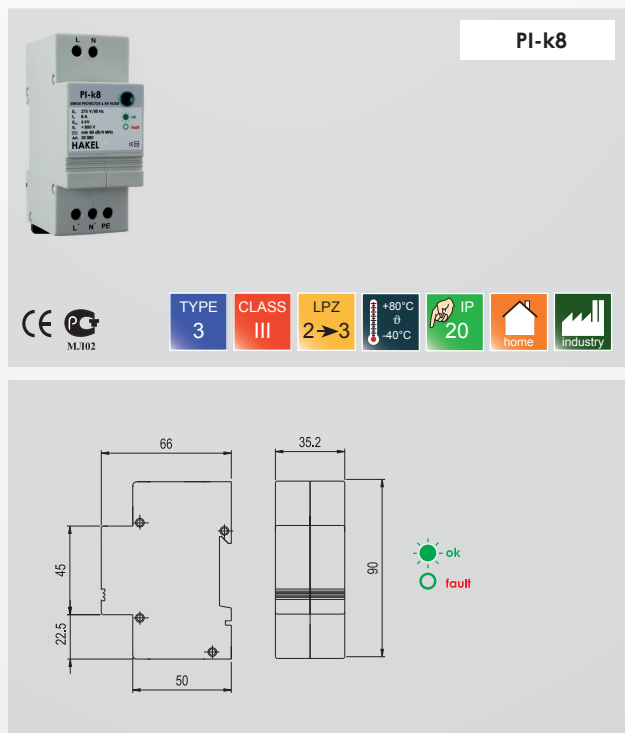


SURGE ARRESTERS – VARISTOR & EMC/EMI filter

PI-k and PD*DS are a single-phase surge arresters type 3 with a high-frequency filter according to EN 61643-11. They are produced for nominal current within the range of 8, 16, 25, 32, 50, 80, 120 and 150A for application use in TNS systems. The types PI-k8, 16, 25, 32A and PD*DS are constructed for mounting on DIN rail 35mm. The types PI-k50, 63, 80, 120 and 150A are produced in basic versions for mounting straight onto the construction of switchboard by four screws M4. PI-k and PD*DS are designed for protection of single-phase electronic appliances in L.V. supply systems against impulse surge and high-frequency disturbance. This complex range is produced for nominal voltage within the range of 6, 12, 24, 48, 60, 80, 110, 120, 130, 160 and 230V (AC/DC).

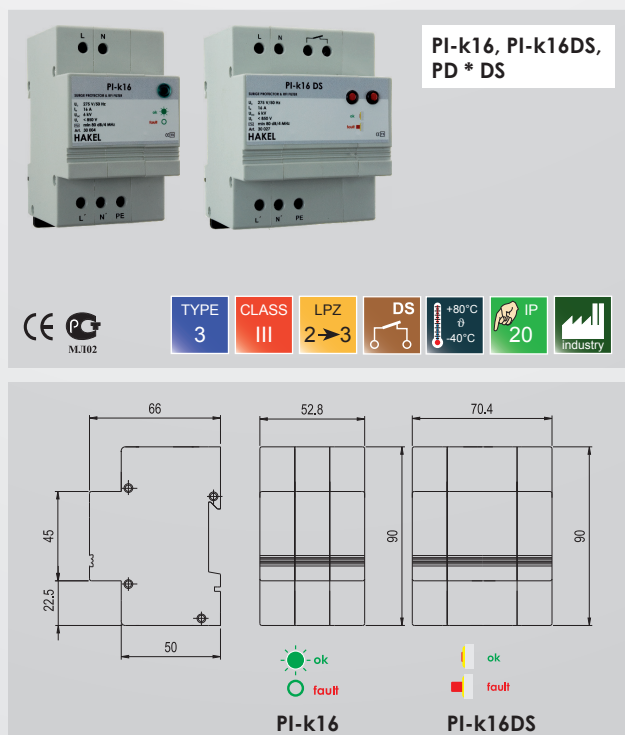
The types PI-k8, 16, 25 and 32 are fitted with a green LED diode signaling the right functioning, types PI-k16 DS, PI-k25 DS and PD*DS indicate the failure by target disconnection of mechanical thermal fuses.

Two stage MOV surge arrester & EMC/EMI filter



Type PI-k8		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	8 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE)
		5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE)
		10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N)
		<1,5 kV (L/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 4 MHz
		min. 40 dB (0,15 - 30 MHz)
Filters constants	C_x	150 nF
	C_y	22 nF
	L	1,2 mH
Power loss at winding temp. 20°C		<2,2 W
Response time	t_A	<25 ns (L/N)
Recommended backup fuse		10 A
Lifetime		min. 100.000 h
Weight	m	130 g
Article number		30 080

Two stage MOV surge arrester & EMC/EMI filter



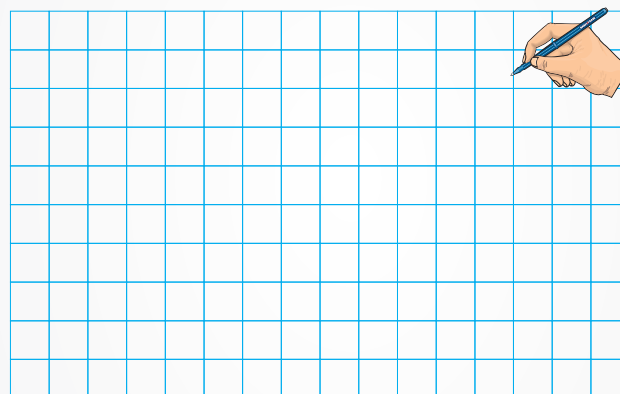
Type PI-k16/PI-k16 DS		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	16 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE)
		5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE)
		10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N)
		<1,5 kV (L/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 4 MHz
		min. 40 dB (0,15 - 30 MHz)
Filters constants	C_x	220 nF
	C_y	22 nF
	L	1,8 mH
Power loss at winding temp. 20°C		<3,5 W
Response time	t_A	<25 ns (L/N)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	170/224 g
Article number		
PI-k16		30 004
PI-k16 DS		30 027



Function of remote monitor terminals

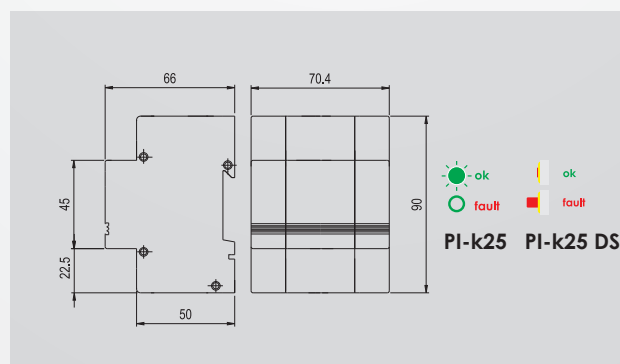
When the PI-k is operating correctly, the switching contact for remote monitoring is connected. Once the thermal fuse reacts to varistor overheating the switching contact for remote monitoring will disconnect.

el. strength against surround. circuits	3750 V _{rms}
el. strength against network circuits	3750 V _{rms}
insulation resistance	2 x 10 ⁷ Ω
max. switching current	~ 3 A
max. switching voltage	~ 250 V



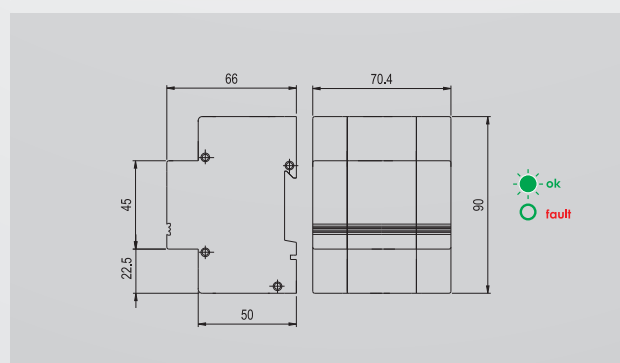
Two stage MOV surge arrester & EMC/EMI filter

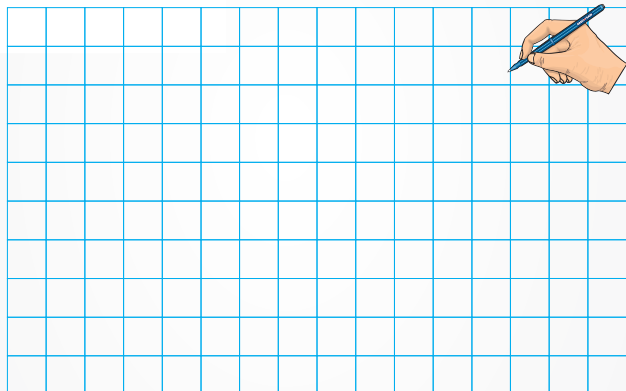
Type PI-k25/PI-k25 DS		
Nominal voltage	U _N	230 V AC
Max. continuous operating voltage	U _C	275 V AC
Nominal current	I _N	25 A
Nominal discharge current I _n (8/20)	I _n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U _{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U _{OC}	U _P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 4 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C _x C _y L	220 nF 22 nF 2,3 mH
Power loss at winding temp. 20°C		<3,5 W
Response time	t _A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		25 A
Lifetime		min. 100.000 h
Weight	m	240 g
Article number		
PI-k25		30 017
PI-k25 DS		30 034



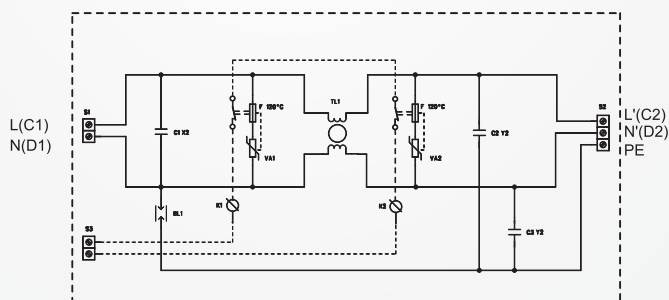
Two stage MOV surge arrester & EMC/EMI filter

Type PI-k32		
Nominal voltage	U _N	230 V AC
Max. continuous operating voltage	U _C	275 V AC
Nominal current	I _N	32 A
Nominal discharge current I _n (8/20)	I _n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U _{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U _{OC}	U _P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 4 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C _x C _y L	220 nF 22 nF 2,3 mH
Power loss at winding temp. 20°C		<4 W
Response time	t _A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		32 A
Lifetime		min. 100.000 h
Weight	m	240 g
Article number		30 005

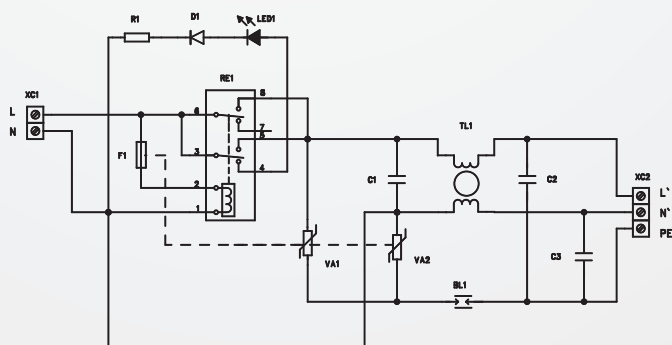




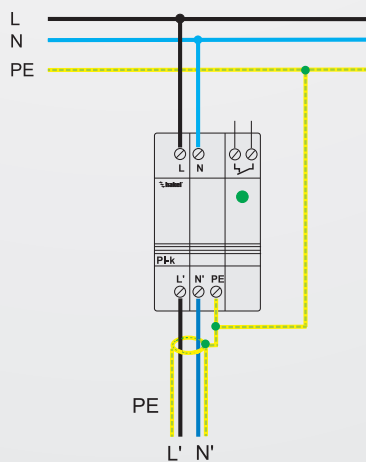
Basic circuit diagram of
PI-k16 DS, PI-K25 DS



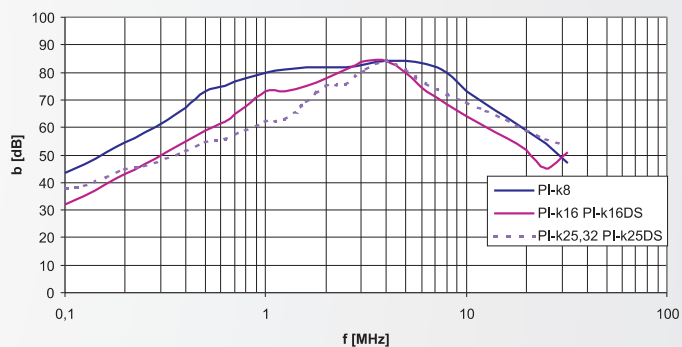
PI-k8 OFF and PI-k16 OFF
fault indication by power interruption



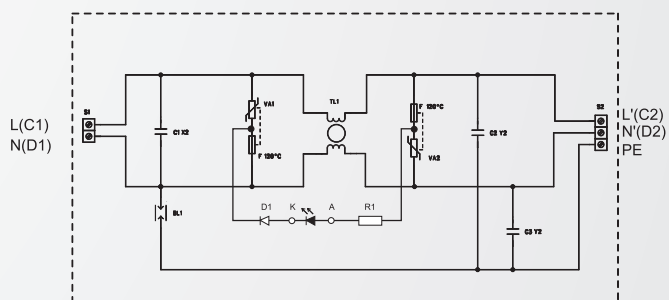
Recommended connection of PI-k



Assymetrical attenuation 50Ω/50Ω



PI-k8, 16, 25, 32



Recommended cross-section for grounding

PI-k8
PI-k16
PI-k25
PI-k32

2.5 mm² Cu

4 mm² Cu

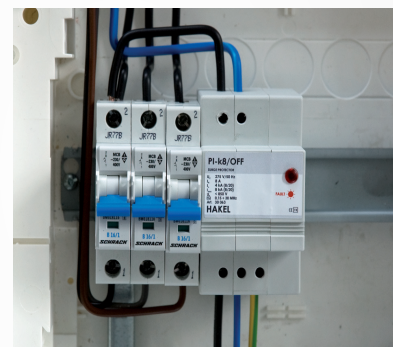
6 mm² Cu

6 mm² Cu

SURGE ARRESTERS - VARISTOR & EMC/EMI filter

PI-k8 OFF and PI-k16 OFF are single-phase arresters type 3 with a high-frequency filter according to EN 61643-11. They are produced for nominal current within the range of 8 and 16A for application use in TNS systems. The types PI-k8 OFF and PI-k16 OFF are constructed for mounting on DIN rail 35mm. PI-k* OFF are designed for protection of single-phase electronic appliances in L.V. supply systems against impulse surge and high-frequency disturbance.

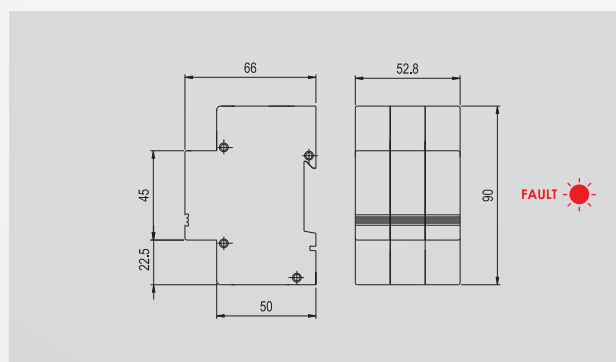
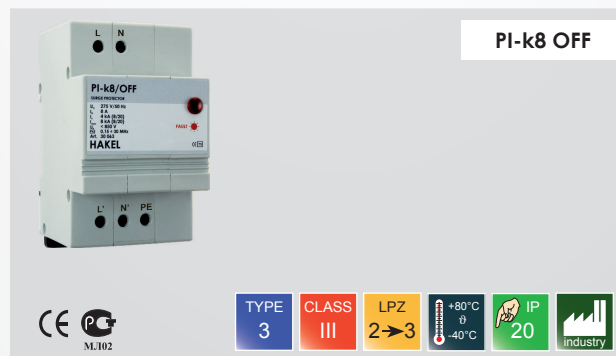
In case of failure the red LED diode turns on and the power supply gets interrupted.



Type PI-k8 OFF

Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	8 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 4 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C_x C_y L	150 nF 22 nF 1,2 mH
Power loss at winding temp. 20°C		<2,2 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		10 A
Lifetime		min. 100.000 h
Weight	m	130 g
Article number		30 063

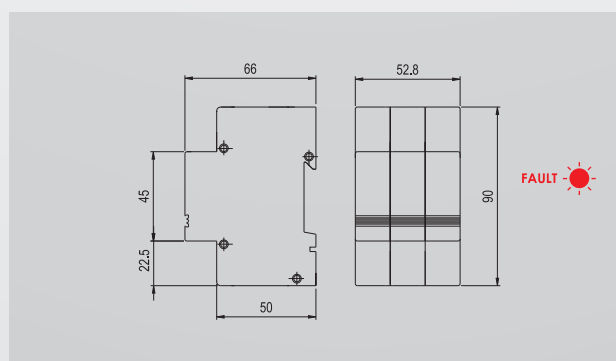
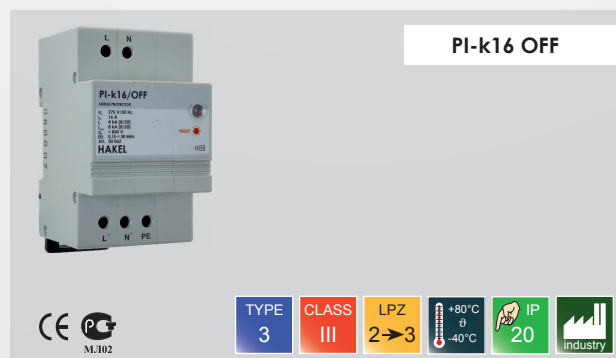
Two stage MOV surge arrester & EMC/EMI filter

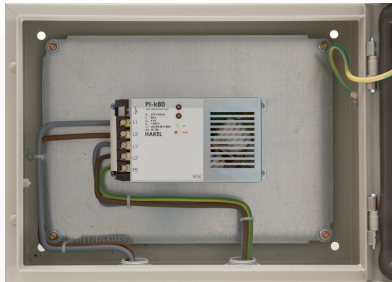


Type PI-k16 OFF

Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	16 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 4 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C_x C_y L	150 nF 22 nF 1,2 mH
Power loss at winding temp. 20°C		<2,2 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	190 g
Article number		30 062

Two stage MOV surge arrester & EMC/EMI filter





SURGE ARRESTERS - VARISTOR & EMC/EMI filter

While mounting surge arresters PI-k50, 63, 80, 120 and 150 it is necessary to ensure that the ventilation holes in their housing are not covered. These arresters are to be placed as near to the protected appliance as possible, for example near to the electronic control systems of NC machines, electronics of robotic production and another sensitive electronic appliances. It is recommended to connect protected appliance by appropriately dimensioned shielding conductor.

Two stage MOV surge arrester & EMC/EMI filter

PI-k50

TYPE 3 CLASS III LPZ 2→3 DS +80°C / -40°C IP 20 industry

Type PI-k50		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	50 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE)
		5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE)
		10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N)
		<1,5 kV (L/PE)
		<0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 4 MHz
		min. 40 dB (0,15 - 30 MHz)
Filters constants	C_x	M68
	C_y	22 nF
	L	2,2 mH
Power loss at winding temp. 20°C		<7 W
Response time	t_A	<25 ns (L/N)
		<100 ns (L/PE, N/PE)
Recommended backup fuse		50 A
Lifetime		min. 100.000 h
Weight	m	970 g
Article number		30 100

Two stage MOV surge arrester & EMC/EMI filter

PI-k63

TYPE 3 CLASS III LPZ 2→3 DS +80°C / -40°C IP 20 industry

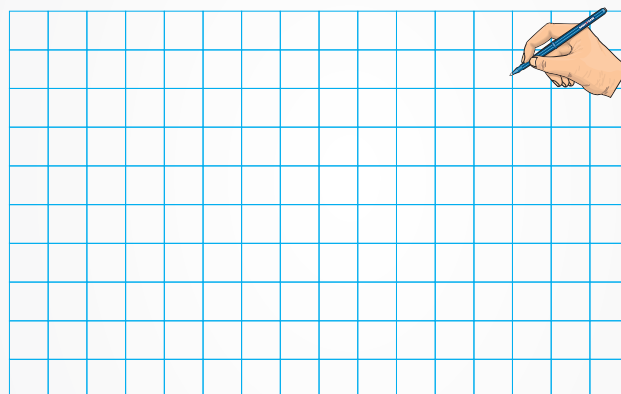
Type PI-k63		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	63 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE)
		5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE)
		10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N)
		<1,5 kV (L/PE)
		<0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 4 MHz
		min. 40 dB (0,15 - 30 MHz)
Filters constants	C_x	M68
	C_y	22 nF
	L	2,2 mH
Power loss at winding temp. 20°C		<9 W
Response time	t_A	<25 ns (L/N)
		<100 ns (L/PE, N/PE)
Recommended backup fuse		63 A
Lifetime		min. 100.000 h
Weight	m	970 g
Article number		30 200



Function of remote monitor terminals

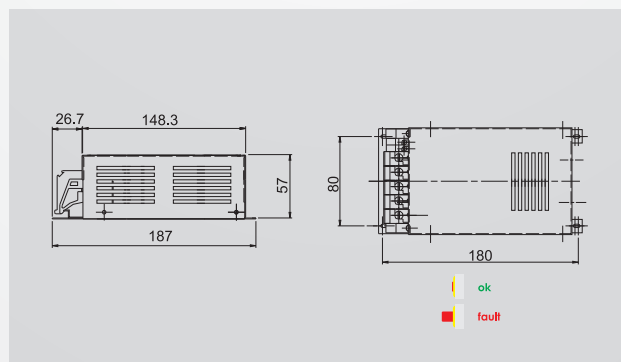
When the PI-k is operating correctly, the switching contact for remote monitoring is connected. Once the thermal fuse reacts to varistor overheating the switching contact for remote monitoring will disconnect.

el. strength against surround. circuits	3750 V _{rms}
el. strength against network circuits	3750 V _{rms}
insulation resistance	2 x 10 ⁷ Ω
max. switching current	~ 3 A
max. switching voltage	~ 250 V



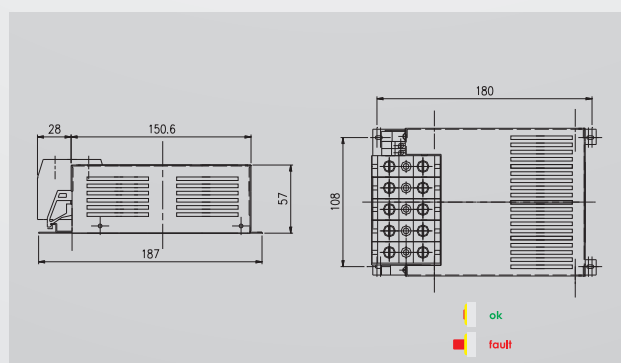
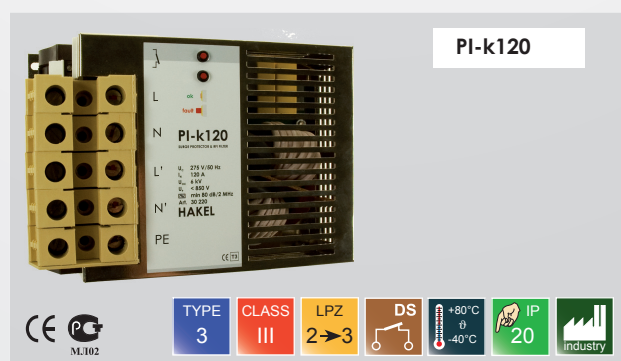
Two stage MOV surge arrester & EMC/EMI filter

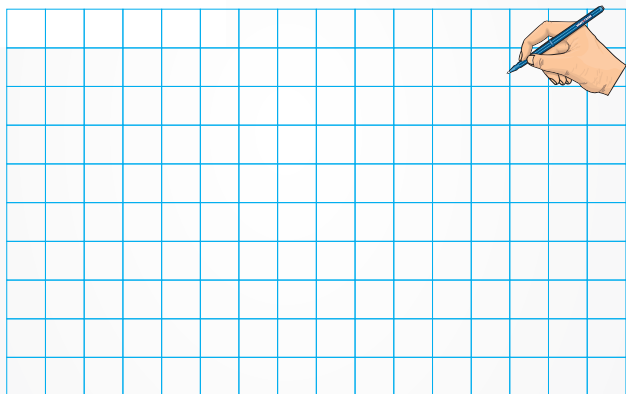
Type PI-k80		
Nominal voltage	U _N	230 V AC
Max. continuous operating voltage	U _C	275 V AC
Nominal current	I _N	80 A
Nominal discharge current I _n (8/20)	I _n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U _{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U _{OC}	U _P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 4 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C _x C _y L	M68 22 nF 1,4 mH
Power loss at winding temp. 20°C		<12 W
Response time	t _A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		80 A
Lifetime		min. 100.000 h
Weight	m	1040 g
Article number		30 180



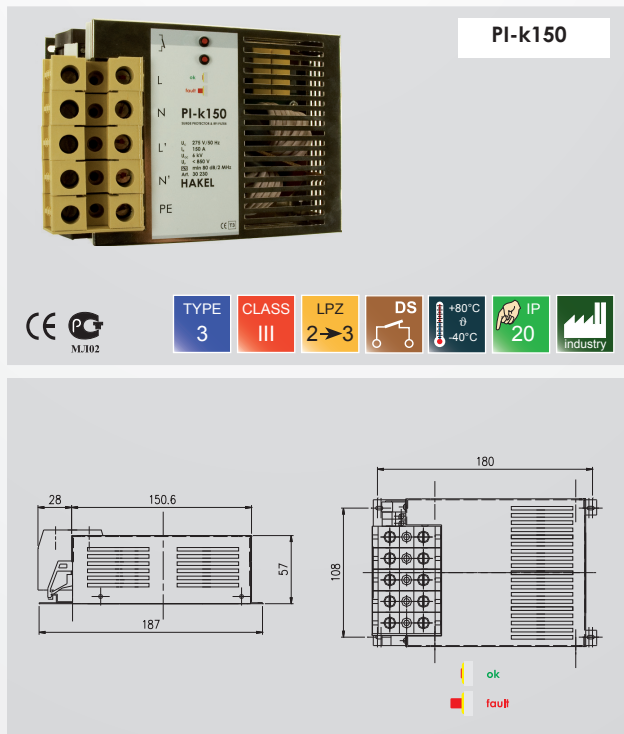
Two stage MOV surge arrester & EMC/EMI filter

Type PI-k120		
Nominal voltage	U _N	230 V AC
Max. continuous operating voltage	U _C	275 V AC
Nominal current	I _N	120 A
Nominal discharge current I _n (8/20)	I _n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U _{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U _{OC}	U _P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 2 MHz min. 30 dB (0,15 - 30 MHz)
Filters constants	C _x C _y L	2M 22 nF 1 mH
Power loss at winding temp. 20°C		<20 W
Response time	t _A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		120 A
Lifetime		min. 100.000 h
Weight	m	1300 g
Article number		30 220

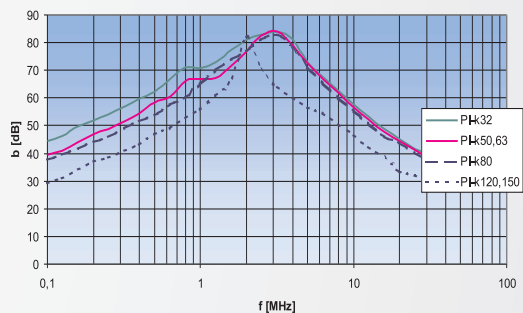




Two stage MOV surge arrester & EMC/EMI filter

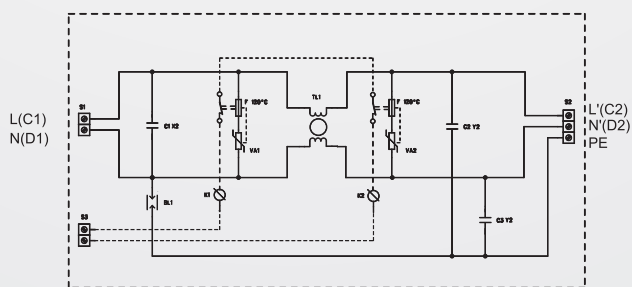


Assymetrical attenuation 50Ω/50Ω

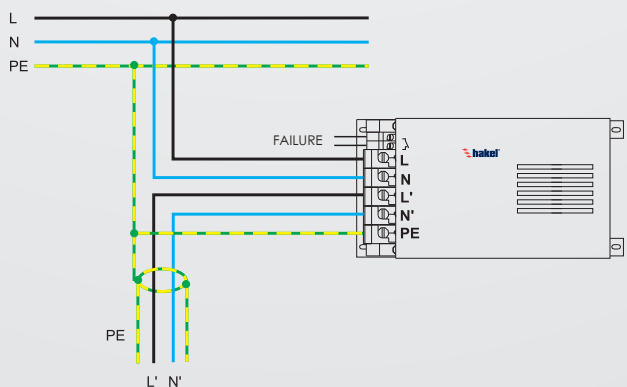
**Type PI-k150**

Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	150 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 2 MHz min. 30 dB (0,15 - 30 MHz)
Filters constants	C_x C_y L	2M 22 nF 0,6 mH
Power loss at winding temp. 20°C		<20 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		150 A
Lifetime		min. 100.000 h
Weight	m	1350 g
Article number		30 230

Basic circuit diagram of PI-k50, 63, 80, 120, 150

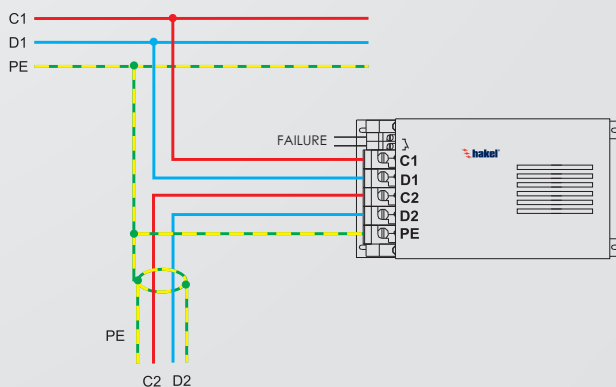


Recommended connection of PI-k50, 63, 80, 120, 150



Recommended cross-section for grounding

PI-k50	16 mm ² Cu
PI-k63	16 mm ² Cu
PI-k80	16 mm ² Cu
PI-k120	25 mm ² Cu
PI-k150	25 mm ² Cu



SURGE ARRESTERS - VARISTOR & EMC/EMI filter

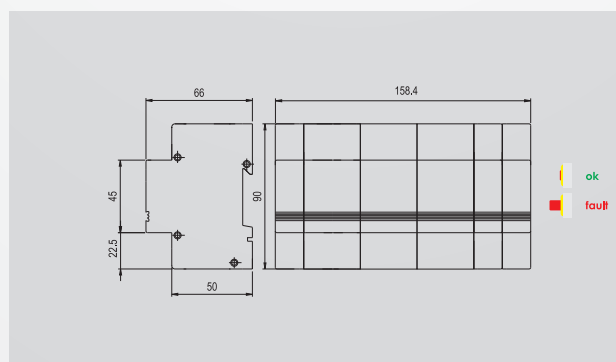
PI-3k is a three-phase surge arrester type 3 with a high-frequency filter according to EN 61643-11. They are produced for nominal current within the range of 16, 25, 32, 50, 63, 80 and 120A for application use in TNS and TNC systems. The types PI-3k16 and PI-3k25 are constructed for mounting on DIN rail 35mm. The types PI-3k32, 50, 63, 80 and 120 are produced in basic versions for mounting straight onto construction of switchboard by four screws M4. PI-3k range is designed for protection of three-phase electronic appliances in L.V. supply systems against impulse surge and high-frequency disturbance. This complex range is produced for nominal voltage within the range of 6, 12, 24, 48, 60, 80, 110, 120, 130, 160 and 230V (AC/DC).

The function failure of varistors is indicated by target disconnection of mechanical thermal fuses which react to varistors overheating above c. 120°C.



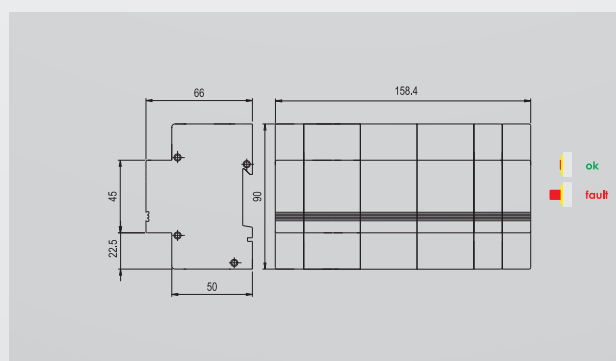
Type PI-3k16		
Nominal voltage	U_N	230/400 V AC
Max. continuous operating voltage	U_C	275/480 V AC
Nominal current	I_N	16 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 2 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C_{x1} C_{x2} C_y L	M15 M33 2x47 nF 1,3 mH
Power loss at winding temp. 20°C		<7,5 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	500 g
Article number		30 300

Two stage MOV surge arrester & EMC/EMI filter



Type PI-3k25		
Nominal voltage	U_N	230/400 V AC
Max. continuous operating voltage	U_C	275/480 V AC
Nominal current	I_N	25 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 2 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C_{x1} C_{x2} C_y L	M15 M33 2x47 nF 1,4 mH
Power loss at winding temp. 20°C		<7,5 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		25 A
Lifetime		min. 100.000 h
Weight	m	520 g
Article number		30 306

Two stage MOV surge arrester & EMC/EMI filter

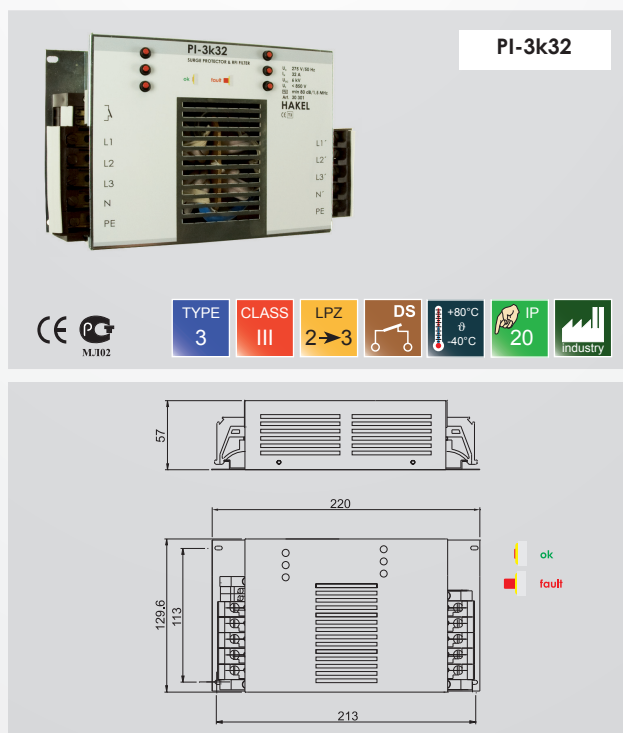




SURGE ARRESTER - VARISTOR & EMC/EMI filter

While mounting surge arresters PI-3k32, 50, 63, 80 and 120 it is necessary to ensure that the ventilation holes in their housing are not covered. These arresters are to be placed as near to the protected appliance as possible, for example near to the electronic control systems of NC machines, electronics of robotic production and another sensitive electronic appliances. It is recommended to connect protected appliance by appropriately dimensioned shielding conductor.

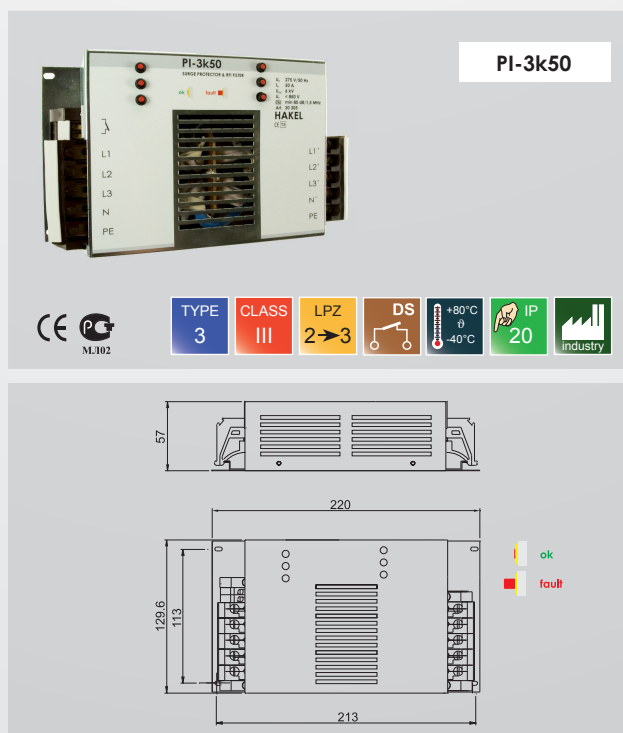
Two stage MOV surge arrester & EMC/EMI filter



Type PI-3k32

Nominal voltage	U_N	230/400 V AC
Max. continuous operating voltage	U_C	275/480 V AC
Nominal current	I_N	32 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 2 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C_{x1} C_{x2} C_Y L	M15 M68 2x47 nF 2,15 mH
Power loss at winding temp. 20°C		<8 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		32 A
Lifetime		min. 100.000 h
Weight	m	1500 g
Article number		30 301

Two stage MOV surge arrester & EMC/EMI filter



Type PI-3k50

Nominal voltage	U_N	230/400 V AC
Max. continuous operating voltage	U_C	275/480 V AC
Nominal current	I_N	50 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 1,5 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C_{x1} C_{x2} C_Y L	M15 M68 2x47 nF 1 mH
Power loss at winding temp. 20°C		<9 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		50 A
Lifetime		min. 100.000 h
Weight	m	1600 g
Article number		30 305



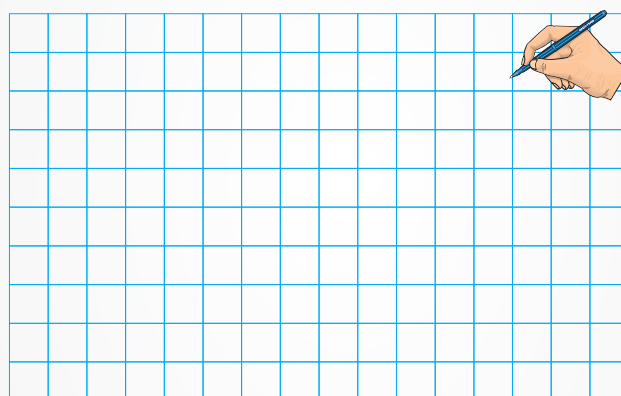
Function of remote monitor terminals

When the PI-3k is operating correctly, the switching contact for remote monitoring is connected. Once the thermal fuse reacts to varistor overheating the switching contact for remote monitoring will disconnect.

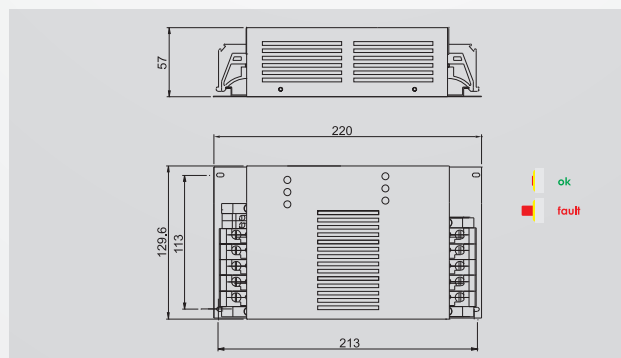
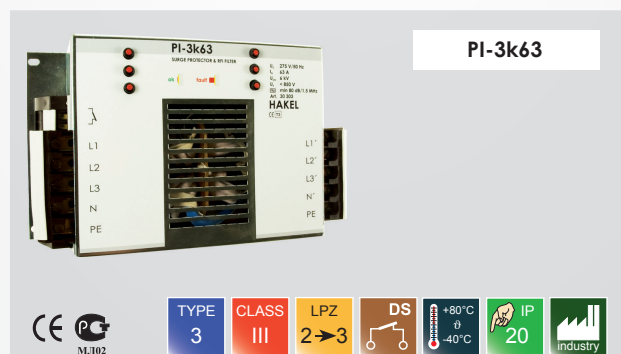
el. strength against surround. circuits	3750 V _{rms}
el. strength against network circuits	3750 V _{rms}
insulation resistance	2 x 10 ⁷ Ω
max. switching current	~ 3 A
max. switching voltage	~ 250 V

Type PI-3k63

Nominal voltage	U _N	230/400 V AC
Max. continuous operating voltage	U _C	275/480 V AC
Nominal current	I _N	63 A
Nominal discharge current I _n (8/20)	I _n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U _{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U _{OC}	U _P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 2 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C _{x1} C _{x2} C _y L	M15 M68 2x47 nF 2,15 mH
Power loss at winding temp. 20°C		<8 W
Response time	t _A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		63 A
Lifetime		min. 100.000 h
Weight	m	1600 g
Article number		30 303



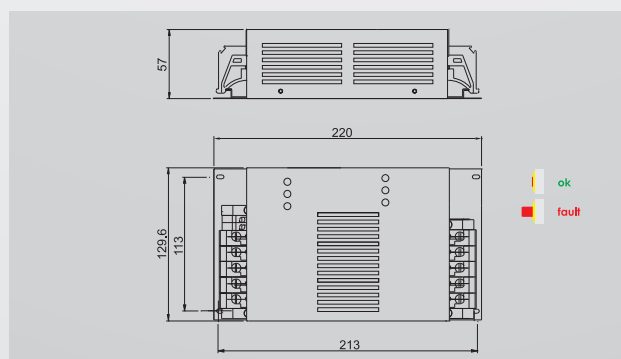
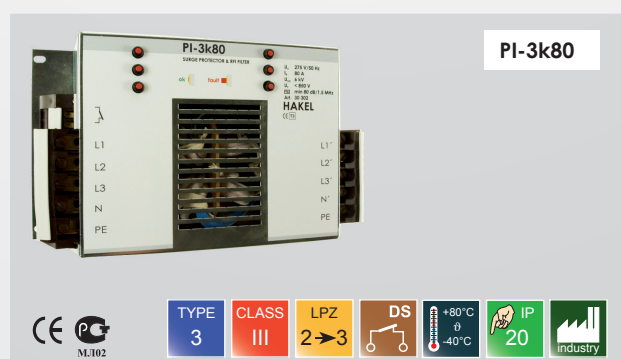
Two stage MOV surge arrester & EMC/EMI filter



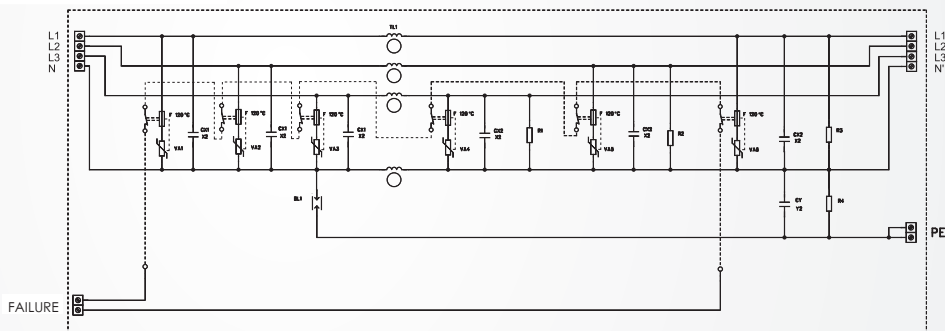
Type PI-3k80

Nominal voltage	U _N	230/400 V AC
Max. continuous operating voltage	U _C	275/480 V AC
Nominal current	I _N	80 A
Nominal discharge current I _n (8/20)	I _n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U _{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U _{OC}	U _P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 80 dB at 1,5 MHz min. 40 dB (0,15 - 30 MHz)
Filters constants	C _{x1} C _{x2} C _y L	M15 M68 2x47 nF 0,9 mH
Power loss at winding temp. 20°C		<15 W
Response time	t _A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		80 A
Lifetime		min. 100.000 h
Weight	m	1730 g
Article number		30 302

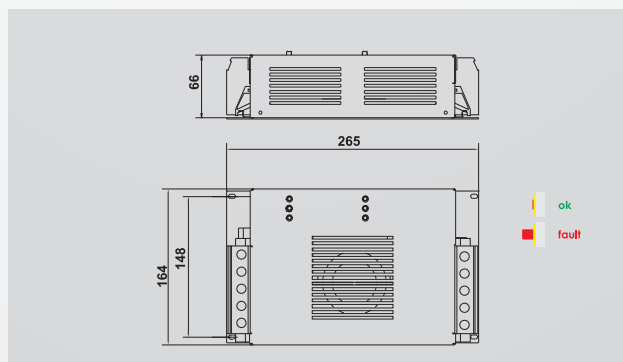
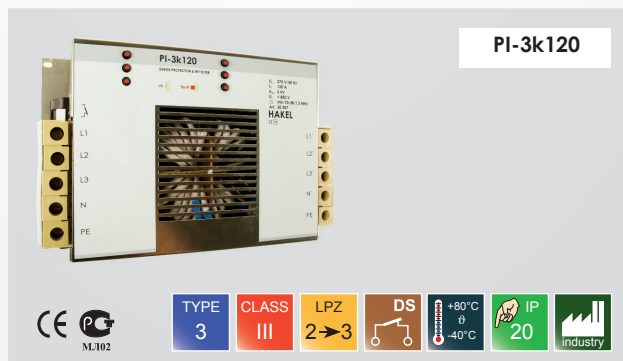
Two stage MOV surge arrester & EMC/EMI filter



Basic circuit diagram of PI-3k



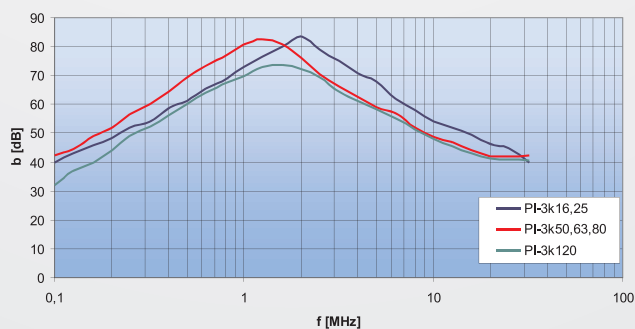
Two stage MOV surge arrester & EMC/EMI filter



Type PI-3k120

Nominal voltage	U_N	230/400 V AC
Max. continuous operating voltage	U_C	275/480 V AC
Nominal current	I_N	120 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <0,5 kV (N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 70 dB at 1,5 MHz min. 30 dB (0,15 - 30 MHz)
Filters constants	C_{x1} C_{x2} C_y L	M15 M68 2x47 nF 1 mH
Power loss at winding temp. 20°C		<25 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		120 A
Lifetime		min. 100,000 h
Weight	m	2600 g
Article number		30 307

Assymetrical attenuation 50Ω/50Ω

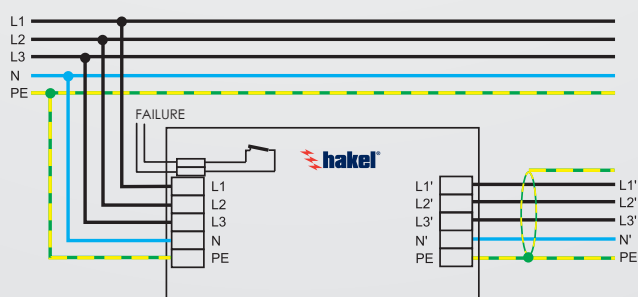


Recommended cross-section for grounding

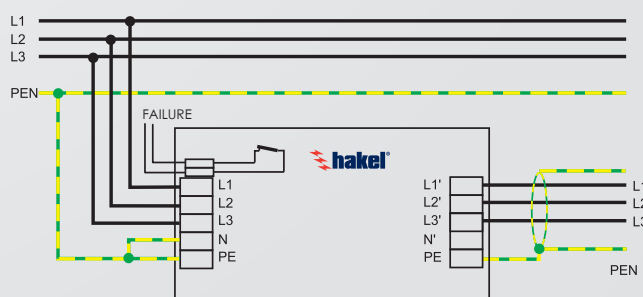
PI-3k16	6 mm ² Cu
PI-3k25	6 mm ² Cu
PI-3k32	16 mm ² Cu
PI-3k50	16 mm ² Cu
PI-3k63	16 mm ² Cu
PI-3k80	16 mm ² Cu
PI-3k120	25 mm ² Cu

Recommended connection of PI-3k

System TNS



System TNC



SURGE ARRESTERS - VARISTOR & EMC/EMI filter

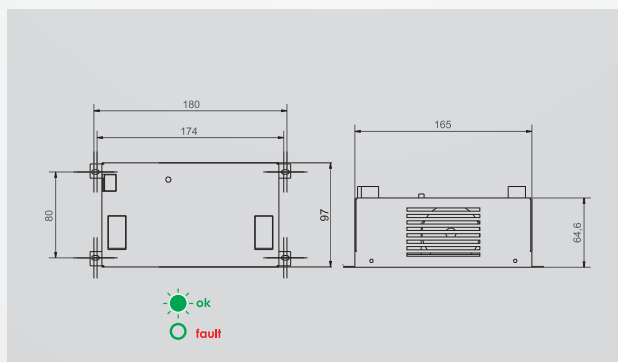
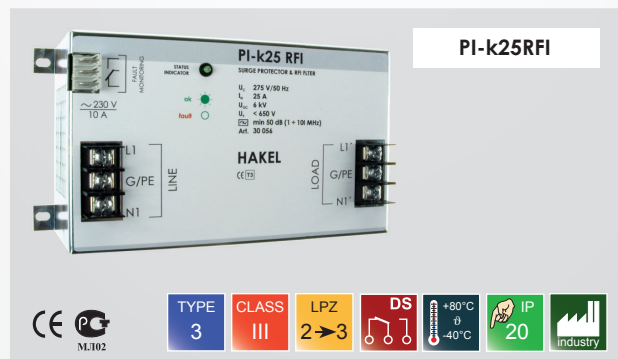
PI-k25RFI is a single-phase surge arrester type 3 according to EN 61643-11. It is specially designed hybrid low noise filter intended for a high effective protection of expensive electronic equipment against high frequency disturbance and against impulse overvoltage. This filter is constructed to be mounted on DIN rail 35mm or straight onto the construction of switchboard by four screws M4. The basic version of PI-k25RFI is for nominal current $I_N = 25A$ and nominal voltage $U_N = 230V$ AC (DC) for use in TNS systems. However, it is possible to supply this arrester for $U_N = 6, 12, 24, 48, 60, 80, 110, 120, 130$ or $160V$ AC(DC) on a special demand. All fitted varistors are equipped with thermal disconnectors that react to varistors overheating at overload. This device is equipped with optical indicator of right function STATUS INDICATOR and with remote monitoring of failure (FAULT MONITORING) by potential-free switching contact. While mounting PI-k25RFI it is necessary to ensure that the ventilation holes in its housing are not covered.



Type PI-k25RFI

Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	25 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE, N/PE)
Voltage protection level at U_{OC}	U_P	<650 V (L/N, L/PE, N/PE)
Asymmetrical attenuation of filter (band-stop filter)		min. 50 dB (1 - 100 MHz) 30 - 50 dB (0,1 - 1 MHz)
Filters constants	C_x	220 nF + 3x4,7 μ F
	C_y	2x47 nF
	L	2x1 μ H + 2x44 μ H
	R	68 k Ω
Power loss at winding temp. 20°C		<29 W
Response time	t_A	<25 ns
Recommended backup fuse		25 A
Lifetime		min. 100.000 h
Weight	m	1140 g
Article number		30 056

Two stage MOV surge arrester & EMC/EMI filter

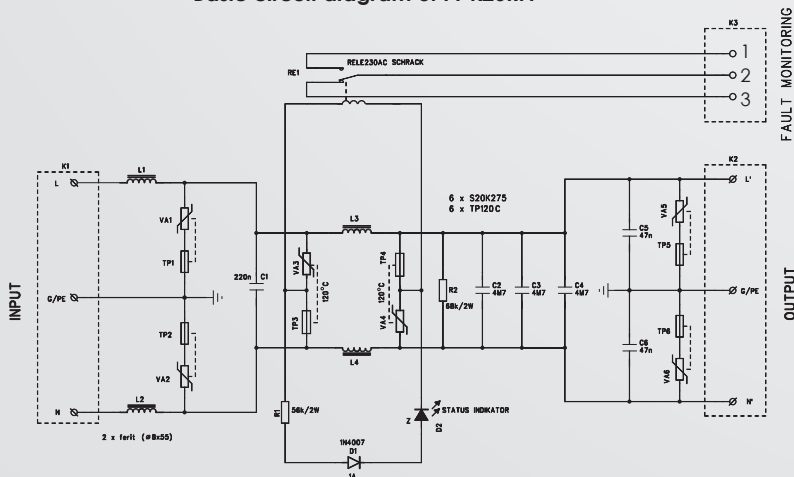


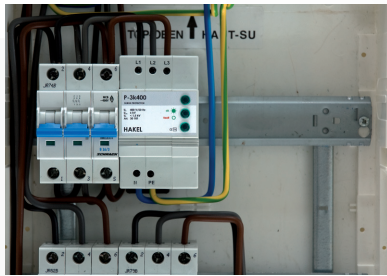
el. strength against surround. circuits	3750 V _{rms}
el. strength against network circuits	3750 V _{rms}
insulation resistance	2 x 10 ⁷ Ω
max. switching current	~ 10 A
max. switching voltage	~ 250 V

Function of remote monitor terminals

When the PI-k25RFI is operating correctly, the switching contact for remote monitoring is connected. Once the thermal fuse reacts to varistor overheating the switching contact for remote monitoring will disconnect.

Basic circuit diagram of PI-k25RFI

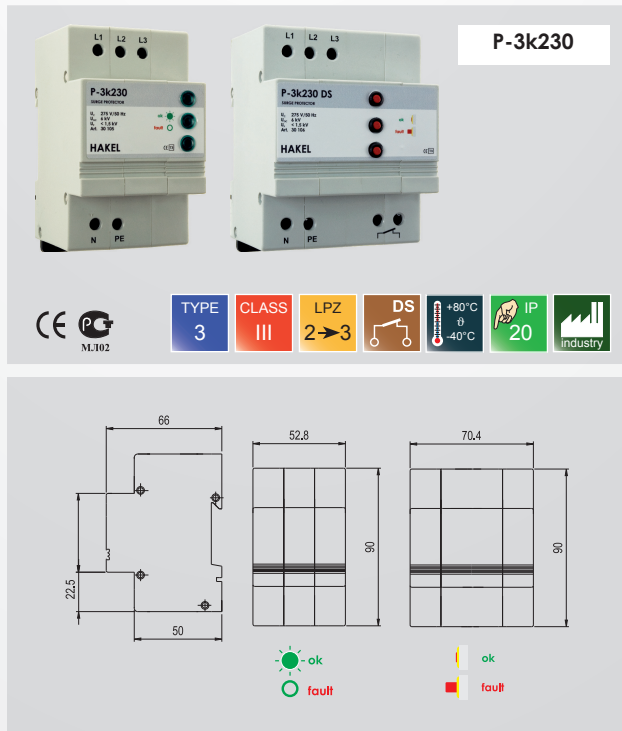




SURGE ARRESTERS - VARISTOR

P-3k is a three-phase surge arrester type 3 according to EN 61643-11 suitable for use in TNS, TNC and TT systems. These are parallel devices intended for protection of electronic appliances against impulse surge. All varistors in P-3k device are fitted with thermal fuses to prevent short and also permanent overloading. P-3k units are to be connected as near to the protected electronic appliance as possible. The right function of P-3k230, P-3k400 and P-3k500 devices is indicated by three green LED diodes. The function failure of P-3k230 DS and P-3k400 DS devices is indicated by target disconnection of mechanical thermal fuses which react to varistors overheating above c. 120°C. If one of the three thermal fuses reacts, the non-potential contact FAILURE disconnects at the same time (in case of DS version only).

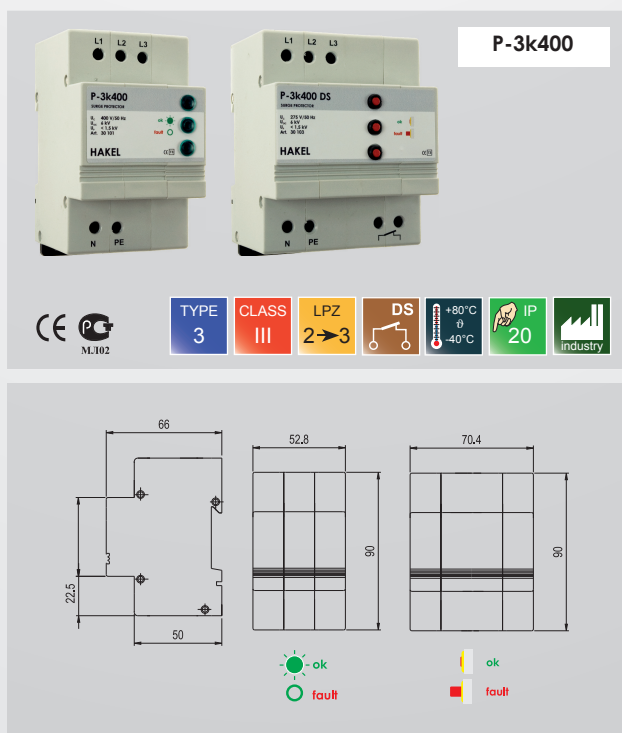
MOV + GDT surge arrester



Type P-3k230/P-3k230 DS

Nominal voltage	U_N	230/400 V AC
Max. continuous operating voltage	U_C	275/480 V AC
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE) <1,5 kV (L/N) <1,5 kV (L/PE) <1,5 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<1,5 kV (L/PE) <1,5 kV (N/PE)
Power loss at winding temp. 20°C		<0,1 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	140/205 g
Article number		
P-3k230		30 105
P-3k230 DS		30 106

MOV + GDT surge arrester



Type P-3k400/P-3k400 DS

Nominal voltage	U_N	400 V AC
Max. continuous operating voltage	U_C	480 V AC
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE) <1,5 kV (L/N) <1,5 kV (L/PE) <1,5 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<1,5 kV (L/PE) <1,5 kV (N/PE)
Power loss at winding temp. 20°C		<3 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	140/205 g
Article number		
P-3k400		30 101
P-3k400 DS		30 103



Function of remote monitor terminals

When the P-3k is operating correctly, the switching contact for remote monitoring is connected. Once the thermal fuse reacts to varistor overheating the switching contact for remote monitoring will disconnect.

el. strength against surround. circuits	3750 V _{rms}
el. strength against network circuits	3750 V _{rms}
insulation resistance	$2 \times 10^7 \Omega$
max. switching current	~ 3 A
max. switching voltage	~ 250 V

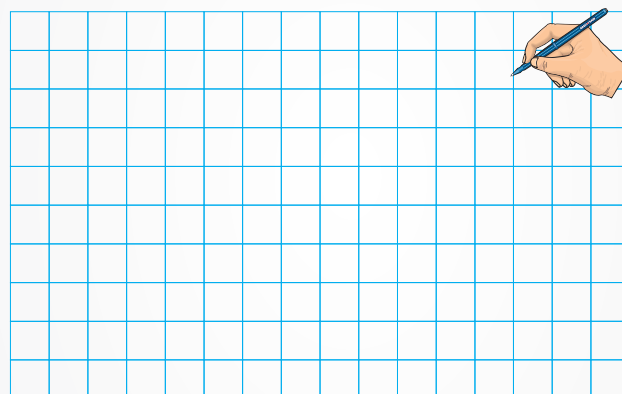
Type P-3k500

Nominal voltage	U _N	500 V AC
Max. continuous operating voltage	U _C	600 V AC
Nominal discharge current I _n (8/20)	I _n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U _{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U _{OC}	U _P	<1,8 kV (L/N) <1,5 kV (L/PE) <1,5 kV (N/PE)
Power loss at winding temp. 20°C		<3 W
Response time	t _A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	150 g
Article number		30 102

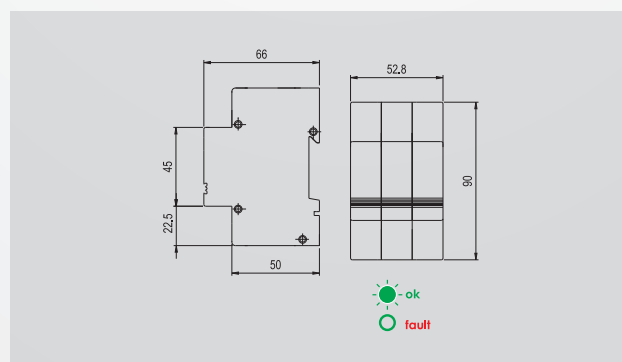
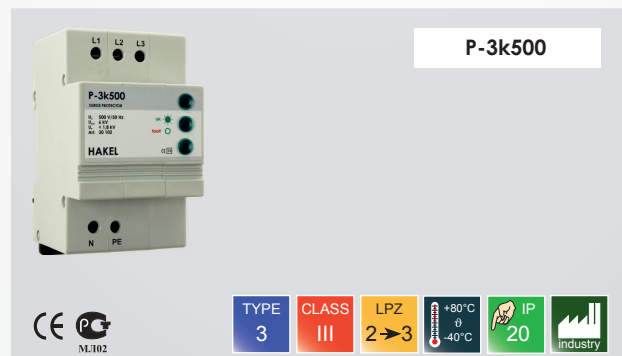
Recommended cross-section for grounding

P-3k230, P-3k400, P-3k500

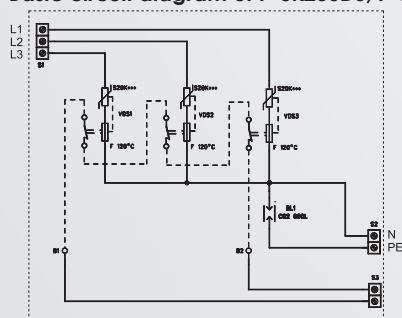
4 mm² Cu



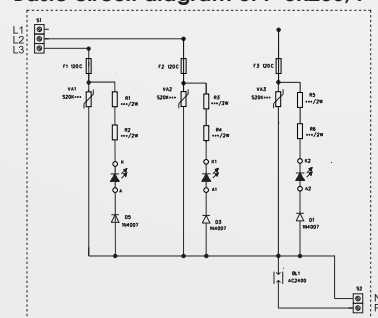
MOV + GDT surge arrester



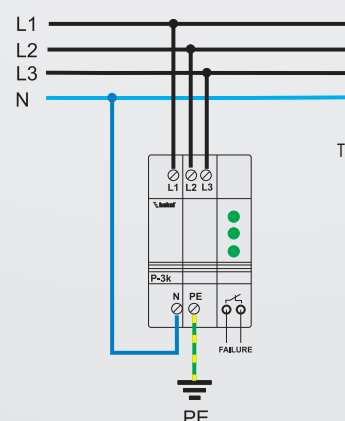
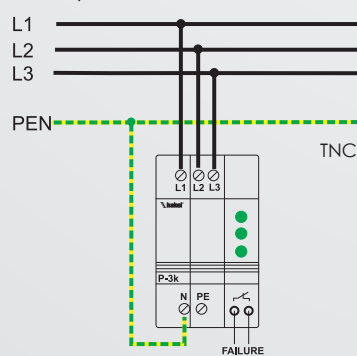
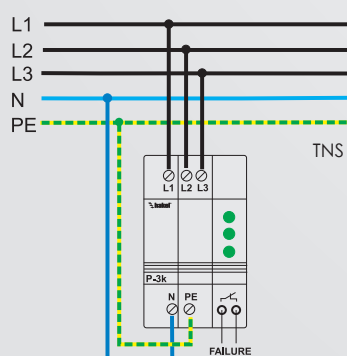
Basic circuit diagram of P-3k230DS, P-3k400DS



Basic circuit diagram of P-3k230, P-3k400, P-3k500



Recommended connection of P3-k230, P3-k400, P3k500





SURGE ARRESTERS - VARISTOR

ZS-1DSM is a single-phase surge arrester type 3 according to EN 61643-11 suitable for use in TNS and TNC systems. It is designed for universal application for protection of electrical appliances connected to L.V. supply system against impulse surge effects. The right function is indicated by fitted green LED diode. The connection to L.V. supply system is provided by means of screw terminals.

MOV + GDT surge arrester



ZS-1DSM



TYPE 3

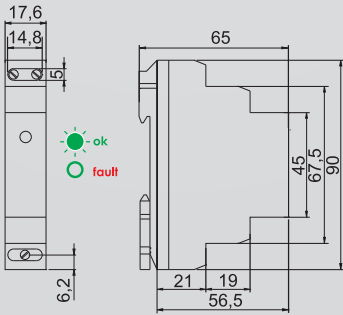
CLASS III

LPZ 2→3

+80°C
-40°C

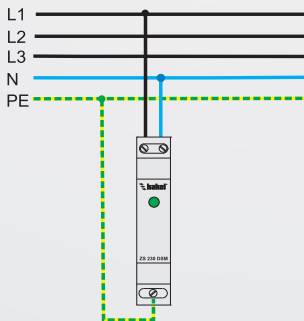
IP 20

industry

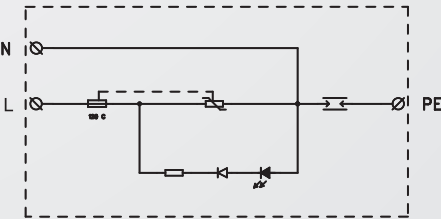


Type ZS-1DSM		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE)
		5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE)
		10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<1 kV (L/N)
		<1,2 kV (L/PE)
Power loss at winding temp. 20°C		<1,2 kV (N/PE)
		<0,5 W
Response time	t_A	<25 ns (L/N)
Recommended backup fuse		<100 ns (L/PE, N/PE)
		16 A
Temporary overvoltage (TOV)	U_T	335V/5 s (L/N)
Lifetime		1200V+ U_0 /200 ms (L/PE)
Weight	m	min. 100.000 h
Article number		45 g
		32 016

Recommended connection of ZS-1DSM



Basic circuit diagram of ZS-1DSM



SURGE ARRESTERS - VARISTOR

Pk2 is a single-phase surge arrester type 3 according to EN 61643-11 suitable for TNS and TNC systems. It is designed for universal application for protection of all electrical appliances connected to L.V. supply system against impulse surge effects. It is possible to supply this arrester for different nominal voltage (different from 230V/50Hz) on a special demand. The function failure of varistor is indicated by target disconnection of mechanical thermal fuse which react to varistor overheating above c. 120°C.

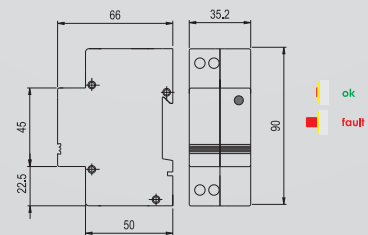


Type Pk2			
Nominal voltage	U_N	230 V AC	
Max. continuous operating voltage	U_C	275 V AC	
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE)	
		5 kA (N/PE)	
Combined impulse	U_{OC}	6 kV (L/N, L/PE)	
		10 kV (N/PE)	
Voltage protection level at U_{OC}	U_P	<1 kV (L/N)	
		<1,2 kV (L/PE)	
		<1,2 kV (N/PE)	
Power loss at winding temp. 20°C		<0,5 W	
Response time	t_A	<25 ns (L/N)	
		<100 ns (L/PE, N/PE)	
Recommended backup fuse		16 A	
Temporary overvoltage (TOV)	U_T	335V/5 s (L/N)	
		1200V+ U_0 /200 ms (L/PE)	
Lifetime		min. 100.000 h	
Weight	m	100 g	
Article number		32 030	

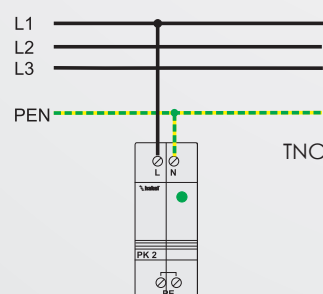
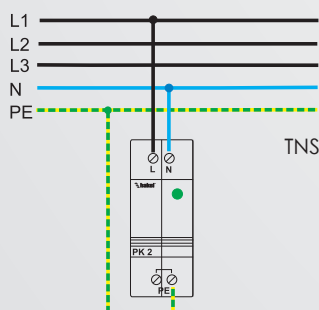
MOV + GDT surge arrester



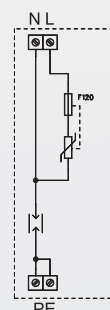
Pk2

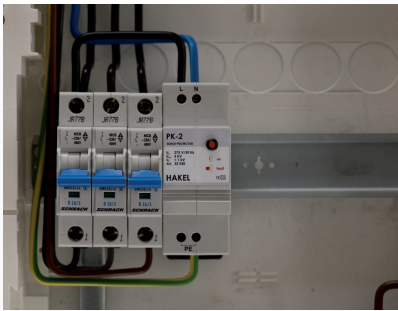


Recommended connection of Pk2



Basic circuit diagram of Pk2





SURGE ARRESTERS - VARISTOR

P-k16/* DC is single-phase surge arrester type 3 according to EN 61643-11 designed for protection of electronic appliances in L.V. supply systems against impulse surge. They are constructed for mounting on DIN rail 35mm for nominal current of 16A. This complex range is produced for nominal voltage within the range of 12, 24, 48 and 110V DC. The right function of P-k16/* DC is indicated by green LED diode.

MOV + GDT surge arrester

P-K16/12 DC

TYPE 3 CLASS III LPZ 2→3 +80°C ÷ -40°C IP 20 industry

Type P-k16/12 DC			
Nominal voltage	U _N	12 V DC	
Max. continuous operating voltage	U _C	20 V DC	
Nominal discharge current I _n (8/20)	I _n	3 kA	
Combined impulse	U _{OC}	6 kV (L+/L-, PE) 10 kV (L-/PE)	
Voltage protection level at U _{OC}	U _P	< 120 V (L+/L-) < 660 V (L-/PE)	
Response time	t _A	< 25 ns (L+/L-) 100 ns (L-, N/PE)	
Recommended backup fuse		16 A	
Lifetime		min. 100.000 h	
Weight	m	90 g	
Article number		30 001	

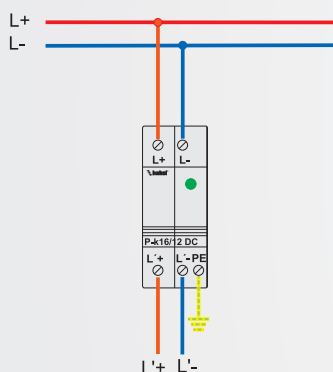
MOV + GDT surge arrester

P-K16/24 DC

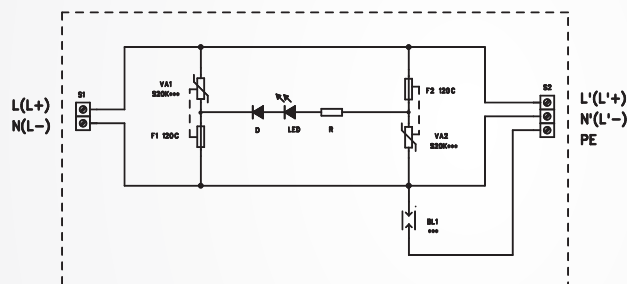
TYPE 3 CLASS III LPZ 2→3 +80°C ÷ -40°C IP 20 industry

Type P-k16/24 DC			
Nominal voltage	U _N	24 V DC	
Max. continuous operating voltage	U _C	36 V DC	
Nominal discharge current I _n (8/20)	I _n	3 kA	
Combined impulse	U _{OC}	6 kV (L+/L-, PE) 10 kV (L-/PE)	
Voltage protection level at U _{OC}	U _P	< 120 V (L+/L-) < 660 V (L-/PE)	
Response time	t _A	< 25 ns (L+/L-) 100 ns (L-, N/PE)	
Recommended backup fuse		16 A	
Lifetime		min. 100.000 h	
Weight	m	90 g	
Article number		30 002	

Recommended connection of P-k16/*DC



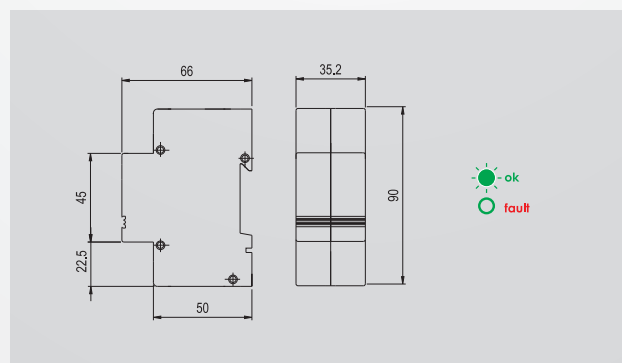
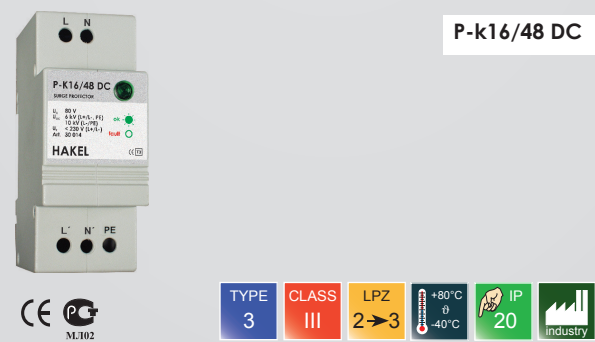
Basic circuit diagram of P-k16/*DC



Type P-k16/48 DC

Nominal voltage	U_N	48 V DC
Max. continuous operating voltage	U_C	80 V DC
Nominal discharge current $I_n(8/20)$	I_n	3 kA
Combined impulse	U_{OC}	6 kV (L+/L-, PE) 10 kV (L-/PE)
Voltage protection level at U_{OC}	U_P	< 230 V (L+/L-)
Response time	t_A	< 25 ns (L+/L-) 100 ns (L, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	90 g
Article number		30 014

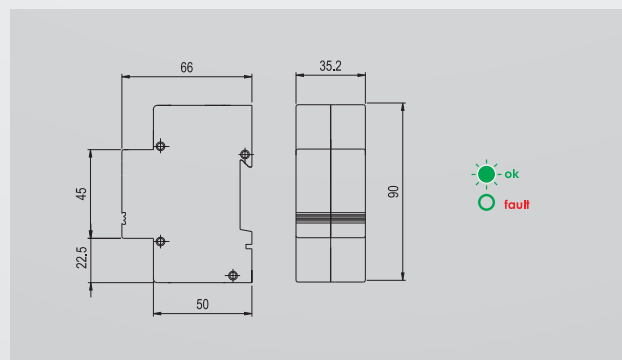
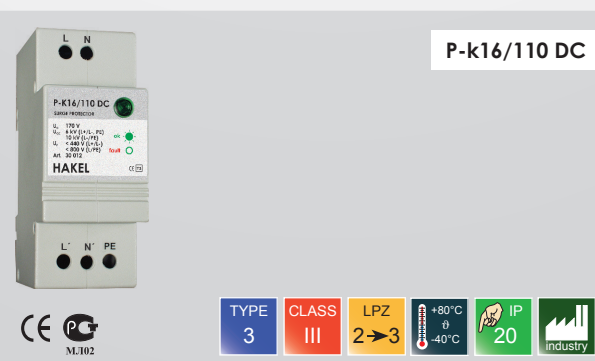
MOV + GDT surge arrester



Type P-k16/110 DC

Nominal voltage	U_N	110 V DC
Max. continuous operating voltage	U_C	170V DC
Nominal discharge current $I_n(8/20)$	I_n	3 kA
Combined impulse	U_{OC}	6 kV (L+/L-, PE) 10 kV (L-/PE)
Voltage protection level at U_{OC}	U_P	< 440 V (L+/L-) < 800 V (L/PE)
Response time	t_A	< 25 ns (L+/L-) 100 ns (L, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	90 g
Article number		30 012

MOV + GDT surge arrester





SURGE ARRESTERS - VARISTOR

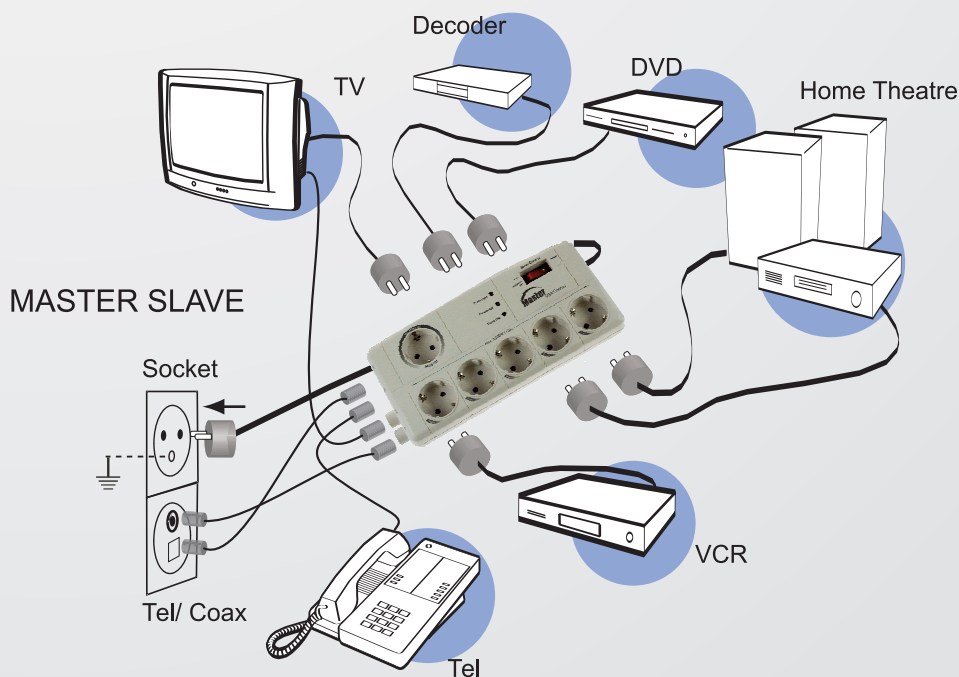
PROTECTOR MS FULL is universal surge protector designed for use in single-phase TNS system. These devices comply with the requirements for surge arrester type 3 according to EN 61643-11. This type of surge protective multiple socket outlet contains protection of telephone lines with RJ12 connector as well as protection of coaxial cable for TV connector 75Ω.

The right function of the protector is indicated by following indicator lights:

- Protected LED: Indicates that the internal surge Protection is in function
- Power OK LED: Indicates that master socket outlets is supplied with voltage
- Slave On LED: Indicates that the slave sockets outlets are feeded with power

All socket outlets have child-protection. The length of connecting cable is 1,8m.

MOV + GDT surge arrester



SURGE ARRESTERS - VARISTOR

PDU-F-807A* is a base unit type 3 intended for protection of electronic appliances in L.V. supply system against impulse overvoltage and high-frequency disturbance. PDU is constructed for mounting into 19" rackmounts. It complies with IEC 939 and EN 61643-11 standards and its right function is indicated by green LED diode. The maximum number of protected outlets is eight.

PDU-F-807A3 is a two-stage surge protection containing MOV+GDT and EMC/EMI filter

PDU-F-807A2 is a single-stage surge protection containing MOV+GDT



Type PDU-F-807A3

Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	16 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (L/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<1 kV (L/N) <1,2 kV (L/PE) <1,2 kV (N/PE)
The number of socket-outlets with child-protection		8 pcs.
19" rackmounts mounting, size 1 U		YES
Length of connecting cable		2m
Asymmetrical attenuation of filter (band-stop filter)		min. 35 dB (0,15 - 30 MHz)
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	650 g
Article number		45 042

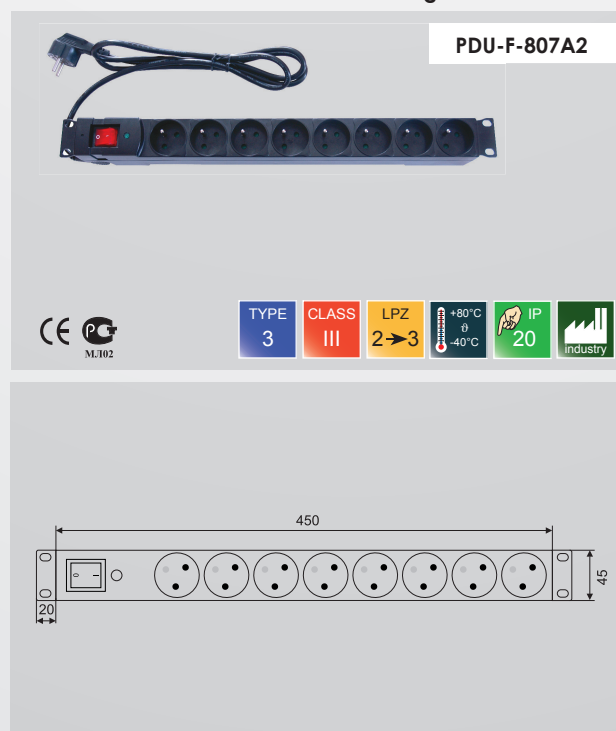
Power Distribution Unit - MOV surge arrester & EMC/EMI filter



Type PDU-F-807A2

Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	16 A
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (L/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<1 kV (L/N) <1,2 kV (L/PE) <1,2 kV (N/PE)
The number of socket-outlets with child-protection		8 pcs.
19" rackmounts mounting, size 1 U		YES
Length of connecting cable		2m
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	650 g
Article number		45 041

Power Distribution Unit - MOV + GDT surge arrester

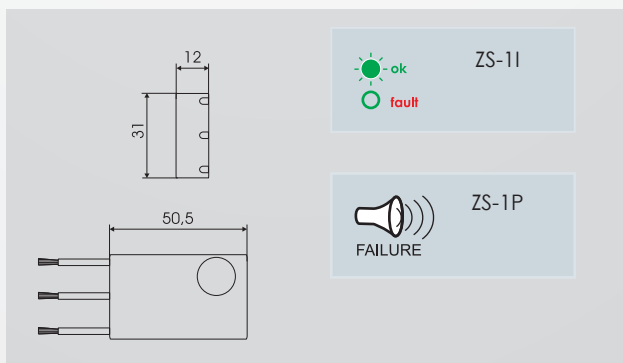
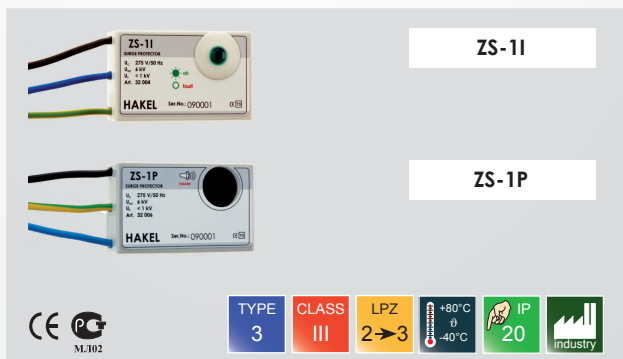




SURGE ARRESTER - VARISTOR

ZS-11, ZS-1P are surge arresters type 3 according to EN 61643-11 and IEC 61643-1 designed for installation into electrical installation systems, e.g.: cable ducts and flush-mounted sockets as an additional protection. These devices are suitable supplements of socket distribution which are protected by PI-k protector. The right function of ZS-11 type is indicated by green LED diode. When the indicator is off, the device must be replaced or technically checked. ZS-1P contains an acoustic fault indicator (buzzer).

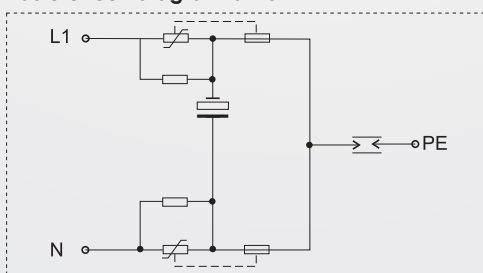
MOV + GDT surge arrester



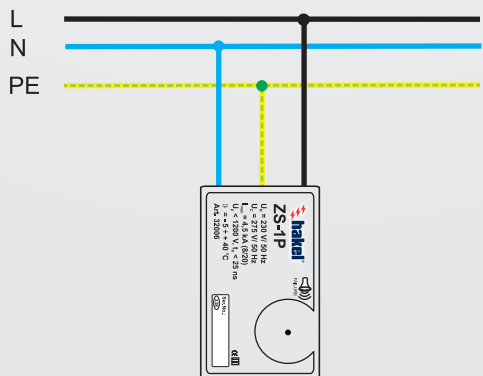
Type ZS-11/ZS-1P

Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal discharge current $I_n(8/20)$	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N, L/PE) 10 kV (N/PE) <1 kV (L/N)
Voltage protection level at U_{OC}	U_P	<1 kV (L/PE) <1,2 kV (N/PE)
Power loss at winding temp. 20°C		<0,5 W
Response time	t_A	<25 ns (L/N) <100 ns (L/PE, N/PE)
Recommended backup fuse		16 A
Temporary overvoltage (TOV)	U_T	335V/5 s (L/N) 1200V+ U_0 /200 ms (L/PE)
Lifetime		min. 100.000 h
Failure indication		green LED diode inbuilt piezosiren
Weight	m	20/30 g
Article number		
ZS-11		32 004
ZS-1P		32 006

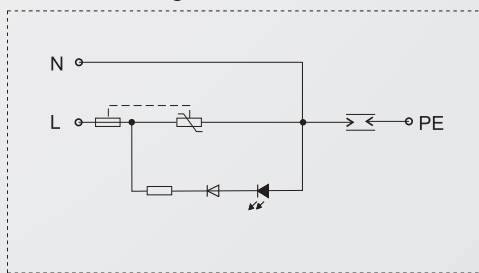
Basic circuit diagram of ZS-1P



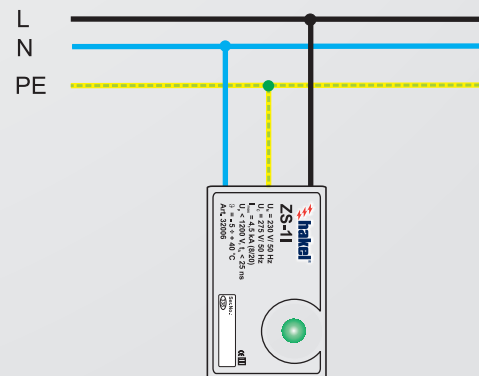
Recommended connection of ZS-1P



Basic circuit diagram of ZS-11



Recommended connection of ZS-11



Application table

Type	Art. No.	Mounting	TE	Weight (g)	U _c (V)	Connect.	Cross-section area mm ²	Nominal voltage I _N (A)	High frequency filter HF
PI - k 8	30 080	DIN 35mm	2	126	275	serial	1,5 - 2,5	8	HF
PI - k 16	30 004	DIN 35mm	3	167	275	serial	1,5 - 2,5	16	HF
PI - k 16 DS	30 027	DIN 35mm	4	224	275	serial	1,5 - 2,5	16	HF
PI - k 25	30 017	DIN 35mm	4	232	275	serial	4	25	HF
PI - k 25 DS	30 034	DIN 35mm	4	237	275	serial	4	25	HF
PI - k 32	30 005	DIN 35mm	4	237	275	serial	6	32	HF
PI - k 50	30 100	sw. board chassis	-	967	275	serial	16	50	HF
PI - k 63	30 200	sw. board chassis	-	970	275	serial	16	63	HF
PI - k 80	30 180	sw. board chassis	-	970	275	serial	25	80	HF
PI - k 120	30 220	sw. board chassis	-	1280	275	serial	35	120	HF
PI - k 150	30 230	sw. board chassis	-	1300	275	serial	35	150	HF
PI - k 25 RFI	30 056	sw. board chassis	-	1140	275	serial	4	25	HF
PI - 3k 16	30 300	DIN 35mm	9	498	275	serial	1,5 - 2,5	16	HF
PI - 3k 25	30 306	DIN 35mm	9	515	275	serial	4	25	HF
PI - 3k 32	30 301	sw. board chassis	-	520	275	serial	6	32	HF
PI - 3k 50	30 305	sw. board chassis	-	1585	275	serial	16	50	HF
PI - 3k 63	30 303	sw. board chassis	-	1588	275	serial	16	63	HF
PI - 3k 80	30 302	sw. board chassis	-	1721	275	serial	25	80	HF
PI - 3k 120	30 307	sw. board chassis	-	2601	275	serial	35	120	HF
PK 2	32 030	DIN 35mm	2	99	275	parallel	1,5 - 2,5	-	-
ZS - 1 DSM	32 016	DIN 35mm	1	44	275	parallel	1,5 - 2,5	-	-
ZS - 1I	32 004	DIN 35mm	-	17	275	parallel	1,5 - 2,5	-	-
ZS - 1P	32 006	DIN 35mm	-	26	275	parallel	1,5 - 2,5	-	-
P - 3k 230	32 105	DIN 35mm	3	135	275	parallel	1,5 - 2,5	-	-
P - 3k 230 DS	30 106	DIN 35mm	4	140	275	parallel	1,5 - 2,5	-	-
P - 3k 400	30 101	DIN 35mm	3	140	440	parallel	1,5 - 2,5	-	-
P - 3k 400 DS	30 103	DIN 35mm	4	205	440	parallel	1,5 - 2,5	-	-
P - 3k 500	30 102	DIN 35mm	3	146	600	parallel	1,5 - 2,5	-	-
PROTECTOR MS FULL	47 006	adaptor	-	729	275	parallel	1,5 - 2,5	16	-
PDU-F-807A2	45 041	19" rack mount	-	645	275	parallel	1,5 - 2,5	16	-
PDU-F-807A3	45 042	19" rack mount	-	650	275	serial	1,5 - 2,5	16	HF

TE - dividing unit (17,5 mm)

Housing material - Polyamide PA6