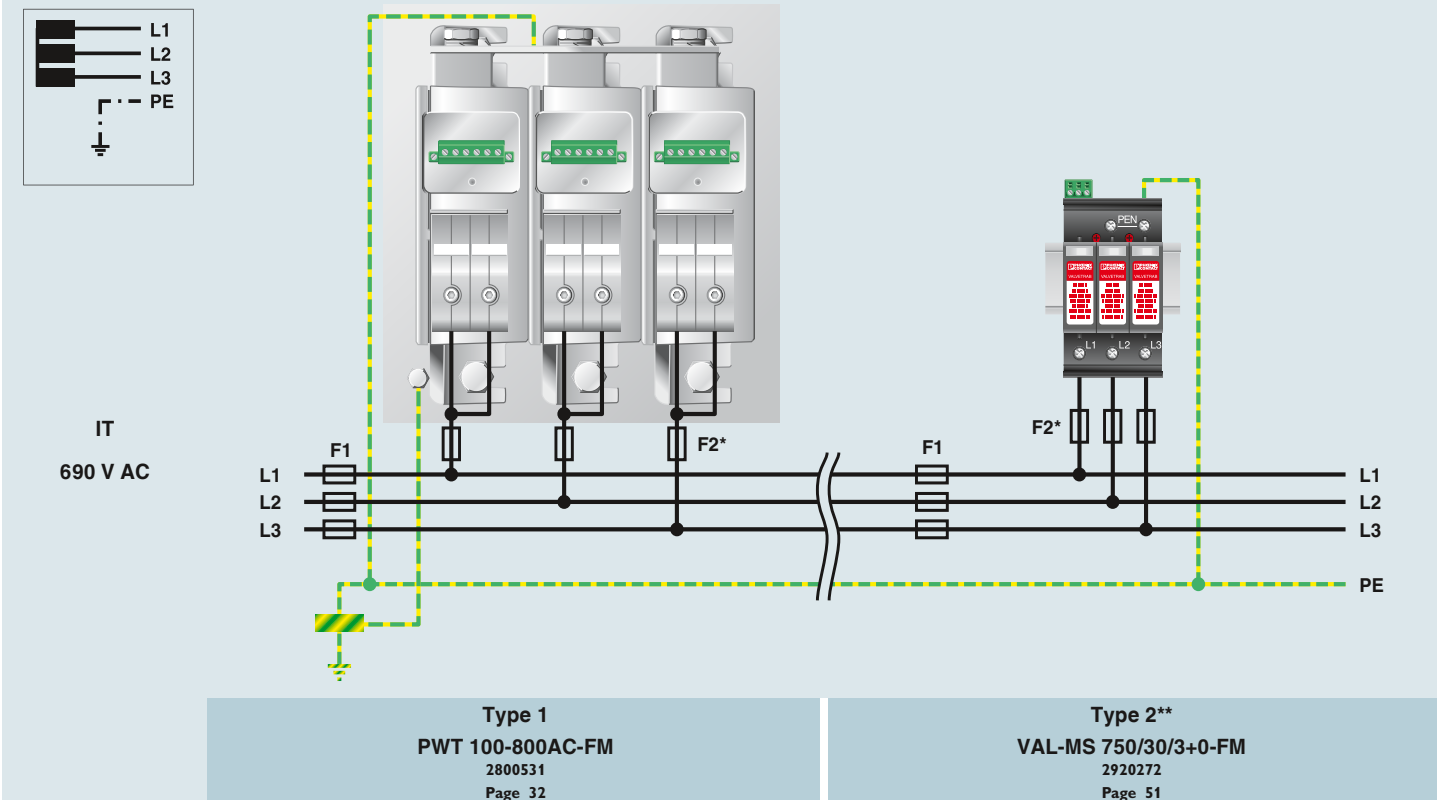


* F2 is not needed if $F1 \leq$ maximum backup fuse according to IEC

Two-stage protection for the power supply, type 1 and type 2 installed separately



Two-stage protection for the power supply, type 1 and type 2 installed separately



* F2 is not needed if $F1 \leq$ maximum backup fuse according to IEC
 ** Application only in IT systems supplied with a low voltage

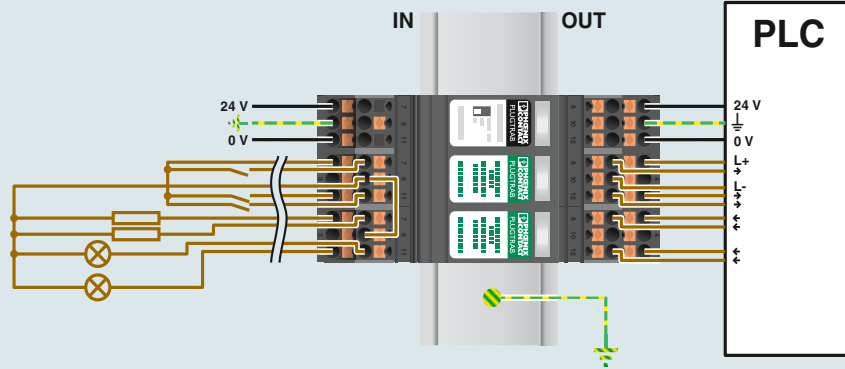
Surge protection and interference filters

Selection guide and applications

Protection of a binary signal input with actuator circuit, floating reference potential



E.g.,
24 V switched



Plug-in

Push-in connection

1 x PT-IQ-PTB-PT +
2 x PT-IQ-4X1+F-24DC-PT
2801296 + 2801272
Page 74

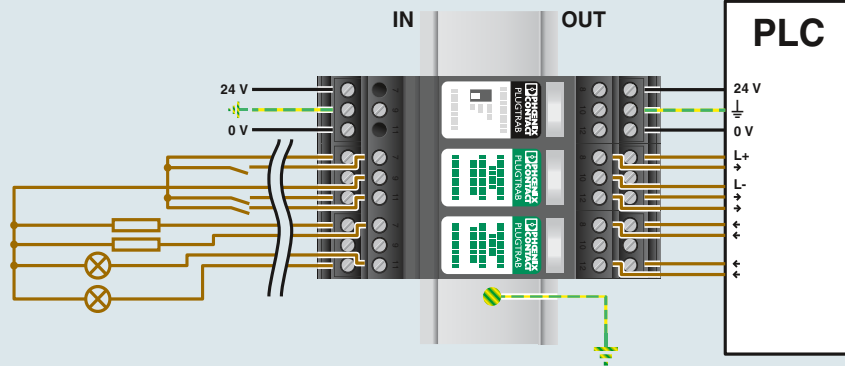
Optional screw connection

1 x PT-IQ-PTB-UT +
2 x PT-IQ-4X1+F-24DC-UT
2800768 + 2800983
Page 72

Protection of a binary signal input with actuator circuit, grounded reference potential



E.g.,
24 V switched



Plug-in

Screw connection

1 x PT-IQ-PTB-UT +
2 x PT-IQ-4X1-24DC-UT
2800768 + 2800982
Page 72

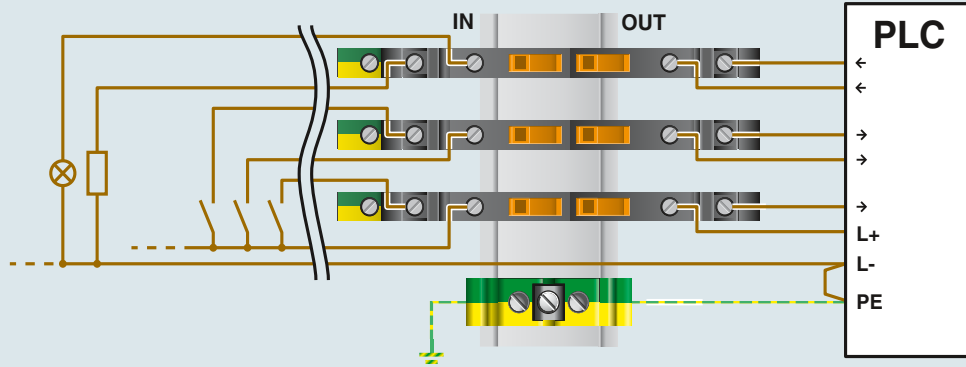
Optional push-in connection

1 x PT-IQ-PTB-PT +
2 x PT-IQ-4X1-24DC-PT
2801296 + 2801271
Page 74

Protection of a binary signal input with actuator circuit, common grounded reference potential (negative pole)



E.g.,
24 V switched



One-piece

Screw connection

TT-2/2-M-24DC
2920722
Page 94

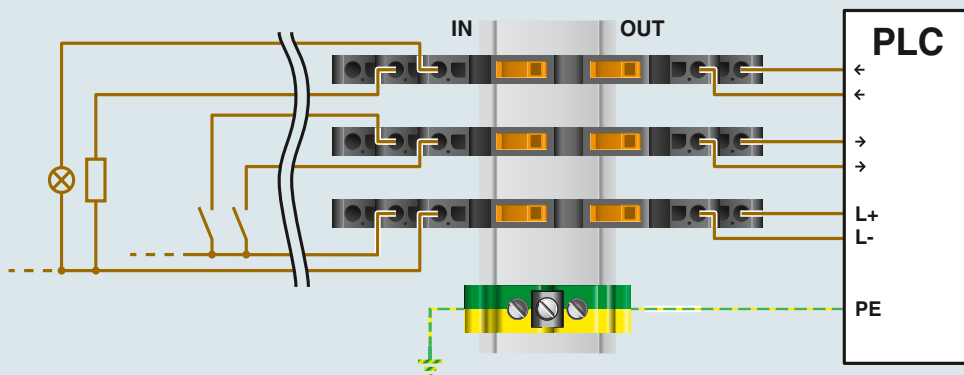
Optional
spring-cage connection

TT-STM-2/2-24DC
2858917
Page 96

Protection of a binary signal input with actuator circuit, common floating reference potential (negative pole)



E.g.,
24 V switched



One-piece

Spring-cage connection

TT-ST-M-2/2-24DC

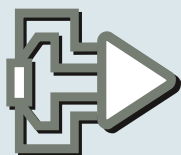
2858917
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Optional
screw connection

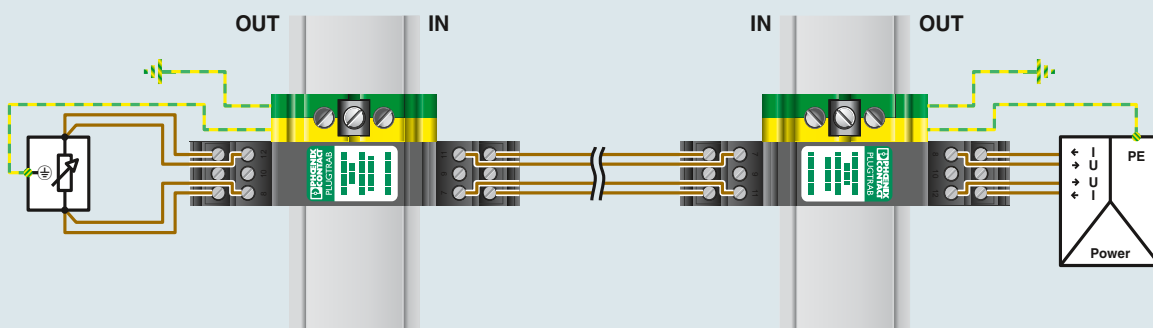
TT-2/2-M-24DC

2920722
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Protection of a four-conductor measurement



E.g., temperature
measurement



Plug-in

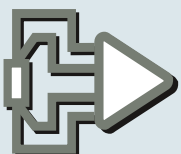
PT 4-24DC-ST + PT 4-BE

2839240 + 2839402
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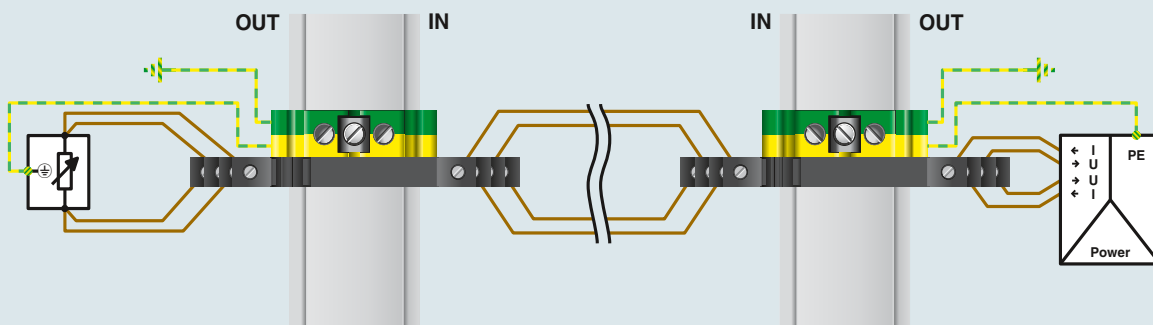
PT 4-24DC-ST + PT 4-BE

2839240 + 2839402
Page 84

Protection of a four-conductor measurement, for Ex and non-Ex applications



E.g., temperature
measurement



One-piece

LIT 4-24

2804678
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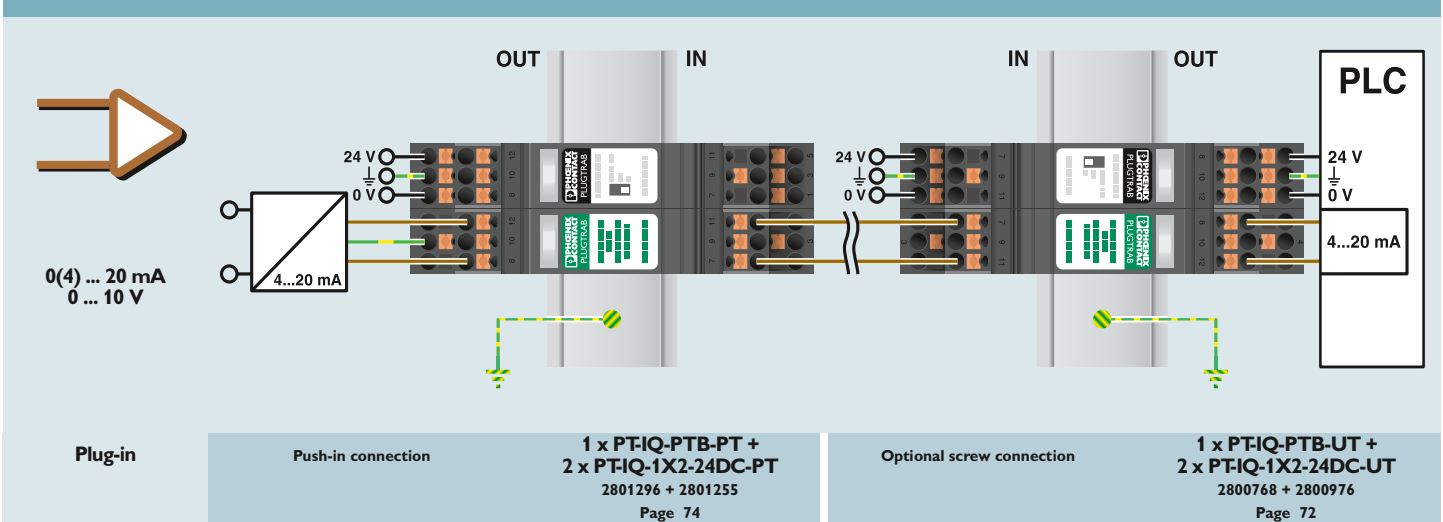
LIT 4-24

2804678
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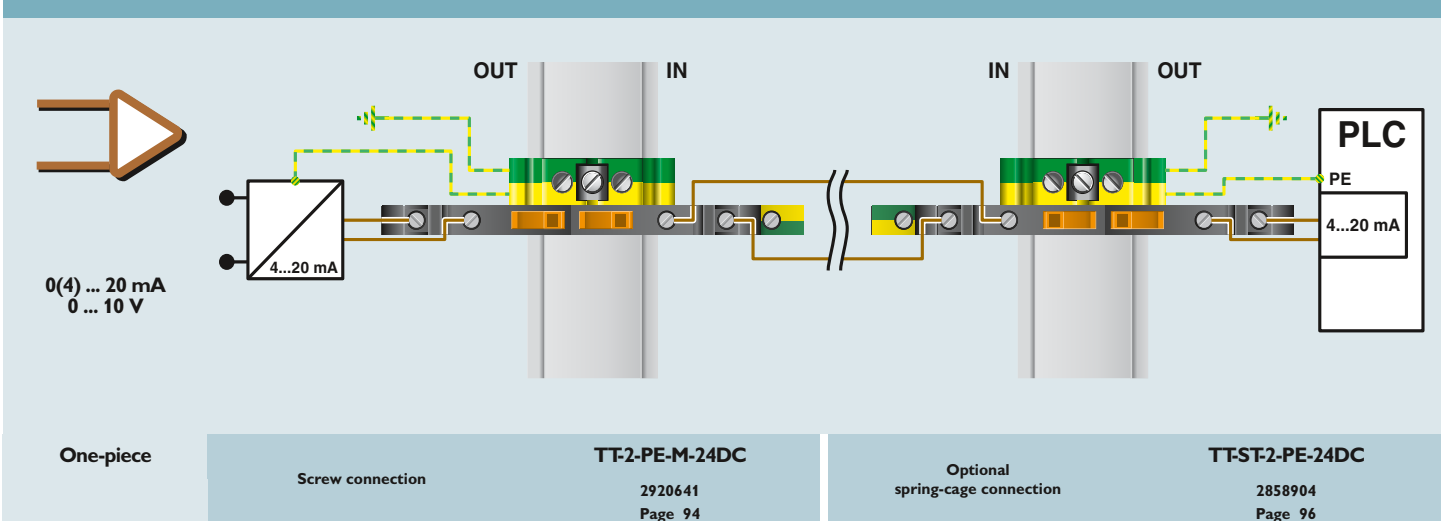
Surge protection and interference filters

Selection guide and applications

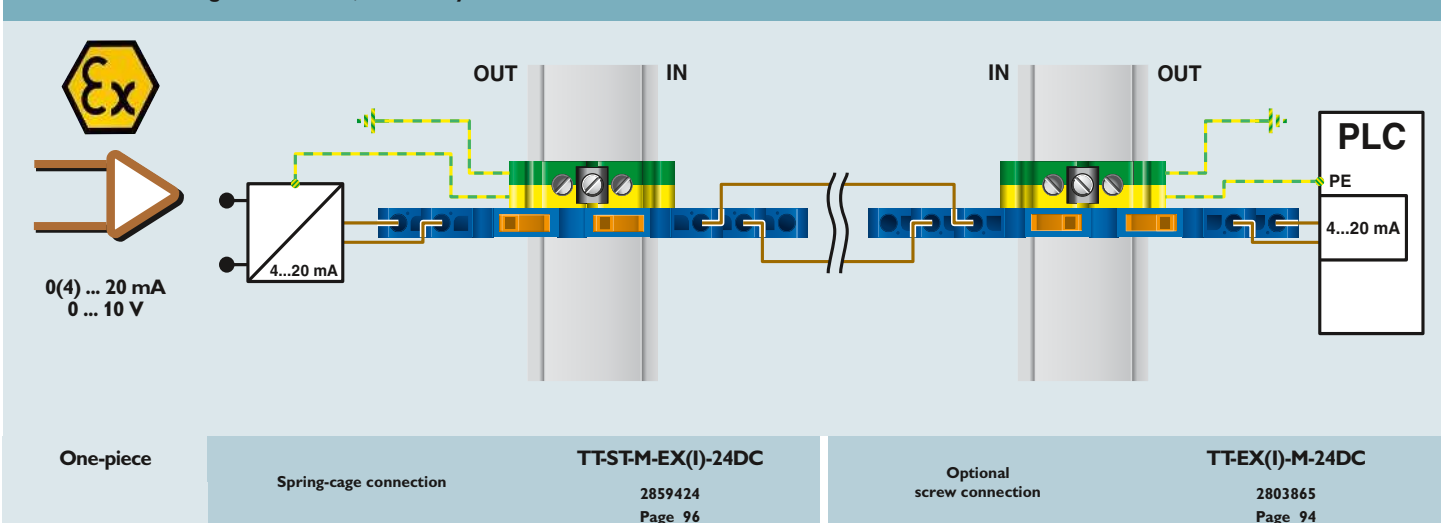
Protection of an analog measurement



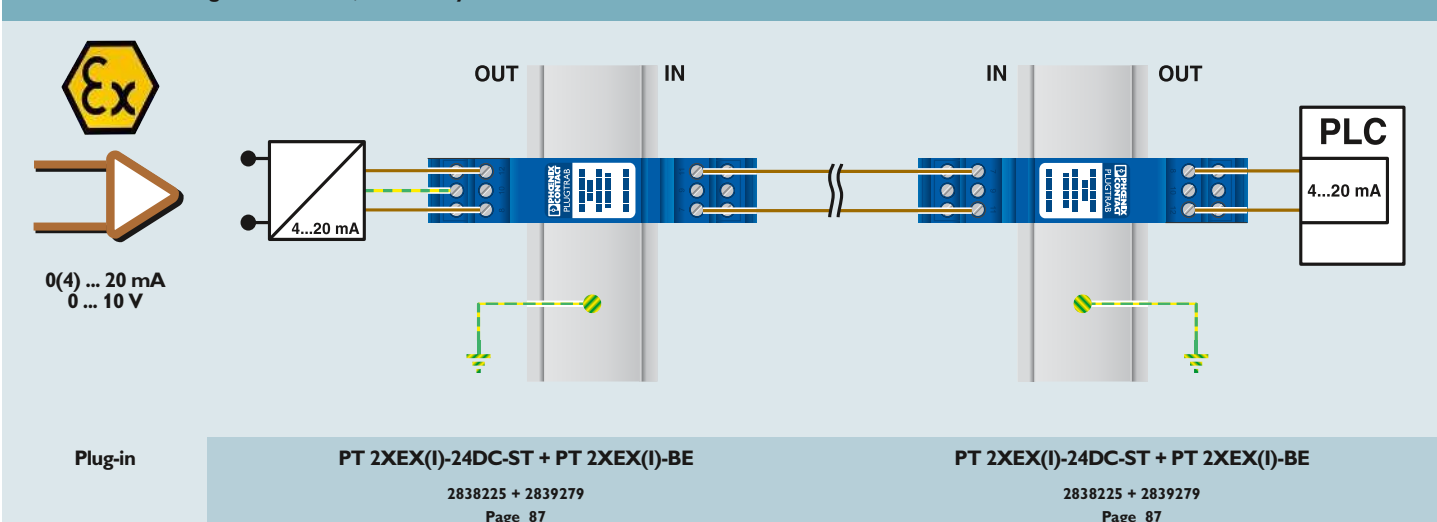
Protection of an analog measurement



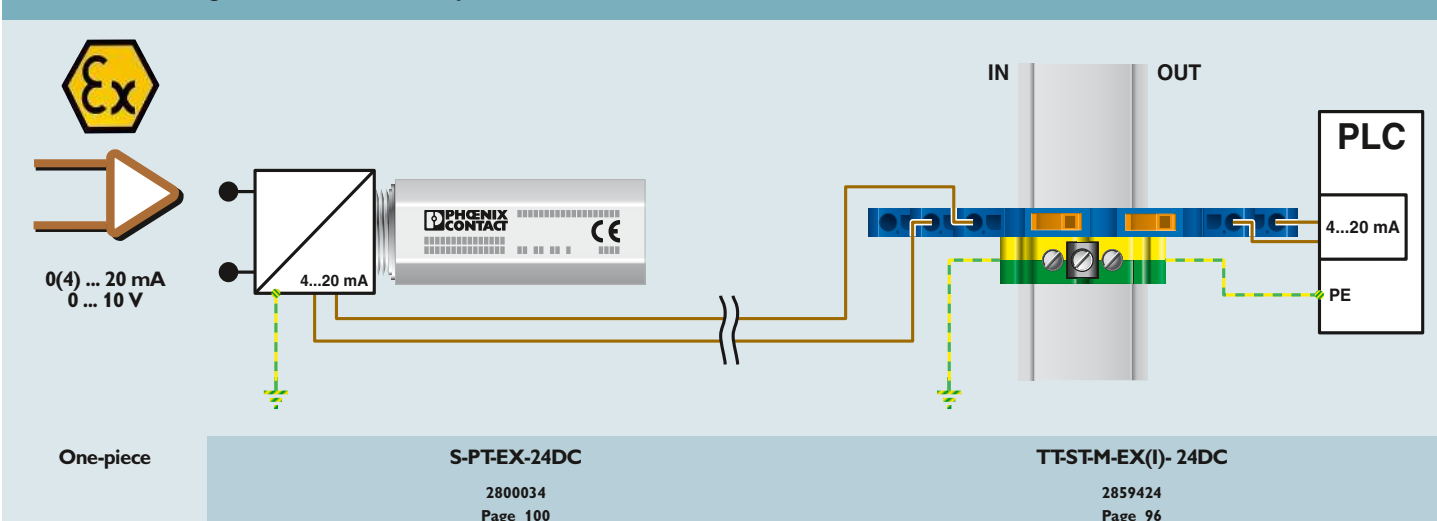
Protection of an analog measurement, intrinsically safe circuits



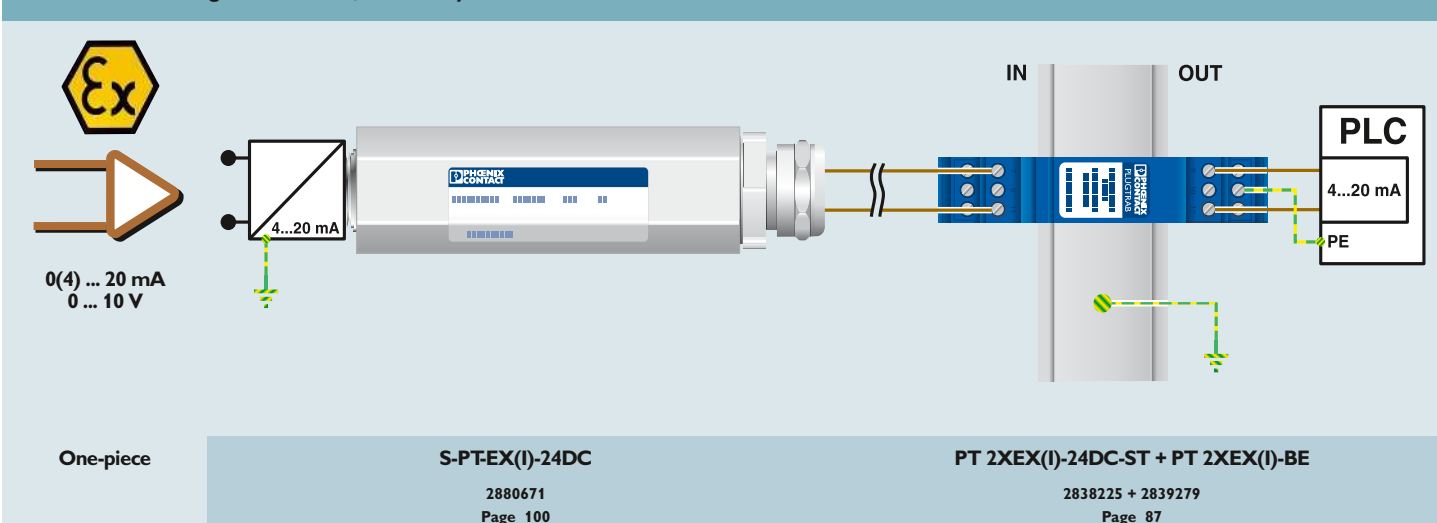
Protection of an analog measurement, intrinsically safe circuits



Protection of an analog measurement, intrinsically safe circuits



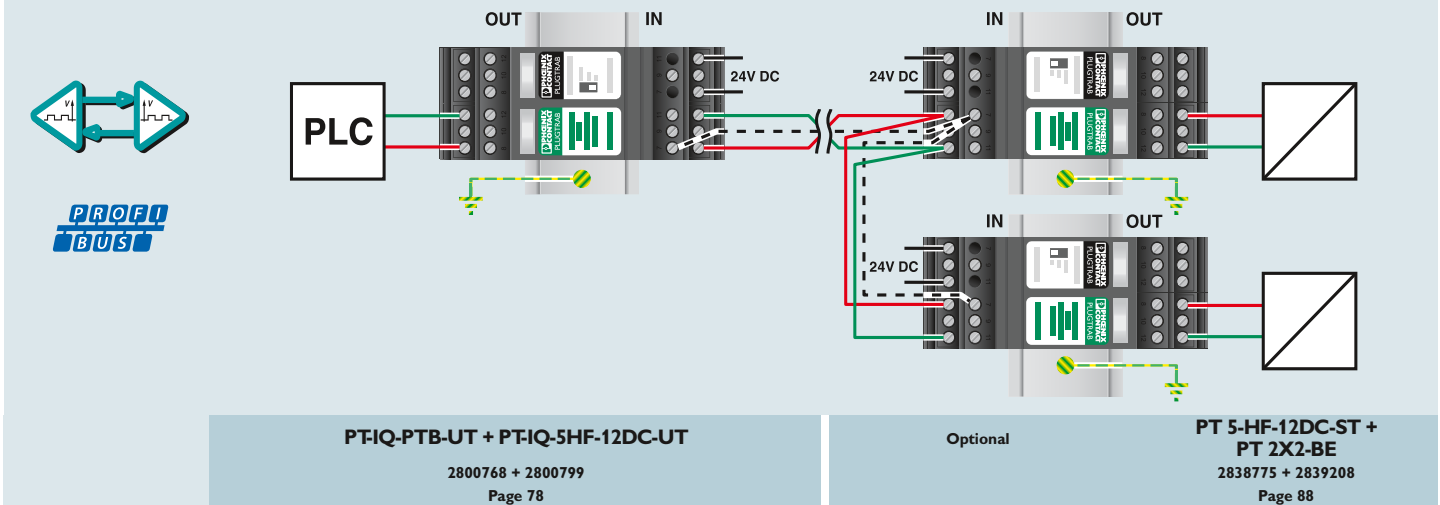
Protection of an analog measurement, intrinsically safe circuits



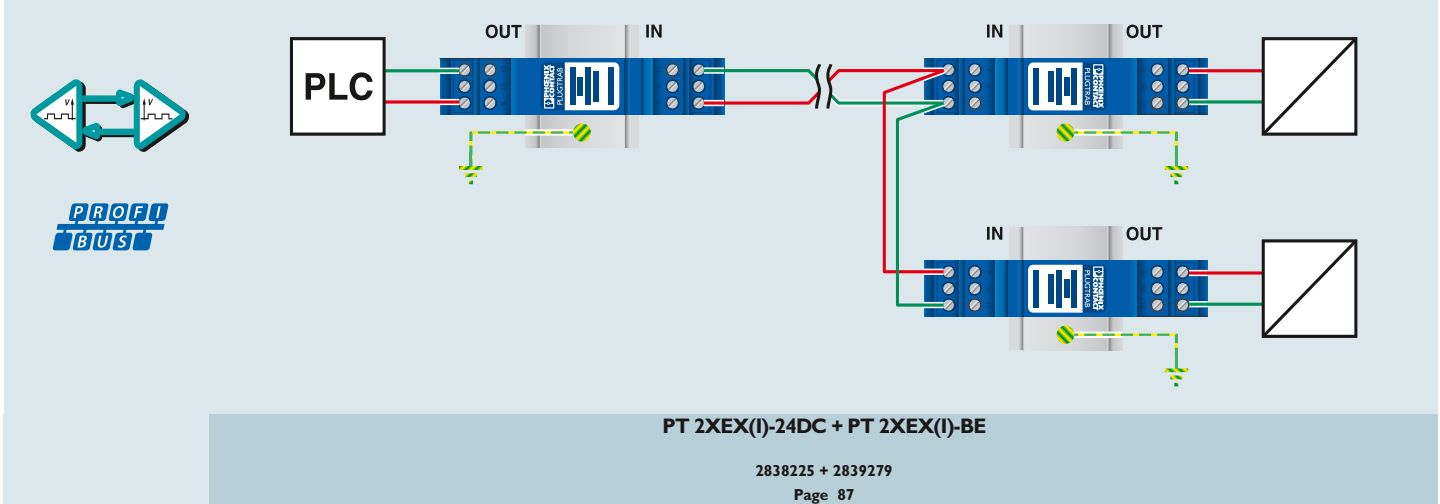
Surge protection and interference filters

Selection guide and applications

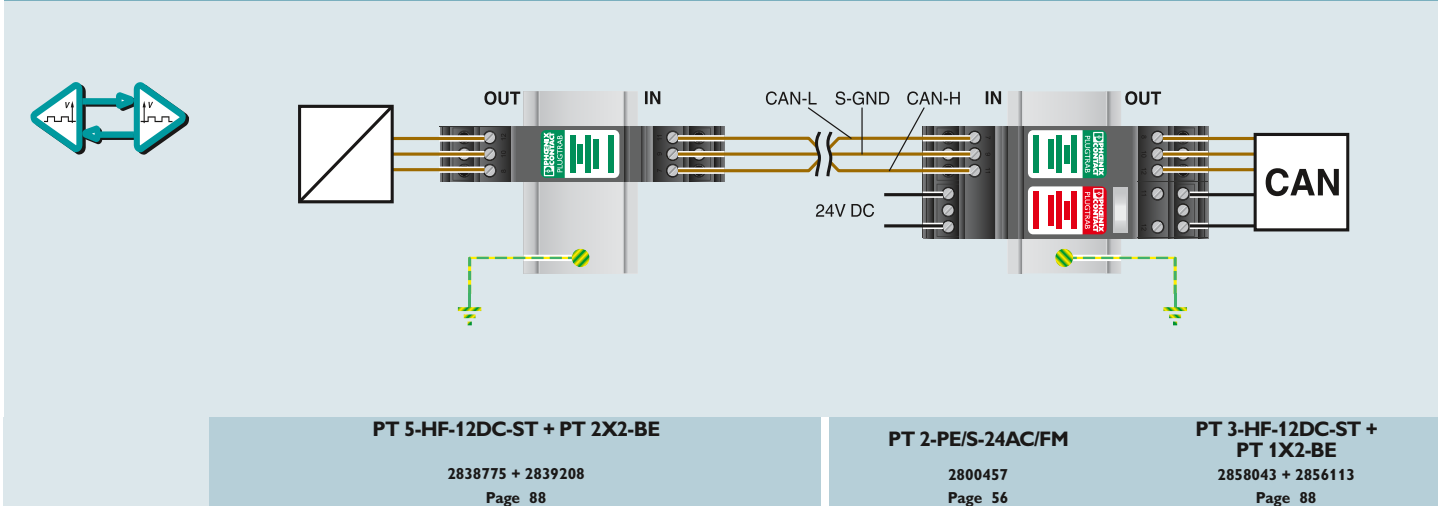
Protection of PROFIBUS DP



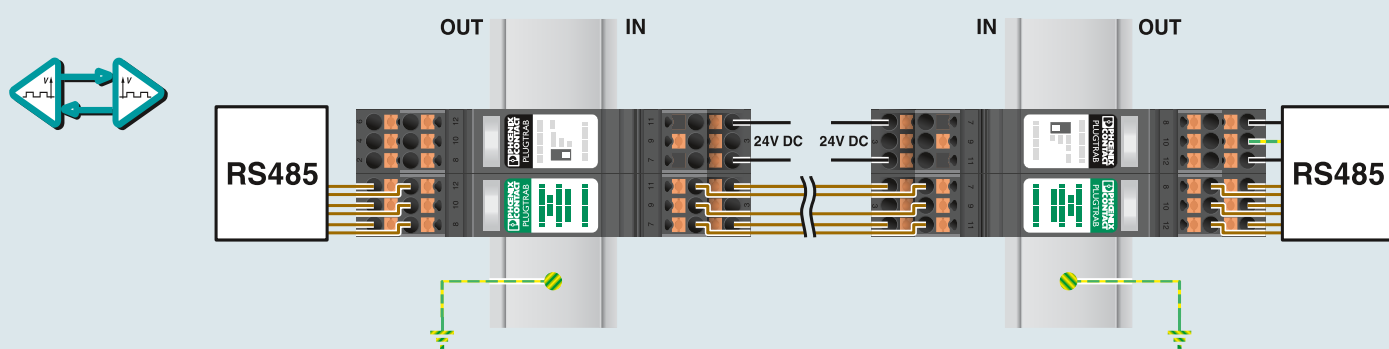
Protection of PROFIBUS PA



Protection of CAN bus/DeviceNet™



Protection of an RS-485 interface



PT-IQ-PTB-PT + PT-IQ-5-HF-12DC-PT

2801296 + 2801293

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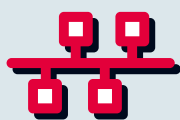
Optional

PT 5-HF-12DC-ST + PT 2X2-BE

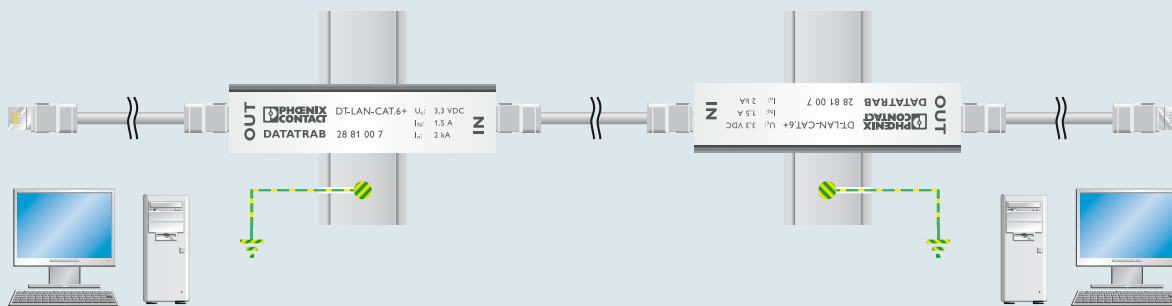
2838775 + 2839208

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Protection of an Ethernet interface (including PoE)



100Base-T
1000Base-T
10GBase-T

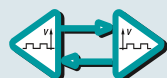


DTLAN-CAT.6+

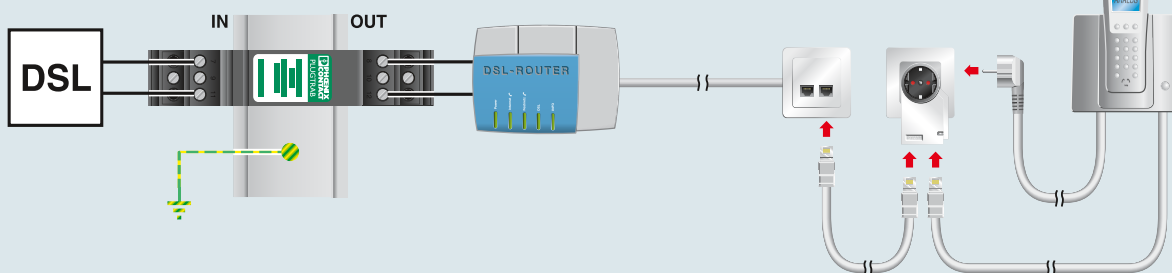
2881007

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Protection of a DSL interface



ADSL
HDSL
VDSL



PT 2-TELE

2882828

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MNT-TAE D/WH

2882394

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