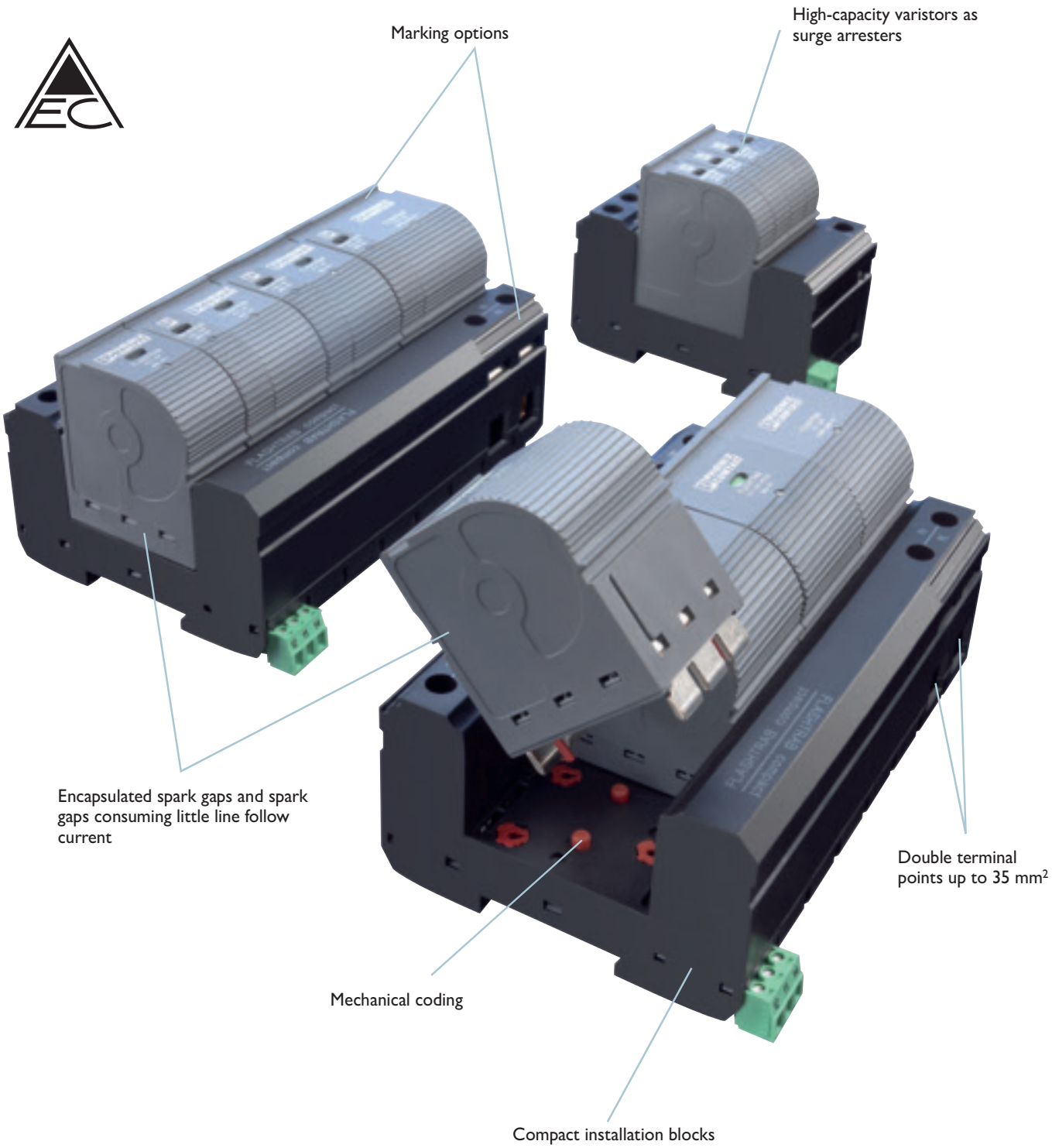
Surge protection for the power supply unit

Building and industrial installations in different parts of the world have different requirements for lightning and surge protection in power supply units. High-capacity lightning arrester combinations of the protection levels type 1 + type 2 are the initial basis for the current supply. TRABTECH implements a complete three-stage protection concept with convenient and ready-to-install solutions, from type 2 surge arresters in the sub-distribution boards up to the termination device protection of protection level type 3.

FLASHTRAB compact / VALVETRAB compact

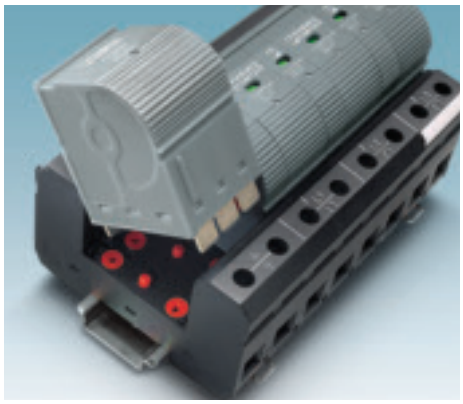


The complete system

The protective devices of the "compact" range offer a uniform installation concept. Uniform and high-capacity modules are available for almost every power supply system. Be it lightning arrester, surge arrester or a combination of the two, the design will convince you and the world with its consistent and universal application features.

Worldwide use

Voltage fluctuations in power supplies vary from country to country. The surge protection also has to deal with these short-term (temporary) voltage fluctuations. Due to the high rated voltage of 350 V AC, arresters of the "compact" range have no limitations and can be used worldwide.



Pluggable to perfection

Universal pluggability ensures a high degree of comfort, e.g. for insulation measurements in the system. Instead of tampering with the installation, just pull out the plug.

The symmetrical plug design facilitates plugging in both directions within the base element. These protective devices can be mounted in any control cabinet environment thanks to their flexibility as regards installation direction.

Innovative technology

The high breaking capacity of the innovative spark gaps also enables their use in low-voltage high-current installations with short-circuit currents of up to 50 kA. The encapsulated lightning arresters are designed such that they consume only little line follow current so that even the smallest of backup fuses remain unaffected.

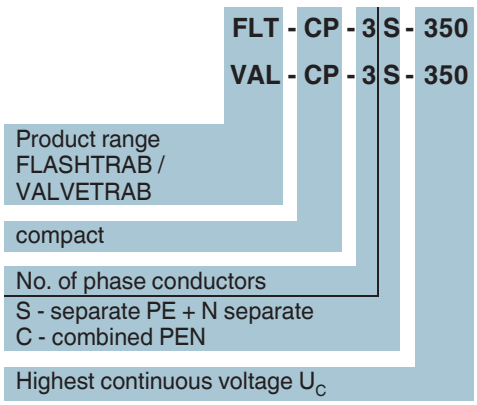
Status at a glance

You can see that the protective plugs function safely. The mechanical diagnostic and status indicator provides on-site information at a glance.

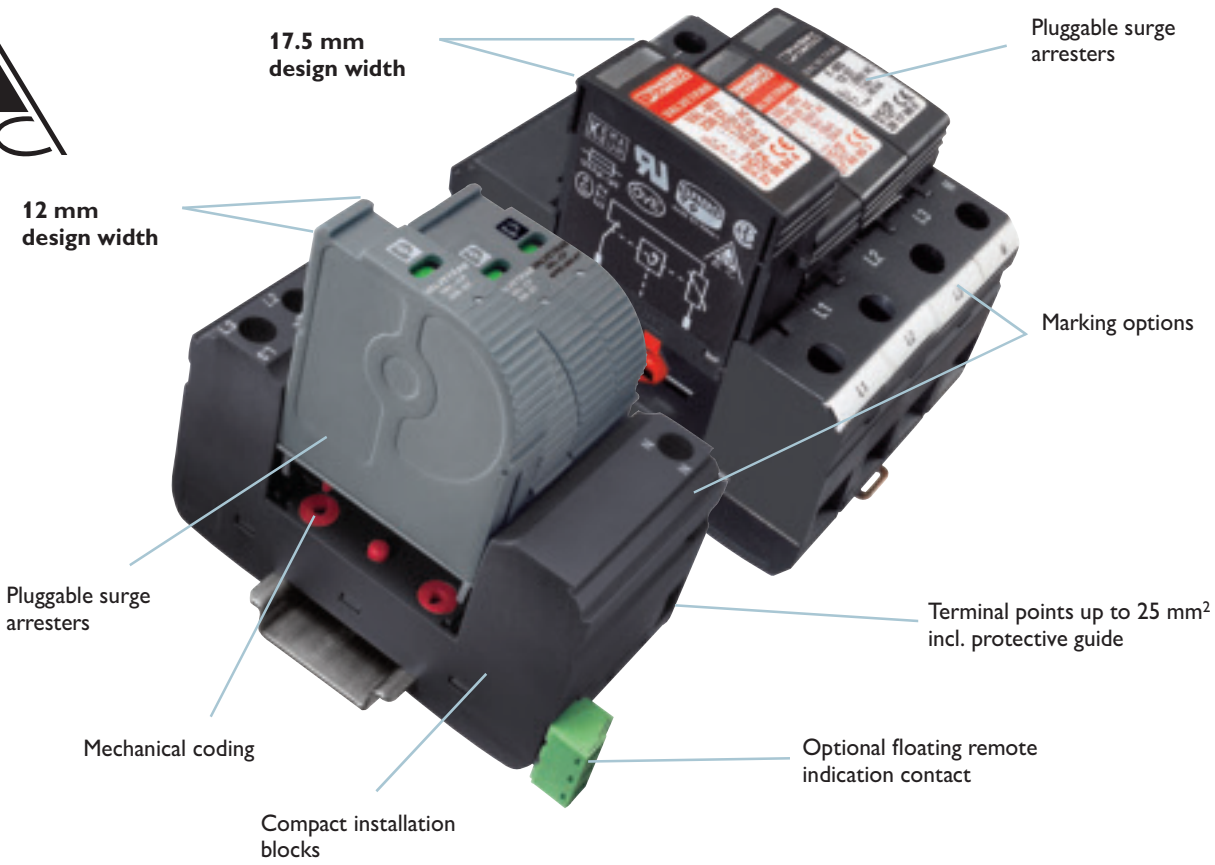
Remote signaling

A common floating remote indication contact makes remote signaling possible without taking up extra space.

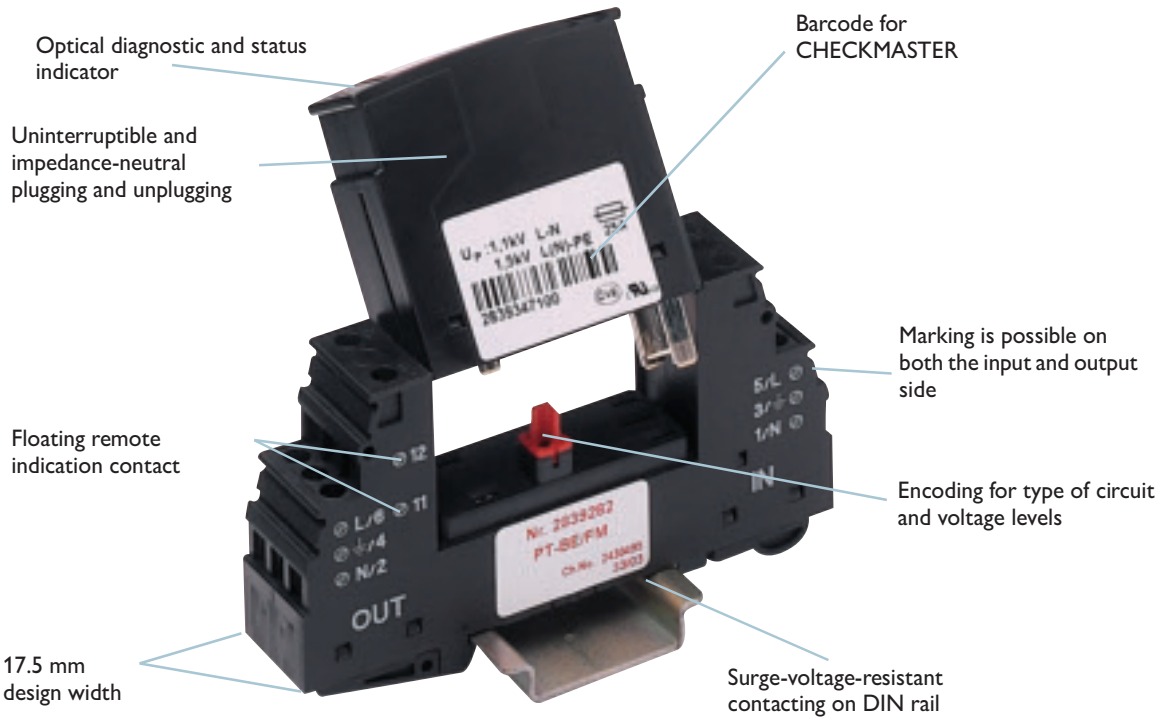
Designation structure



VALVETRAB

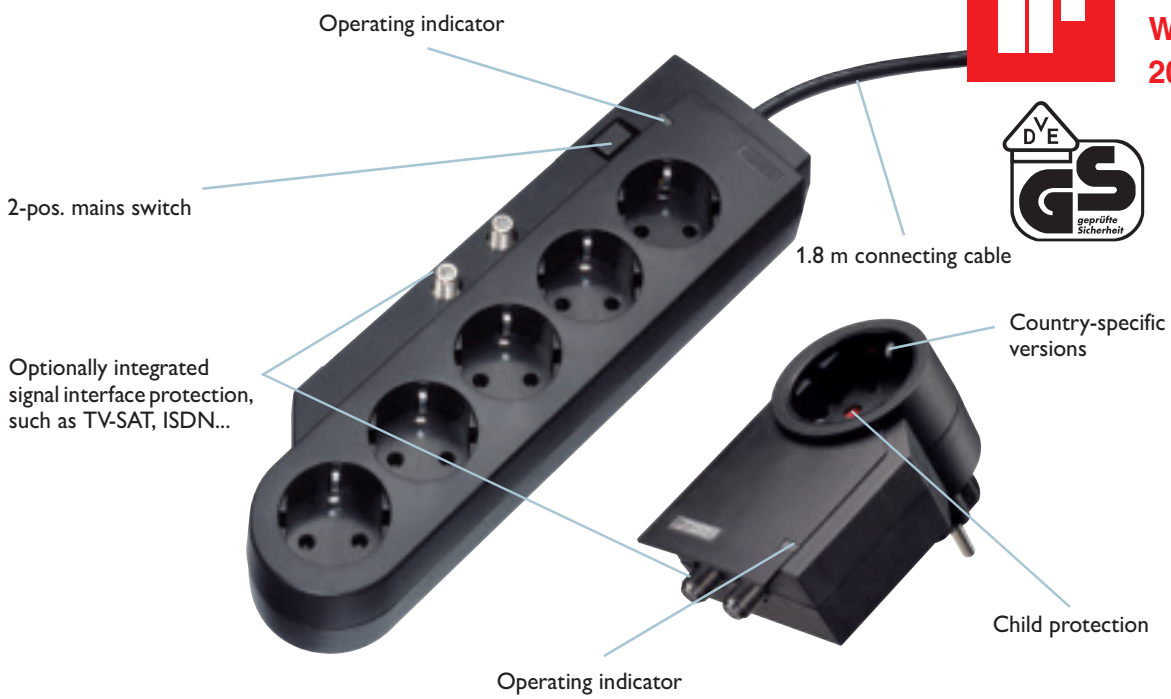


PLUGTRAB PT

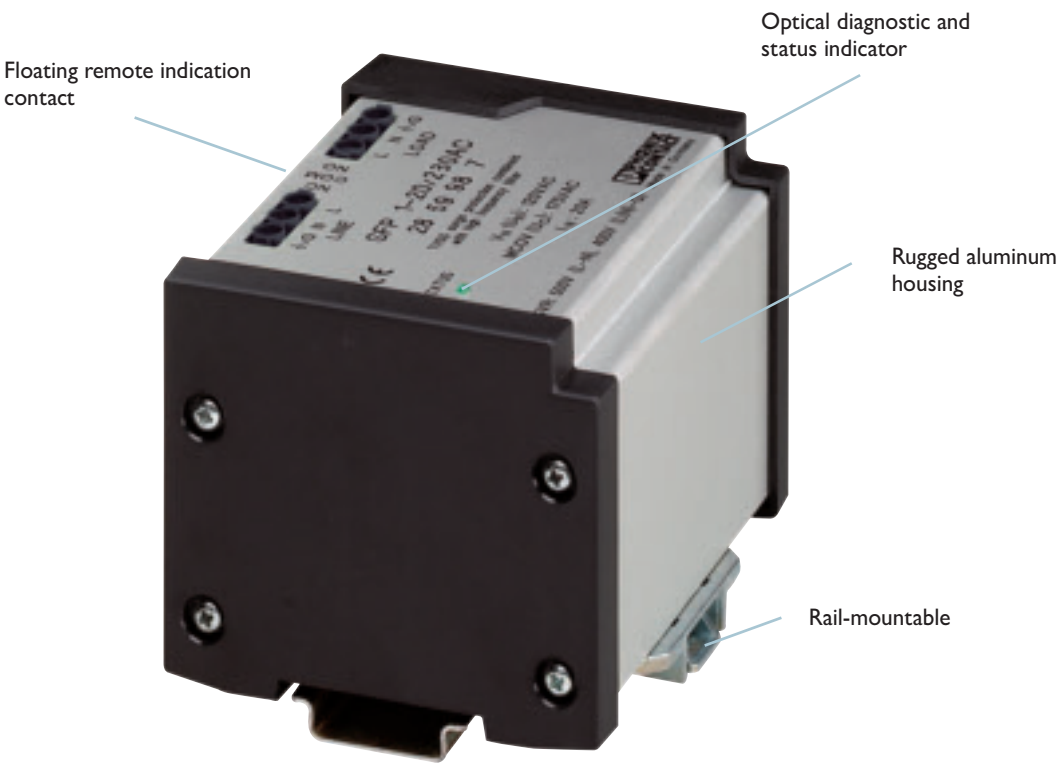


COMBITRAB / MAINTRAB

Design Award Winner 2003



SFP-TRAB



The selection matrix makes it easy to select suitable surge protection for the desired application.

The first column (Network type) divides the selection into the number of phases of the power supply system, and the second column (Description) shows the corresponding power supply system. Other columns provide information on the properties of the surge protection devices. Afterwards, a suitable product is shown with its order number. Product-specific information can be found on the corresponding pages listed.

Special solutions for the IT power supply system are given starting on page 45.

	Network type		Description
3-phase power supply	TN-S/TT		3-phase power supply unit Separate N and PE
	TN-C		3-phase power supply unit Common PEN
2-phase power supply	TN-S/TT		2-phase power supply unit Separate N and PE
	TN-C		2-phase power supply unit Common PEN
1-phase power supply	TN-S/TT		1-phase power supply unit Separate N and PE
	TN-C		1-phase power supply unit Common N and PE
Termination device power supply	TN-S/TT		3-phase power supply unit on the termination device Separate N and PE
	TN-S/TT		1-phase power supply unit on the termination device

Note

Products bearing this stamp (plugs) can all be tested with the CHECKMASTER.

Lightning arrester, type 1	Surge arrester, type 2	Device protection, type 3	Design width 12 mm per channel	Design width 17.5 mm per channel	Pluggable and testable	Diagnostic and status indicator + remote indicator contact	Rail-mountable	Adapter	Multi-position socket strip	Socket installation	Surge protection device	Order no.	Page
✓											FLT-CP-PLUS-3S-350	2882640	14
✓	✓				✓	✓	✓				FLT-CP-3S-350	2859712	22
	✓		✓								VAL-CP-3S-350	2859521	26
				✓							VAL-MS-320/3+1-FM	2859181	30
✓											FLT-CP-PLUS-3C-350	2882653	14
✓	✓				✓	✓	✓				FLT-CP-3C-350	2859725	22
	✓		✓								VAL-CP-3C-350	2859547	26
				✓							VAL-MS-320/3+0-FM	2920243	31
✓											FLT-CP-PLUS-2S-350	2882666	15
✓	✓				✓	✓	✓				FLT-CP-2S-350	2859767	23
	✓		✓								VAL-CP-2S-350	2859505	27
✓											FLT-CP-PLUS-2C-350	2882679	15
✓	✓				✓	✓	✓				FLT-CP-2C-350	2859770	23
	✓		✓								VAL-CP-2C-350	2859589	27
✓											FLT-CP-PLUS-1S-350	2882682	16
✓	✓				✓	✓	✓				FLT-CP-1S-350	2859738	23
	✓		✓								VAL-CP-1S-350	2859563	27
✓											FLT-CP-PLUS-1C-350	2882695	16
✓	✓				✓	✓	✓				FLT-CP-1C-350	2859741	24
		✓				✓	✓				PT 4-PE/S-230AC	2882459	46
		✓			✓	✓	✓				PT 2-PE/S-230AC	2858357	46
		✓						✓			MNT-1D[1])	2818180	51
		✓							✓		CBT-SCHUKO[1])	2857280	51
		✓								✓	BT-SKT-230AC	2859343	49

[1]) Protection for power supply units is available in corresponding country-specific versions. Surge protection devices with signal interface protection are also available.

Lightning arrester
FLASHTRAB compact PLUS

FLT-CP-PLUS are powerful, compact and encapsulated type 1 lightning current arresters. The pluggable and testable spark gaps are characterized by their extremely high performance data. Convenient installation blocks are available for all power supply systems common around the world. The modules can be used universally, including in the area of the intermediate meter.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

FLT-CP-PLUS-3S-350

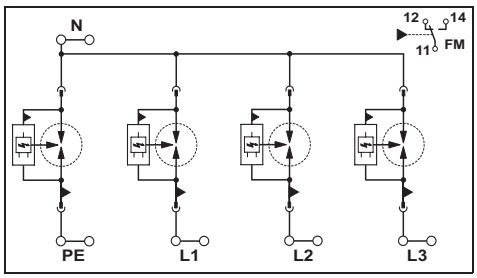
Lightning current arrester for 5-wire networks
(L1, L2, L3, N, PE)

FLT-CP-PLUS-3C-350

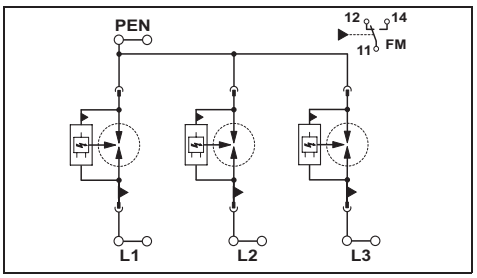
Lightning current arrester for 4-wire networks
(L1, L2, L3, PEN)

	solid	stranded [mm²]	AWG
Connection data	2.5-35	2.5-25	13-2
Remote indication contact	0.14-1.5	0.14-1.5	28-16

Total width 142.8 mm



Total width 106.9 mm



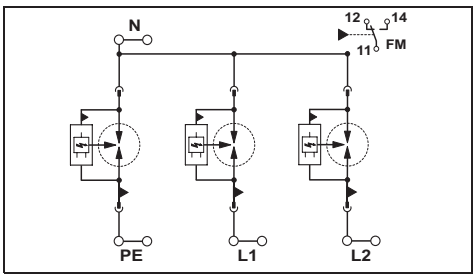
Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FLASHTRAB compact PLUS							
		FLT-CP-PLUS-3S-350	**2882640**	1	**FLT-CP-PLUS-3C-350**	**2882653**	1
Replacement connector							
	L-N / L-PEN	**FLT-CP-PLUS-350-ST**	**2859913**	10	**FLT-CP-PLUS-350-ST**	**2859913**	10
	N-PE	**FLT-CP-N/PE-350-ST**	**2859686**	10			
Labeling material		**ZBN 18,...**			**ZBN 18,...**		

Technical data			
Electrical data			
IEC category / EN type		I / T1	I / T1
Nominal voltage U_N		240 V AC (230/400 V AC ... 240/415 V AC)	240 V AC (230/400 V AC ... 240/415 V AC)
Highest continuous voltage U_C			
	L-N / N-PE / L-PEN	350 V AC / 350 V AC / -	- / - / 350 V AC
Lightning test curr. I_{imp} (10/350)µs			
	Peak value	100 kA	75 kA
	Charge	50 As	37.5 As
	Specific energy	2.50 MJ/Ω	1.40 MJ/Ω
Nominal discharge surge current I_n (8/20) µs			
	L-N / N-PE / L-PEN	25 kA / 100 kA / -	- / - / 75 kA (3L-PEN)
Follow current quenching capacity I_{fi}			
	L-N / N-PE / L-PEN	50 kA (264 V AC) / 100 A / -	- / - / 50 kA (264 V AC)
Protection level U_p			
	L-N / N-PE / L-PEN	≤ 1.5 kV / ≤ 1.5 kV / -	- / - / ≤ 1.5 kV
Response time t_A			
	L-N / N-PE / L-PEN	≤ 100 ns / ≤ 100 ns / -	- / - / ≤ 100 ns
Backup fuse max. in acc. with IEC		315 A (gL/gG)	315 A (gL/gG)
Immunity to short-circuiting (with max. backup fuse) I_P		50 kA	50 kA
General data			
Temperature range		-40°C ... 80°C	-40°C ... 80°C
Inflammability class in acc. with UL 94		V0	V0
Test standards		IEC 61643-1 / EN 61643-11 / UL 1449	IEC 61643-1 / EN 61643-11 / UL 1449
Remote indication contact		PDT contact	PDT contact
Max. operating voltage		250 V AC / 125 V DC	250 V AC / 125 V DC
Max. operating current		1 A AC / 200 mA DC	1 A AC / 200 mA DC

FLT-CP-PLUS-2S-350

Lightning current arrester for 4-wire networks (L1, L2, N, PE)

Total width 106.9 mm



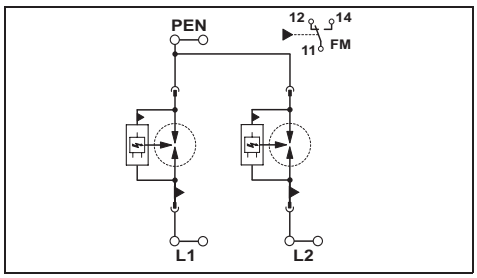
Type	Order No.	Pcs. / Pkt.
FLT-CP-PLUS-2S-350	**2882666**	1
FLT-CP-PLUS-350-ST	**2859913**	10
FLT-CP-N/PE-350-ST	**2859686**	10
ZBN 18,...		

I / T1	
240 V AC (230/400 V AC ... 240/415 V AC)	
350 V AC / 350 V AC / -	
75 kA	
37.5 As	
1.40 MJ/Ω	
25 kA / 100 kA / -	
50 kA (264 V AC) / 100 A / -	
≤ 1.5 kV / ≤ 1.5 kV / -	
≤ 100 ns / ≤ 100 ns / -	
315 A (gL/gG)	
50 kA	
-40°C ... 80°C	
V0	
IEC 61643-1 / EN 61643-11 / UL 1449	
PDT contact	
250 V AC / 125 V DC	
1 A AC / 200 mA DC	

FLT-CP-PLUS-2C-350

Lightning current arrester for 3-wire networks (L1, L2, PEN)

Total width 71.6 mm



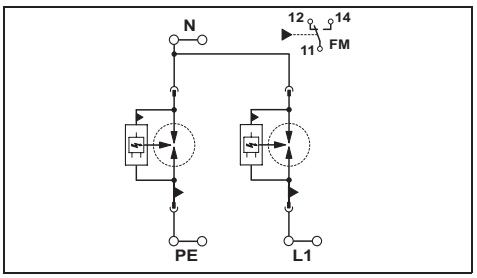
Type	Order No.	Pcs. / Pkt.
FLT-CP-PLUS-2C-350	**2882679**	1
FLT-CP-PLUS-350-ST	**2859913**	10
ZBN 18,...		

I / T1	
240 V AC (230/400 V AC ... 240/415 V AC)	
- / - / 350 V AC	
50 kA	
25 As	
625.00 kJ/Ω	
- / - / 25 kA	
- / - / 50 kA (264 V AC)	
- / - / ≤ 1.5 kV	
- / - / ≤ 100 ns	
315 A (gL/gG)	
50 kA	
-40°C ... 80°C	
V0	
IEC 61643-1 / EN 61643-11 / UL 1449	
PDT contact	
250 V AC / 125 V DC	
1 A AC / 200 mA DC	

FLT-CP-PLUS-1S-350

Lightning current arrester for 3-wire networks (L1, N, PE)

Total width 71.6 mm



Type	Order No.	Pcs. / Pkt.
FLT-CP-PLUS-1S-350	**2882682**	1
FLT-CP-PLUS-350-ST	**2859913**	10
FLT-CP-N/PE-350-ST	**2859686**	10
ZBN 18,...		

I / T1	
240 V AC (230/400 V AC ... 240/415 V AC)	
350 V AC / 350 V AC / -	
50 kA	
25 As	
625.00 kJ/Ω	
25 kA / 100 kA / -	
50 kA (264 V AC) / 100 A / -	
≤ 1.5 kV / ≤ 1.5 kV / -	
≤ 100 ns / ≤ 100 ns / -	
315 A (gL/gG)	
50 kA	
-40°C ... 80°C	
V0	
IEC 61643-1 / EN 61643-11 / UL 1449	
PDT contact	
250 V AC / 125 V DC	
1 A AC / 200 mA DC	

Lightning arrester, type 1 FLASHTRAB compact PLUS and FLASHTRAB PLUS

FLT-CP-PLUS-1C-350 and the equally encapsulated **FLT-CP-N/PE-350** total current spark gap are single-channel, pluggable lightning current arresters that can be used for individual solutions in different areas of application.
The one-part **FLT-PLUS CTRL...** lightening current arresters are characterized by an extremely high arresting capacity and good follow current quenching capacity at higher rated voltages. AEC technology enables a direct parallel connection to the appropriate type 2 surge arresters.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

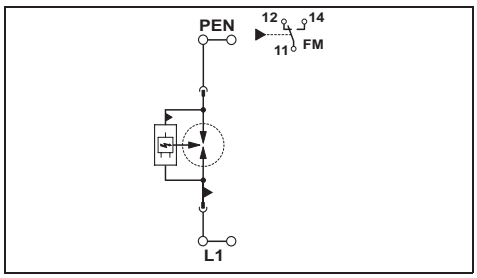
FLT-CP-PLUS-1C-350

Lightning current arrester for 2-wire networks (L1, PEN)

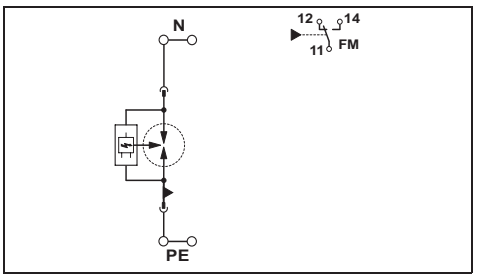
FLT-CP-N/PE-350

Arrester N/PE spark gap

Total width 35.8 mm



Total width 35.8 mm



	solid [mm²]	stranded [mm²]	AWG
Connection data			
FLT-CP	2.5-35	2.5-25	13-2
FLT-PLUS...	10-50	16-35	6-1
Remote contact	0.14-1.5	0.14-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FLASHTRAB compact PLUS	**FLT-CP-PLUS-1C-350**	**2882695**	1			
FLASHTRAB compact				**FLT-CP-N/PE-350**	**2859754**	1
FLASHTRAB PLUS CTRL						
Without status indicator						
With status indicator						
Replacement connector						
L-N / L-PEN	**FLT-CP-PLUS-350-ST**	**2859913**	10	**FLT-CP-PLUS-350-ST**	**2859913**	10
N-PE				**FLT-CP-N/PE-350-ST**	**2859686**	10
Labeling material	**ZBN 18,...**			**ZBN 18,...**		

Technical data

Electrical data			
IEC category / EN type		I / T1	I / T1
Nominal voltage U_N		240 V AC (230/400 V AC ... 240/415 V AC)	240 V AC (N-PE)
Highest continuous voltage U_C			
	L-N / N-PE / L-PEN	350 V AC / - / 350 V AC	- / 350 V AC / -
Lightning test curr. I_{imp} (10/350)µs			
	Peak value	25 kA	100 kA
	Charge	12.5 As	50 As
	Specific energy	160.00 kJ/Ω	2.50 MJ/Ω
Nominal discharge surge current I_n (8/20) µs			
	L-N / N-PE / L-PEN	25 kA / - / 25 kA	- / 100 kA / -
Follow current quenching capacity I_{fi}			
	L-N / N-PE / L-PEN	50 kA (264 V AC) / - / 50 kA (264 V AC)	- / 100 A / -
Protection level U_p			
	L-N / N-PE / L-PEN	≤ 1.5 kV / - / ≤ 1.5 kV	- / ≤ 1.5 kV / -
Response time t_A			
	L-N / N-PE / L-PEN	- / - / ≤ 100 ns	- / ≤ 100 ns / -
Backup fuse max. in acc. with IEC		315 A (gL/gG)	-
Immunity to short-circuiting (with max. backup fuse) I_P		50 kA	25 kA
General data			
Temperature range		-40°C ... 80°C	-40°C ... 80°C
Inflammability class in acc. with UL 94		V0	V0
Test standards		IEC 61643-1 / EN 61643-11 / UL 1449	IEC 61643-1 / EN 61643-11 / UL 1449
Remote indication contact		PDT contact	PDT contact
Max. operating voltage		250 V AC / 125 V DC	250 V AC / 125 V DC
Max. operating current		1 A AC / 200 mA DC	1 A AC / 200 mA DC

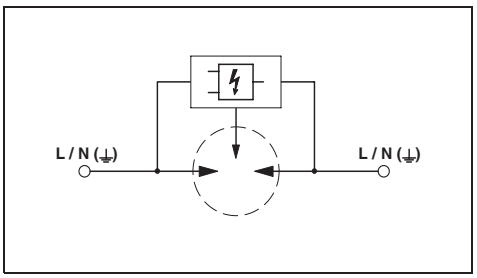
FLT-PLUS CTRL-1.5

Triggered 1-channel lightning arrester, protection level 1.5 kV

FLT-PLUS CTRL-2.5

Triggered 1-channel lightning arrester, protection level 2.5 kV

Total width 35.5 mm



Type	Order No.	Pcs. / Pkt.
FLT-PLUS CTRL-1.5	**2800119**	1
FLT-PLUS CTRL-1.5/I	**2800120**	1
ZBN 18,...		

I / T1
400 V AC

440 V AC / - / 440 V AC

50 kA
25 As
625.00 kJ/Ω

50 kA / - / 50 kA

50 kA (At 400 V AC) / - / 50 kA (At 400 V AC)

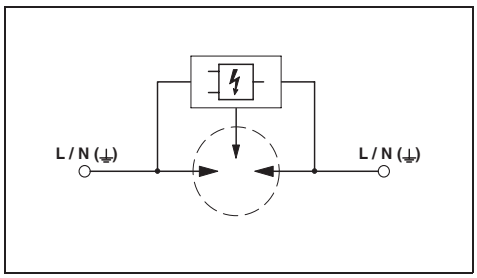
≤ 1.5 kV / - / ≤ 1.5 kV

≤ 100 ns / - / ≤ 100 ns
500 A (gL)
50 kA (At 400 V AC)

-40°C ... 85°C
V0
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

-
-
-

Total width 35.5 mm



Type	Order No.	Pcs. / Pkt.
FLT-PLUS CTRL-2.5	**2800121**	1
FLT-PLUS CTRL-2.5/I	**2800122**	1
ZBN 18,...		

I / T1
400 V AC

440 V AC / - / 440 V AC

50 kA
25 As
625.00 kJ/Ω

50 kA / - / 50 kA

50 kA (At 400 V AC) / - / 50 kA (At 400 V AC)

≤ 2.5 kV / - / ≤ 2.5 kV

≤ 100 ns / - / ≤ 100 ns
500 A (gL)
50 kA (At 400 V AC)

-40°C ... 85°C
V0
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

-
-
-

FLASHTRAB lightning arrester

FLT...CTRL... are encapsulated triggered, type 1 lightning current arresters. The ignition electronics control the response voltage of the spark gap, several variants with different protection levels are thus available. **FLT 35/3...** and **FLT 35/3+1...** arresters are preassembled installation blocks for 4 and 5-wire systems. AEC technology enables a direct parallel connection to the appropriate type 2 surge arresters.

Dimensional drawings starting on page 196.

Approvals starting on page 208.

FLT 35/3 CTRL-1.3/I

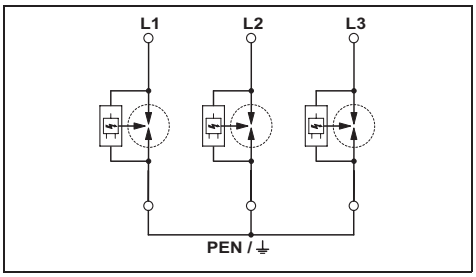
Lightning current arrester for 4-wire networks (L1, L2, L3, PEN)

FLT 35/3+1 CTRL-1.3/I

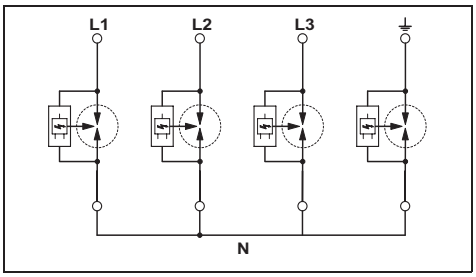
Lightning current arrester for 5-wire networks (L1, L2, L3, N, PE)

	solid [mm²]	stranded [mm²]	AWG
Connection data			
FLT 35...	1.5-35	1.5-25	15-2
FLT 100...	1.5-35	1.5-25	15-2

Total width 52.5 mm



Total width 70.8 mm



Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FLASHTRAB installation block						
With status indicator	**FLT 35/3 CTRL-1.3/I**	**2800124**	1	**FLT 35/3+1 CTRL-1.3/I**	**2800125**	1
FLASHTRAB						
Without status indicator						
With status indicator						
FLASHTRAB						
I_{imp}: 50 kA (10/350) µs						
I_{imp}: 100 kA (10/350) µs						
Labeling material	**ZBN 18,...**			**ZBN 18,...**		

Technical data			
Electrical data			
IEC category / EN type		I / T1	I / T1
Nominal voltage U_N		230 V AC (230/400 V AC ... 240/415 V AC)	230 V AC (230/400 V AC ... 240/415 V AC)
Highest continuous voltage U_C			
	L-N / N-PE / L-PEN	- / - / 260 V AC	260 V AC / 260 V AC / -
Lightning test curr. I_{imp} (10/350)µs			
	Peak value	100 kA	50 kA
	Charge	50 As	25 As
	Specific energy	2.50 MJ/Ω	625.00 kJ/Ω
Nominal discharge surge current I_n (8/20) µs			
	L-N / N-PE / L-PEN	- / - / 100 kA	100 kA / 50 kA / -
Follow current quenching capacity I_{fi}			
	L-N / N-PE / L-PEN	- / - / 3 kA (260 V AC)	3 kA / 500 A / -
Protection level U_p			
	L-N / N-PE / L-PEN	- / - / ≤ 1.3 kV	≤ 1.3 kV / ≤ 1.5 kV / -
Response time t_A			
	L-N / N-PE / L-PEN	- / - / ≤ 100 ns	≤ 100 ns / ≤ 100 ns / -
Backup fuse max. in acc. with IEC		400 A (gL)	400 A (gL)
Immunity to short-circuiting (with max. backup fuse) I_P		25 kA	25 kA
General data			
Temperature range		-40°C ... 85°C	-40°C ... 85°C
Inflammability class in acc. with UL 94		V0	V0
Test standards		IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11	IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

FLT 35 CTRL-1.3

Encapsulated and triggered lightning arrester, 1-channel, protection level 1.3 kV

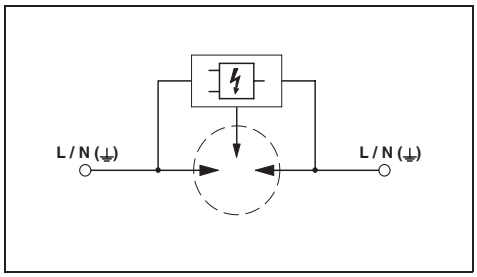
FLT 35 CTRL-1.5

Encapsulated and triggered lightning arrester, 1-channel, protection level 1.5 kV

FLT 50 N/PE CTRL-1.5

Encapsulated and triggered N-PE spark gap, 1-channel, protection level 1.5 kV

Total width 17.7 mm

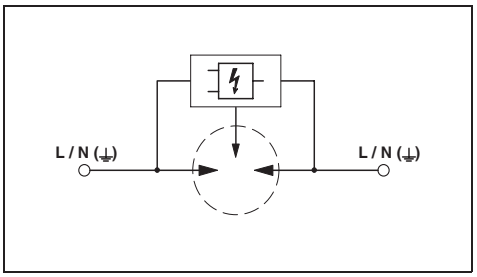


Type	Order No.	Pcs. / Pkt.
FLT 35 CTRL-1.3	**2800111**	1
FLT 35 CTRL-1.3/I	**2800112**	1
ZBN 18,...		

FLT 35 CTRL-1.3	FLT 35 CTRL-1.3/I
I / T1	I / T1
230 V AC	230 V AC
350 V AC / - / 350 V AC	260 V AC / - / 260 V AC
35 kA 17.5 As 305.00 kJ/Ω	35 kA 17.5 As 305.00 kJ/Ω
35 kA / - / 35 kA	35 kA / - / -
3 kA (260 V AC) / - / 3 kA (260 V AC)	3 kA (260 V AC) / - / 3 kA (260 V AC)
≤ 1.3 kV / - / ≤ 1.3 kV	≤ 1.3 kV / - / ≤ 1.3 kV
≤ 100 ns / - / ≤ 100 ns	≤ 100 ns / - / ≤ 100 ns
400 A (gL)	
25 kA	

-40°C ... 85°C
V0
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

Total width 17.7 mm

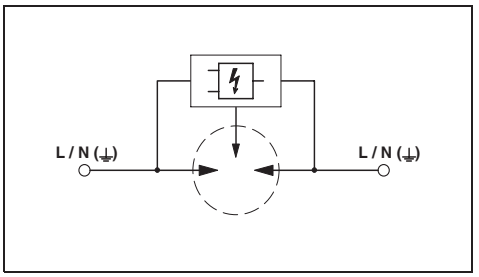


Type	Order No.	Pcs. / Pkt.
FLT 35 CTRL-1.5	**2800113**	1
FLT 35 CTRL-1.5/I	**2800115**	1
ZBN 18,...		

FLT 35 CTRL-1.5	FLT 35 CTRL-1.5/I
I / T1	I / T1
230 V AC	230 V AC
350 V AC / - / 350 V AC	260 V AC / - / 260 V AC
35 kA 17.5 As 305.00 kJ/Ω	35 kA 17.5 As 305.00 kJ/Ω
35 kA / - / 35 kA	35 kA / - / 35 kA
3 kA (260 V AC) / - / 3 kA (260 V AC)	3 kA (260 V AC) / - / 3 kA (260 V AC)
≤ 1.5 kV / - / ≤ 1.5 kV	≤ 1.5 kV / - / ≤ 1.5 kV
- / - / -	≤ 100 ns / - / ≤ 100 ns
	400 A (gL)
	25 kA

-40°C ... 85°C
V0
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

Total width 17.7 mm



Type	Order No.	Pcs. / Pkt.
FLT 50 N/PE CTRL-1.5	**2800109**	1
FLT 100 N/PE CTRL-1.5	**2856388**	1
ZBN 18,...		

FLT 50 N/PE CTRL-1.5	FLT 100 N/PE CTRL-1.5
I / T1	I / T1
230 V AC	230 V AC
- / 260 V AC / -	- / 260 V AC / -
50 kA 25 As 625.00 kJ/Ω	100 kA 50 As 2.50 MJ/Ω
- / 50 kA / -	- / 100 kA / -
- / 500 A / -	- / 100 A / -
- / ≤ 1.5 kV / -	- / ≤ 1.5 kV / -
/ ≤ 100 ns / -	- / ≤ 100 ns / -
	-
	-

-40°C ... 85°C
V0
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

FLASHTRAB lightning arrester

FLT 35-260, **FLT 25-400, FLT 60-400** and **FLT 100-260** are single-channel, type 1 lightning current arresters that can be combined with the MPB bridging system to form arresters blocks conforming to the system. These arrester are used in applications that do not require direct parallel connection to the type 2 surge arresters. They are characterized by an extremely high arresting capacity and slim design. **FLT-PLUS** also has an excellent follow current quenching capacity.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

FLT 35-260

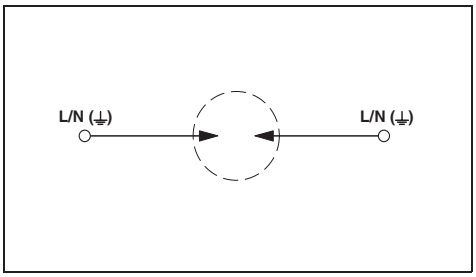
Encapsulated lightning arrester, 1-channel

FLT 25-400

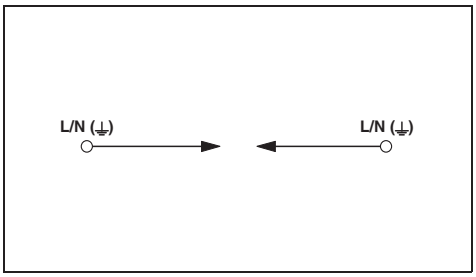
1-channel lightning arrester

	solid [mm²]	stranded [mm²]	AWG
Connection data			
FLT 35...	1.5-35	1.5-25	15-2
FLT-PLUS...	1.5-35	1.5-25	15-2
FLT 100...	10-50	16-35	6-1

Total width 17.7 mm



Total width 17.7 mm

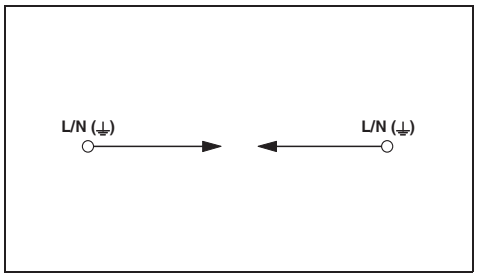


Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FLASHTRAB						
	FLT 35-260	**2800110**	1	**FLT 25-400**	**2800106**	1
Labeling material	**ZBN 18,...**			**ZBN 18,...**		
Technical data						
Electrical data						
IEC category / EN type	I / T1			I / T1		
Nominal voltage U_N	230 V AC			240 V AC		
Highest continuous voltage U_C						
L-N / N-PE / L-PEN	350 V AC / - / 350 V AC			400 V / - / 400 V		
Lightning test curr. I_{imp} (10/350)µs						
Peak value	35 kA			25 kA		
Charge	17.5 As			12.5 As		
Specific energy	305.00 kJ/Ω			160.00 kJ/Ω		
Nominal discharge surge current I_n (8/20) µs						
L-N / N-PE / L-PEN	35 kA / - / 35 kA			25 kA / - / 25 kA		
Follow current quenching capacity I_{fi}						
L-N / N-PE / L-PEN	3 kA (260 V AC) / - / 3 kA (260 V AC)			2.5 kA / - / 2.5 kA		
Protection level U_p						
L-N / N-PE / L-PEN	≤ 5 kV / - / ≤ 5 kV			≤ 5 kV / - / ≤ 5 kV		
Response time t_A						
L-N / N-PE / L-PEN	≤ 100 ns / - / ≤ 100 ns			≤ 100 ns / - / ≤ 100 ns		
Backup fuse max. in acc. with IEC	400 A (gL)			250 A (gL)		
Immunity to short-circuiting (with max. backup fuse) I_P	25 kA			25 kA		
General data						
Temperature range	-40°C ... 85°C			-40°C ... 85°C		
Inflammability class in acc. with UL 94	V0			V0		
Test standards	IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11			IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11		

FLT 60-400

1-channel lightning arrester

Total width 35.8 mm



Type	Order No.	Pcs. / Pkt.
FLT 60-400	**2800107**	1
ZBN 18,...		

I / T1
240 V AC

400 V / - / 400 V

60 kA
30 As
0.90 MJ/Ω

60 kA / - / 60 kA

2.5 kA / - / 2.5 kA

≤ 5 kV / - / ≤ 5 kV

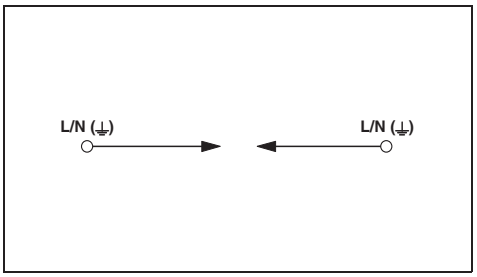
≤ 100 ns / - / ≤ 100 ns
500 A (gL)
25 kA

-40°C ... 85°C
V0
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

FLT-PLUS

1-channel lightning arrester

Total width 35.5 mm



Type	Order No.	Pcs. / Pkt.
FLT-PLUS	**2800116**	1
ZBN 18,...		

I / T1
400 V AC (400/690 V AC)

440 V AC / - / 440 V AC

50 kA
25 As
625.00 kJ/Ω

50 kA / - / 50 kA

50 kA (400 V AC) / - / 50 kA (400 V AC)

≤ 5 kV / - / ≤ 5 kV

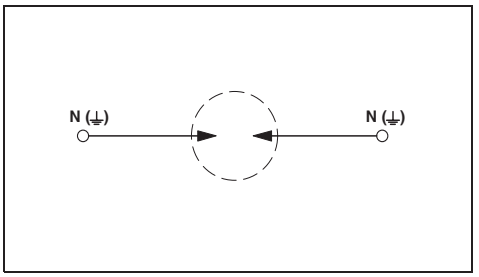
≤ 100 ns / - / ≤ 100 ns
500 A (gL)
50 kA

-40°C ... 85°C
V0
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

FLT 100-260

Encapsulated N-PE spark gap, 1-channel

Total width 35.8 mm



Type	Order No.	Pcs. / Pkt.
FLT 100-260	**2838160**	1
ZBN 18,...		

I / T1
230 V AC

- / 260 V / -

100 kA
50 As
2500.00 kJ/Ω

- / 100 kA / -

- / 100 A / -

- / ≤ 4 kV / -

- / ≤ 100 ns / -
-
-

-40°C ... 85°C
V0
IEC 61643-1 / EN 61643-11

FLASHTRAB compact lightning current and surge arrester combination

FLASHTRAB compact are type 1 + type 2 surge protection combinations. There is an application-oriented installation block available for almost every requirement. The choice of the correct module depends on the type of power supply system (TT/ TN-S or TN-C). The arrester combinations form the link between the pure type 1 FLASHTRAB compact PLUS arresters and the type 2 VALVETRAB compact arresters.

Dimensional drawings starting on page 196.

Approvals starting on page 208.

FLT-CP-3S-350

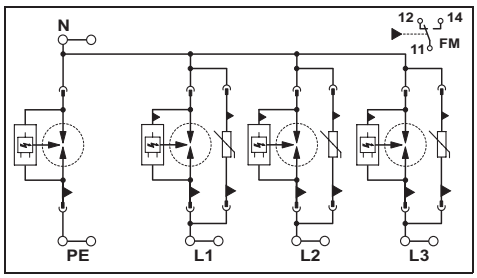
Arrester combination for 5-wire networks (L1, L2, L3, N, PE)

FLT-CP-3C-350

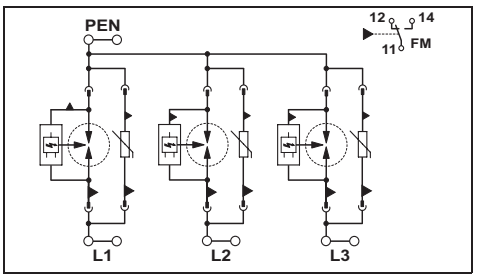
Arrester combination for 4-wire networks (L1, L2, L3, PEN)

	solid	stranded [mm²]	AWG
Connection data	2.5-35	2.5-25	13-2
Remote indication contact	0.14-1.5	0.14-1.5	28-16

Total width 142.8 mm



Total width 106.9 mm



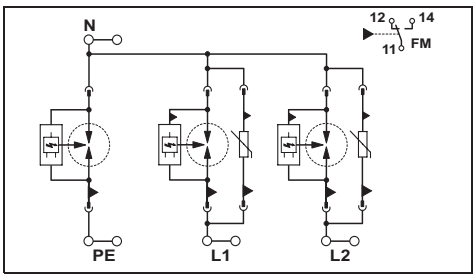
Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FLASHTRAB compact							
		FLT-CP-3S-350	**2859712**	1	**FLT-CP-3C-350**	**2859725**	1
Replacement connector							
	L-N / L-PEN	**FLT-CP-350-ST**	**2881887**	10	**FLT-CP-350-ST**	**2881887**	10
	N-PE	**FLT-CP-N/PE-350-ST**	**2859686**	10			
	L-N / L-PEN	**VAL-CP-350-ST**	**2859602**	10	**VAL-CP-350-ST**	**2859602**	10
Labeling material		**ZBN 18,...**			**ZBN 18,...**		

Technical data			
Electrical data			
IEC category / EN type		I + II / T1 + T2	I + II / T1 + T2
Nominal voltage U_N		240 V AC (230/400 V AC ... 240/415 V AC)	240 V AC (230/400 V AC ... 240/415 V AC)
Highest continuous voltage U_C			
	L-N / N-PE / L-PEN	350 V AC / 350 V AC / -	- / - / 350 V AC
Lightning test curr. I_{imp} (10/350)µs			
	Peak value	100 kA (L-N)	75 kA
	Charge	50 As	37.5 As
	Specific energy	2.50 MJ/Ω	1.40 MJ/Ω
Nominal discharge surge current I_n (8/20) µs			
	L-N / N-PE / L-PEN	25 kA / 100 kA / -	- / - / 75 kA (all channels)
Follow current quenching capacity I_{fi}			
	L-N / N-PE / L-PEN	25 kA (264 V AC) / 100 A / -	- / - / 25 kA (264 V AC)
Protection level U_p			
	L-N / N-PE / L-PEN	≤ 1.5 kV / ≤ 1.5 kV / -	- / - / ≤ 1.5 kV
Response time t_A			
	L-N / N-PE / L-PEN	≤ 25 ns / ≤ 100 ns / -	- / - / ≤ 25 ns
Backup fuse max. in acc. with IEC		315 A (gL/gG)	315 A (gL / gG)
Immunity to short-circuiting (with max. backup fuse) I_P		25 kA	25 kA
General data			
Temperature range		-40°C ... 80°C	-40°C ... 80°C
Inflammability class in acc. with UL 94		V0	V0
Test standards		IEC 61643-1 / EN 61643-11 / UL 1449	IEC 61643-1 / EN 61643-11 / UL 1449
Remote indication contact		PDT contact	PDT contact
Max. operating voltage		250 V AC / 125 V DC	250 V AC / 125 V DC
Max. operating current		1 A AC / 0.2 A DC	1 A AC / 0.2 A DC

FLT-CP-2S-350

Arrester combination for 4-wire networks (L1, L2, N, PE)

Total width 106.9 mm



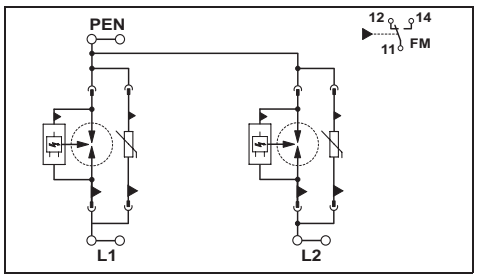
Type	Order No.	Pcs. / Pkt.
FLT-CP-2S-350	**2859767**	1
FLT-CP-350-ST	**2881887**	10
FLT-CP-N/PE-350-ST	**2859686**	10
VAL-CP-350-ST	**2859602**	10
ZBN 18,...		

I + II / T1 + T2	
240 V AC (230/400 V AC ... 240/415 V AC)	
350 V AC / 350 V AC / -	
75 kA	
37.5 As	
1.40 MJ/Ω	
25 kA / 100 kA / -	
25 kA (264 V AC) / 100 A / -	
≤ 1.5 kV / ≤ 1.5 kV / -	
≤ 25 ns / ≤ 100 ns / -	
315 A (gL/gG)	
25 kA	
-40°C ... 80°C	
V0	
IEC 61643-1 / EN 61643-11 / UL 1449	
PDT contact	
250 V AC / 125 V DC	
1 A AC / 0.2 A DC	

FLT-CP-2C-350

Arrester combination for 3-wire networks (L1, L2, PEN)

Total width 71.6 mm



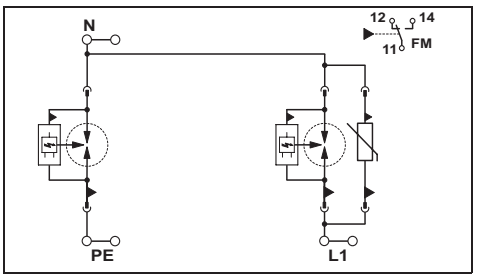
Type	Order No.	Pcs. / Pkt.
FLT-CP-2C-350	**2859770**	1
FLT-CP-350-ST	**2881887**	10
VAL-CP-350-ST	**2859602**	10
ZBN 18,...		

I + II / T1 + T2	
240 V AC (230/400 V AC ... 240/415 V AC)	
- / - / 350 V AC	
50 kA	
25 As	
625.00 kJ/Ω	
- / - / 50 kA (all channels)	
- / - / 25 kA (264 V AC)	
- / - / ≤ 1.5 kV	
- / - / ≤ 25 ns	
315 A (gL / gG)	
25 kA	
-40°C ... 80°C	
V0	
IEC 61643-1 / EN 61643-11 / UL 1449	
PDT contact	
250 V AC / 125 V DC	
1 A AC / 0.2 A DC	

FLT-CP-1S-350

Arrester combination for 1-phase power supply systems (L1, N, PE)

Total width 71.6 mm



Type	Order No.	Pcs. / Pkt.
FLT-CP-1S-350	**2859738**	1
FLT-CP-350-ST	**2881887**	10
FLT-CP-N/PE-350-ST	**2859686**	10
VAL-CP-350-ST	**2859602**	10
ZBN 18,...		

I + II / T1 + T2	
240 V AC (230 V AC ... 240 V AC)	
350 V AC / 350 V AC / -	
50 kA	
25 As	
625.00 kJ/Ω	
25 kA / 100 kA / -	
25 kA (264 V AC) / 100 A / -	
≤ 1.5 kV / ≤ 1.5 kV / -	
≤ 25 ns / ≤ 100 ns / -	
315 A (gL/gG)	
25 kA	
-40°C ... 80°C	
V0	
IEC 61643-1 / EN 61643-11 / UL 1449	
PDT contact	
250 V AC / 125 V DC	
1 A AC / 0.2 A DC	

FLASHTRAB compact lightning current and surge arrester combination

FLT-CP-1C-350 and **FLT-CP-N/PE-350** are available for flexible wiring in special applications. Any combination can be put together using these modules and standard bridging material.

– Mechanical coding of all slots
– Mechanical status indication of the individual arresters without consuming electrical power
– Integrated floating changeover contact for remote signaling
– Convenient connection method with two biconnect terminal blocks per connection
– Comprehensive labeling options
– Encapsulated, spark gap technology only consuming little line follow current
– Independent, powerful Type 1/ Class I and Type 2/Class II arresters
– In order to ensure the full performance capability of the surge protection devices, missing plugs or plugs without components are reported as errors at the remote indicator contact.

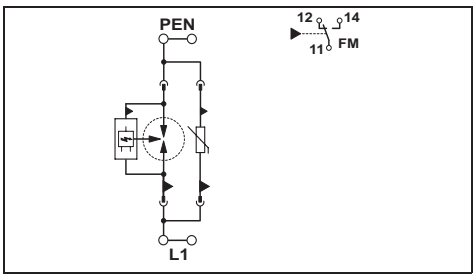
All plugs of the "compact" family can be tested using the CHECKMASTER arrester testing device. Extra security that benefits the system availability.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

FLT-CP-1C-350

Arrester combination for L1, PEN

Total width 35.8 mm



	solid	stranded	
	[mm²]		AWG
Connection data	2.5-35	2.5-25	13-2
Remote indication contact	0.14-1.5	0.14-1.5	28-16

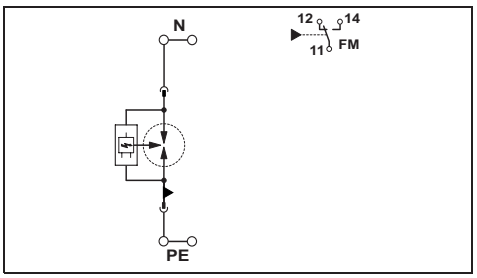
Description		Type	Order No.	Pcs. / Pkt.
FLASHTRAB compact				
1-pos.		**FLT-CP-1C-350**	**2859741**	1
Replacement connector				
	L-N / L-PEN	**FLT-CP-350-ST**	**2881887**	10
	N-PE			
	L-N / L-PEN	**VAL-CP-350-ST**	**2859602**	10
Labeling material		**ZBN 18,...**		

Technical data		
Electrical data		
IEC category / EN type		I + II / T1 + T2
Nominal voltage U_N		240 V AC (230 V AC ... 240 V AC)
Highest continuous voltage U_C		
	L-N / N-PE / L-PEN	350 V AC / - / 350 V AC
Lightning test curr. I_{imp} (10/350)µs		
	Peak value	25 kA
	Charge	12.5 As
	Specific energy	160.00 kJ/Ω
Nominal discharge surge current I_n (8/20) µs		
	L-N / N-PE / L-PEN	25 kA / - / 25 kA
Follow current quenching capacity I_{fi}		
	L-N / N-PE / L-PEN	25 kA (264 V AC) / - / 25 kA (264 V AC)
Protection level U_p		
	L-N / N-PE / L-PEN	≤ 1.5 kV / - / ≤ 1.5 kV
Response time t_A		
	L-N / N-PE / L-PEN	≤ 25 ns / - / ≤ 25 ns
Backup fuse max. in acc. with IEC		315 A (gL / gG)
Immunity to short-circuiting (with max. backup fuse) I_P		25 kA
General data		
Temperature range		-40°C ... 80°C
Inflammability class in acc. with UL 94		V0
Test standards		IEC 61643-1 / EN 61643-11 / UL 1449
Remote indication contact		PDT contact
Max. operating voltage		250 V AC / 125 V DC
Max. operating current		1 A AC / 0.2 A DC

FLT-CP-N/PE-350

Arrester N/PE spark gap

Total width 35.8 mm



Type	Order No.	Pcs. / Pkt.
FLT-CP-N/PE-350	**2859754**	1
FLT-CP-N/PE-350-ST	**2859686**	10
ZBN 18,...		

I / T1
240 V AC (N-PE)

- / 350 V AC / -

100 kA
50 As
2.50 MJ/Ω

- / 100 kA / -

- / 100 A / -

- / ≤ 1.5 kV / -

- / ≤ 100 ns / -
-
25 kA

-40°C ... 80°C
V0
IEC 61643-1 / EN 61643-11 / UL 1449

PDT contact
250 V AC / 125 V DC
1 A AC / 200 mA DC

VALVETRAB compact surge arrester

VALVETRAB compact are multi-position pluggable, type 2 surge arresters. These modular arrester blocks are characterized by their extremely slim design. The high rated surge arrester voltage of 350 VAC enables global use. Here too, the choice of the correct product depends on the type of power supply system (TT/TN-S or TN-C). VALVETRAB compact use only varistors with low leakage current. This reduces energy conversion in the component, thus extending the life of the arresters.

Dimensional drawings starting on page 196.

Approvals starting on page 208.

VAL-CP-3S-...

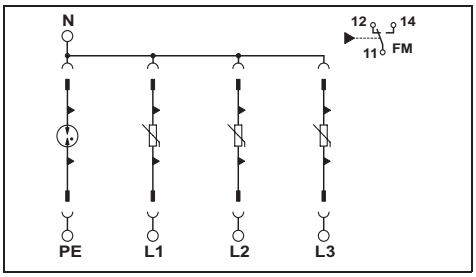
Arrester for 5-wire networks (L1, L2, L3, N, PE)

VAL-CP-3C-...

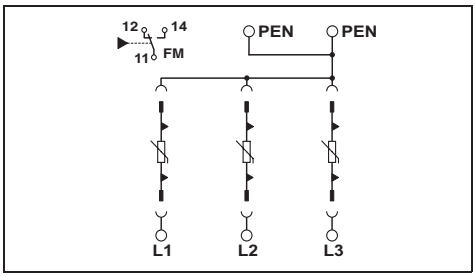
Arrester for 4-wire networks (L1, L2, L3, PEN)

	solid [mm²]	stranded [mm²]	AWG
Connection data	2.5-25	2.5-16	12-4
Remote indication contact	0.14-1.5	0.14-1.5	28-16

Total width 49.2 mm



Total width 37.25 mm



Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
VALVETRAB compact							
With remote indication contact		**VAL-CP-3S-350**	**2859521**	1	**VAL-CP-3C-350**	**2859547**	1
Without remote indication contact		**VAL-CP-3S-350/O**	**2881010**	1	**VAL-CP-3C-350/O**	**2881023**	1
With remote indication contact		**VAL-CP-3S-175**	**2859453**	1	**VAL-CP-3C-175**	**2859466**	1
Bridge set, for bridging VALVETRAB compact to the r.c.c.b.		**MPB SET VAL-CP-3S**	**2880684**	1			
Replacement connector							
	L-N / L-PEN	**VAL-CP-350-ST**	**2859602**	10	**VAL-CP-350-ST**	**2859602**	10
	N-PE	**VAL-CP-N/PE-350-ST**	**2859699**	10			
	L-N / L-PEN	**VAL-CP-175-ST**	**2859628**	10	**VAL-CP-175-ST**	**2859628**	10
Labeling material		**ZBFM 5 ... (see CLIPLINE catalog)**			**ZBFM 5 ... (see CLIPLINE catalog)**		

Technical data		... 350	... 175	... 350	... 175
Electrical data					
IEC category / EN type		II / T2	II / T2	II / T2	II / T2
Nominal voltage U_N		240 V AC (230/400 V AC ... 240/415 V AC)	120 V AC	240 V AC (230/400 V AC ... 240/415 V AC)	120 V AC (3P/PEN)
Highest continuous voltage U_C	L-N / N-PE / L-PEN	350 V AC / 264 V AC / -	175 V AC / 150 V AC / -	- / - / 350 V AC	- / - / 175 V AC
Nominal discharge surge current I_n (8/20) µs	L-N / N-PE / L-PEN	60 kA (all channels) / 20 kA / -	60 kA (all channels) / 20 kA / -	- / - / 60 kA (all channels)	- / - / 60 kA (all channels)
Max. discharge surge current $I_{max.}$ (8/20) µs	L-N / N-PE / L-PEN	120 kA (all channels) / 40 kA / -	120 kA (all channels) / 40 kA / -	- / - / 120 kA (all channels)	- / - / 120 kA (all channels)
Residual voltage at 5 kA	L-N / N-PE / L-PEN	≤ 1.1 kV / ≤ 0.25 kV / -	≤ 600 V / ≤ 200 V / -	- / - / ≤ 1.1 kV	- / - / ≤ 600 V
Protection level U_p	L-N / N-PE / L-PEN	≤ 1.4 kV / ≤ 1.5 kV / -	≤ 850 V / ≤ 950 V / -	- / - / ≤ 1.4 kV	- / - / ≤ 850 V (at In)
Response time t_A	L-N / N-PE / L-PEN	≤ 25 ns / ≤ 100 ns / -	≤ 25 ns / ≤ 100 ns / -	- / - / ≤ 25 ns	- / - / ≤ 25 ns
Backup fuse max. in acc. with IEC		125 A (gL/gG)		125 A (gL/gG)	
General data					
Temperature range		-40°C ... 80°C		-40°C ... 80°C	
Inflammability class in acc. with UL 94		V0		V0	
Test standards		IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.45 / IEEE C62.34		IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.34 / IEEE C62.45	
Remote indication contact		PDT contact		PDT contact	
Max. operating voltage		250 V AC / 125 V DC		250 V AC / 125 V DC	
Max. operating current		1 A AC / 0.2 A DC		1 A AC / 0.2 A DC	

VAL-CP-2S-...

Arrester for 4-wire networks (L1, L2, N, PE)

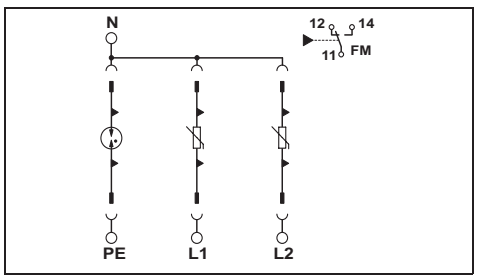
VAL-CP-2C-...

Arrester for 3-wire networks (L1, L2, PEN)

VAL-CP-1S-...

Arrester for 3-wire networks (L1, N, PE)

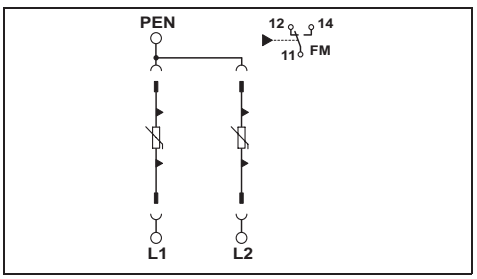
Total width 37.25 mm



Type	Order No.	Pcs. / Pkt.
VAL-CP-2S-350	**2859505**	1
VAL-CP-2S-350/O	**2881049**	1
VAL-CP-2S-175	**2859495**	1
VAL-CP-350-ST	**2859602**	10
VAL-CP-N/PE-350-ST	**2859699**	10
VAL-CP-175-ST	**2859628**	10
ZBFM 5 ... (see CLIPLINE catalog)		

... 350	... 175
II / T2	II / T2
240 V AC (230/400 V AC ... 240/415 V AC)	120 V AC
350 V AC / 264 V AC / -	175 V AC / 150 V AC / -
40 kA (all channels) / 20 kA / -	40 kA (all channels) / 20 kA / -
80 kA (all channels) / 40 kA / -	80 kA (all channels) / 40 kA / -
≤ 1.1 kV / ≤ 0.25 kV / -	≤ 600 V / ≤ 200 V / -
≤ 1.4 kV / ≤ 1.5 kV / -	≤ 850 V / ≤ 950 V / -
≤ 25 ns / ≤ 100 ns / -	≤ 25 ns / ≤ 100 ns / -
125 A (gL/gG)	
-40°C ... 80°C	
V0	
IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.45 / IEEE C62.34	
PDT contact	
250 V AC / 125 V DC	
1 A AC / 0.2 A DC	

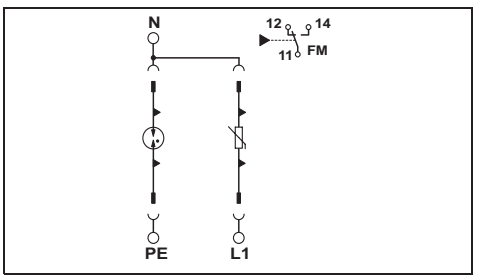
Total width 25.3 mm



Type	Order No.	Pcs. / Pkt.
VAL-CP-2C-350	**2859589**	1
VAL-CP-2C-350/O	**2881052**	1
VAL-CP-2C-175	**2859482**	1
VAL-CP-350-ST	**2859602**	10
VAL-CP-175-ST	**2859628**	10
ZBFM 5 ... (see CLIPLINE catalog)		

... 350	... 175
II / T2	II / T2
240 V AC (230/400 V AC ... 240/415 V AC)	120 V AC (2P/PEN)
- / - / 350 V AC	- / - / 175 V AC
- / - / 40 kA (all channels)	- / - / 40 kA (all channels)
- / - / 80 kA (all channels)	- / - / 80 kA (all channels)
- / - / ≤ 1.1 kV	- / - / ≤ 600 V
- / - / ≤ 1.4 kV	- / - / ≤ 850 V (at In)
- / - / ≤ 25 ns	- / - / ≤ 25 ns
125 A (gL/gG)	
-40°C ... 80°C	
V0	
IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.34 / IEEE C62.45	
PDT contact	
250 V AC / 125 V DC	
1 A AC / 0.2 A DC	

Total width 25.3 mm



Type	Order No.	Pcs. / Pkt.
VAL-CP-1S-350	**2859563**	1
VAL-CP-1S-350/O	**2881036**	1
VAL-CP-1S-175	**2859479**	1
VAL-CP-350-ST	**2859602**	10
VAL-CP-N/PE-350-ST	**2859699**	10
VAL-CP-175-ST	**2859628**	10
ZBFM 5 ... (see CLIPLINE catalog)		

... 350	... 175
II / T2	II / T2
240 V AC (230/400 V AC ... 240/415 V AC)	120 V AC
350 V AC / 264 V AC / -	175 V AC / 150 V AC / -
20 kA / 20 kA / -	20 kA / 20 kA / -
40 kA / 40 kA / -	40 kA / 40 kA / -
≤ 1.1 kV / ≤ 0.25 kV / -	≤ 600 V / ≤ 200 V / -
≤ 850 V / ≤ 950 V / -	≤ 1.4 kV / ≤ 1.5 kV / -
≤ 25 ns / ≤ 100 ns / -	≤ 25 ns / ≤ 100 ns / -
125 A (gL/gG)	
-40°C ... 80°C	
V0	
IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.45 / IEEE C62.34	
PDT contact	
250 V AC / 125 V DC	
1 A AC / 0.2 A DC	

VALVETRAB compact surge arrester; free of leakage current

The leakage current free versions of VALVETRAB compact surge arresters are realized with a series connection of high-performance varistor and gas-filled surge arrester. They are marked with a "VF". The installation-friendly compact solutions VAL-CP-.../VF fulfill the requirements for leakage current free type 2 arresters.

Further versions on request.

Dimensional drawings starting on page 196.

Approvals starting on page 208.

VAL-CP-3S-350VF

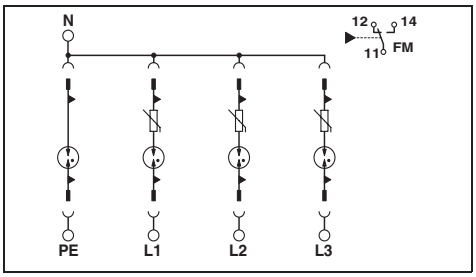
Arrester for 5-wire networks (L1, L2, L3, N, PE)

VAL-CP-3C-350 VF

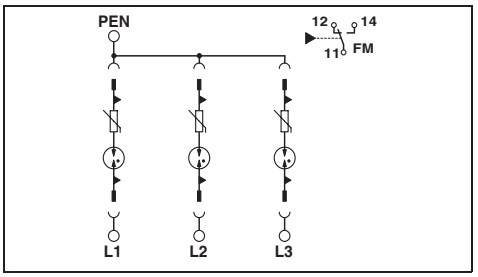
Arrester for 4-wire networks (L1, L2, L3, PEN)

	solid	stranded [mm²]	AWG
Connection data	2.5-25	2.5-16	12-4
Remote indication contact	0.14-1.5	0.14-1.5	28-16

Total width 49.2 mm



Total width 37.25 mm



Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
VALVETRAB compact,		**VAL-CP-3S-350VF**	**2859518**	1	**VAL-CP-3C-350 VF**	**2859534**	1
Replacement connector	L-N / L-PEN	**VAL-CP-350 VF-ST**	**2859615**	10	**VAL-CP-350 VF-ST**	**2859615**	10
	N-PE	**VAL-CP-N/PE-350-ST**	**2859699**	10			
Labeling material		**ZBFM 5 ... (see CLIPLINE catalog)**			**ZBFM 5 ... (see CLIPLINE catalog)**		

Technical data			
Electrical data			
IEC category / EN type		II / T2	II / T2
Nominal voltage U_N		240 V AC (230/400 V AC ... 240/415 V AC)	240 V AC (230/400 V AC ... 240/415 V AC)
Highest continuous voltage U_C			
	L-N / N-PE / L-PEN	350 V AC / 264 V AC / -	- / - / 350 V AC
Nominal discharge surge current I_n (8/20) µs			
	L-N / N-PE / L-PEN	30 kA (all channels) / 20 kA / -	- / - / 30 kA (all channels)
Max. discharge surge current $I_{max.}$ (8/20) µs			
	L-N / N-PE / L-PEN	60 kA (all channels) / 40 kA / -	- / - / 60 kA (all channels)
Residual voltage at 5 kA	L-N / N-PE / L-PEN	≤ 1 kV / ≤ 0.25 kV / -	- / - / ≤ 1 kV
Protection level U_p			
	L-N / N-PE / L-PEN	≤ 1.5 kV / ≤ 1.5 kV / -	- / - / ≤ 1.5 kV
Response time t_A			
	L-N / N-PE / L-PEN	≤ 100 ns / ≤ 100 ns / -	- / - / ≤ 100 ns
Backup fuse max. in acc. with IEC		125 A (gL/gG)	125 A (gL/gG)
General data			
Temperature range		-40°C ... 80°C	-40°C ... 80°C
Inflammability class in acc. with UL 94		V0	V0
Test standards		IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.34 / IEEE C62.45	IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.34 / IEEE C62.45
Remote indication contact		PDT contact	PDT contact
Max. operating voltage		250 V AC / 125 V DC	250 V AC / 125 V DC
Max. operating current		1 A AC / 0.2 A DC	1 A AC / 0.2 A DC

VAL-CP-2S-350 VF

Arrester for 4-wire networks (L1, L2, N, PE)

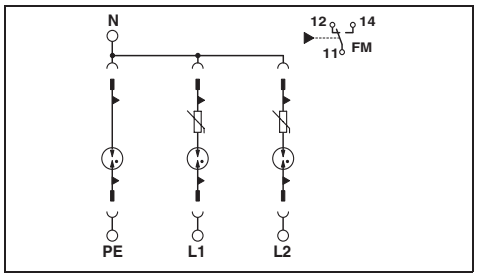
VAL-CP-2C-350 VF

Arrester for 3-wire networks (L1, L2, PEN)

VAL-CP-1S-350 VF

Arrester for 3-wire networks (L1, N, PE)

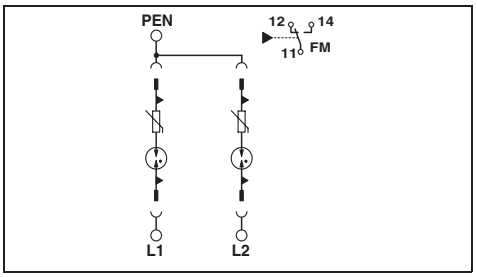
Total width 37.25 mm



Type	Order No.	Pcs. / Pkt.
VAL-CP-2S-350 VF	**2859592**	1
VAL-CP-350 VF-ST	**2859615**	10
VAL-CP-N/PE-350-ST	**2859699**	10
ZBFM 5 ... (see CLIPLINE catalog)		

II / T2
240 V AC (230/400 V AC ... 240/415 V AC)
350 V AC / 264 V AC / -
20 kA (all channels) / 20 kA / -
40 kA (all channels) / 40 kA / -
≤ 1 kV / ≤ 0.25 kV / -
≤ 1.5 kV / ≤ 1.5 kV / -
≤ 100 ns / ≤ 100 ns / -
125 A (gL/gG)
-40°C ... 80°C
V0
IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.34 / IEEE C62.45
PDT contact
250 V AC / 125 V DC
1 A AC / 0.2 A DC

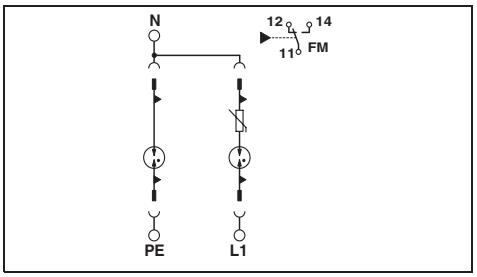
Total width 25.3 mm



Type	Order No.	Pcs. / Pkt.
VAL-CP-2C-350 VF	**2859576**	1
VAL-CP-350 VF-ST	**2859615**	10
ZBFM 5 ... (see CLIPLINE catalog)		

II / T2
240 V AC (230/400 V AC ... 240/415 V AC)
- / - / 350 V AC
- / - / 20 kA (all channels)
- / - / 40 kA (all channels)
- / - / ≤ 1 kV
- / - / ≤ 1.5 kV
- / - / ≤ 100 ns
125 A (gL/gG)
-40°C ... 80°C
V0
IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.34 / IEEE C62.45
PDT contact
250 V AC / 125 V DC
1 A AC / 0.2 A DC

Total width 25.3 mm



Type	Order No.	Pcs. / Pkt.
VAL-CP-1S-350 VF	**2859550**	1
VAL-CP-350 VF-ST	**2859615**	10
VAL-CP-N/PE-350-ST	**2859699**	10
ZBFM 5 ... (see CLIPLINE catalog)		

II / T2
240 V AC (230/400 V AC ... 240/415 V AC)
350 V AC / 264 V AC / -
10 kA / 20 kA / -
20 kA / 40 kA / -
≤ 1 kV / ≤ 0.25 kV / -
≤ 1.5 kV / ≤ 1.5 kV / -
≤ 100 ns / ≤ 100 ns / -
125 A (gL/gG)
-40°C ... 80°C
V0
IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.34 / IEEE C62.45
PDT contact
250 V AC / 125 V DC
1 A AC / 0.2 A DC

VALVETRAB MS surge arrester 30/40 kA performance class

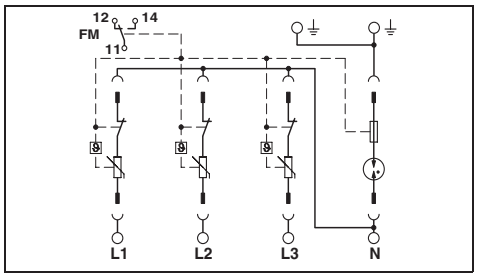
VALVETRAB **VAL-MS…/3+…** are multi-channel type 2 arresters. They simplify the choice and installation of surge arresters for TT and TN power supply systems. The protective devices consist of a multi-channel base element and VAL-MS … ST plugs for protection between the phases and the neutral conductor. The pluggable N-PE spark gap F-MS 12 is also used in the 3+1 version.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

VAL-MS.../3+1

Surge protection combination for 5-wire TT and TN-S system networks, for assembly if power is supplied with feed lines from the bottom

Total width 70.8 mm



	solid	stranded	
	[mm²]		AWG
Connection data	0.5-35	0.5-25	20-2
Remote indication contact	0.14-1.5	0.14-1.5	28-16

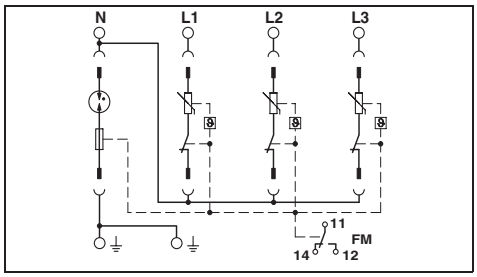
Description	I_{max}	U_C	Type	Order No.	Pcs. / Pkt.
VALVETRAB, multi-position surge arrester combination					
With remote indication contact	40 kA	150 V AC			
Without remote indication contact	40 kA	275 V AC	**VAL-MS 230/3+1**	**2838209**	1
With remote indication contact	40 kA	275 V AC	**VAL-MS 230/3+1 FM**	**2838199**	1
Without remote indication contact	40 kA	335 V AC	**VAL-MS 320/3+1**	**2859178**	1
With remote indication contact	40 kA	335 V AC	**VAL-MS 320/3+1/FM**	**2859181**	1
VALVETRAB MS					
Without remote indication contact	30 kA	580 V AC			
With remote indication contact	30 kA	580 V AC			
Replacement connector					
120 V AC		1L-N/PE			
230 V AC		1L-N/PE	**VAL-MS 230 ST**	**2798844**	10
230 V AC		1L-N/PE	**VAL-MS 320 ST**	**2838843**	10
580 V AC		1L-N/PE			
230 V AC		N-PE	**F-MS 12 ST**	**2817990**	10
Marking material			**ZBN 18,...**		

Technical data		VAL-MS 230	VAL-MS 320
Electrical data			
IEC category / EN type		II / T2	II / T2
Nominal voltage U_N		230 V AC (max. 240/415 V AC)	230 V AC (max. 240/415 V AC)
Highest continuous voltage U_C			
	L-N / N-PE / L-PEN	275 V AC / 260 V AC / -	335 V AC / 260 V AC / -
Nominal discharge surge current I_n (8/20) µs			
	L-N / N-PE / L-PEN	20 kA / 20 kA / -	20 kA / 20 kA / -
Max. discharge surge current $I_{max.}$ (8/20) µs			
	L-N / N-PE / L-PEN	40 kA / 40 kA / -	40 kA / 40 kA / -
Residual voltage at 5 kA	L-N / N-PE / L-PEN	≤ 1.1 kV / ≤ 0.15 kV / -	≤ 1.25 kV / ≤ 0.15 kV / -
Protection level U_p			
	L-N / N-PE / L-PEN	≤ 1.4 kV / ≤ 1.5 kV / -	≤ 1.5 kV / ≤ 1.5 kV / -
Response time t_A			
	L-N / N-PE / L-PEN	≤ 25 ns / ≤ 100 ns / -	≤ 25 ns / ≤ 100 ns / -
Backup fuse max. in acc. with IEC		125 A (gL)	
Immunity to short-circuiting (with max. backup fuse) I_P		25 kA	
General data			
Temperature range		-25°C ... 80°C	
Inflammability class in acc. with UL 94		V0	
Test standards		IEC 61643-1 / DIN EN 61643-11/A11 / NF C61-740	
Remote indication contact		PDT contact	
Max. operating voltage		250 V AC / 30 V DC	
Max. operating current		0.75 A (250 V AC) / 3 A (125 V AC)	

VAL-MS .../3+1/FM-UD

Surge protection combination for 5-wire networks with a TT and TN-S system, for mounting with feed lines from the top

Total width 70.8 mm



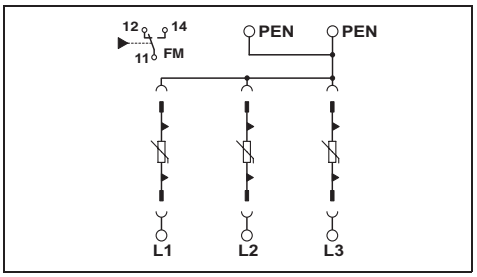
Type	Order No.	Pcs. / Pkt.
VAL-MS 120/3+1/FM-UD	**2856692**	1
VAL-MS 320/3+1/FM-UD	**2856689**	1
VAL-MS 120-UD ST	**2858292**	10
VAL-MS 320-UD ST	**2858315**	10
F-MS 12 ST	**2817990**	10
ZBN 18,...		

VAL-MS 120	VAL-MS 320
II / T2	II / T2
120 V AC (max. 208 V AC)	230 V AC (max. 240/415 V AC)
150 V AC / 260 V AC / -	335 V AC / 260 V AC / -
20 kA / 20 kA / -	20 kA / 20 kA / -
40 kA / 40 kA / -	40 kA / 40 kA / -
≤ 700 V / ≤ 0.15 kV / -	≤ 1.25 kV / ≤ 0.15 kV / -
≤ 0.85 kV / ≤ 1.5 kV / -	≤ 1.5 kV / ≤ 1.5 kV / -
≤ 25 ns / ≤ 100 ns / -	≤ 25 ns / ≤ 100 ns / -
125 A (gL)	
25 kA	
-40°C ... 80°C	
V0	
IEC 61643-1 / DIN EN 61643-11/A11	
PDT contact	
250 V AC / 30 V DC	
0.75 A (250 V AC) / 3 A (125 V AC)	

VAL-MS 320/3+0...

Type 2 surge arrester for 4-wire power supply systems (L1, L2, PEN)

Total width 53.4 mm



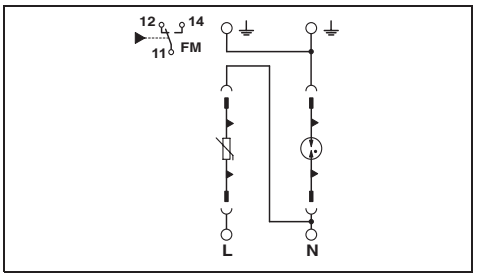
Type	Order No.	Pcs. / Pkt.
VAL-MS 320/3+0	**2920230**	1
VAL-MS 320/3+0-FM	**2920243**	1
VAL-MS 580/3+0	**2920450**	1
VAL-MS 580/3+0-FM	**2920447**	1
VAL-MS 320 ST	**2838843**	10
VAL-MS 580-ST	**2920434**	10
ZBN 18,...		

VAL-MS 320	VAL-MS 580
II / T2	II / T2
230 V AC (max. 240/415 V AC)	400 V AC (400/690 V AC TN-C)
- / - / 335 V AC	- / - / 580 V AC
- / - / 60 kA (all channels)	- / - / 45 kA (all channels)
- / - / 120 kA (all channels)	- / - / 90 kA (all channels)
- / - / ≤ 1.2 kV	- / - / ≤ 2.1 kV
- / - / ≤ 1.5 kV	- / - / ≤ 2.5 kV
- / - / ≤ 25 ns	- / - / ≤ 25 ns
125 A (gL / gG)	
25 kA	
-40°C ... 80°C	
V0	
IEC 61643-1 / DIN EN 61643-11/A11	
PDT contact	
250 V AC / 30 V DC	
1.5 A (250 V AC) / 1.5 A (125 V AC)	

VAL-MS 320/1+1

Type 2 surge arrester for 3-wire power supply systems (L1, N, PE)

Total width 35.6 mm



Type	Order No.	Pcs. / Pkt.
VAL-MS 320/1+1	**2804380**	1
VAL-MS 320/1+1-FM	**2804393**	1
F-MS 12 ST	**2817990**	10
ZBN 18,...		

II / T2
230 V AC
335 V AC / 260 V AC / -
20 kA / 20 kA / -
40 kA / 40 kA / -
- 1.2 kV / ≤ 150 V / -
1.5 kV / 1.5 kV / -
≤ 25 ns / ≤ 100 ns / -
125 A (gL/gG)
25 kA
-40°C ... 80°C
V0
IEC 61643-1 / DIN EN 61643-11/A11
PDT, 1-pos.
250 V AC
1.5 A (250 V AC) / 1.5 A (30 V DC)

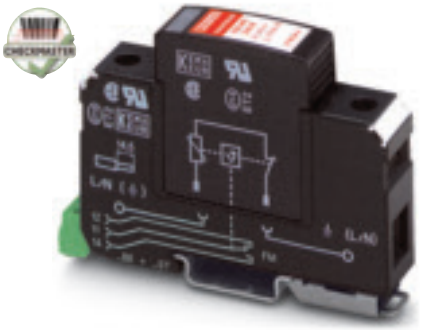
VALVETRAB MS surge arrester

VAL-MS are single-channel, DIN rail-mountable protective devices, consisting of base elements and connectors. Base elements are available with and without a remote signaling function. There are varied combinations between connectors and base elements. The base element is suitably coded to match the selected plug when plugged in for the first time in order to prevent accidental confusion with plugs of other voltage levels or functions later.

F-MS 12 is the suitable total current spark gap for use between N and PE.

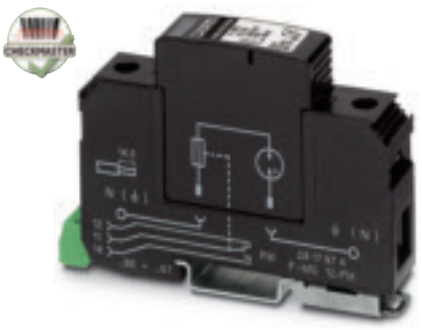
Dimensional drawings starting on page 196.

Approvals starting on page 208.



VAL-MS...

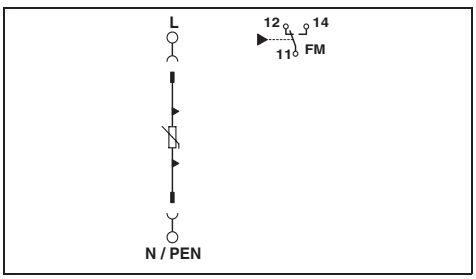
1-pos. plug-in surge arrester, consisting of base element and plug



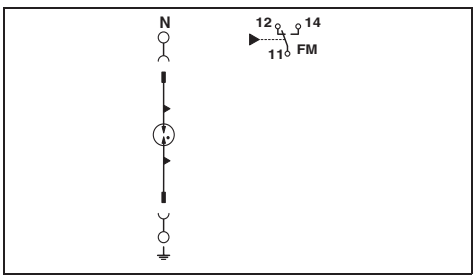
F-MS 12...

1-pos. plug-in surge arrester as N-PE total current spark gap, consisting of base element and plug

Total width 17.7 mm



Total width 17.7 mm



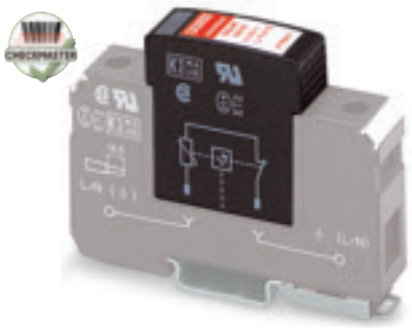
	solid [mm²]	stranded [mm²]	AWG
Connection data	0.5-35	0.5-25	20-2
Remote indication contact	0.14-1.5	0.14-1.5	28-16

Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
VALVETRAB MS							
With remote indication contact		**VAL-MS 230/FM**	**2839130**	1	**F-MS 12/FM**	**2817974**	1
Without remote indication contact		**VAL-MS 230**	**2839127**	1	**F-MS 12**	**2817987**	1
VALVETRAB surge protection plug							
60 V AC							
120 V AC							
230 V AC							
230 V AC IT							
230 V AC							
400 V AC							
500 V AC							
Replacement connector							
230 V AC	1L-N/PE	**VAL-MS 230 ST**	**2798844**	10	**F-MS 12 ST**	**2817990**	10
Labeling material		**ZBN 18,...**			**ZBN 18,...**		

Technical data			
Electrical data			
IEC category / EN type		II / T2	II / T2
Nominal voltage U_N		230 V AC	230 V AC
Highest continuous voltage U_C			
	L-N / N-PE / L-PEN	275 V AC / - / 275 V AC	- / 260 V AC / -
Nominal discharge surge current I_n (8/20) µs			
	L-N / N-PE / L-PEN	20 kA / - / 20 kA	- / 20 kA / -
Max. discharge surge current $I_{max.}$ (8/20) µs			
	L-N / N-PE / L-PEN	40 kA / - / 40 kA	- / 40 kA / -
Residual voltage at 5 kA	L-N / N-PE / L-PEN	≤ 1 kV / - / ≤ 1 kV	- / ≤ 150 V / -
Protection level U_p			
	L-N / N-PE / L-PEN	≤ 1.35 kV / - / ≤ 1.35 kV	- / ≤ 1.5 kV / -
Response time t_A			
	L-N / N-PE / L-PEN	≤ 25 ns / - / ≤ 25 ns	- / ≤ 100 ns / -
Backup fuse max. in acc. with IEC		125 A (gL)	-
General data			
Temperature range		-40°C ... 80°C	-40°C ... 80°C
Inflammability class in acc. with UL 94		V0	V0
Test standards		IEC 61643-1 / DIN EN 61643-11/A11 / UL 1449 / DIN EN 61643-11/A11 / NF C61-740	IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11
Remote indication contact		PDT contact	PDT contact
Max. operating voltage		250 V AC / 125 V DC	250 V / 125 V
Max. operating current		1 A AC / 0.2 A DC	1 A AC / 0.2 A DC

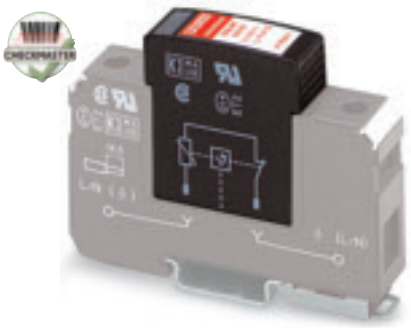
VAL-MS...350VF

1-pos. plug-in surge arrester, consisting of base element and plug



VAL-MS...ST

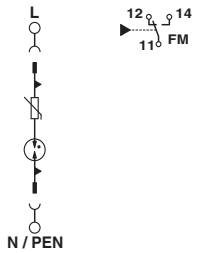
Surge protection connector type 2 with high-capacity varistor for VAL-MS base element



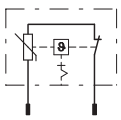
VAL-MS...ST

Surge protection connector type 2 with high-capacity varistor for VAL-MS base element

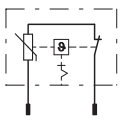
Total width 17.7 mm



Total width 17.7 mm



Total width 17.7 mm



Type	Order No.	Pcs. / Pkt.
VAL-MS 350 VF/FM	**2856579**	1
VAL-MS 350VF	**2856582**	1
VAL-MS 350 VF ST	**2856595**	10
ZBN 18,...		

Type	Order No.	Pcs. / Pkt.
VAL-MS 230 ST	**2798844**	10
VAL-MS 230 IT ST	**2807599**	10
VAL-MS 320 ST	**2838843**	10

Type	Order No.	Pcs. / Pkt.
VAL-MS 60 ST	**2807573**	10
VAL-MS 120 ST	**2807586**	10
VAL-MS 400 ST	**2816399**	10
VAL-MS 500 ST	**2807609**	10

		... 230AC	... 230AC IT	... 320AC	... 60AC	... 120AC	... 400AC	... 500AC
II / T2 230 V AC		II / T2 230 V AC	II / T2 230 V AC	II / T2 230 V AC	II / T2 60 V AC	II / T2 120 V AC	II / T2 400 V AC	II / T2 500 V AC
350 V AC / - / 350 V AC		275 V AC / 350 V DC	385 V AC / 500 V DC	335 V AC / 420 V DC	75 V AC / 100 V DC	150 V AC / 200 V DC	440 V AC / 585 V DC	600 V AC / 600 V DC
10 kA / - / 10 kA		20 kA	20 kA	20 kA	15 kA	20 kA	20 kA	15 kA
20 kA / - / 20 kA		40 kA	40 kA	40 kA	40 kA	40 kA	40 kA	30 kA
≤ 1 kV / - / ≤ 1 kV		≤ 1 kV	≤ 1.35 kV	≤ 1.2 kV	≤ 325 V	≤ 550 V	≤ 1.5 kV	≤ 2.3 kV
≤ 1.5 kV / - / ≤ 1.5 kV		≤ 1.35 kV	≤ 1.8 kV	≤ 1.5 kV	≤ 500 V	≤ 800 V	≤ 2.2 kV	≤ 2.7 kV
≤ 100 ns / - / ≤ 100 ns		≤ 25 ns	≤ 25 ns	≤ 25 ns	≤ 25 ns	≤ 25 ns	≤ 25 ns	≤ 25 ns
125 A (gL)		125 A (gL)			125 A (gL (AC))			
-40°C ... 80°C		-40°C ... 80°C			-40°C ... 80°C			
-		V0			V0			
IEC 61643-1 / DIN EN 61643-11/A11 / NF C61-740 / UL 1449		IEC 61643-1 / UL 1449			IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11 / UL 1449 / IEEE C62.1 / C62.34 / C62.45			
PDT contact		-			-			
250 V AC / 125 V DC		-			-			
1 A AC / 0.2 A DC		-			-			

Surge arrester, type 2
VALVETRAB MS
performance class 10/20 kA

The multi-channel type 2 arrester blocks VAL-MS…/10/… and VAL-MS…/20/… are the ideal solution in the low performance class (I_{max} 10/20 kA). They simplify the choice of surge arresters for TT and TN power supply systems. Consisting of a multi-channel base element and VAL-MS … ST connectors for protection between the phases and the neutral conductor. The pluggable N-PE spark gap F-MS 30-ST is also used in the 1+1 and 3+1 versions.

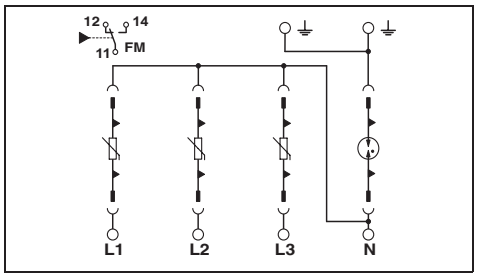
– VAL-MS…/3+1/… for 3-phase TT and TN-S current supply systems (230/400…240/415 V AC)
– VAL-MS…/1+1/… for 1-phase TT and TN-S current supply systems (230/400…240/415 V AC)
– VAL-MS…/3+0/… for 3-phase TT and TN-C power supply networks (230/400…240/415 V AC)

Dimensional drawings starting on page 196.
Approvals starting on page 208.

VAL-MS.../3+1...

Type 2 surge arrester for 5-wire power supply systems (L1, L2, L3, N, PE)

Total width 71.2 mm



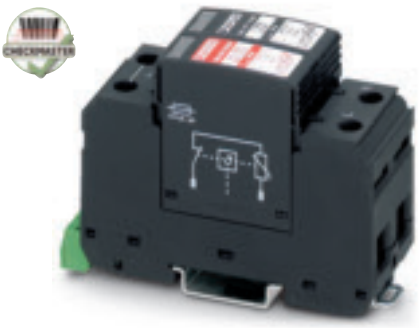
	solid	stranded	
	[mm²]		AWG
Connection data	1.5-35	1.5-25	15-2
Remote indication contact	0.14-1.5	0.14-1.5	28-16

Description	I_{max}	U_C	Type	Order No.	Pcs. / Pkt.
VALVETRAB MS					
Without remote indication contact	10 kA	350 V AC	**VAL-MS 350/10/3+1**	**2803593**	1
With remote indication contact	10 kA	350 V AC	**VAL-MS 350/10/3+1-FM**	**2803603**	1
VALVETRAB MS					
Without remote indication contact	20 kA	350 V AC	**VAL-MS 350/20/3+1**	**2803548**	1
With remote indication contact	20 kA	350 V AC	**VAL-MS 350/20/3+1-FM**	**2803551**	1
VALVETRAB, base element for individual assembly with protective plugs					
Without remote indication contact		600 V AC (L-L)	**VAL-MS/3+1-BE**	**2838885**	1
With remote indication contact		450 V AC (L-L)	**VAL-MS/3+1-BE/FM**	**2838898**	1
Replacement connector					
		1L-N/PE	**VAL-MS 350/10 ST**	**2803564**	1
		1L-N/PE	**VAL-MS 350/20 ST**	**2803506**	1
		N-PE	**F-MS 30 ST**	**2803519**	1
Marking material			**ZBN 18,...**		

Technical data		... 350/10	... 350/20
Electrical data			
IEC category / EN type		II / T2	II / T2
Nominal voltage U_N		230 V AC (400 V AC)	230 V AC (400 V AC)
Highest continuous voltage U_C			
	L-N / N-PE / L-PEN	350 V AC / 260 V AC / -	350 V AC / 260 V AC / -
Nominal discharge surge current I_n (8/20) µs			
	L-N / N-PE / L-PEN	15 kA (all channels) / 20 kA / -	30 kA (all channels) / 20 kA / -
Max. discharge surge current $I_{max.}$ (8/20) µs			
	L-N / N-PE / L-PEN	30 kA (all channels) / 30 kA / -	60 kA (all channels) / 30 kA / -
Residual voltage at 5 kA	L-N / N-PE / L-PEN	≤ 1.2 kV / ≤ 150 V / -	≤ 1.2 kV / ≤ 150 V / -
Protection level U_p			
	L-N / N-PE / L-PEN	≤ 1.2 kV / ≤ 1.5 kV / -	≤ 1.4 kV / ≤ 1.5 kV / -
Response time t_A			
	L-N / N-PE / L-PEN	≤ 25 ns / ≤ 100 ns / -	≤ 25 ns / ≤ 100 ns / -
Backup fuse max. in acc. with IEC		125 A (gL/gG)	
Immunity to short-circuiting (with max. backup fuse) I_P		25 kA	
General data			
Temperature range		-40°C ... 80°C	
Inflammability class in acc. with UL 94		V0	
Test standards		IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11	
Remote indication contact		PDT, 1-pos.	
Max. operating voltage		250 V AC	
Max. operating current		0.75 A (250 V AC) / 3 A (125 V AC)	
Min. operational current		5 mA (5 V)	

VAL-MS.../3+0...

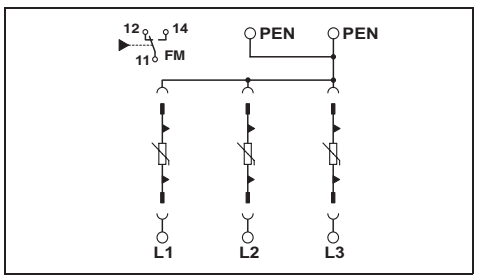
Type 2 surge arrester for 4-wire power supply systems
(L1, L2, PEN)



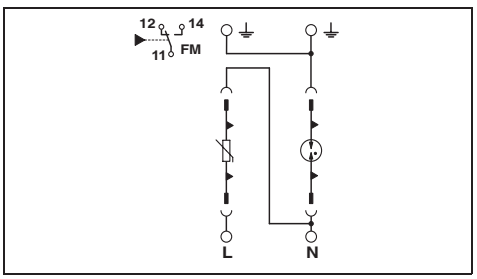
VAL-MS 350/.../1+1...

Type 2 surge arrester for 3-wire power supply systems
(L1, N, PE)

Total width 53.4 mm



Total width 35.6 mm



Type	Order No.	Pcs. / Pkt.
VAL-MS 350/10/3+0	**2803577**	1
VAL-MS 350/10/3+0-FM	**2803580**	1
VAL-MS 350/20/3+0	**2803522**	1
VAL-MS 350/20/3+0-FM	**2803535**	1
VAL-MS/3+0-BE	**2881816**	1
VAL-MS/3+0-BE/FM	**2881803**	1
VAL-MS 350/10 ST	**2803564**	1
VAL-MS 350/20 ST	**2803506**	1
ZBN 18,...		

... 350/10	... 350/20
II / T2	II / T2
230 V AC (400 V AC)	230 V AC (400 V AC)
- / - / 350 V AC	- / - / 350 V AC
- / - / 15 kA (all channels)	- / - / 30 kA (all channels)
- / - / 30 kA (all channels)	- / - / 60 kA (all channels)
- / - / ≤ 1.2 kV	- / - / ≤ 1.2 kV
- / - / ≤ 1.2 kV	- / - / ≤ 1.4 kV
- / - / ≤ 25 ns	- / - / ≤ 25 ns
125 A (gL/gG)	
25 kA	
-40°C ... 80°C	
V0	
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11	
PDT, 1-pos.	
250 V AC	
1.5 A (250 V AC) / 1.5 A (30 V DC)	
5 mA (5 V)	

Type	Order No.	Pcs. / Pkt.
VAL-MS 350/10/1+1	**2803632**	1
VAL-MS 350/10/1+1-FM	**2803645**	1
VAL-MS 350/20/1+1	**2803616**	1
VAL-MS 350/20/1+1-FM	**2803629**	1
VAL-MS/1+1-BE	**2920528**	1
VAL-MS/1+1-BE/FM	**2920531**	1
VAL-MS 350/10 ST	**2803564**	1
VAL-MS 350/20 ST	**2803506**	1
F-MS 30 ST	**2803519**	1
ZBN 18,...		

... 350/10	... 350/20
II / T2	II / T2
230 V AC (400 V AC)	230 V AC (400 V AC)
350 V AC / 260 V AC / -	350 V AC / 260 V AC / -
5 kA / 20 kA / -	10 kA / 20 kA / -
10 kA / 30 kA / -	20 kA / 30 kA / -
≤ 1.2 kV / ≤ 150 V / -	≤ 1.2 kV / ≤ 150 V / -
≤ 1.2 kV / ≤ 1.5 kV / -	≤ 1.4 kV / ≤ 1.5 kV / -
≤ 25 ns / ≤ 100 ns / -	≤ 25 ns / ≤ 100 ns / -
125 A (gL/gG)	
25 kA	
-40°C ... 80°C	
V0	
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11	
PDT, 1-pos.	
250 V AC	
1.5 A (250 V AC) / 1.5 A (30 V DC)	
5 mA (5 V)	

Base elements VALVETRAB MS

VAL-MS…BE provide base elements for various application areas. The multi-position blocks provide a convenient solution for three to five-wire networks.

VAL-MS BE… provides space for a protective plug. The base elements are available with and without remote indication contact. They are equipped with VAL-MS…-ST.

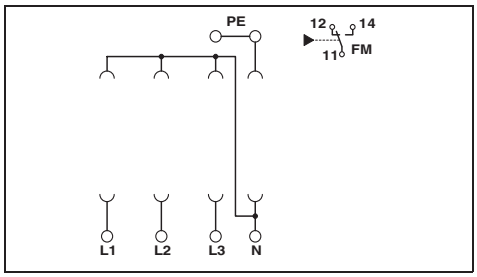
The base elements are suitably coded to match the selected plug when plugged in for the first time in order to prevent accidental confusion with plugs of other voltage levels or functions later.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

VAL-MS/3+1-BE...

Multi-position base element for accommodating the protective plugs, for 5-wire networks

Total width 70.8 mm



	solid	stranded	
	[mm²]		AWG
Connection data	0.5-35	0.5-25	20-2
VAL...3+1	0.5-35	0.5-25	20-2
VAL...3+0	1.5-35	1.5-25	15-2
Remote indication contact	1.5-0.14	1.5-0.14	28-16

Description	Type	Order No.	Pcs. / Pkt.
VALVETRAB, base element			
With remote indication contact	**VAL-MS/3+1-BE/FM**	**2838898**	1
Without remote indication contact	**VAL-MS/3+1-BE**	**2838885**	1
Marking material	**ZBN 18,...**		

Technical data	
Electrical data	
Nominal voltage U_N	-
Backup fuse max. in acc. with IEC	125 A (gL / gG)
General data	
Temperature range	-40°C ... 80°C
Inflammability class in acc. with UL 94	V0
Test standards	IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11
Remote indication contact	PDT, 1-pos.
Max. operating voltage	250 V / 30 V DC
Max. operating current	0.75 A / 2 A

VAL-MS/3+0-BE...

Multi-position base element for accommodating the protective plugs, for 4-wire networks

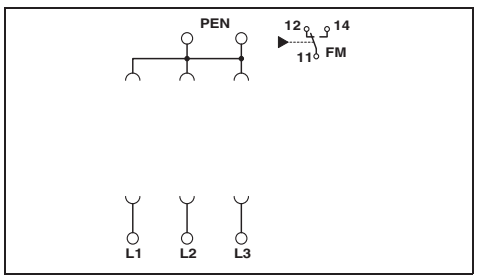
VAL-MS/1+1-BE/FM

Multi-position base element for accommodating the protective plugs, for 3-wire networks

VAL-MS BE

Single-position base element in networks with one or more phases, to accept a protective plug

Total width 53.4 mm



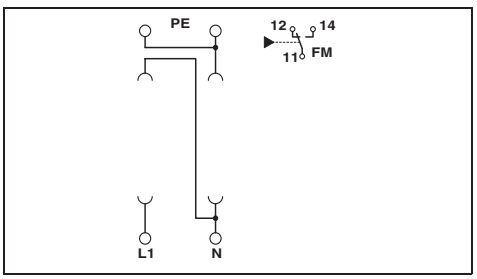
Type	Order No.	Pcs. / Pkt.
VAL-MS/3+0-BE/FM	**2881803**	1
VAL-MS/3+0-BE	**2881816**	1
ZBN 18,...		

400 V AC (690 V AC)
200 A (gL / gG)

-40°C ... 80°C
V0
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

PDT, 1-pos.
250 V / 30 V DC
1.5 A / 1.5 A

Total width 35.6 mm



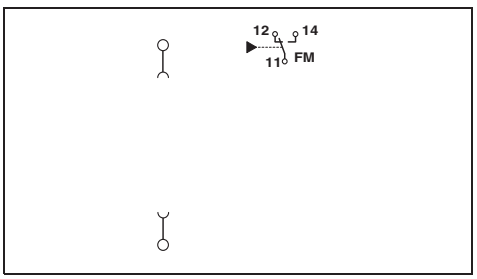
Type	Order No.	Pcs. / Pkt.
VAL-MS/1+1-BE/FM	**2920531**	1
VAL-MS/1+1-BE	**2920528**	1
ZBN 18,...		

240 V AC (1P/N/PE)
200 A (gL/gG)

-40°C ... 80°C
V0
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

PDT, 1-pos.
250 V AC
1.5 A / 1.5 A

Total width 17.7 mm



Type	Order No.	Pcs. / Pkt.
VAL-MS BE/FM	**2817738**	10
VAL-MS BE	**2817741**	10
ZBN 18,...		

240 V AC
125 A (gL/gG)

-40°C ... 80°C
V0
IEC 61643-1 / DIN EN 61643-11 / DIN EN 61643-11/A11

PDT contact
250 V AC / 125 V DC
1 A AC / 0.2 A DC

The combination principle of VALVETRAB compact – Double safety – Easy to install

Combi-RCD

The VAL-CP-RCD combines the properties of an RCD residual current circuit breaker (FI) with those of a type 2 surge arrester in one device. It is used in main and sub-distribution boards.
– Protects persons and devices at the same time
– Minimum installation time and space requirements
– Simple handling
– Also available in selective versions for installations as per DIN VDE 0100-410:2007-06

Combi-TOV

The VAL-CP-TOV combines the type 2 surge protection and the detector for excessive operating voltages. If the voltage is excessive, the load circuits will be disconnected.
– Comprehensive protection of devices
– Operating voltage and status indicator
– As per the requirements of Spanish power supply companies

Combi-MCB

The VAL-CP-MCB and VAL-CP-MOSO combine the type 2 surge arrester with the arrester backup fuses that are ideally coordinated with it.
The VAL-CP-MCB is used for applications on DIN rails; the VAL-CP-MOSO adapts comfortably to all 60 mm rail systems.
– Maximum protection thanks to coordinated components
– Universal application irrespective of the system fuse
– Status message about the status of all components

Combi-RCD
VAL-CP-RCD...

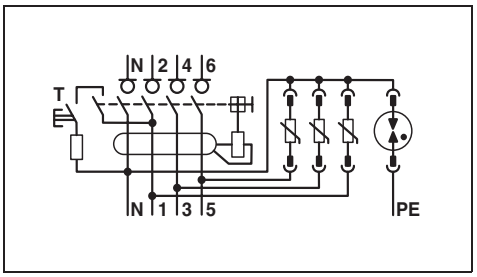
The combination of type 2 surge arrester and leakage current circuit breaker RCD (FI) provides protection to persons and devices in one unit. The protection elements of the surge protection are temperature monitored with mechanical status display per path, i.e. in each plug of the type 2 arrester. Magnetic influences that develop due to the arrester currents in the type 2 arrester when surges occur do not result in triggering the residual current circuit breaker.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

VAL-CP-RCD-3S/40/0.3/SEL

Combination of pluggable type 2 arrester and selective residual current circuit breaker RCD (FI) for TN-S and TT systems (5-wire system, L1, L2, L3, N, PE)

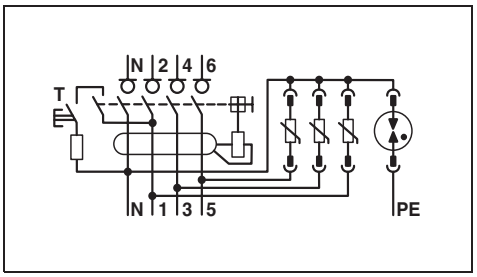
Total width 121 mm



VAL-CP-RCD-3S/40/0.03

Combination of pluggable type 2 arrester and residual current circuit breaker RCD (FI) for TN-S and TT systems (5-wire system, L1, L2, L3, N, PE)

Total width 121 mm



	solid	stranded [mm²]	AWG
Connection data	4-16	4-16	11-6

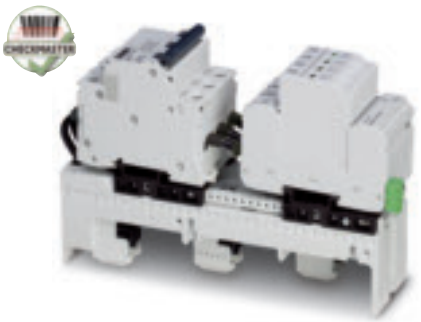
Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
VALVETRAB compact with RCD							
		VAL-CP-RCD-3S/40/0.3/SEL	**2808001**	1			
					VAL-CP-RCD-3S/40/0.03	**2882802**	1
Replacement connector							
	L-N / L-PEN	**VAL-CP-350-ST-GY**	**2882718**	10	**VAL-CP-350-ST-GY**	**2882718**	10
	N-PE	**VAL-CP-N/PE-350-ST-GY**	**2882734**	10	**VAL-CP-N/PE-350-ST-GY**	**2882734**	10
Technical data							
Electrical data							
IEC category / EN type		II / T2			II / T2		
Nominal voltage U_N		240 V AC (230/400 V AC ... 240/415 V AC)			240 V AC (230/400 V AC ... 240/415 V AC)		
Highest continuous voltage U_C							
	L-N / N-PE	350 V AC / 264 V AC			350 V AC / 264 V AC		
Nominal discharge surge current I_n (8/20) µs							
	L-N / N-PE	60 kA (all channels) / 20 kA			60 kA (all channels) / 20 kA		
Max. discharge surge current $I_{max.}$ (8/20) µs							
	L-N / N-PE	90 kA (all channels) / 30 kA			90 kA (all channels) / 30 kA		
Residual voltage at 5 kA	L-N / N-PE	≤ 1.2 kV / ≤ 0.3 kV			≤ 1.2 kV / ≤ 0.3 kV		
Protection level U_p							
	L-N / N-PE	≤ 2 kV / ≤ 2 kV			≤ 2 kV / ≤ 2 kV		
Response time t_A							
	L-N / N-PE	≤ 25 ns / ≤ 100 ns			≤ 25 ns / ≤ 100 ns		
General data							
Temperature range		-25°C ... 40°C			-25°C ... 40°C		
Inflammability class in acc. with UL 94		V0			V0		
Test standards		IEC 61643-1 / EN 61643-11 / IEC 61008-1 / IEC 61008-2-1 / IEC 60947-3			IEC 61643-1 / EN 61643-11 / IEC 61008-1 / IEC 61008-2-1 / IEC 60947-3		
RCD data							
Class		A selective			A		
Nominal load current I_L		40 A			40 A		
Dimensioning error current		300 mA			30 mA		
Rated making and breaking capacity I_m		630 A			1.5 kA		
Rated residual making and breaking capacity $I_{\Delta m}$		630 A			2.5 kA		
Surge withstand capability		6 kV (1.2/50 µs)			6 kV (1.2/50 µs)		
Immunity to short-circuiting I_{nc}		10 kA backup fuse: 63 A			10 kA backup fuse: 63 A		
Tripping time for $I_{\Delta n}$		≤ 300 ms			≤ 300 ms		
Tripping time for $5xI_{\Delta n}$		≤ 40 ms			≤ 40 ms		
Cycles, max.		20000			20000		
Utilization category		AC 23 A			AC 23 A		

Combi-MCB
VAL-CP-MOSO...

These protective devices consist of multi-channel type 2 surge arresters and integrated arrester backup fuses. They can be snapped on either on 5 mm busbars or on 10 mm busbars of the 60 mm system technology without using tools and are only 54 mm wide. The remote indication contact can output a signal to the monitoring systems in the case of an error. The surge-proof arrester backup fuse is especially suitable for surge protection.

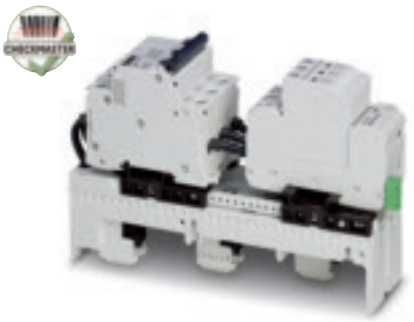
Dimensional drawings starting on page 196.

Approvals starting on page 208.



VAL-CP-MOSO 60-3S-FM

Combination of pluggable type 2 arrester and an arrester backup fuse for 60 mm system technology, TN-S and TT systems (5-wire system, L1, L2, L3, N, PE)

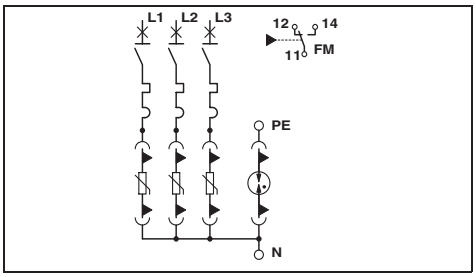


VAL-CP-MOSO 60-3C-FM

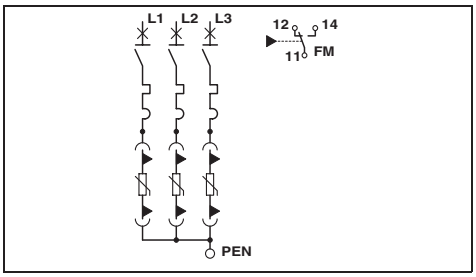
Combination of pluggable type 2 arrester with an arrester backup fuse for 60 mm system technology, TN-C system, (4-wire system, L1, L2, L3, PEN)

	solid	stranded [mm²]	AWG
Connection data PE / N / PEN	2.5-25	2.5-16	12-4
Remote indication contact	0.14-1.5	0.14-1.5	28-16

Total width 54 mm



Total width 54 mm



Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
VALVETRAB compact							
		VAL-CP-MOSO 60-3S-FM	**2804403**	1	**VAL-CP-MOSO 60-3C-FM**	**2804416**	1
Replacement connector							
	L-N / L-PEN	**VAL-CP-350-ST-GY**	**2882718**	10	**VAL-CP-350-ST-GY**	**2882718**	10
	N-PE	**VAL-CP-N/PE-350-ST-GY**	**2882734**	10			
Marking material		**ZBF 12:UNBEDRUCKT**			**ZBF 12:UNBEDRUCKT**		
Technical data							
Electrical data							
IEC category / EN type		II / T2			II / T2		
Nominal voltage U_N		240 V AC (230/400 V AC ... 240/415 V AC)			240 V AC (230/400 V AC ... 240/415 V AC)		
Highest continuous voltage U_C							
	L-N / N-PE / L-PEN	350 V AC / 264 V AC / -			- / - / 350 V AC		
Nominal discharge surge current I_n (8/20) µs							
	L-N / N-PE / L-PEN	60 kA (all channels) / 20 kA / -			- / - / 60 kA (all channels)		
Max. discharge surge current $I_{max.}$ (8/20) µs							
	L-N / N-PE / L-PEN	75 kA (all channels) / 40 kA / -			- / - / 75 kA (all channels)		
Residual voltage at 5 kA	L-N / N-PE / L-PEN	≤ 1.8 kV / ≤ 0.25 kV / -			- / - / ≤ 1.8 kV		
Protection level U_p							
	L-N / N-PE / L-PEN	≤ 2.5 kV / ≤ 1.5 kV / -			- / - / ≤ 2.5 kV		
Response time t_A							
	L-N / N-PE / L-PEN	≤ 25 ns / ≤ 100 ns / -			- / - / ≤ 25 ns		
Backup fuse max. in acc. with IEC		(not required)			(not required)		
Immunity to short-circuiting (with max. backup fuse) I_P		25 kA			25 kA		
Rated surge current resistance I_{pk}		52 kA			52 kA		
General data							
Temperature range		-25°C ... 60°C			-25°C ... 60°C		
Inflammability class in acc. with UL 94		V0			V0		
Test standards		IEC 61643-1 / EN 61643-11			IEC 61643-1 / EN 61643-11/A11		
Remote indication contact		PDT contact			PDT contact		
Max. operating voltage		250 V AC / 125 V DC			250 V AC / 125 V DC		
Max. operating current		1 A AC / 0.2 A DC			1 A AC / 0.2 A DC		

Combi-TOV
VAL-CP-TOV

The VAL-CP-TOV is a surge protection module consisting of a surge arrester with an integrated option for monitoring temporary surge voltages (TOV). The surge protection is arranged in a classical 1+1 circuit for one-phase supply networks (L, N, PE). The TOV monitoring is integrated into the N-PE connector. In the event of permanent surge voltage, a fault current > 30 mA is generated and results in the FI circuit breaker in the installation being switched off.

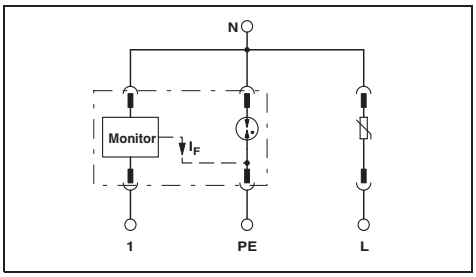
The module can be plugged in throughout. The surge protection plug between L and N corresponds to the serial connector of the VAL-CP range and can be checked using CHECKMASTER.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

VAL-CP-TOV

Combination of pluggable surge arrester and integrated TOV monitoring for TN-S and TT systems (3-wire systems L1, N, PE)

Total width 37.25 mm



	solid	stranded [mm²]	AWG
Connection data	2.5-25	2.5-16	12-4

Description	Type	Order No.	Pcs. / Pkt.
VALVETRAB compact with TOV			
	VAL-CP-TOV	**2883649**	1
Replacement connector			
	VAL-CP-TOV-ST	**2804461**	1
	VAL-CP-350-ST	**2859602**	10
Marking material	**ZBN 18,...**		

Technical data		
Electrical data		
IEC category / EN type		II / T2
Nominal voltage U_N		230 V AC
Highest continuous voltage U_C		
	L-N / N-PE	253 V AC / 253 V AC
Nominal discharge surge current I_n (8/20) µs		
	L-N / N-PE	20 kA / 20 kA
Max. discharge surge current $I_{max.}$ (8/20) µs		
	L-N / N-PE	40 kA / 40 kA
Residual voltage at 5 kA	L-N / N-PE	≤ 1.1 kV / ≤ 150 V
Protection level U_p		
	L-N / N-PE	≤ 1.5 kV / ≤ 1.5 kV
Response time t_A		
	L-N / N-PE	≤ 25 ns / ≤ 100 ns
Backup fuse max. in acc. with IEC		63 A (gL/gG)
Immunity to short-circuiting (with max. backup fuse) I_P		10 kA
General data		
Temperature range		-5°C ... 40°C
Inflammability class in acc. with UL 94		V0
Test standards		IEC 61643-1 / EN 61643-11/A11 / BTTF128-1/Conv0001/DC
TOV data		
TOV shutdown time tA		< 1 s
Maximum rated differential current of the RCD		30 mA
Pick-up voltage range Ua		255 VAC...275 VAC

Combi-MCB
VAL-CP-MCB...

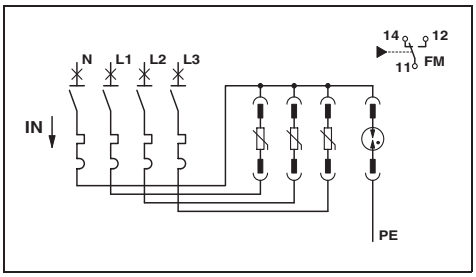
VAL-CP-MCB... are combinations of type 2 surge arresters with integrated arrester backup fuses. In the event of overloading of the surge protection, there is an all-pos. disconnection from the mains. The integrated remote indication contact can output a signal to the monitoring systems in the case of an error. The surge-proof arrester backup fuse is especially suitable for surge protection. Application-specific blocks facilitate handling and provide a solution for every application.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

VAL-CP-MCB-3S-350/40/FM

Combination of pluggable type 2 arrester with an arrester backup fuse for TN-S and TT systems
(5-wire system, L1, L2, L3, N, PE)

Total width 131.5 mm



	solid	stranded	
	[mm²]		AWG
Connection data	2.5-25	2.5-16	12-4
Remote indication contact	0.14-1.5	0.14-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
VALVETRAB compact, with an arrester backup fuse			
	VAL-CP-MCB-3S-350/40/FM	**2882750**	1
Replacement connector			
L-N / L-PEN	**VAL-CP-350-ST-GY**	**2882718**	10
N-PE	**VAL-CP-N/PE-350-ST-GY**	**2882734**	10

Technical data		
Electrical data		
IEC category / EN type		II / T2
Nominal voltage U_N		240 V AC (230/400 V AC ... 240/415 V AC)
Highest continuous voltage U_C		
	L-N / N-PE / L-PEN	350 V AC / 264 V AC / -
Nominal discharge surge current I_n (8/20) µs		
	L-N / N-PE / L-PEN	60 kA (all channels) / 20 kA / -
Max. discharge surge current $I_{max.}$ (8/20) µs		
	L-N / N-PE / L-PEN	90 kA (all channels) / 30 kA / -
Residual voltage at 5 kA	L-N / N-PE / L-PEN	≤ 1.3 kV / ≤ 0.5 kV / -
Protection level U_p		
	L-N / N-PE / L-PEN	≤ 2.5 kV / ≤ 1.7 kV / -
Response time t_A		
	L-N / N-PE / L-PEN	≤ 25 ns / ≤ 100 ns / -
Backup fuse max. in acc. with IEC		(not required)
Immunity to short-circuiting (with max. backup fuse) I_P		25 kA
General data		
Temperature range		-25°C ... 60°C
Inflammability class in acc. with UL 94		V0
Test standards		IEC 61643-1 / EN 61643-11 / IEC 60364-4-443 / IEC 60364-5-534
Remote indication contact		PDT, 1-pos.
Max. operating voltage		250 V AC / 250 V DC
Max. operating current		2 A AC / 50 mA DC

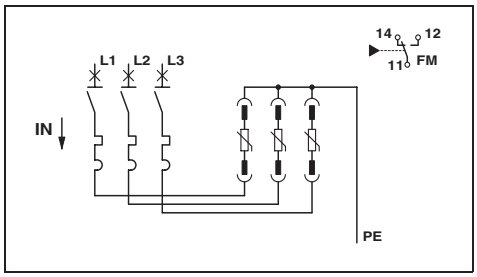
VAL-CP-MCB-3C-350/40/FM

Combination of pluggable type 2 arrester with an arrester backup fuse for TN-C systems,
(4-wire system, L1, L2, L3, PEN)

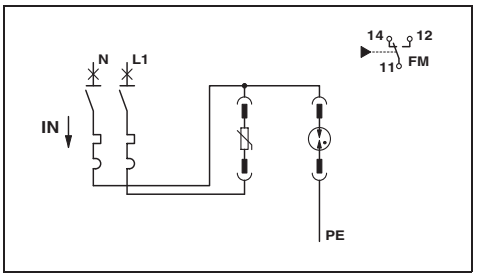
VAL-CP-MCB-1S-350/40/FM

Combination of pluggable type 2 arrester with an arrester backup fuse for TN-S and TT systems
(3-wire system, L1, N, PE)

Total width 113.5 mm



Total width 72 mm



Type	Order No.	Pcs. / Pkt.
VAL-CP-MCB-3C-350/40/FM	**2882776**	1
VAL-CP-350-ST-GY	**2882718**	10

Type	Order No.	Pcs. / Pkt.
VAL-CP-MCB-1S-350/40/FM	**2882763**	1
VAL-CP-350-ST-GY	**2882718**	10
VAL-CP-N/PE-350-ST-GY	**2882734**	10

II / T2	II / T2
240 V AC (230/400 V AC ... 240/415 V AC)	240 V AC (230/400 V AC ... 240/415 V AC)
- / - / 350 V AC	350 V AC / 264 V AC / -
- / - / 60 kA (all channels)	20 kA / 20 kA / -
- / - / 90 kA (all channels)	30 kA / 30 kA / -
- / - / ≤ 1.3 kV	≤ 1.3 kV / ≤ 0.5 kV / -
- / - / ≤ 2.5 kV	≤ 2.5 kV / ≤ 1.7 kV / -
- / - / ≤ 25 ns	≤ 25 ns / ≤ 100 ns / -
(not required)	(not required)
25 kA	25 kA
-25°C ... 60°C	-25°C ... 60°C
V0	V0
IEC 61643-1 / EN 61643-11 / IEC 60364-4-443 / IEC 60364-5-534	IEC 61643-1 / EN 61643-11 / IEC 60364-4-443 / IEC 60364-5-534
PDT, 1-pos.	PDT, 1-pos.
250 V AC / 250 V DC	250 V AC / 250 V DC
2 A AC / 50 mA DC	2 A AC / 50 mA DC

Surge protection in an IT system

Convenient surge protection combinations are available for the IT power supply system, such as in medical facilities. These combinations take into account the special installation conditions in the IT network.

Installation blocks enable easy assembly in the 230 V IT network (L1, L2, PE).

Further solutions for the IT network on request.

Dimensional drawings starting on page 196.

Approvals starting on page 208.

FLT-CP-2C-350

Arrester combination for 3-wire networks (L1, L2, PEN)

VAL-CP-2C-...

Arrester for 3-wire networks (L1, L2, PEN)

Description		Total width 71.6 mm Type	Order No.	Pcs. / Pkt.	Total width 25.3 mm Type	Order No.	Pcs. / Pkt.
FLASHTRAB compact		**FLT-CP-2C-350**	**2859770**	1			
VALVETRAB compact							
With remote indication contact					**VAL-CP-2C-350**	**2859589**	1
Labeling material		**ZBN 18,...**			**ZBFM 5 ... (see CLIPLINE catalog)**		
Technical data							
Electrical data							
IEC category / EN type		I + II / T1 + T2			II / T2		
Nominal voltage U_N		240 V AC (230/400 V AC ... 240/415 V AC)			240 V AC (230/400 V AC ... 240/415 V AC)		
Highest continuous voltage U_C							
	L-PEN	350 V AC			350 V AC		
Lightning test curr. I_{imp} (10/350)µs							
	Peak value	50 kA			-		
	Charge	25 As			-		
	Specific energy	625.00 kJ/Ω			-		
Nominal discharge surge current I_n (8/20) µs							
	L-PEN	50 kA (all channels)			40 kA (all channels)		
Follow current quenching capacity I_{fi}							
	L-PEN	25 kA (264 V AC)			-		
Protection level U_p							
	L-PEN	≤ 1.5 kV			≤ 1.4 kV		
Response time t_A							
	L-PEN	≤ 25 ns			≤ 25 ns		
Backup fuse max. in acc. with IEC		315 A (gL / gG)			125 A (gL/gG)		
Immunity to short-circuiting (with max. backup fuse) I_P		25 kA			25 kA		
General data							
Temperature range		-40°C ... 80°C			-40°C ... 80°C		
Inflammability class in acc. with UL 94		V0			V0		
Test standards		IEC 61643-1 / EN 61643-11 / UL 1449			IEC 61643-1 / EN 61643-11 / UL 1449 / IEEE C62.1 / IEEE C62.34 / IEEE C62.45		
Remote indication contact		PDT contact			PDT contact		
Max. operating voltage		250 V AC / 125 V DC			250 V AC / 125 V DC		
Max. operating current		1 A AC / 0.2 A DC			1 A AC / 0.2 A DC		

Surge protection for 690 V AC and 960 V AC power supply systems

Type 1 and type 2 protective devices are suitable for installation in power supply units with higher supply voltages. The voltage levels of 690 V AC and 960 V AC in the TN-C system are typical in high-capacity industrial networks and wind power generators.

Other solutions for power supplies $U_N \geq 400$ V on request.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

SYS-SET/3/.../690

Arresters for 400 / 690 V TN-C systems
(4-wire system, L1, L2, L3, PEN)

VAL-MS 750/3+0

Surge arrester combination for 554 / 960 V TN-S systems
(4-wire system, L1, L2, L3, PEN)

Description	Total width 142 mm Type	Order No.	Pcs. / Pkt.	Total width 53.4 mm Type	Order No.	Pcs. / Pkt.
SYS-SET, multi-position lightening current arrester combination						
Type 1	**SYS-SET/3/T1/690**	**2800126**	1			
Surge protection combination						
Type 2	**SYS-SET/3/T2/690**	**2880341**	1			
VALVETRAB MS						
with remote indication contact				**VAL-MS 750/30/3+0-FM**	**2920272**	1
without remote indication contact				**VAL-MS 750/30/3+0**	**2920269**	1
VALVETRAB surge protection plug						
500 V AC	**VAL-MS 500 ST**	**2807609**	10			
554 V AC				**VAL-MS 750/30-ST**	**2920256**	10
Labeling material	**ZBN 18,...**			**ZBN 18,...**		

Technical data	SYS-SET/3/T1/690	SYS-SET/3/T2/690	
Electrical data			
IEC category / EN type	I / T1	II / T2	II / T2
Nominal voltage U_N	400 V AC (690 V AC)	400 V AC (690 V AC)	554 V AC (554/960 V AC TN-C)
Highest continuous voltage U_C			
L-PEN	440 V AC	600 V AC	750 V AC
Lightning test curr. I_{imp} (10/350)µs			
Peak value	50 kA (per channel)	-	-
Charge	25 As	-	-
Specific energy	625.00 kJ/Ω	-	-
Nominal discharge surge current I_n (8/20) µs			
L-PEN	150 kA (all channels)	45 kA (all channels)	45 kA (all channels)
Follow current quenching capacity I_{fi}			
L-PEN	50 kA (400 V AC)	-	-
Protection level U_p			
L-PEN	≤ 2.5 kV	≤ 2.7 kV	≤ 2.7 kV
Response time t_A			
L-PEN	≤ 100 ns	≤ 25 ns	≤ 25 ns
General data			
Remote indication contact	-	PDT contact	PDT contact
Max. operating voltage	-	250 V AC	250 V AC
Max. operating current	-	1 A AC (inductive)	1.5 A (250 V AC) / 1.5 A (30 V DC)

Device protection
MAINS-PLUGTRAB

MAINS-PLUGTRAB are designed in two parts, consisting of a base element and a plug. These arresters are the practical solution of the third protection stage for single and multiple phase power supply units in distribution boxes and control cabinets.

The **PT 2-IT-230AC** is a device protection for isolated power supply systems (IT networks).

Dimensional drawings starting on page 196.

Approvals starting on page 208.

PT 4-PE/S-230AC/FM

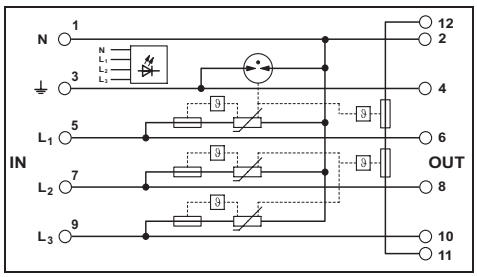
Surge protection for 3-phase power supply unit
(5-wire networks L1, L2, L3, N, PE)

PT 2-PE/S-... AC/FM

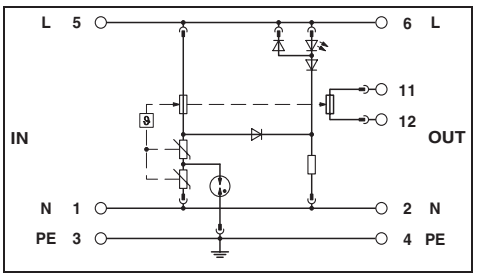
Surge protection for 1-phase power supply unit
(3-wire networks L1, N, PE)

	solid	stranded [mm²]	AWG
Connection data	0.2-4	0.2-2.5	24-12
Remote indication contact	0.2-4	0.2-2.5	24-12

Total width 35.4 mm



Total width 17.7 mm



Description	Voltage U_N	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
MAINS-PLUGTRAB, consisting of a plug and base element							
	120 V AC				**PT 2-PE/S-120AC/FM**	**2856812**	1
	230 V AC	**PT 4-PE/S-230AC/FM**	**2882459**	5	**PT 2-PE/S-230AC/FM**	**2858357**	1
	48 V DC						
MAINS-PLUGTRAB plug							
	24 V AC						
	60 V AC						
	120 V AC				**PT 2-PE/S-120AC-ST**	**2839334**	10
	230 V AC	**PT 4-PE/S-230AC-ST**	**2882462**	5	**PT 2-PE/S-230AC-ST**	**2839347**	10
	48 V DC						
PLUGTRAB base element, for mounting on ⊓					**PT-BE/FM**	**2839282**	10
Grounding plug, for MAINS-PLUGTRAB base elements					**PT MAIN-EST**	**2880736**	10

Technical data			... 120AC	... 230AC
Electrical data				
IEC category / EN type		III / T3	III / T3	III / T3
Nominal voltage U_N		230 V AC (max. 240/415 V AC)	120 V AC	230 V AC
Highest continuous voltage U_C	AC/DC	335 V AC (255 V AC / N-PE) / -	150 V AC / -	253 V AC / -
Nominal load current I_L		26 A (≤ 30°C)	26 A (≤ 30°C)	26 A (≤ 30°C)
Nominal discharge surge current I_n (8/20) µs		1.5 kA (per channel)	2.5 kA	3 kA
Max. discharge surge current $I_{max.}$ (8/20) µs		10 kA (N-PE)	10 kA	10 kA
Combined surge U_{OC}		4 kV	6 kV	6 kV
Residual voltage at I_n	L-N / L-PE	- / -	- / -	≤ 1.1 kV / ≤ 600 V
Protection level U_p	L-N/L(N)-PE	≤ 1.2 kV / ≤ 1.5 kV	≤ 620 V / ≤ 850 V	≤ 1.1 kV / ≤ 1.5 kV
Response time t_A	L-N/L(N)-PE	≤ 25 ns / ≤ 100 ns	≤ 25 ns / ≤ 100 ns	≤ 25 ns / ≤ 100 ns
Backup fuse max. in acc. with IEC		25 A (gL)	25 A (gL/C)	
General data				
Temperature range		-40°C ... 85°C	-40°C ... 85°C	
Inflammability class in acc. with UL 94		V0	V0	
Test standards		IEC 61643-1 / IEC 61643-11	IEC 61643-1 / DIN EN 61643-11/A11 / NF C61-740	
Remote indication contact		N/C contact	N/C contact	
Max. operating voltage		250 V	250 V	
Max. operating current		3 A AC/DC	3 A AC/DC	

PT 2-PE/S...ST

Replacement connector with surge protection for 1-phase power supply unit (3-wire networks L1, N, PE)

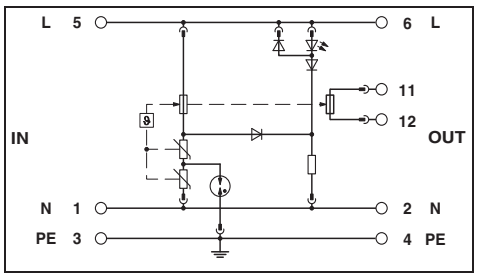
PT 2-IT-230AC/FM

Surge protection for 1-phase power supply units in the IT system (3-wire system L, N, PE / L, L, PE)

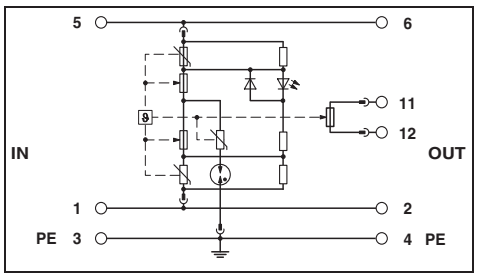
PT 2+1-S-48DC

Surge protection for 1-phase DC power supplies

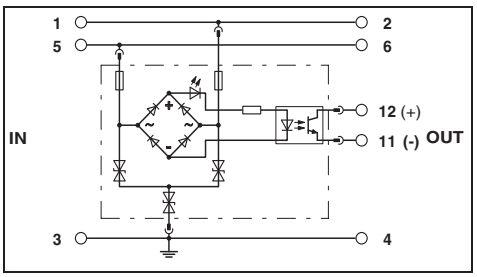
Total width 17.7 mm



Total width 17.7 mm



Total width 17.7 mm



Type	Order No.	Pcs. / Pkt.
PT 2-PE/S- 24AC-ST	2839318	10
PT 2-PE/S- 60AC-ST	2839321	10
PT 2-PE/S-120AC-ST	2839334	10
PT 2-PE/S-230AC-ST	2839347	10
PT-BE/FM	2839282	10
PT MAIN-EST	2880736	10

... 24AC	... 60AC	... 120AC	... 230AC
III / T3	III / T3	III / T3	III / T3
24 V AC	60 V AC	120 V AC	230 V AC
34 V AC / 44 V DC	100 V AC / 95 V DC	150 V AC / -	253 V AC / -
26 A (30°C)	26 A (30°C)	26 A (30°C)	26 A (30°C)
1 kA	2.5 kA	2.5 kA	3 kA
2 kA	6.5 kA	10 kA	10 kA
2 kV	4 kV	6 kV	6 kV
≤ 180 V / ≤ 120 V	≤ 420 V / ≤ 250 V	≤ 620 V / ≤ 330 V	≤ 1.1 kV / ≤ 600 V
≤ 180 V / ≤ 550 V	≤ 400 V / ≤ 700 V	≤ 620 V / ≤ 850 V	≤ 1.1 kV / ≤ 1.5 kV
≤ 25 ns / ≤ 100 ns	≤ 25 ns / ≤ 100 ns	≤ 25 ns / ≤ 100 ns	≤ 25 ns / ≤ 100 ns
25 A (gL)			
-40°C ... 85°C			
V0			
IEC 61643-1 / EN 61643-11 / UL 1449			
N/C contact			
250 V AC			
3 A AC			

Type	Order No.	Pcs. / Pkt.
PT 2-IT-230AC/FM	2805130	1
PT 2-IT-230AC/ST	2805127	1
PT-BE/FM	2839282	10
PT MAIN-EST	2880736	10

III / T3
230 V AC
253 V AC / -
26 A (30°C)
3 kA
8 kA
6 kV
- / -
≤ 1.2 kV / ≤ 1.5 kV
≤ 25 ns / ≤ 100 ns
25 A (gL)
-40°C ... 85°C
V0
IEC 61643-1 / EN 61643-11
N/C contact
250 V
3 A AC/DC

Type	Order No.	Pcs. / Pkt.
PT 2+1-S-48DC/FM	2817958	10
PT 2+1-S-48DC-ST	2839648	10
PT-BE/FM	2839282	10
PT MAIN-EST	2880736	10

III / T3
48 V DC
- / 60 V DC
26 A (at 30°C)
500 A
500 A
6 kV (for 12 Ω)
- / -
≤ 120 V / ≤ 120 V
≤ 1 ns / ≤ 1 ns
25 A (gL)
-40°C ... 85°C
V0
IEC 61643-1
N/C contact
-
-

Device protection for sockets and cable ducts

BT-1S-230/A is used in deep installation boxes for device protection. Independent of the range of switches and the pin assignment
– Later on-site installation possible
– Thermally monitored protective circuit
– Acoustic signaling of disconnection

BT-SKT 230/A is a device protection for UP sockets.

Independent of the range of switches and the pin assignment
– Is mounted on the socket insert
– For installation boxes as per DIN 49073
– Bridges provided for multiple combination
– Later on-site installation possible
– Thermally monitored protective circuit
– Acoustic signaling of disconnection
– Signal deactivation by pulling the tab under the socket cover

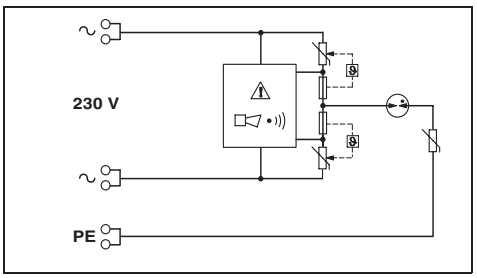
MAINS-PRINTRAB is the device protection for cable ducts and installation boxes.
– Two-part design, consisting of the protective plug, **PRT-S-230/FM** and the **PRT-CD-AD1** outlet box
– Optical and acoustic signaling of disconnection
– Remote signaling of the defect signal to a central computer possible
– Potective plugs are available with voltage levels of 120 V AC and 230 V AC
– Installation in range of switches with the appropriate central plate possible
– Thermally monitored protective circuit
– All connections are in the outlet box
– Service-friendly replacement of the plug in the case of damage

Dimensional drawings starting on page 196.
Approvals starting on page 208.

BT-1S-230AC/A

Device protection for universal mounting in installation boxes, sill-type trunking, concealed installation or directly in the termination device

Total width 22.5 mm



	solid	stranded [mm²]	AWG
Connection data			
BT-1S...	0.2-2.5	0.2-2.5	24-14
BT-SKT...	-	1.5	-
PRT-...	0.2-4	0.2-2.5	24-12

Description	Voltage U_N	Type	Order No.	Pcs. / Pkt.
BLOCKTRAB, for universal mounting	230 V AC	**BT-1S-230AC/A**	**2803409**	10
SOCKETTRAB, device protection for installation socket inserts	230 V AC			
MAINS-PRINTRAB, device protection plug with temperature monitoring and visual fault warning, as well as remote indication contact	120 V AC 230 V AC			
MAINS-PRINTRAB, device protection plug with temperature monitoring, visual and acoustic fault warning and remote indicator contact	120 V AC 230 V AC			
MAINS-PRINTRAB, flush-type base for installation in cable ducts and flush-type boxes	230 V AC			
Cover frame				
Central plate				

Technical data		
Electrical data		
IEC category / EN type		III / T3
Nominal voltage U_N		230 V AC
Highest continuous voltage U_C	L-N / L-PE	275 V AC / 440 V AC
Nominal load current I_L		16 A (≤ 30°C)
Nominal discharge surge current I_n (8/20) µs		3 kA
Max. discharge surge current $I_{max.}$ (8/20) µs	L-N / L-PE	8 kA / 5 kA
Combined surge U_{OC}		6 kV
Residual voltage at I_n	L-N / L-PE	- / -
Protection level U_p	L-N/L(N)-PE	≤ 1.2 kV / ≤ 1.5 kV
Response time t_A	L-N/L(N)-PE	≤ 25 ns (L-N) / ≤ 100 ns (L, N-PE)
Backup fuse max. in acc. with IEC		16 A (gL/C)
General data		
Temperature range		-25°C ... 75°C
Inflammability class in acc. with UL 94		V0
Test standards		IEC 61643-1 / DIN EN 61643-11/A11
Remote indication contact		-
Max. operating voltage		-
Max. operating current		-

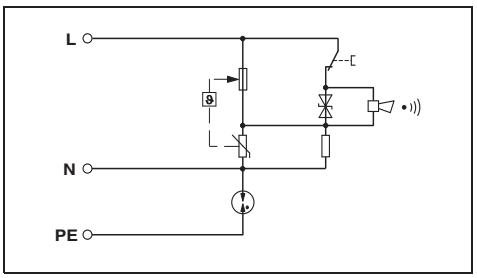
BT-SKT 230/A

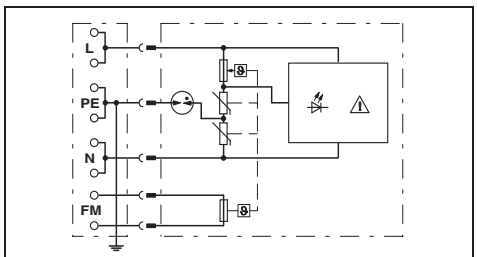
Device protection

PRT...

Device protection

Total width 31.5 mm





Type	Order No.	Pcs. / Pkt.
BT-SKT 230/A	**2859343**	1

Type	Order No.	Pcs. / Pkt.
PRT-S-120/FM	**2830618**	10
PRT-S-230/FM	**2749686**	10
PRT-S/A-120/FM	**2830605**	1
PRT-S/A-230/FM	**2830621**	10
PRT-CD-AD1	**2749673**	25
AR-J/ST550 WH	**2830359**	1
ZP-J/TAE/ST550 WH	**2830362**	10

	... 120AC	... 230AC
III / T3	III / T3	III / T3
230 V AC	120 V AC	230 V AC
250 V AC / -	150 V AC / 150 V AC	253 V AC / 253 V AC
16 A (≤ 30°C)	16 A (≤ 45°C)	16 A (≤ 45°C)
1.5 kA	1.5 kA	1.5 kA
4.5 kA / 4.5 kA	4.5 kA / 4.5 kA	4.5 kA / 4.5 kA
4 kV	4 kV	4 kV
- / -	≤ 610 V / ≤ 330 V	≤ 1.2 kV / ≤ 650 V
≤ 1.3 kV / ≤ 1.5 kV	≤ 600 V / ≤ 800 V	≤ 1.3 kV / ≤ 1.5 kV (At Uoc)
≤ 25 ns / ≤ 100 ns	≤ 25 ns / ≤ 100 ns	≤ 25 ns / ≤ 100 ns
16 A (gL/C)	16 A (gL/C)	
-25°C ... 75°C	-25°C ... 75°C	
V0	V0	
As per IEC 61643-1 / As per DIN EN 61643-11/A11	IEC 61643-1 / DIN EN 61643-11/A11	
-	N/C contact	
-	250 V AC	
-	3 A	

Device protection
COMBITRAB and MAINTRAB

COMBITRAB **CBT...** are multiple socket strips with integrated type 3 (device protection) surge protection. Like the MAINTRAB **MNT-…** socket adapters, they too have an operating indicator that goes out if the surge protection no longer has the required capacity due to load. The protective circuit is thermally monitored.

MNT Powerline is a type 3 surge protection adapter with a special protective circuit and optimized attenuation behavior. It can therefore be used in PLC (Power Line Communication).

Type 3 (device protection) surge protection devices are arresters of the third protection stage.

Note: More information on other versions of CBT-… socket strips and MNT attachment plugs with combined protection for the power supply unit and the interfaces of data/information technology is given from page 151.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

Description	For country-specific use in
COMBITRAB, socket strip with surge protection	
Black	D, I, NL, E, P
MAINTRAB, attachment plug with signal lamp for plugging into a socket, for device protection	
Black	D, A, NL, N, FIN
White	D, A, NL, N, FIN
Black	B, F, CZ, SVK, PL
Black	E, P
White	S, FIN, N
MAINTRAB, surge protection attachment plug for plugging into a socket for equipment protection	
Black	D, A, NL, E, P

Technical data	
Electrical data	
IEC category / EN type	
Nominal voltage U_N	
Highest continuous voltage U_C	L-N / L-PE
Nominal load current I_L	
Nominal discharge surge current I_n (8/20) µs	L-N / L-PE
Combined surge U_{OC}	
Protection level U_p	L-N/N-PE/L-PE
Response time t_A	L-N / L-PE
General data	
Temperature range	
Inflammability class in acc. with UL 94	
Test standards	

Design Award Winner 2003

CBT-SCHUKO

Surge protected socket strip, with 1.8 m connection line

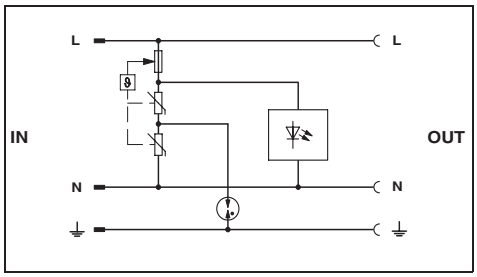
MNT-...

Device protection attachment plug

MNT-POWERLINE

Device protection attachment plug for data communication systems

Total width 81 mm



Type	Order No.	Pcs. / Pkt.
CBT-SCHUKO	**2857280**	1

III / T3
230 V AC

260 V AC / 260 V AC
16 A (≤ 30°C)

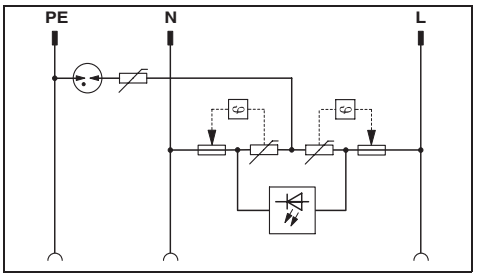
1.5 kA / 1.5 kA
4 kV

≤ 1.3 kV / ≤ 1.5 kV / ≤ 1.5 kV

≤ 25 ns / ≤ 100 ns (and N-PE)

-20°C ... 75°C
V0
IEC 61643-1 / DIN EN 61643-11/A11

Total width 63 mm



Type	Order No.	Pcs. / Pkt.
MNT-1 D	**2882200**	1
MNT-1 D/WH	**2882213**	1
MNT-NET B/F	**2882226**	1
MNT-1 E	**2882239**	1
MNT-1 S/WH	**2880862**	1

III / T3
230 V AC

275 V AC / 360 V AC
16 A (≤ 30°C)

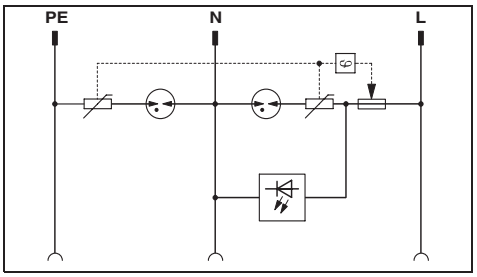
3 kA / 3 kA
4 kV

≤ 1.2 kV / ≤ 1.5 kV / ≤ 1.5 kV

≤ 25 ns / ≤ 100 ns (and N-PE)

-25°C ... 75°C
V0/HB
IEC 61643-1 / DIN EN 61643-11/A11 / VDE 0620-1 /
IEC 60884-1 / NEK-HD 195 S6

Total width 63 mm



Type	Order No.	Pcs. / Pkt.
MNT-POWERLINE	**2858001**	1

III / T3
230 V AC

260 V AC / 260 V AC
16 A (≤ 30°C)

3 kA / 3 kA
6 kV

≤ 1.1 kV / ≤ 1.5 kV / ≤ 1.5 kV

- / ≤ 100 ns

-25°C ... 75°C
V0/HB
IEC 61643-1 / DIN EN 61643-11/A11 / IEC 60884-1 /
DIN VDE 0620-1

Device protection with integrated interference suppressor filter

SFP 1-10, CBT-4SFP-10 and **SFP 1-20/…** have a combined protective circuit to absorb transient surge voltages and high-frequency interference voltages. If the protective circuit is overloaded by surge voltages which are too high or too frequent, a thermal disconnect device disconnects the protective path from the mains power supply. This state is indicated by a red status indicator in the case of SFP 1-10 and CBT-4SFP-10. An acoustic warning can be also be triggered in the case of CBT-4SFP-10. A green light indicates error-free operation and/or the availability of mains voltage. A floating PDT is used for the remote signaling of the status in the case of SFP 1-20/….

SFP 1-20/… is especially suitable for control cabinets in industrial environments due to the option of DIN rail-mountable installation. SFP 1-10 socket attachment plugs and CBT-4SFP-10 socket strips are available for simple retrofitting in laboratories and office environments.

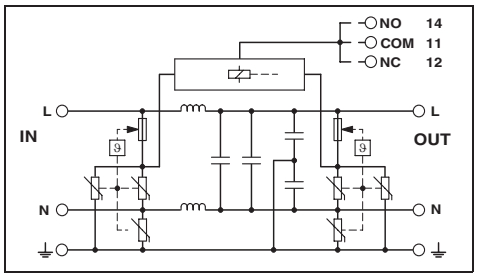
Note: For other current levels, further device protection modules are available for nominal voltages of 120 V AC.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

SFP 1-20/...AC

Rail-mountable device protection with interference filter, 20 A

Total width 112 mm



	solid	stranded [mm²]	AWG
Connection data	0.2-6	0.2-4	24-10
Remote indication contact	0.14-1.5	0.14-1.5	28-16

Description	Voltage U_N	Type	Order No.	Pcs. / Pkt.
SFP-TRAB, rail-mountable device protection TVSS with integrated mains interference filter and visual signaling				
Nominal current: 20 A	230 V AC	**SFP 1-20/230AC**	**2859987**	1
Nominal current: 20 A	120 V AC	**SFP 1-20/120AC**	**2856702**	1
SFP-TRAB, rail-mountable device protection TVSS with integrated mains interference filter and visual signaling				
Nominal current: 5 A	120 V AC			
Nominal current: 10 A	120 V AC			
Nominal current: 15 A	120 V AC			
COMBITRAB, socket strip with surge protection and mains interference filter, visual and acoustic signaling				
Nominal current: 10 A	230 V AC			

Technical data		... 230AC	... 120AC
Electrical data			
IEC category / EN type		III / T3	III / T3
Nominal voltage U_N		230 V AC	120 V AC
Highest continuous voltage U_C	DC/AC	- / 264 V AC	200 V DC / 150 V AC
Nominal load current I_L		20 A (≤ 40°C)	20 A (≤ 40°C)
Nominal discharge surge current I_n (8/20) µs	L-N / L-PE	5 kA / 5 kA	3 kA / 3 kA
Max. discharge surge current $I_{max.}$ (8/20) µs	L-N / L-PE	10 kA / 10 kA	10 kA / 10 kA
Combined surge U_{OC}		10 kV	6 kV (3 kA)
Protection level U_p	L-N/L(N)-PE	≤ 1 kV / ≤ 1 kV	≤ 450 V / ≤ 450 V
Response time t_A	L-N/L(N)-PE	≤ 25 ns / ≤ 25 ns	≤ 25 ns / ≤ 25 ns
Backup fuse max. in acc. with IEC		20 A (gL / gG)	20 A (gL / gG)
Input attenuation a_i			
	Symmetrical	20 dB (≥ 100 kHz / 50 Ω)	40 dB (≥ 500 kHz / 50 Ω)
	Asymmetrical	30 dB (≥ 1 MHz / 50 Ω)	30 dB (≥ 1 MHz / 50 Ω)
Inductivity		2x 1 mH ±30% (with current compensation)	2x 1 mH ±30% (with current compensation)
General data			
Temperature range		-40°C ... 70°C	
Inflammability class in acc. with UL 94		V0	
Test standards		IEC 61643-1 / EN 61643-11	
Remote indication contact		PDT, 1-pos.	
Max. operating voltage		250 V AC / 300 V DC	
Max. operating current		1 A (250 V AC) / 0.25 A (250 V DC) / 1 A (48 V DC)	

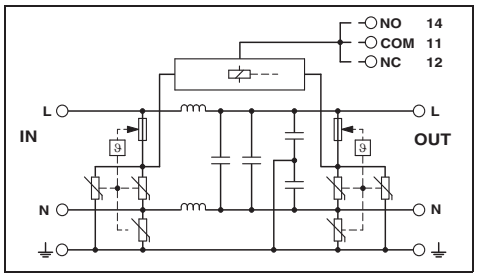
SFP 1-.../120AC

Rail-mountable device protection with interference filter, 5 A

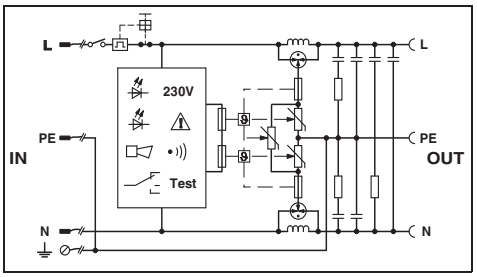
CBT-4SFP-10

Socket strip with surge protection and interference filter

Total width 112 mm



Total width 61 mm



Type	Order No.	Pcs. / Pkt.
SFP 1-5/120AC	**2920667**	1
SFP 1-10/120AC	**2920670**	1
SFP 1-15/120AC	**2920683**	1

Type	Order No.	Pcs. / Pkt.
CBT-4SFP-10	**2748386**	1

5 A	10 A	15 A	
III / T3	III / T3	III / T3	III / T3
120 V AC	120 V AC	120 V AC	230 V AC
200 V DC / 150 V AC	200 V DC / 150 V AC	200 V DC / 150 V AC	- / 250 V AC
5 A (≤ 72°C)	10 A (≤ 62°C)	15 A (≤ 52°C)	10 A (≤ 40°C)
3 kA / 3 kA	3 kA / 3 kA	3 kA / 3 kA	2.5 kA / 2.5 kA
10 kA / 10 kA	10 kA / 10 kA	10 kA / 10 kA	6.5 kA / 6.5 kA
6 kV (3 kA)	6 kV (3 kA)	6 kV (3 kA)	-
≤ 450 V / ≤ 450 V	≤ 450 V / ≤ 450 V	≤ 450 V / ≤ 450 V	≤ 650 V / ≤ 1 kV
≤ 25 ns / ≤ 25 ns	≤ 25 ns / ≤ 25 ns	≤ 25 ns / ≤ 25 ns	≤ 100 ns / ≤ 100 ns
20 A (gL / gG)	20 A (gL / gG)	20 A (gL / gG)	10 A (Automatic device / 1-pos. / thermal))
40 dB (≥ 500 kHz / 50 Ω)	40 dB (≥ 500 kHz / 50 Ω)	40 dB (≥ 500 kHz / 50 Ω)	≥ 40 dB (1 MHz / 50 Ω)
30 dB (≥ 1 MHz / 50 Ω)	30 dB (≥ 1 MHz / 50 Ω)	30 dB (≥ 1 MHz / 50 Ω)	≥ 40 dB (1 MHz / 50 Ω)
2x 1 mH ±30% (with current compensation)	2x 1 mH ±30% (with current compensation)	2x 1 mH ±30% (with current compensation)	2x 8 mH ±30% (with current compensation)
-40°C ... 85°C			-25°C ... 75°C
V0			V0
IEC 61643-1 / EN 61643-11 / UL 1449 /			IEC 61643-1 / DIN EN 61643-11/A11 / DIN EN 60939-2
PDT, 1-pos.			
250 V AC / 300 V DC			- / -
1 A (250 V AC) / 0.25 A (250 V DC) / 1 A (48 V DC)			-

Interference suppressor filters
FILTRAB

NEF... are low-pass filters that are designed for a maximum nominal current of 1 to 10 A depending on the type. They limit symmetrical as well as asymmetrical interference voltages.

In order to limit the occurrence of interference couplings in the line between the filter and the device to a minimum, NEF should be installed as close to the device to be protected as possible.

Dimensional drawings starting on page 196.

Approvals starting on page 208.

NEF 1- 1 / NEF 1-3

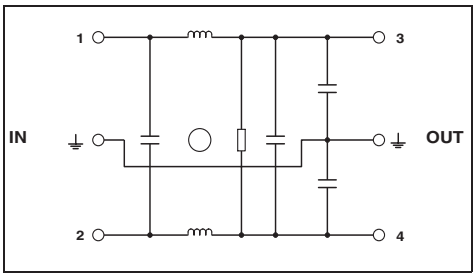
Mains interference filter for single-phase current circuits with 1 A / 3 A nominal current

NEF 1- 6 / NEF 1-10

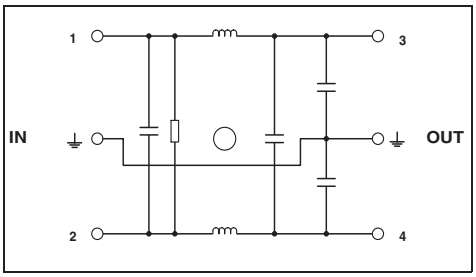
Mains interference filter for single-phase current circuits with 6 A/ 10 A nominal current

	solid	stranded [mm²]	AWG
Connection data	0.2-4	0.2-2.5	24-12

Total width 24.25 mm



Total width 38.3 mm



Description	Nominal load current I_L	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FILTRAB, interference suppressor filter for single-phase current circuits, for mounting on ⊏⊐ or ⊐⊏							
	1 A	**NEF 1- 1**	**2794123**	10			
	3 A	**NEF 1- 3**	**2794110**	10			
	6 A				**NEF 1- 6**	**2783082**	5
	10 A				**NEF 1-10**	**2788977**	5
Labeling material		**ZB 5 (see page 123)**			**ZB 5 (see page 123)**		

Technical data		NEF 1- 1	NEF 1- 3	NEF 1- 6	NEF 1-10
Electrical data					
Nominal voltage U_N		240 V AC	240 V AC	240 V AC	240 V AC
Highest continuous voltage U_C	L - N	264 V AC	264 V AC	264 V AC	264 V AC
Nominal load current I_L		1 A (≤ 40°C)	3 A (≤ 40°C)	6 A (≤ 40°C)	10 A (≤ 40°C)
Backup fuse max. in acc. with IEC		1 A (gL)	3 A (gL)	6.3 A (gL/C)	10 A (gL)
Inductivity		2x 10 mH	2x 2.7 mH	2x 2.7 mH	2x 1.8 mH
Input attenuation a_i					
	Symmetrical	≥ 65 dB (50 Ω/ 1 MHz)	≥ 55 dB (50 Ω/ 1 MHz)	> 80 dB (50 Ω/ 1 MHz)	> 80 dB (50 Ω/ 1 MHz)
	Asymmetrical	≥ 45 dB (50 Ω/ 1 MHz)	≥ 35 dB (50 Ω/ 1 MHz)	> 40 dB (50 Ω/ 1 MHz)	> 40 dB (50 Ω/ 1 MHz)
General data					
Temperature range		-25°C ... 100°C (HMF)		-25°C ... 100°C (HMF)	
Inflammability class in acc. with UL 94		V2		V2	
Test standards		IEC 60939-2 / DIN EN 60939-2		IEC 60939-2 / DIN EN 60939-2	

TRABTECH wiring bridges

With the MPB wiring bridges, all products from the "Modular Arrester Range" can be interconnected or connected in combination with other devices in the distributor such as r.c.c.b.s. and m.c.b.s., to form all common applications.

The bridges are available in one, three and four-phase versions with different numbers of positions. The dimensioning cross-section of MPB bridge metals is 16 mm² per phase. The MPB ...D end covers insulate and terminate bridges individually cut from MPB 18/3-57 or MPB 18/4-56. These bridge types can be ordered by the meter with 57 or 56 individual positions. The end covers are already attached in the case of all assembled 6 to 16-position bridges of the 3 and 4-phase versions.

MPB 18/...

Wiring bridge, for wiring applications with lightning current and surge arresters

Description	Nominal current I_N	Type	Order No.	Pcs. / Pkt.
Wiring bridge, for modules with 17.5 mm connecting pitch, 1-phase				
2-pos.	100 A	**MPB 18/1- 2**	**2809209**	10
3-pos.	100 A	**MPB 18/1- 3**	**2809212**	10
4-pos.	100 A	**MPB 18/1- 4**	**2809225**	10
6-pos.	100 A	**MPB 18/1- 6**	**2748564**	10
7-pos.	100 A	**MPB 18/1- 7 BU**	**2856278**	10
8-pos.	100 A	**MPB 18/1- 8 BU**	**2858470**	10
8-pos.	100 A	**MPB 18/1- 8**	**2748577**	10
9-pos.	100 A	**MPB 18/1- 9**	**2748580**	10
12-pos.	100 A	**MPB 18/1-12**	**2748593**	10
57-pos.	100 A	**MPB 18/1-57**	**2809238**	1
Wiring bridge, for modules with 17.5 mm connecting pitch, 3-phase				
6-pos.	80 A	**MPB 18/3- 6**	**2809241**	10
9-pos.	80 A	**MPB 18/3- 9**	**2809254**	10
Wiring bridge, for modules with 17.5 mm connecting pitch, 4-phase				
8-pos.	80 A	**MPB 18/4- 8**	**2809283**	10
12-pos.	80 A	**MPB 18/4-12**	**2809296**	10
Wiring bridge, flexible, diameter 16 mm², fork-type cable lug on one side				
200 mm	100 A (30°C)	**MPB F200X16/ 1GS**	**2818339**	1
400 mm	100 A (30°C)	**MPB F400X16/ 1GS**	**2818342**	1
600 mm	100 A (30°C)	**MPB F600X16/ 1GS**	**2818355**	1

Accessories

The **DK-BIC-35** biconnect feed-through terminal block brings order to the wiring of mixed combinations of lightning and surge arresters. As a system extension for FLASHTRAB and VALVETRAB applications, this module represents a considerable aid when it comes to wiring. For 500 V nominal voltage, the terminal feed-through is designed for 125 A nominal current and for a lightning test current of 100 kA (10/350) µs.

The flat **ZBN 18** Zack marker strips consist of five individual labels with a pitch of 17.5 mm. It can be labeled both with the Computer Marking System CMS from Phoenix Contact and by hand using the B-STIFT marker pen.

Pre-assembled versions are available with the most common standard labels.

DK-BIC-35

Description	Type	Order No.	Pcs. / Pkt.
Feed-through terminal block with biconnect connecting terminal blocks as wiring aid for lightning current and surge arrester applications.	**DK-BIC-35**	**2749880**	1
Marking labels, unprinted, 5-section, for individual labeling with the B-STIFT marker pen or CMS system	**ZBN 18:SO/CMS**	**0800763**	1
Zack marker strip, unprinted	**ZBN 18:UNBEDRUCKT**	**2809128**	10
L1, L2, L3, N, ⏚	**ZBN 18,LGS:L1-N,ERDE**	**2749576**	10
⏚, ⏚, ⏚, ⏚, ⏚	**ZBN 18,LGS:ERDE**	**2749589**	10

Technical data	
General data	
Temperature range	-40°C ... 85°C
Inflammability class in acc. with UL 94	V0
Test standards	IEC 61643-1 / DIN EN 61643-11 / IEC 60947-7-1

Equipotential bonding

The equipotential bonding strip **PAS-1** is designed for the main equipotential bonding in accordance with DIN VDE 0100 and the lightning protection equipotential bonding in accordance with DIN VDE 0185. PAS-1 has a contact bar in the form of a comb.

Dimensional drawings starting on page 196.

PAS-1

Description	Type	Order No.	Pcs. / Pkt.
Equipotential busbar	**PAS-1**	**2765615**	1

TRABTECH housing

Certain application cases require separate installation of surge protection devices. This means that distribution or terminal boxes are not available or cannot be used.
The sturdy design of the TRABTECH housing satisfies high degrees of protection up to IP65. Surge protection can therefore be installed even in harsh environmental conditions, such as outdoors or in industrial environments.

The TG 40 aluminum housing is equipped with two Pg13.5 cable screw connections positioned opposite each other on either side. The housing cover is attached to the base using four rust-proof and captive screws.

TG 40 is supplied with DIN rail NS 35/7.5. On the DIN rail, five sections, each having a width of 17.5 mm, are available for the installation of protection devices.

Dimensional drawings starting on page 196.

TG 40

Description	Type	Order No.	Pcs. / Pkt.
TRABTECH housing, for the separate mounting of surge arresters	**TG 40**	**2788896**	1

Package solutions for building installations
GEB-SET-CP

GEB-SET-CP is the basic equipment for surge protection for the office, surgery, legal office or home, for example. It consists of a VALVETRAB compact (type 2) surge arrester for installation in the subdistribution. Four MAINTRAB (type 3) device protection adapters, of which two are designed as combined adapters with power supply unit protection, and data/signal interfaces, complete the basic equipment.

Material such as adapters, cables and bridges required for proper installation is also included in the set.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

GEB-SET-CP ...

Description	Type	Order No.	Pcs. / Pkt.
Building set, consisting of: 1 x VAL-CP-3S-350/O (surge arrester) 2 x MNT-1D (device protection adapter) 1 x MNT-ISDN D (device and ISDN protection adapter) 1 x MNT-TV-SAT D (device and TV-SAT protective adapter) 2 x adapter F on TV (IEC) connector 1 x MPB-SET (4 flexible bridges) 1 x KBL TV-SAT/150, 1 x KBL TV/150, 1 x KBL ISDN/150 (connecting cable)	**GEB-SET-CP ISDN/TV-SAT**	**2856943**	1
Building set, consisting of: 1 x VAL-CP-3S-350/O (surge arrester) 2 x MNT-1D (device protection adapter) 1 x MNT-TAE D (device and TAE protection adapter) 1 x MNT-TV-SAT D (device and TV-SAT protective adapter) 2 x adapter F on TV (IEC) connector 1 x MPB-SET (4 flexible bridges) 1 x KBL TV-SAT/150, 1 x KBL TV/150, 1 x KBL TAE/150 (connecting cable)	**GEB-SET-CP TAE/TV-SAT**	**2856964**	1

Surge protection for photovoltaic systems

The surge arresters listed here are pre-assembled protection solutions. Two DIN rail-mountable versions and three versions as sets in the IP65 installation housing are available.

Dimensional drawings starting on page 196.
Approvals starting on page 208.

VAL-MS 1000DC/1+V-FM

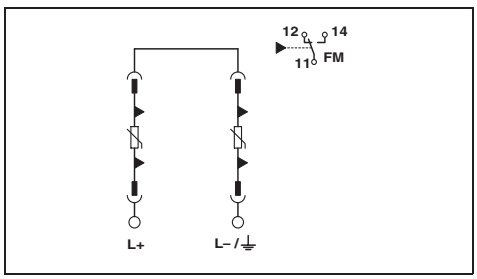
Compact DC surge protection for inverter, DC input and solar strings

VAL-MS ...DC/2+V

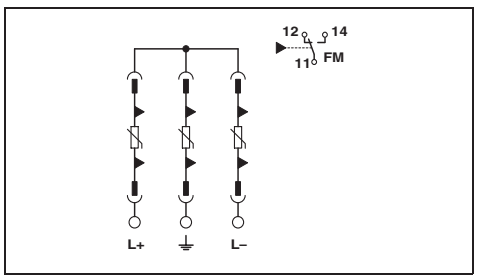
Compact DC surge protection for inverter, DC input and solar strings

	solid [mm²]	stranded [mm²]	AWG
Connection data			
Biconnect screw terminal block	1.5-35	1.5-25	15-2
Remote contact	0.14-1.5	0.14-1.5	28-16

Total width 35.6 mm



Total width 53.4 mm



Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
VALVETRAB-MS							
(L+)-(L-)		**VAL-MS 1000DC/1+V-FM**	**2804490**	1			
(L+)-(L-)		**VAL-MS 1000DC/1+V**	**2804542**	1			
(L+)-PE & (L-)-PE & (L+)-(L-)					**VAL-MS 1000DC/2+V-FM**	**2920502**	1
(L+)-PE & (L-)-PE & (L+)-(L-)					**VAL-MS 1000DC/2+V**	**2805091**	1
(L+)-PE & (L-)-PE & (L+)-(L-)					**VAL-MS 600DC/2+V**	**2805457**	1
PV-SET 1000 DC/AC							
DC: (L+)-PE & (L-)-PE & (L+)-(L-) / AC: L-N & N-PE							
PV-SET 1000DC							
(L+)-PE & (L-)-PE & (L+)-(L-)							
PV-SET 5ST/600DC							
(L+)-PE & (L-)-PE & (L+)-(L-)							
Replacement connector							
1000 V DC	1L-N/PE	**VAL-MS 1000PV ST**	**2805185**	1	**VAL-MS 1000PV ST**	**2805185**	1
230 V AC					**VAL-MS 600PV ST**	**2805431**	1
230 V AC	1L-N/PE						
230 V AC	N-PE						
Marking material		**ZBN 18,...**			**ZBN 18,...**		

Technical data			... 1000 DC	... 600 DC
Electrical data				
IEC category / EN type		II / T2	II / T2	II / T2
No-load voltage U_{OC} max.		≤ 1000 V DC	≤ 1000 V DC	≤ 600 V DC
Highest continuous voltage U_C				
	(L+) - (L-) / (L+/L-) - PE	1000 V DC	1000 V DC	600 V DC
	L-N / N-PE	- / -	-	- / -
Max. short circuit current $I_{SC\ max}$		≤ 80 A DC	≤ 80 A DC	≤ 80 A DC
Nominal discharge surge current I_n (8/20) µs		15 kA	15 kA	20 kA
Max. discharge surge current $I_{max.}$ (8/20) µs		30 kA	30 kA	40 kA
Protection level U_p				
	(L+) - (L-) / (L+/L-) - PE	≤ 5 kV	≤ 5 kV	≤ 3 kV
	L-N / N-PE	- / -	- / -	- / -
Response time t_A				
	(L+) - (L-) / (L+/L-) - PE	≤ 25 ns	≤ 25 ns	≤ 25 ns
	L-N / N-PE	- / -	- / -	- / -
General data				
Temperature range		-40°C ... 80°C	-40°C ... 80°C	
Degree of protection in acc. with IEC 60529/ EN 60529		IP20	IP20	
Housing material		PBT / PA	PBT / PA	
Inflammability class in acc. with UL 94		V0	V0	
Test standards		DIN EN 61643-11 / IEC 61643-1 / IEC 60364-7-712	DIN EN 61643-11 / IEC 61643-1 / IEC 60364-7-712	
Remote indication contact		PDT, 1-pos.	PDT, 1-pos.	
Max. operating voltage		250 V AC	250 V AC	
Max. operating AC current		1.5 A (250 V AC)	1.5 A (250 V AC)	
Connection method		Screw connection	Screw connection	
	IN/OUT	Biconnect screw terminal block / Biconnect screw terminal block	Biconnect screw terminal block / Biconnect screw terminal block	

PV-SET 1000 DC/AC

DC/AC surge protection in IP65 housing

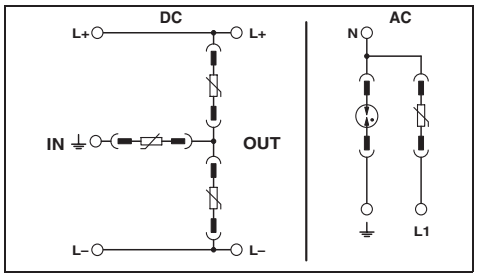
PV-SET 1000 DC

DC surge protection in the IP65 housing with solar connector

PV-SET 5ST/600DC

DC surge protection in an IP65 housing, for up to five solar strings, including a generator disconnect

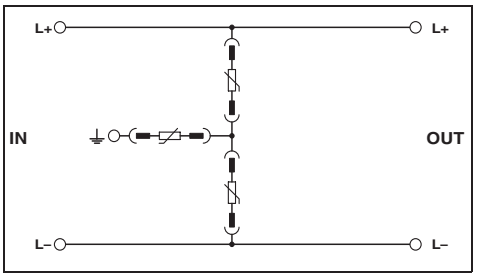
Total width 200 mm



Type	Order No.	Pcs. / Pkt.
PV-SET 1000 DC/AC	**2804458**	1
VAL-MS 1000PV ST	**2805185**	1
VAL-MS 320 ST	**2838843**	10
F-MS 12 ST	**2817990**	10

DC side	AC side
II / T2	II / T2
≤ 1000 V DC	230 V AC (U_N)
1000 V DC	-
-	335 V AC / 260 V AC
≤ 80 A DC	-
15 kA	20 kA
30 kA	40 kA
≤ 5 kV	-
- / -	≤ 1.5 kV / ≤ 1.2 kV
≤ 25 ns	-
- / -	≤ 25 ns / ≤ 100 ns
-25°C ... 70°C	
IP65	
Polycarbonate fiber reinforced	
V2	
IEC 61643-1 / DIN EN 61643-11 / IEC 60364-7-712	
PDT, 1-pos.	
250 V AC	
1.5 A AC (at 250 V)	
Screw terminal blocks	
Biconnect screw terminal block / Biconnect screw terminal block	

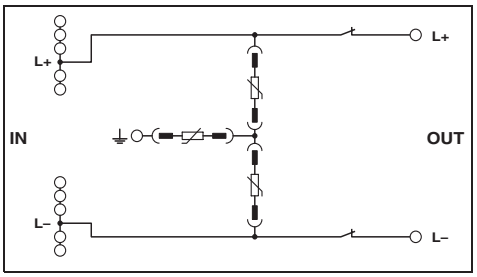
Total width 125 mm



Type	Order No.	Pcs. / Pkt.
PV-SET 1000 DC	**2804445**	1
VAL-MS 1000PV ST	**2805185**	1

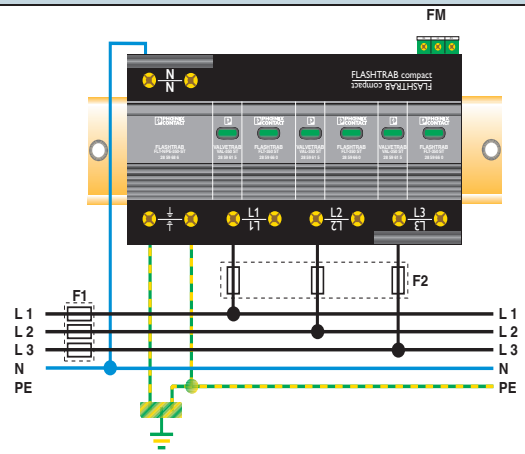
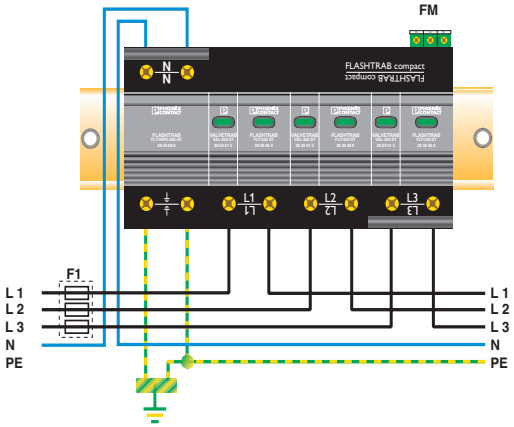
II / T2	
≤ 1000 V DC	
1000 V DC	
- / -	
≤ 30 A DC	
15 kA (DC)	
30 kA	
≤ 5 kV	
- / -	
≤ 25 ns	
- / -	
-25°C ... 65°C	
IP65	
Polycarbonate fiber reinforced	
V2	
IEC 61643-1 / DIN EN 61643-11 / IEC 60364-7-712	
PDT, 1-pos.	
250 V AC	
1.5 A AC (at 250 V)	
Photovoltaic connector	
Plug/Socket / Socket/Plug	

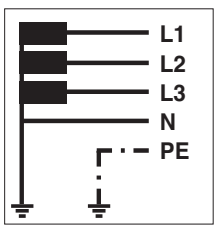
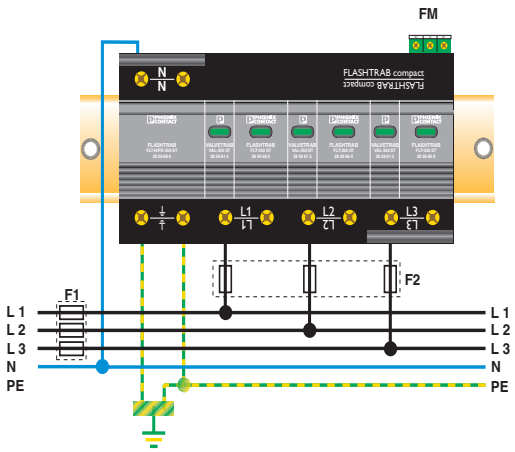
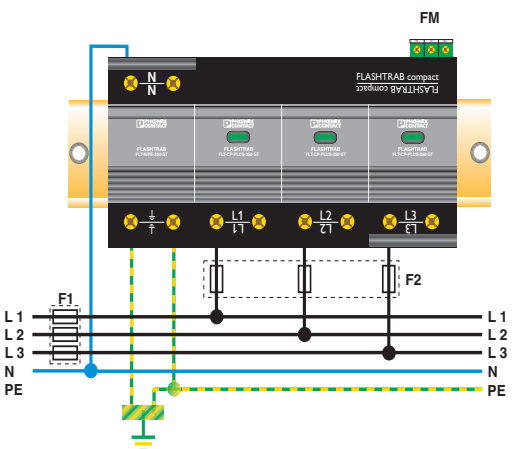
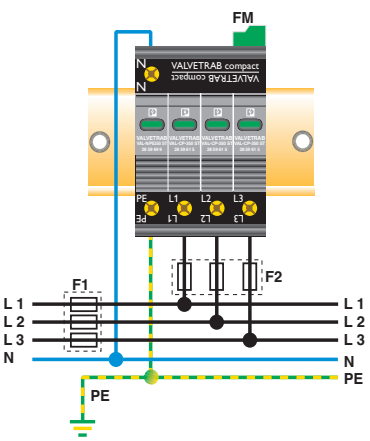
Total width 300 mm

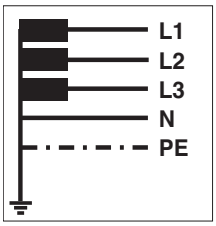
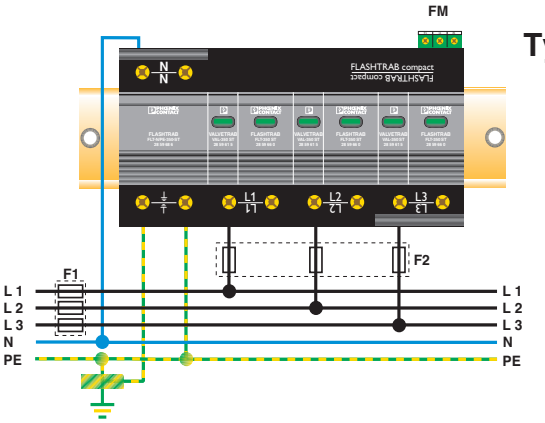
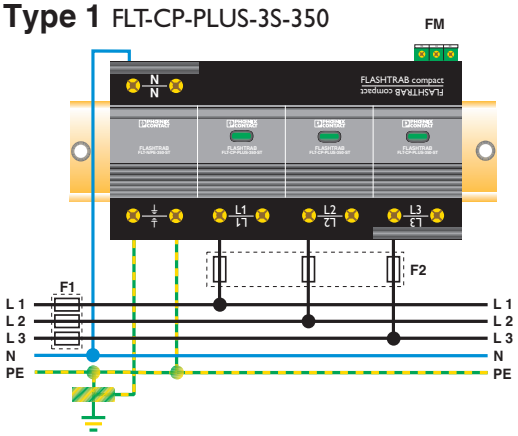
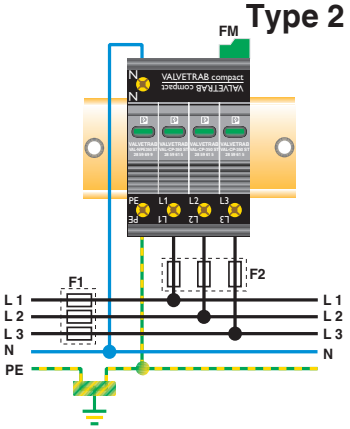
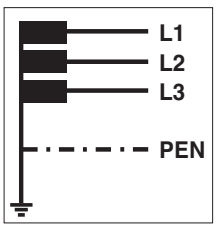
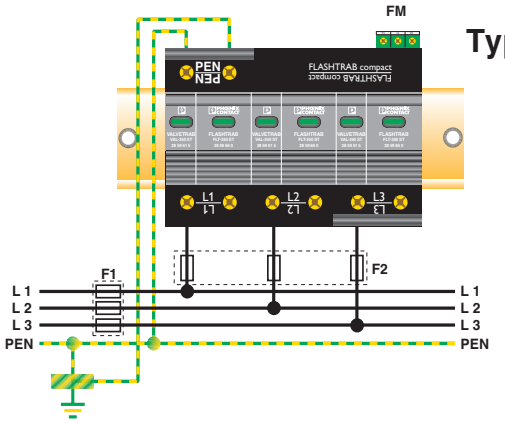
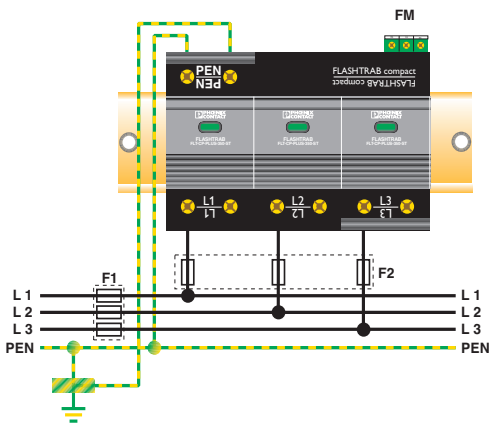
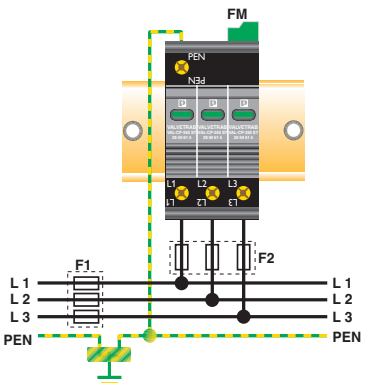


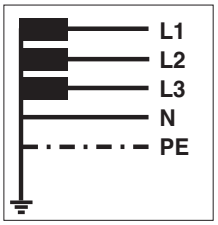
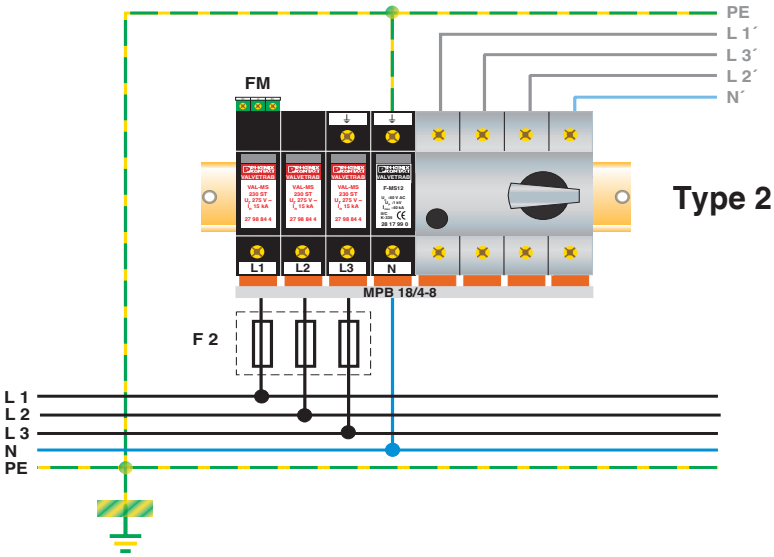
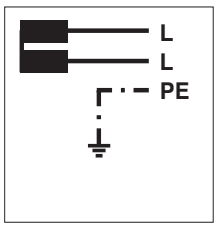
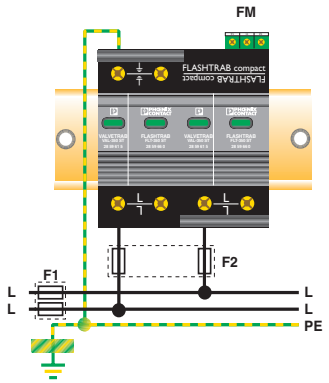
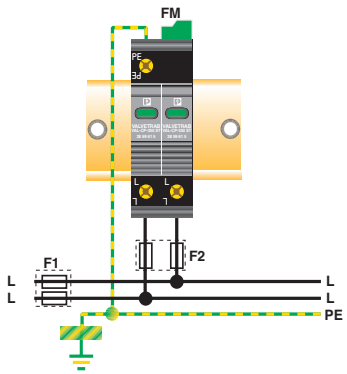
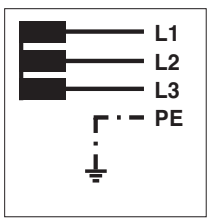
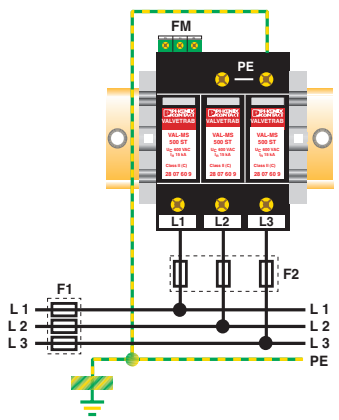
Type	Order No.	Pcs. / Pkt.
PV-SET 5ST/600DC	**2920780**	1
VAL-MS 320 ST	**2838843**	10

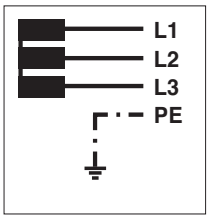
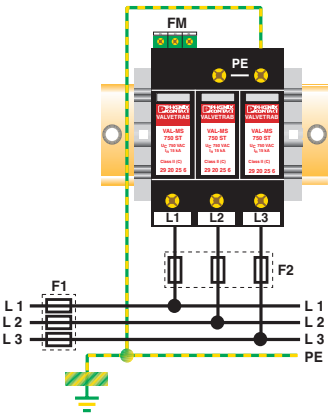
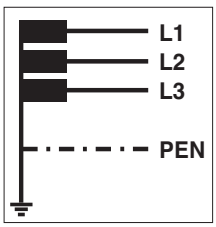
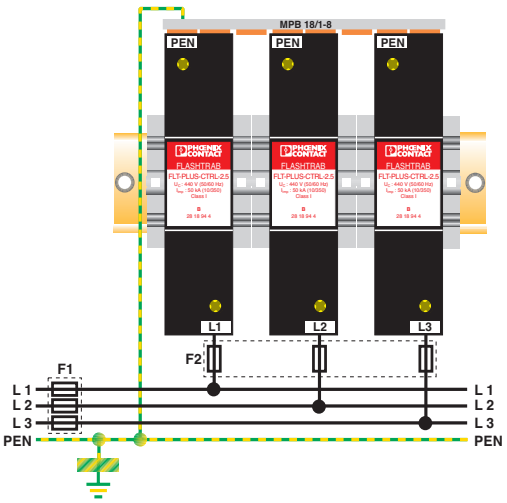
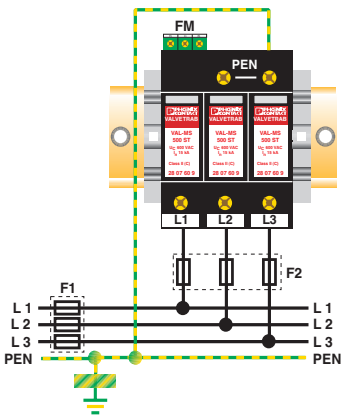
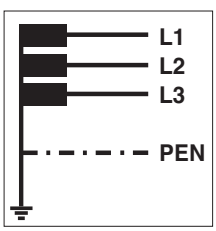
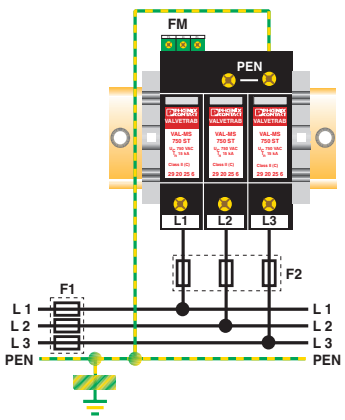
II / T2	
≤ 600 V DC	
600 V DC	
- / -	
≤ 30 A	
20 kA	
40 kA	
≤ 3 kV	
- / -	
≤ 25 ns	
- / -	
-25°C ... 60°C	
IP65	
Polycarbonate fiber reinforced	
V2	
IEC 61643-1 / DIN EN 61643-11 / IEC 60364-7-712	
-	
-	
-	
Screw terminal blocks	
UT 6 / UT 6	

Branch wiring	V-type through wiring
	
The values for backup fuses F1 and F2 can be found in the respective installation instructions	The values for backup fuse F1 can be found in the respective installation instructions. This connection is especially suitable for reducing additional voltages on conductors (due to surge currents).

Network type	Application
 **TT system** **230/400 V AC** **240/415 V AC**	**Type 1+2** FLT-CP-3S-350  **Type 1** FLT-CP-PLUS-3S-350  **Type 2** VAL-CP-3S-350 

Network type	Application
 **TN-S system** **230/400 V AC** **240/415 V AC**	**Type 1+2** FLT-CP-3S-350  **Type 1** FLT-CP-PLUS-3S-350  **Type 2** VAL-CP-3S-350 
 **TN-C system** **230/400 V AC** **240/415 V AC**	**Type 1+2** FLT-CP-3C-350  **Type 1** FLT-CP-PLUS-3C-350  **Type 2** VAL-CP-3C-350 

Network type	Application
 **TN-S system** **230/400 V AC** **240/415 V AC**	 **Type 2** VAL-MS-230/3+1-FM
 **IT system** **230 V AC**	 **Type 1+2** FLT-CP-2C-350  **Type 2** VAL-CP-2C-350
 **IT system** **500 V AC**	 **Type 2** SYS-SET/3/T2/690

Network type	Application
 **IT system** **690 V AC**	 **Type 2** VAL-MS 750/30/3+0/FM
 **TN-C system** **400/690 V AC**	 **Type 1** SYS-SET/3/T1/690  **Type 2** SYS-SET/3/T2/690
 **TN-C system** **554/960 V AC**	 **Type 2** VAL-MS 750/30/3+0/FM