

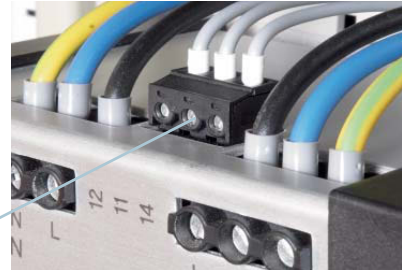
# EMC solutions

## Reliable signals with mains interference filter

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

<b>Main range</b>	<b>228</b>
<b>Mains interference filters with integrated surge protection</b>	<b>230</b>
<b>Interference filters</b>	<b>233</b>
<b>Multi-stage modular terminal block</b>	<b>232</b>

# SFP-TRAB



AC input

Remote indication contact via  
MINI-COMBICON connector

Optical status indication

AC output



DIN-rail mountable

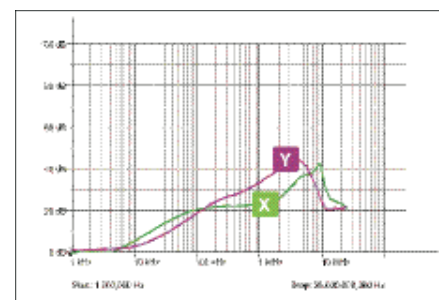
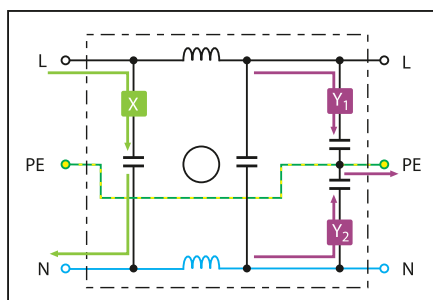
Can be latched onto a DIN rail

Rugged metal housing

## Interference voltage filters for power supply units

Interference filters limit conducted high-frequency interference voltages. Devices used in data processing or automation particularly benefit from a clean power supply.

The end result is safe operation and reliable measured results.



## Mains interference filters - Operating principle and range

### Filtering of symmetrical disturbance variables

**X** Interference voltages between the phase and neutral conductor are filtered.

### Filtering of asymmetrical disturbance variables

**Y<sub>1</sub>** The opposite grounded interference voltages from phase to PE and from the neutral conductor to PE are filtered.

**Y<sub>2</sub>**

## Operating range of filters

An attenuation curve diagram illustrates the effective operating range of mains interference filters. The relevant frequency-dependent attenuation can be read according to the symmetrical or asymmetrical filter circuit.



## The perfect team for maximum power and signal quality

Interference filters are an important measure for increasing availability. Devices for residual current monitoring and professional lightning and surge protection increase availability to the maximum level.

## Mains interference filter with integrated surge protection

### SFP-TRAB

- Combined protective circuit for absorbing transient surge voltages and high-frequency interference voltages
- Thermal monitoring of the protective circuit
- Disconnection status signaled via floating remote indication contact
- Can be installed in industrial environments



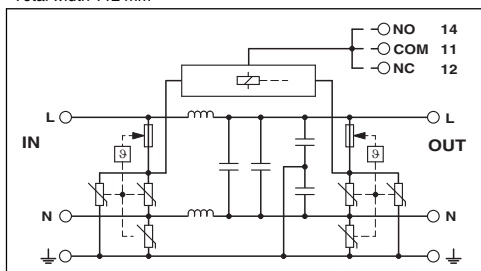
20 A nominal current



5 A / 10 A / 15 A nominal current

<b>Notes:</b>
Dimensional drawings starting on page 240
Approvals starting on page 252
Attenuation curves, from page 246

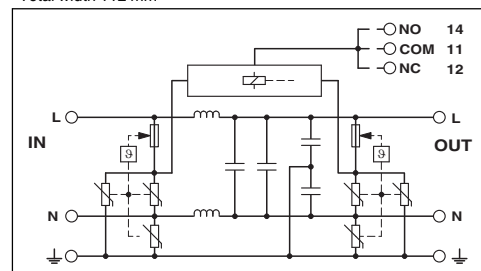
Total width 112 mm



#### Technical data

<b>Electrical data</b>	... 230AC	... 120AC
IEC category / EN type	III / T3	III / T3
Nominal voltage $U_N$	230 V AC	120 V AC
Maximum continuous operating voltage $U_C$	DC / AC	DC / AC
Nominal load current $I_L$	20 A (40°C)	20 A (40°C)
Nominal discharge surge current $I_n$ (8/20) $\mu$ s	L-N / L-PE	L-N / L-PE
Max. discharge surge current $I_{max}$ (8/20) $\mu$ s	L-N / L-PE	L-N / L-PE
Combined surge $U_{OC}$	10 kV	6 kV (3 kA)
Protection level $U_p$	L-N / L(N)-PE	L-N / L(N)-PE
Response time $t_A$	L-N / L(N)-PE	L-N / L(N)-PE
Max. backup fuse according to IEC	20 A (gL / gG)	20 A (gL / gG)
Input attenuation $a_i$	Symmetrical	Asymmetrical
Inductance	20 dB ( $\geq$ 100 kHz / 50 $\Omega$ )	Typ. 40 dB ( $\geq$ 500 kHz / 50 $\Omega$ )
<b>General data</b>	0.2 ... 6 mm <sup>2</sup> / 0.2 ... 4 mm <sup>2</sup> / 24 - 10	0.2 ... 6 mm <sup>2</sup> / 0.2 ... 4 mm <sup>2</sup> / 24 - 10
Connection data solid / stranded / AWG	-40°C ... 70°C	-25°C ... 40°C
Temperature range	V0	V0
Inflammability class according to UL 94	IEC 61643-1 / DIN EN 61643-11 / EN 61643-11/A11 / UL 1449 / UL 1283	IEC 61643-1 / EN 61643-11/A11 / UL 1449 / UL 1283
Test standards	Single-pos. PDT	Single-pos. PDT
Remote indication contact	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 28 - 16	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 28 - 16
Connection data solid / stranded / AWG	250 V AC / -	250 V AC / -
Max. operating voltage	1 A (250 V AC) / 0.25 A (250 V DC) / 1 A (48 V DC)	1 A (250 V AC) / 0.25 A (250 V DC) / 1 A (48 V DC)
Max. operating current		

Total width 112 mm



#### Technical data

5 A	10 A	15 A
III / T3	III / T3	III / T3
120 V AC	120 V AC	120 V AC
- / 150 V AC	- / 150 V AC	- / 150 V AC
5 A (72°C)	10 A (62°C)	15 A (52°C)
3 kA / 3 kA	3 kA / 3 kA	3 kA / 3 kA
10 kA / 10 kA	10 kA / 10 kA	10 kA / 10 kA
6 kV (3 kA)	6 kV (3 kA)	6 kV (3 kA)
$\leq$ 450 V / $\leq$ 450 V	$\leq$ 450 V / $\leq$ 450 V	$\leq$ 450 V / $\leq$ 450 V
$\leq$ 25 ns / $\leq$ 25 ns	$\leq$ 25 ns / $\leq$ 25 ns	$\leq$ 25 ns / $\leq$ 25 ns
20 A (gL / gG)	20 A (gL / gG)	20 A (gL / gG)
	Typ. 40 dB ( $\geq$ 500 kHz / 50 $\Omega$ )	Typ. 40 dB ( $\geq$ 500 kHz / 50 $\Omega$ )
	Typ. 30 dB ( $\geq$ 1 MHz / 50 $\Omega$ )	Typ. 30 dB ( $\geq$ 1 MHz / 50 $\Omega$ )
	2 x 1 mH $\pm$ 30% (with current compensation)	2 x 1 mH $\pm$ 30% (with current compensation)

5 A	10 A	15 A
III / T3	III / T3	III / T3
120 V AC	120 V AC	120 V AC
- / 150 V AC	- / 150 V AC	- / 150 V AC
5 A (72°C)	10 A (62°C)	15 A (52°C)
3 kA / 3 kA	3 kA / 3 kA	3 kA / 3 kA
10 kA / 10 kA	10 kA / 10 kA	10 kA / 10 kA
6 kV (3 kA)	6 kV (3 kA)	6 kV (3 kA)
$\leq$ 450 V / $\leq$ 450 V	$\leq$ 450 V / $\leq$ 450 V	$\leq$ 450 V / $\leq$ 450 V
$\leq$ 25 ns / $\leq$ 25 ns	$\leq$ 25 ns / $\leq$ 25 ns	$\leq$ 25 ns / $\leq$ 25 ns
20 A (gL / gG)	20 A (gL / gG)	20 A (gL / gG)
	Typ. 40 dB ( $\geq$ 500 kHz / 50 $\Omega$ )	Typ. 40 dB ( $\geq$ 500 kHz / 50 $\Omega$ )
	Typ. 30 dB ( $\geq$ 1 MHz / 50 $\Omega$ )	Typ. 30 dB ( $\geq$ 1 MHz / 50 $\Omega$ )
	2 x 1 mH $\pm$ 30% (with current compensation)	2 x 1 mH $\pm$ 30% (with current compensation)

#### Ordering data

Description	Voltage $U_N$
<b>SFP-TRAB</b> , DIN rail-mountable device protection with integrated mains interference filter and optical signaling	
Nominal current: 20 A	230 V AC
Nominal current: 20 A	120 V AC
<b>SFP-TRAB</b> , DIN rail-mountable device protection with integrated mains interference filter and optical signaling	
Nominal current: 5 A	120 V AC
Nominal current: 10 A	120 V AC
Nominal current: 15 A	120 V AC

Type	Order No.	Pcs. / Pkt.
<b>SFP 1-20/230AC</b>	<b>2859987</b>	1
<b>SFP 1-20/120AC</b>	<b>2856702</b>	1

#### Ordering data

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

## COMBITRAB

- Combined protective circuit for absorbing transient surge voltages and high-frequency interference voltages
- Thermal monitoring of the protective circuit
- Optical operation and function monitoring
- Integrated on/off switch

## Notes:

Dimensional drawings starting on page 240

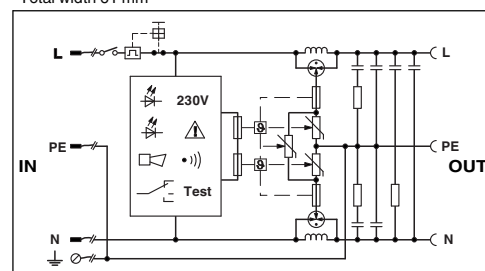
Approvals starting on page 252

Attenuation curves, from page 246



10 A nominal current

Total width 61 mm



## Technical data

Electrical data	
IEC category / EN type	III / T3
Nominal voltage $U_N$	230 V AC
Maximum continuous operating voltage $U_C$	250 V AC
Nominal load current $I_L$	10 A (40°C)
Nominal discharge surge current $I_n$ (8/20) $\mu$ s	L-N / L-PE 2.5 kA / 2.5 kA
Max. discharge surge current $I_{max}$ (8/20) $\mu$ s	L-N / L-PE 6.5 kA / 6.5 kA
Protection level $U_p$	L-N / L(N)-PE $\leq 650$ V / $\leq 650$ V
Response time $t_A$	L-N / L(N)-PE $\leq 100$ ns / $\leq 100$ ns
Max. backup fuse according to IEC	10 A (circuit breaker/single-pos./thermal)
Input attenuation $a_i$	Symmetrical $\geq 40$ dB (1 MHz / 50 $\Omega$ ) Asymmetrical $\geq 40$ dB (1 MHz / 50 $\Omega$ )
Inductance	1.8 mH $\pm 30\%$ (with current compensation)
General data	
Temperature range	-25°C ... 75°C
Inflammability class according to UL 94	V0
Test standards	IEC 61643-1 / EN 61643-11/A11 / DIN EN 60939-2 /

## Ordering data

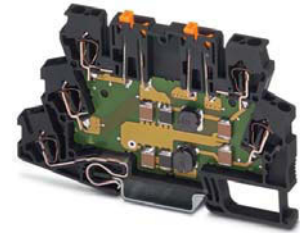
Description	Voltage $U_N$	Type	Order No.	Pcs. / Pkt.
COMBITRAB socket strip with surge protection and mains interference filter, optical and acoustic signaling				
Nominal current: 10 A	230 V AC	CBT-4SFP-10	2748386	1

## Mains interference filter with integrated surge protection

### TERMITRAB

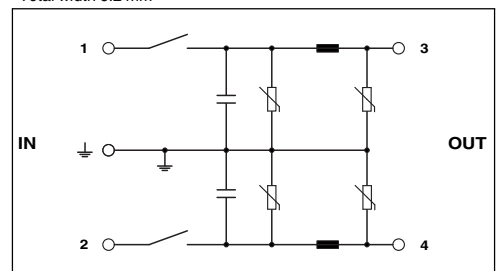
- Combined protective circuit for absorbing transient surge voltages and high-frequency interference voltages
- With spring-cage connection
- Disconnection of signal circuits by disconnect knife

Notes:
Dimensional drawings starting on page 240
Approvals starting on page 252
Attenuation curves, from page 246



Protection for two conductors with a common reference potential

Total width 6.2 mm



#### Technical data

Electrical data	
IEC category / EN type	C1 / C3
Maximum continuous operating voltage $U_C$	DC / AC 38 V DC / 30 V AC
Nominal load current $I_L$	500 mA (55°C)
Nominal discharge surge current $I_n$ (8/20) $\mu$ s	Core-Ground 350 A
Total surge current (8/20) $\mu$ s	700 A
Output voltage limitation at 1 kV/ $\mu$ s	Core-Ground $\leq 70$ V
Cut-off frequency $f_g$ (3 dB)	Asymmetrical in the 50 $\Omega$ system Typ. 60 kHz
Resistance per path	0.5 $\Omega$
Inductance per path	100 $\mu$ H (per path)
Capacitance per path	130 nF
General data	
Connection data solid / stranded / AWG	0.5 ... 4 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 24 - 12
Temperature range	-40°C ... 85°C
Degree of protection according to IEC 60529/EN 60529	IP20
Inflammability class according to UL 94	V2
Test standards	IEC 61643-21

#### Ordering data

Description	Voltage $U_N$	Type	Order No.	Pcs. / Pkt.
TERMITRAB, spring-cage modular terminal block with integrated surge protection as a filter circuit and disconnect knives, for mounting on NS 35	24 V AC	TT-ST-M-SFP-24AC	2858946	10

#### Accessories

Cover, for terminating a row of terminal blocks	TT-D-STTCO-BK	2858894	50
Zack marker strip, 10-section, white	ZB 6, see page 125		



**FILTRAB**

- Low pass filters for nominal currents of 1 to 10 A
- For single-phase circuits
- DIN rail module

<b>Notes:</b>
Dimensional drawings starting on page 240
Approvals starting on page 252
Attenuation curves, from page 246

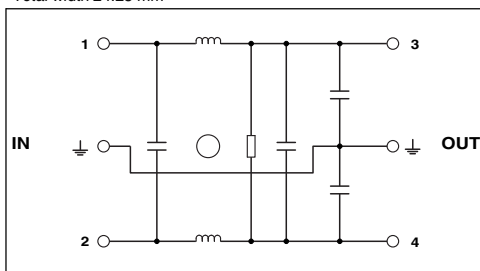


1 A / 3 A nominal current

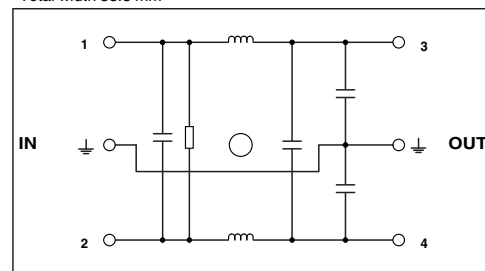


6 A / 10 A nominal current

Total width 24.25 mm



Total width 38.3 mm



**Technical data**

	NEF 1- 1	NEF 1- 3
Nominal voltage $U_N$	240 V AC	240 V AC
Maximum continuous operating voltage $U_C$	264 V AC	264 V AC
Nominal load current $I_L$	1 A (40°C)	3 A (40°C)
Max. backup fuse according to IEC	1 A (gL)	3 A (gL)
Inductance	2 x 10 mH	2 x 2.7 mH
Input attenuation $a_i$	Symmetrical	$\geq 55$ dB (50 $\Omega$ / 1 MHz)
	Asymmetrical	$\geq 45$ dB (50 $\Omega$ / 1 MHz)

**Technical data**

	NEF 1- 6	NEF 1-10
Nominal voltage $U_N$	240 V AC	240 V AC
Maximum continuous operating voltage $U_C$	264 V AC	264 V AC
Nominal load current $I_L$	6 A (40°C)	10 A (40°C)
Max. backup fuse according to IEC	6.3 A (gL/C)	10 A (gL)
Inductance	2 x 2.7 mH	2 x 1.8 mH
Input attenuation $a_i$	Symmetrical	$> 80$ dB (50 $\Omega$ / 1 MHz)
	Asymmetrical	$> 40$ dB (50 $\Omega$ / 1 MHz)

<b>Electrical data</b>	
Nominal voltage $U_N$	L-N
Maximum continuous operating voltage $U_C$	L-N
Nominal load current $I_L$	
Max. backup fuse according to IEC	
Inductance	
Input attenuation $a_i$	
<b>General data</b>	
Connection data solid / stranded / AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Temperature range	-25°C ... 100°C (HMF)
Inflammability class according to UL 94	V2
Test standards	IEC 60939-2 / DIN EN 60939-2

**Ordering data**

Type	Order No.	Pcs. / Pkt.
NEF 1- 1	2794123	10
NEF 1- 3	2794110	10

**Ordering data**

Type	Order No.	Pcs. / Pkt.
NEF 1- 6	2783082	5
NEF 1-10	2788977	5

**Accessories**

For ZB 5..., see page 125

**Accessories**

For ZB 5..., see page 125

**Labeling material**