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LIGHTNING AND SURGE ARRESTERS FOR SUPPLY SYSTEMS AND EQUIPMENT UP TO 1000V

Classification of typical objects	System	No. of phases	Circuit	Type 1-at boundaries of LPZ 0-1 (lightning arrester) SPD type	Installation	Coordination T1 and T2 < 5 m
Buildings with considerable level of protection LPL I (I_{imp} = 100 kA) *Hospitals* *Banks* *Transmission point for GSM,BTS* *Water stations* *Power plants* *Aerodrome control tower* *Buildings with danger of explosion* ***Bigger industrial buildings*** ***Buildings with particular importance***	TNC	1	1+0	 HS50-50	Substation Switchboard (kWh) Main switchboard	5 metres cable or decoupling element Pl-L (16-120 A)
		3	3+0	 HS50-50/3+0	Substation Switchboard (kWh) Main switchboard	
				 SPC25/3+0	Main switchboard Coordination of SPC with SPU doesn't require separation by longer cable or by decoupling element. (The installation of SPD T2 is necessary, if the length is > 30 m from T1)	
	TNS	1	1+1	 HS50-50/1+1	Substation Switchboard (kWh) Main switchboard	5 metres cable or decoupling element Pl-L (16-120 A)
			2+0	 HS50-50/2+0		
		3	3+1	 SPC25/3+1	Main switchboard Coordination of SPC with SPU doesn't require separation by longer cable or by decoupling element. (The installation of SPD T2 is necessary, if the length is > 30 m from T1)	
			4+0	 SPC25/4+0		

Step 1
(object selection)

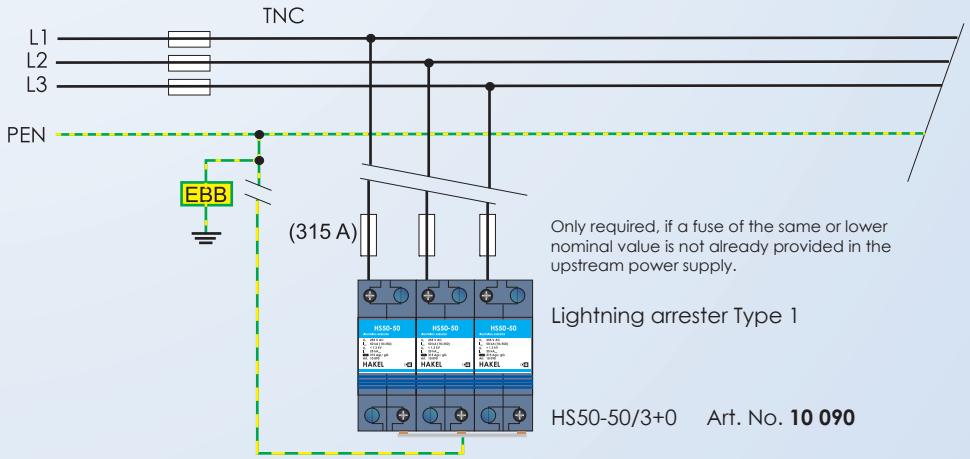








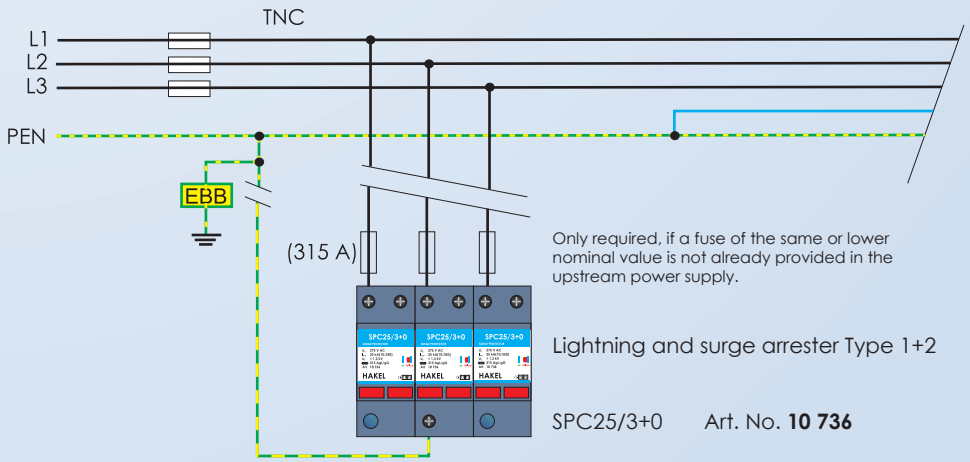
Step 2
(selection of SPD T1)



Only required, if a fuse of the same or lower nominal value is not already provided in the upstream power supply.

Lightning arrester Type 1

HS50-50/3+0 Art. No. **10 090**



Only required, if a fuse of the same or lower nominal value is not already provided in the upstream power supply.

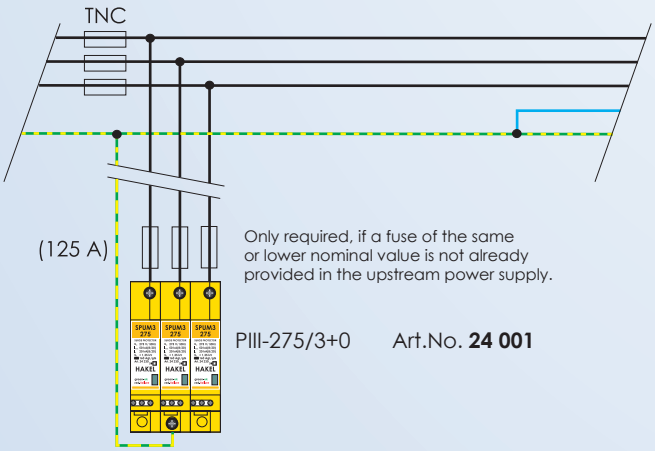
Lightning and surge arrester Type 1+2

SPC25/3+0 Art. No. **10 736**

Type 2 - at boundaries of LPZ 1-2 (surge arrester)		Coordination T2 a T3
SPD type	Installation	< 5 m
 PIII-275	Subsidiary switchboard, Switchboards on every floor of the object or in every control panel	5 meters of cable or decoupling element PI-L(16-120 A) *(Decoupling elements(PI-L) are installed for coordination of T2 and T3. These protect SPD T3 against destruction. If there is a distance between T2 and T3 < 5 m, it is necessary to use decoupling elements. The recommended connection is in series, hence is required to know the nominal voltage of existing conductor.*
 PIII-275/3+0		
 PIII-275/3+0	If the distance from T1 is > 30 m, then it is necessary to install SPD T2	
 SPU1-275	Subsidiary switchboard, Switchboards on every floor of the object or in every control panel	5 meters of cable or decoupling element PI-L(16-120 A) *(Decoupling elements(PI-L) are installed for coordination of T2 and T3. These protect SPD T3 against destruction. If there is a distance between T2 and T3 < 5 m, it is necessary to use decoupling elements. The recommended connection is in series, hence is required to know the nominal voltage of existing conductor.*
 SPUM1-275		
 SPU3-275	If the distance from T1 is > 30 m, then it is necessary to install SPD T2	
 SPUM3-275		

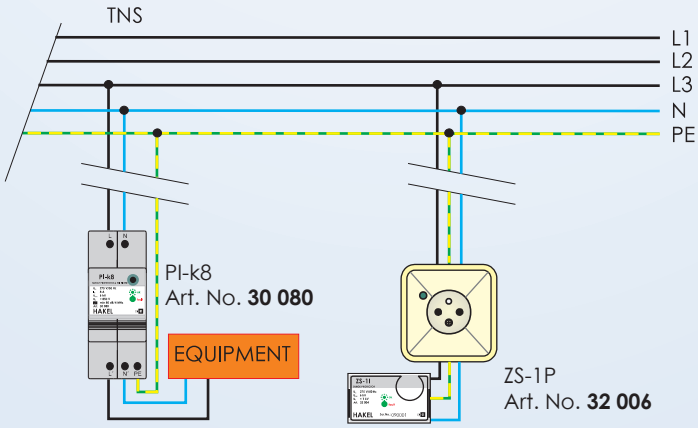
Type 3 - at boundaries of LPZ 2-3 (surge arrester)			
SPD + EMI filter		Additional SPD	
SPD type	Installation	SPD type	Installation
 PI-k(8-150A)	To the switchboard, which is closest to the protected equipment *(In case of electronic control protection, the installation is directly to the appliance)*	 ZS-1DSM	*Outlet circuits which are longer than 20 m. Flush-mounted sockets and cable ducts. It is recommended to install SPD into the outlet circuit to every fourth socket or to the point of supply. The installation eliminates induced overvoltage which is enducing into the object's service cables.*
 PI-3k(16-120A)		 Pk2	
		 ZS-1I	
 PI-k(8-150A)	To the switchboard, which is closest to the protected equipment *(In case of electronic control protection, the installation is directly to the appliance)*	 ZS-1P	*Outlet circuits which are longer than 20 m. Flush-mounted sockets and cable ducts. It is recommended to install SPD into the outlet circuit to every fourth socket or to the point of supply. The installation eliminates induced overvoltage which is enducing into the object's service cables.*
 PI-3k(16-120A)		 PDU	
		 PK2	
		 ZS-1DSM	

Step 3
(selection of SPD T2)

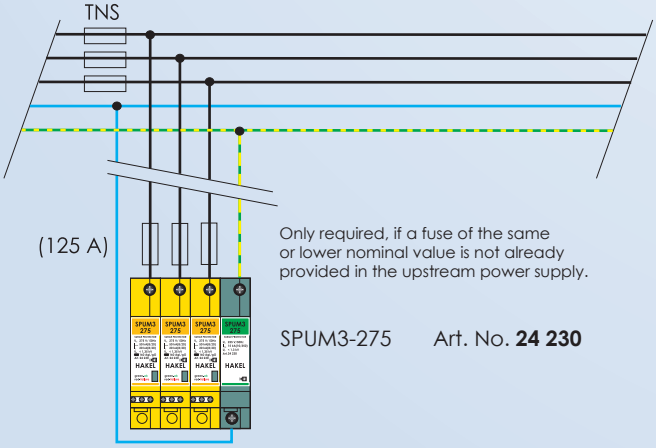


Step 4
(selection of SPD T3)

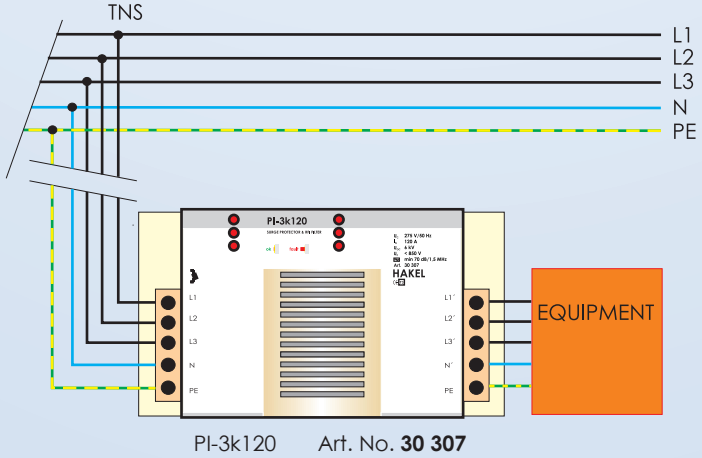
100 %
(property protection)



Surge arrester Type 2



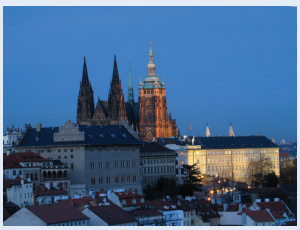
Surge arrester Type 3



Classification of typical objects	System	No. of phases	Circuit	Type 1-at boundaries of LPZ 0-1 (lightning arrester)		Coordination T1 and T2
				SPD type	Installation	< 5 m
Buildings with considerable level of protection LPL II (I_{imp} = 75 kA) *Industrial buildings* *Administrative buildings* *Schools* *Supermarkets* *Cathedrals* **Objects connected by buried cable.**	TNC	1	1+0	 HS50-50	Substation Switchboard (kWh) Main switchboard	5 metres cable or decoupling element PI-L (16-120 A)
		3	3+0	 HS50-50/3+0	Substation Switchboard (kWh) Main switchboard	
				 SPC25/3+0	Main switchboard Coordination of SPC with SPU doesn't require separation by longer cable or by decoupling element. (The installation of SPD T2 is necessary, if the length is > 30 m from T1)	
	TNS	1	1+1	 HS50-50/1+1	Substation Switchboard (kWh) Main switchboard	5 metres cable or decoupling element PI-L (16-120 A)
			2+0	 HS50-50/2+0		
		3	3+1	 SPC25/3+1	Main switchboard Coordination of SPC with SPU doesn't require separation by longer cable or by decoupling element. (The installation of SPD T2 is necessary, if the length is > 30 m from T1)	
			4+0	 SPC25/4+0		

Step 1
(object selection)

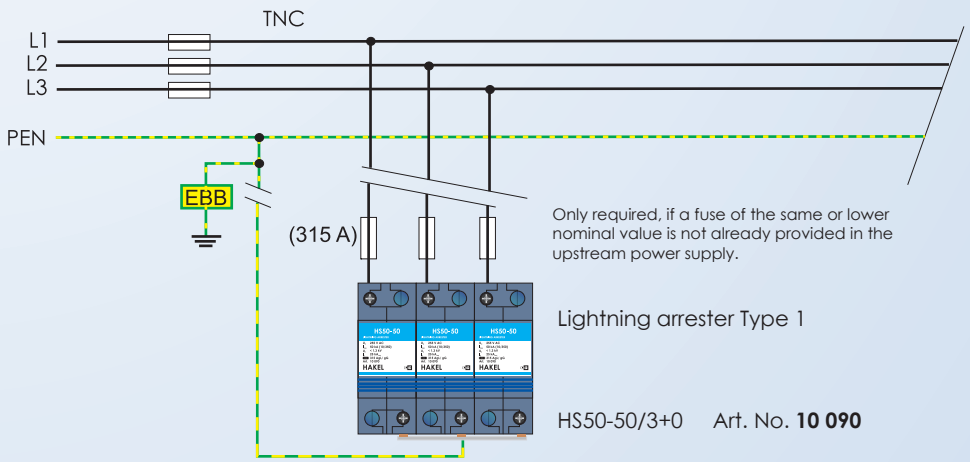








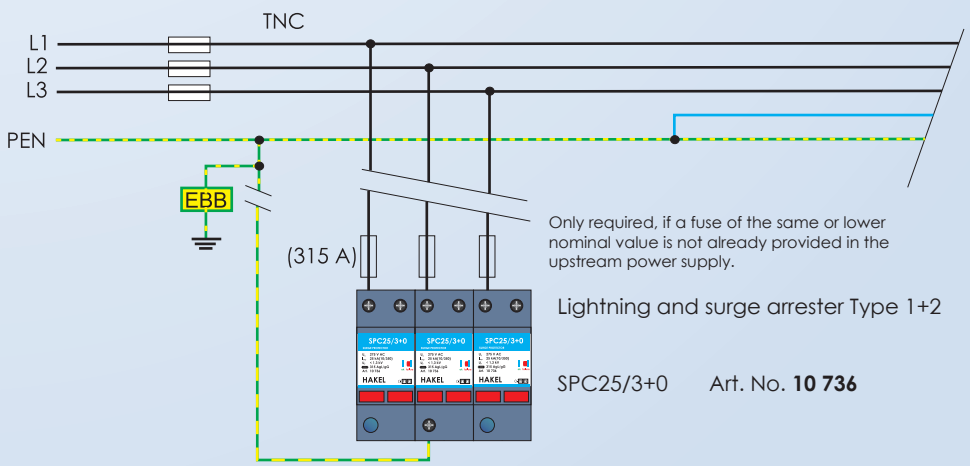
Step 2
(selection of SPD T1)



Only required, if a fuse of the same or lower nominal value is not already provided in the upstream power supply.

Lightning arrester Type 1

HS50-50/3+0 Art. No. **10 090**



Only required, if a fuse of the same or lower nominal value is not already provided in the upstream power supply.

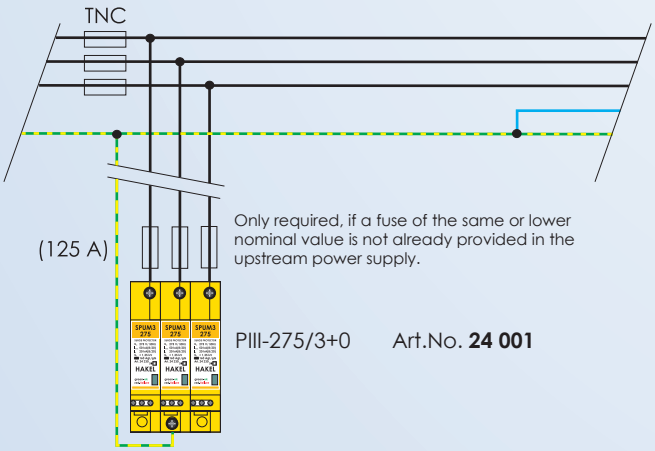
Lightning and surge arrester Type 1+2

SPC25/3+0 Art. No. **10 736**

Type 2 - at boundaries of LPZ 1-2 (surge arrester)		Coordination T2 a T3
SPD type	Installation	< 5 m
PIII-275	Subsidiary switchboard, Switchboards on every floor of the object or in every control panel	5 meters of cable or decoupling element PI-L(16-120 A) *(Decoupling elements(PI-L) are installed for coordination of T2 and T3. These protect SPD T3 against destruction. If there is a distance between T2 and T3 < 5 m, it is necessary to use decoupling elements. The recommended connection is in series, hence is required to know the nominal voltage of existing conductor.*
PIII-275/3+0		
PIII-275/3+0	If the distance from T1 is > 30 m, then it is necessary to install SPD T2	
SPU1-275	Subsidiary switchboard, Switchboards on every floor of the object or in every control panel	5 meters of cable or decoupling element PI-L(16-120 A) *(Decoupling elements(PI-L) are installed for coordination of T2 and T3. These protect SPD T3 against destruction. If there is a distance between T2 and T3 < 5 m, it is necessary to use decoupling elements. The recommended connection is in series, hence is required to know the nominal voltage of existing conductor.*
SPUM1-275		
SPU3-275	If the distance from T1 is > 30 m, then it is necessary to install SPD T2	
SPUM3-275		

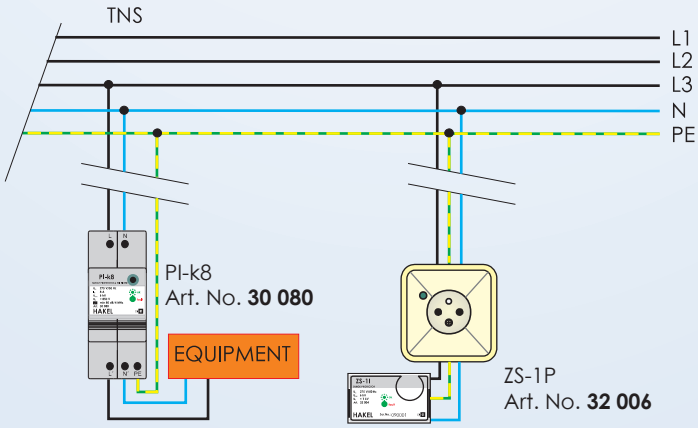
Type 3 - at boundaries of LPZ 2-3 (surge arrester)			
SPD + EMI filter		Additional SPD	
SPD type	Installation	SPD type	Installation
PI-k(8-150A)	To the switchboard, which is closest to the protected equipment *(In case of electronic control protection, the installation is directly to the appliance)*	ZS-1DSM	*Outlet circuits which are longer than 20 m. Flush-mounted sockets and cable ducts. It is recommended to install SPD into the outlet circuit to every fourth socket or to the point of supply. The installation eliminates induced overvoltage which is enducing into the object's service cables.*
		Pk2	
PI-3k(16-120A)		ZS-1I	
PI-k(8-150A)	To the switchboard, which is closest to the protected equipment *(In case of electronic control protection, the installation is directly to the appliance)*	ZS-1P	*Outlet circuits which are longer than 20 m. Flush-mounted sockets and cable ducts. It is recommended to install SPD into the outlet circuit to every fourth socket or to the point of supply. The installation eliminates induced overvoltage which is enducing into the object's service cables.*
		PDU	
		PK2	
PI-3k(16-120A)		ZS-1DSM	

Step 3
(selection of SPD T2)

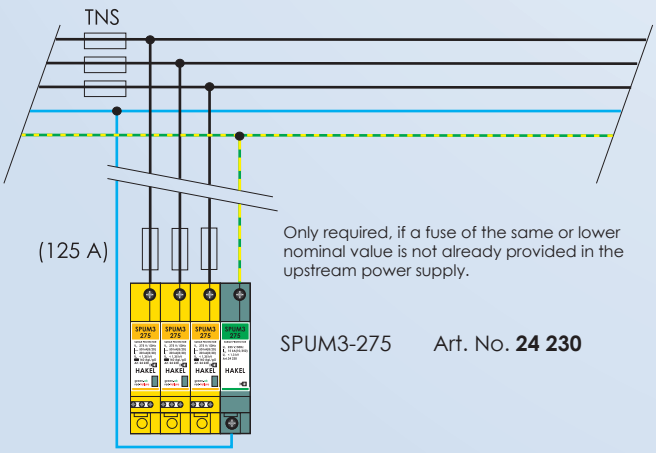


Step 4
(selection of SPD T3)

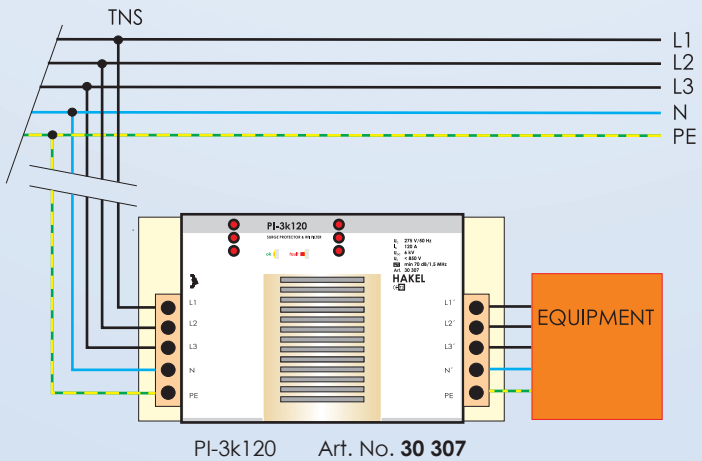
100 %
(property protection)



Surge arrester Type 2



Surge arrester Type 3



Classification of typical objects	System	No. of phases	Circuit	Type 1-at boundaries of LPZ 0-1 (lightning arrester) SPD type	Installation	Coordination T1 and T2 < 5 m
Buildings with considerable level of protection LPL III and IV (I_{imp} = 50 kA) *LPL III* *Apartment houses* *Small administartive buildings* *Family houses* *Agricultural structures* *LPL IV* *Buildings and halls without occurrence of persons and internal equipment* **Objects with the main back-up fuse up to 63A connected by buried cable.**	TNC	1	1+0	 SPC25	Main switchboard Coordination of SPC with SPU doesn't require separation by longer cable or by decoupling element. (The installation of SPD T2 is necessary, if the length is > 30 m from T1)	
		3	3+0	 PIV12.5/3+0	Main switchboard	5 metres cable or decoupling element PI-L (16-120 A)
				 SPC25/3+0	Main switchboard Coordination of SPC with SPU doesn't require separation by longer cable or by decoupling element. (The installation of SPD T2 is necessary, if the length is > 30 m from T1)	
	TNS	1	1+1	 SPC25/1+1	Main switchboard Coordination of SPC with SPU doesn't require separation by longer cable or by decoupling element. (The installation of SPD T2 is necessary, if the length is > 30 m from T1)	
			2+0	 SPC25/2+0		
		3	3+1	 SPC12,5/3+1	Main switchboard Coordination of SPC with SPU doesn't require separation by longer cable or by decoupling element. (The installation of SPD T2 is necessary, if the length is > 30 m from T1)	
			4+0	 PIV12,5/4+0	Main switchboard	5 metres cable or decoupling element PI-L (16-120 A)

Step 1
(object selection)

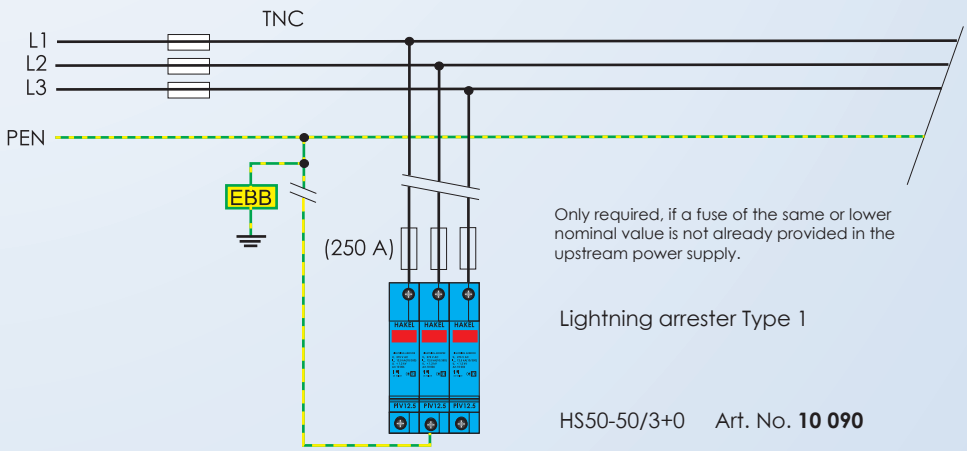






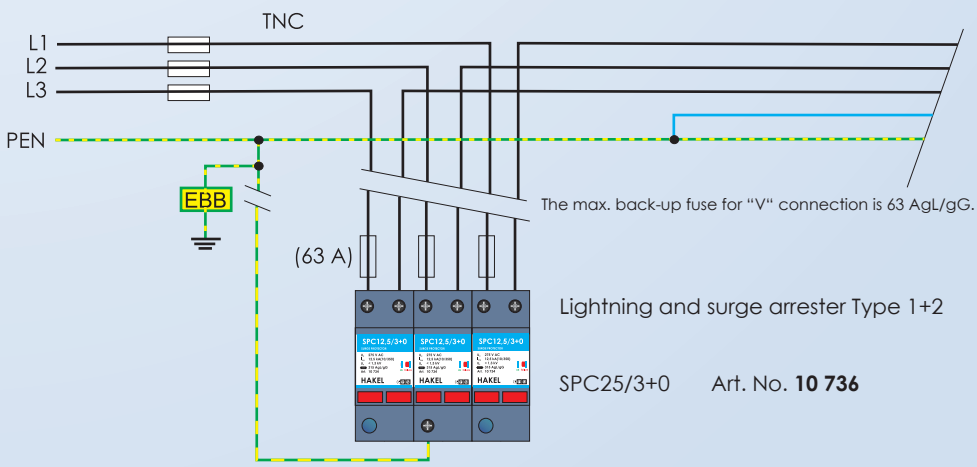


Step 2
(selection of SPD T1)



Lightning arrester Type 1

HS50-50/3+0 Art. No. **10 090**



Lightning and surge arrester Type 1+2

SPC25/3+0 Art. No. **10 736**

Type 2 - at boundaries of LPZ 1-2 (surge arrester)

Coordination T2 a T3

SPD type	Installation	< 5 m
 PIII-275	Subsidiary switchboard, Switchboards on every floor of the object or in every control panel	5 meters of cable or decoupling element PI-L(16-120 A) *(Decoupling elements(PI-L) are installed for coordination of T2 and T3. These protect SPD T3 against destruction. If there is a distance between T2 and T3 < 5 m, it is necessary to use decoupling elements. The recommended connection is in series, hence is required to know the nominal voltage of existing conductor.*
 PIII-275/3+0		
 PIII-275/3+0	If the distance from T1 is > 30 m, then it is necessary to install SPD T2	
 SPU1-275	Subsidiary switchboard, Switchboards on every floor of the object or in every control panel	5 meters of cable or decoupling element PI-L(16-120 A) *(Decoupling elements(PI-L) are installed for coordination of T2 and T3. These protect SPD T3 against destruction. If there is a distance between T2 and T3 < 5 m, it is necessary to use decoupling elements. The recommended connection is in series, hence is required to know the nominal voltage of existing conductor.*
 SPUM1-275		
 SPU3-275	If the distance from T1 is > 30 m, then it is necessary to install SPD T2	
 SPUM3-275		

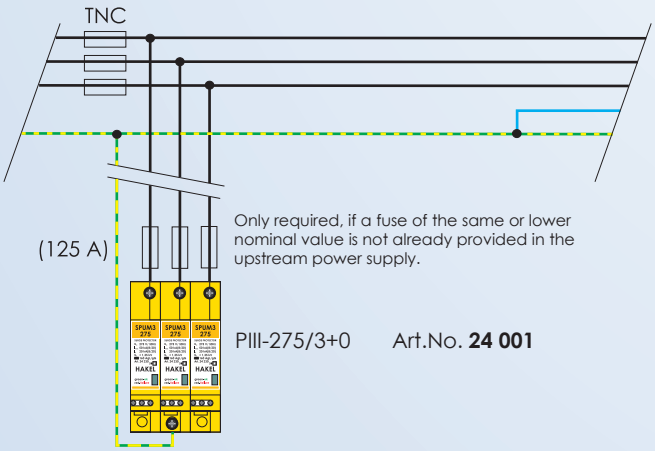
Type 3 - at boundaries of LPZ 2-3 (surge arrester)

SPD + EMI filter

Additional SPD

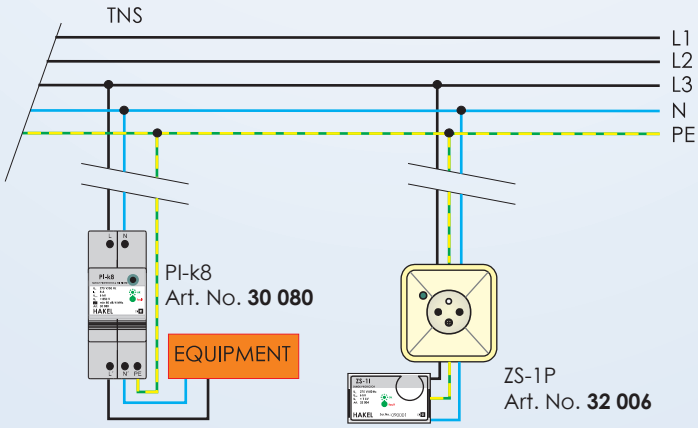
SPD type	Installation	SPD type	Installation
 PI-k(8-150A)	To the switchboard, which is closest to the protected equipment *(In case of electronic control protection, the installation is directly to the appliance)*	 ZS-1DSM	*Outlet circuits which are longer than 20 m. Flush-mounted sockets and cable ducts. It is recommended to install SPD into the outlet circuit to every fourth socket or to the point of supply. The installation eliminates induced overvoltage which is enducing into the object's service cables.*
		 Pk2	
 PI-3k(16-120A)		 ZS-1I	
	To the switchboard, which is closest to the protected equipment *(In case of electronic control protection, the installation is directly to the appliance)*	 ZS-1P	*Outlet circuits which are longer than 20 m. Flush-mounted sockets and cable ducts. It is recommended to install SPD into the outlet circuit to every fourth socket or to the point of supply. The installation eliminates induced overvoltage which is enducing into the object's service cables.*
 PI-k(8-150A)		 PDU	
		 PK2	
 PI-3k(16-120A)		 ZS-1DSM	

Step 3
(selection of SPD T2)

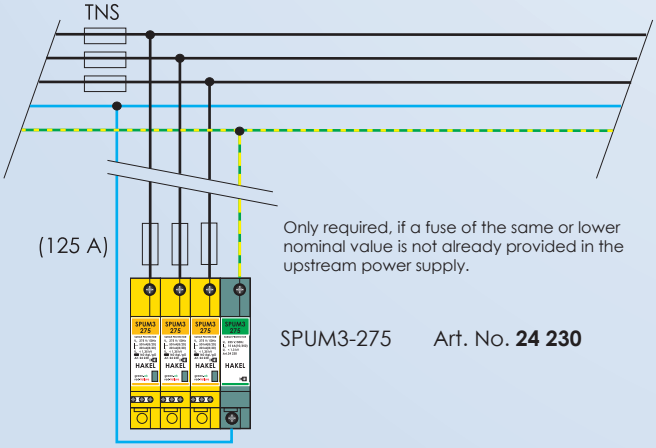


Step 4
(selection of SPD T3)

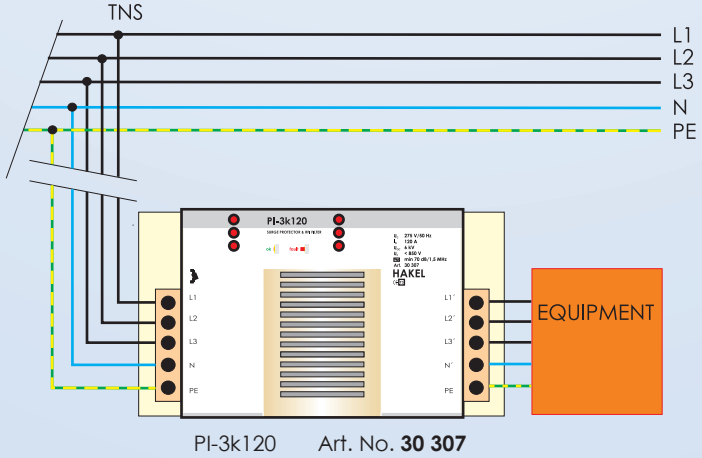
100 %
(property protection)

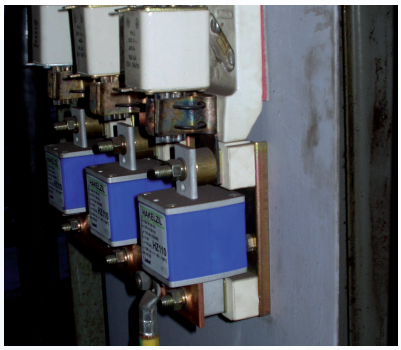


Surge arrester Type 2



Surge arrester Type 3





HIGH-POWER LIGHTNING ARRESTER

HZ110 is a lightning arrester type 1 according to EN 61643-11. These are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 0 – 1 (according to IEC 1312-1 and EN 62305) for lightning current equipotential bonding in power supply systems entering the building.

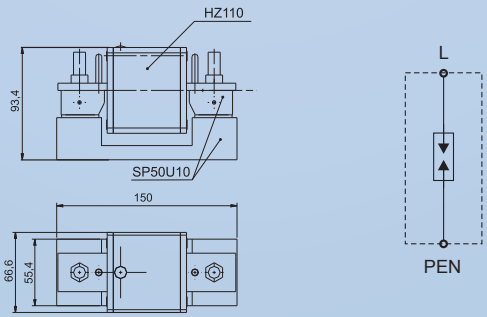
The lightning arrester is constructed as an encapsulated multiple spark gap for installation in main switchboards. HZ110 is mainly intended for use in TNC systems.

Multiple spark gap

HZ110



TYPE 1 | CLASS I | LPZ 0➔1 | +80°C ϑ -40°C | IP 00 | industry



High-power lightning arrester HZ110 is intended for use in areas with a high frequency of storm days. The main use of HZ110 arrester is in industrial installations such as transformers or the main switchboards of large industrial buildings.

Type **HZ110**		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	255 V AC
Insulation resistance	R_i	> 100 MΩ
Lightning impulse current (10/350)	I_{imp}	110 kA
- charge	Q	55 As
- specific energy	W/R	3000 kJ/Ω
Temporary overvoltage (TOV)	U_T	500 V/ 5 sec
Voltage protection level at I_{imp}	U_p	< 2,5 kV
Follow current interrupting rating at U_C	I_{fi}	50 kA_{rms}
Response time	t_A	< 100 ns
Max. back-up fuse		500 AgL/gG
Lifetime		min. 100 000 h
Weight	m	1000 g
Article number		10 120

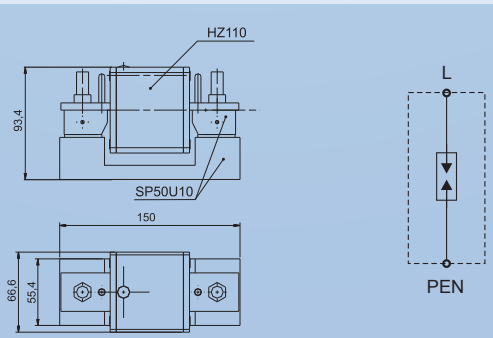
CE PG MJ02

Multiple spark gap

HZ110/500



TYPE 1 | CLASS I | LPZ 0➔1 | +80°C ϑ -40°C | IP 00 | industry

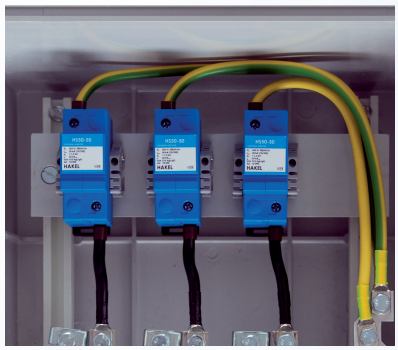


High-power lightning arrester HZ110/500 is intended for use in areas with a high frequency of storm days. The main use of HZ110/500 arrester is in industrial installations such as main switchboards of large industrial buildings.

Type **HZ110/500**		
Nominal voltage	U_N	400 V AC
Max. continuous operating voltage	U_C	500 V AC
Insulation resistance	R_i	> 100 MΩ
Lightning impulse current (10/350)	I_{imp}	110 kA
- charge	Q	55 As
- specific energy	W/R	3000 kJ/Ω
Temporary overvoltage (TOV)	U_T	500 V/ 5 sec
Voltage protection level at I_{imp}	U_p	< 2,5 kV
Follow current interrupting rating at U_C	I_{fi}	8 kA_{rms}
Response time	t_A	< 100 ns
Max. back-up fuse		500 AgL/gG
Lifetime		min. 100 000 h
Weight	m	1000 g
Article number		10 125

CE PG MJ02

LIGHTNING ARRESTERS – SPARK GAP



HS50-50 is a lightning arrester type 1 according to EN 61643-11. These are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 0 – 1 (according to IEC 1312-1 and EN 62305) for lightning current equipotential bonding in power supply systems entering the building.

The lightning arrester is constructed as an encapsulated multiple spark gap for installation in main switchboards. HS50-50 is mainly intended for use in TNC systems. For TNS and TT systems it is necessary to combine these arresters with lightning arrester HS100 (or JK110) which is intended for equipotential bonding between N and PE.

The main use of HS50-50 is in industrial installations such as transformers, the main switchboards of large industrial buildings and places with high risk of a direct lightning strike. It is also suitable for applications in unmeasured parts of electrical installation (before electrometer) according to VDN Directive, 2nd Edition 2004 (TAB 2000).

Type **HS50-50**		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	255 V AC
Insulation resistance	R_i	> 100 MΩ
Lightning impulse current (10/350)	I_{imp}	50 kA
- charge	Q	25 As
- specific energy	W/R	600 kJ/Ω
Temporary overvoltage (TOV)	U_T	440 V/ 5 sec
Voltage protection level at I_{imp}	U_p	< 1,3 kV
Follow current interrupting rating at U_C	I_{fi}	12 kA_{rms}
Response time	t_A	< 100 ns
Max. back-up fuse		315 AgL/gG
Lifetime		min. 100 000 h
Weight	m	225 g
Article number		10 090

CE PG M.I02

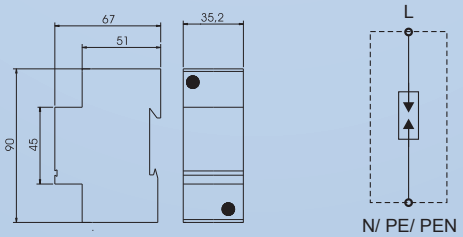
Note: HS50-50 can be supplied with LED diode signalizing the right functioning on a special request.

Multiple spark gap



HS50-50

TYPE 1 | CLASS I | LPZ 0➔1 | +80°C ϑ -40°C | kWh | IP 20 | industry



HS55 arrester is intended for special installations in industrial buildings requiring max. continuous operating voltage of 440 V AC. The main use of HS55 arrester is in main switchboards of large industrial buildings and places with high risk of a direct lightning strike.

Type **HS55**		
Nominal voltage	U_N	400 V AC
Max. continuous operating voltage	U_C	440 V AC
Insulation resistance	R_i	> 100 MΩ
Lightning impulse current (10/350)	I_{imp}	50 kA
- charge	Q	25 As
- specific energy	W/R	600 kJ/Ω
Temporary overvoltage (TOV)	U_T	500 V/5 sec
Voltage protection level at I_{imp}	U_p	< 2,5 kV
Follow current interrupting rating at U_C	I_{fi}	3,5 kA_{rms}
Response time	t_A	< 100 ns
Max. back-up fuse		315 AgL/gG
Lifetime		min. 100 000 h
Weight	m	225 g
Article number		10 055

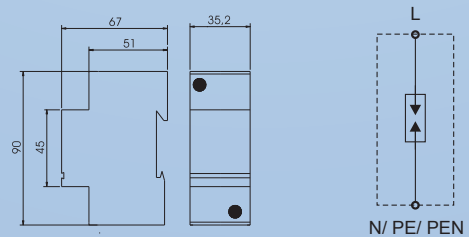
CE PG M.I02

Multiple spark gap



HS55

TYPE 1 | CLASS I | LPZ 0➔1 | +80°C ϑ -40°C | IP 20 | industry

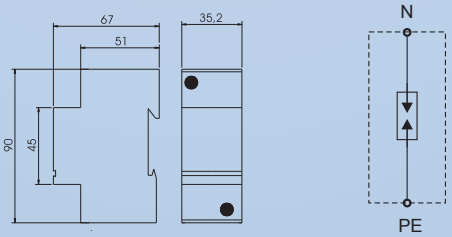


Single spark gap

HS100



TYPE 1 | CLASS I | LPZ 0➔1 | +80°C ϑ -40°C | IP 20 | industry



HS100 is a total current spark gap type 1 according to EN 61643-11 and is intended for use in TNS and TT systems (3+1 or 1+1) at the boundaries of LPZ 0 – 1. HS100 is to be installed between N and PE only.

Type **HS100**		
Max. continuous operating voltage	U_C	255 V AC
Insulation resistance	R_i	> 1000 MΩ
Lightning impulse current (10/350)	I_{imp}	100 kA
- charge	Q	50 As
- specific energy	W/R	2500 kJ/Ω
Temporary overvoltage (TOV)	U_T	1200 V/ 0,2 sec
Max. discharge current (8/20)	I_{max}	150 kA
Nominal discharge current (8/20)	I_n	75 kA
Voltage protection level at I_{imp}	U_p	< 2 kV
Spark-Over Voltage 1,2/50 μs		< 1,5 kV
Follow current interrupting rating at U_C	I_{fi}	100 A_{rms}
Response time	t_A	< 100 ns
Lifetime		min. 100 000 h
Weight	m	360 g
Article number		10 100

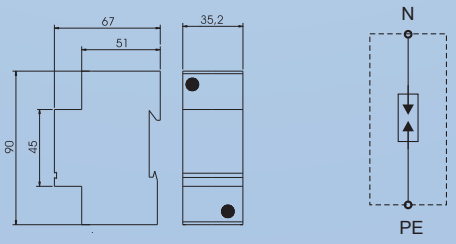
MJ102

Single spark gap

JK110



TYPE 1 | CLASS I | LPZ 0➔1 | +80°C ϑ -40°C | IP 20 | industry



JK110 is a total current spark gap type 1 according to EN 61643-11 and is intended for use in TNS and TT systems (3+1 or 1+1) at the boundaries of LPZ 0 – 1. JK110 is to be installed between N and PE only.

Type **JK110**		
Max. continuous operating voltage	U_C	255 V AC
Insulation resistance	R_i	> 1000 MΩ
Lightning impulse current (10/350)	I_{imp}	110 kA
- charge	Q	55 As
- specific energy	W/R	3000 kJ/Ω
Max. discharge current (8/20)	I_{max}	150 kA
Nominal discharge current (8/20)	I_n	75 kA
Temporary overvoltage (TOV)	U_T	1200 V/ 0,2 sec
Voltage protection level at I_{imp}	U_p	< 2 kV
Follow current interrupting rating at U_C	I_{fi}	100 A_{rms}
Response time	t_A	< 100 ns
Lifetime		min. 100 000 h
Weight	m	360 g
Article number		10 110

Application table									
Type	**Art. No.**		**TE**	**Weight (g)**	**No.of poles**	**Circuit**	**I_{imp} (kA)**	**U_C (V)**	**Mode of protection**
HZ110	10 120		4	1000	1	1+0	110	255	L/N, L/PEN, L/PE
HZ110/500	10 125		4	1000	1	1+0	110	500	L/N, L/PEN, L/PE
HS50-50	10 090		2	225	1	1+0	50	255	L/N, L/PEN, L/PE
HS55	10 055		2	225	1	1+0	50	440	L/N, L/PEN, L/PE
HS100	10 100		2	360	1	0+1	100	255	N/PE
JK110	10 110		2	360	1	0+1	110	255	N/PE

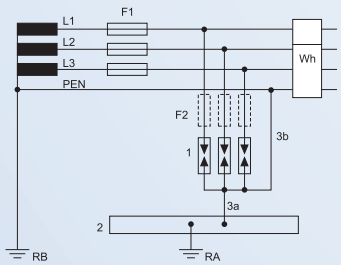
Recommended sets for TNC system							
Set	**Consisting of**	**TE**	**Weight (g)**	**No. of poles**	**Circuit**	**I_{total} (kA)**	**Application**
HZ110/3+0	3xHZ110	12	3000	3	3+0	-	Areas with high frequency of storm days
HZ110/500/3+0	3xHZ110/500	12	3000	3	3+0	-	Areas with high frequency of storm days
HS50-50/3+0	3xHS50-50	6	675	3	3+0	-	Transformers, main switchboard and before electrometer
HS55/3+0	3xHS55	6	675	3	3+0	-	Transformers and main switchboard
Recommended sets for TNS system							
HS50-50/4+0	4xHS50-50	6	900	4	4+0	-	Transformers, main switchboard and before electrometer
HS55/4+0	4xHS55	6	900	4	4+0	-	Transformers and main switchboard
Recommended sets for TNS and TT systems							
HS50-50/3+1	3xHS50-50 + 1xHS100	8	1035	4	3+1	100	Transformers, main switchboard and before electrometer
HS55/3+1	3xHS55 + 1xJK110	8	1035	4	3+1	110	Transformers and main switchboard

TE - dividing unit (17,5 mm)

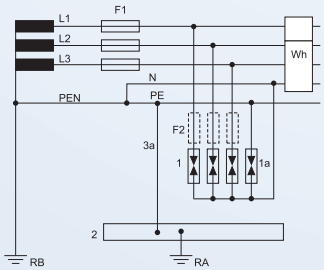
Housing material **-** Polyamide **PA6**

Recommended cable cross-section of the connected conductors (at tightning torque of clamps 4Nm) **35 mm² (solid), 25 mm² (flexible)**

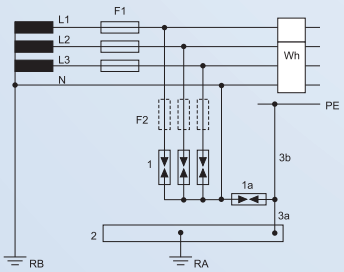
TNC (3+0)



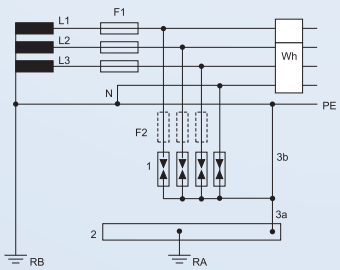
TNS (3+1)



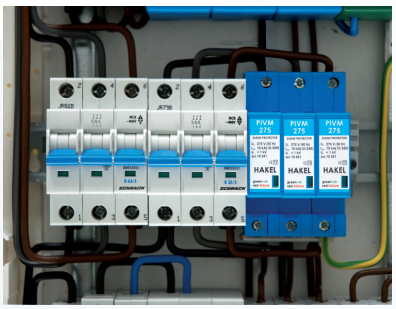
TT (3+1)



TNS (4+0)



1	Multiple spark gap HS50-50 or HS55
2	Total current spark gap HS100 or JK110
3a, 3b	Earthing wires for arresters
F1	Main back-up fuse of service main
F2	Recommended back-up fuse 315AgL/gG (only if the main back-up fuse F1 is fitted with back-up fuses > 315AgL/gG)
RA	Grounding of the equipment
RB	Grounding system



LIGHTNING ARRESTERS - VARISTOR

PIVM is modular lightning arrester type 1 according to EN 61643-11. Complete device consist of a base part and pluggable module. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 0 – 1 (according to IEC 1312-1 and EN 62305) for lightning current equipotential bonding and elimination of switching surges that originate in power supply systems entering the building.

The PIVM is mainly intended for use in TNC systems. For TNS and TT systems it is necessary to combine these arresters with lightning arrester B25, B25M or B50 which are intended for equipotential bonding between N and PE.

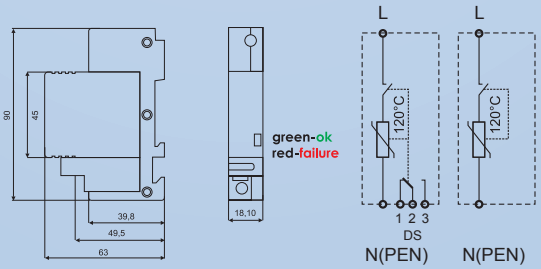
The main use of PIVM7 arrester is in structures of LPL III – IV according to EN 62305, e.g. residential houses with cable supply and subdistribution boards of big industrial structures.

Single-pole MOV lightning arrester

PIVM7-75



TYPE 1 | CLASS I | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | home



Type **PIVM7-75/PIVM7-75 DS**		
Max. continuous operating voltage	U_C	75 V AC
Lightning impulse current (10/350)	I_{imp}	7 kA
- charge	Q	3,5 As
- specific energy	W/R	12 kJ/Ω
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	30 kA
Temporary overvoltage (TOV)	U_T	-
Voltage protection level at I_{imp}	U_p	< 350 V
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Weight	m	98 g
Article number		
PIVM7-75		10 116
PIVM7-75 DS		10 117



CE PG MJ02

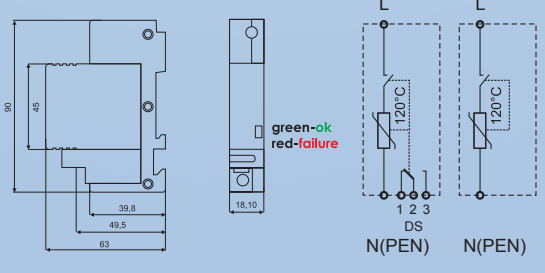
Varistor-based spare module	Art. No.
PIVM7-75/M	**10 522**

Single-pole MOV lightning arrester

PIVM7-150



TYPE 1 | CLASS I | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | home



Type **PIVM7-150/PIVM7-150 DS**		
Max. continuous operating voltage	U_C	150 V AC
Lightning impulse current (10/350)	I_{imp}	7 kA
- charge	Q	3,5 As
- specific energy	W/R	12 kJ/Ω
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	30 kA
Temporary overvoltage (TOV)	U_T	-
Voltage protection level at I_{imp}	U_p	< 950 V
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Weight	m	106 g
Article number		
PIVM7-150		10 018
PIVM7-150 DS		10 019



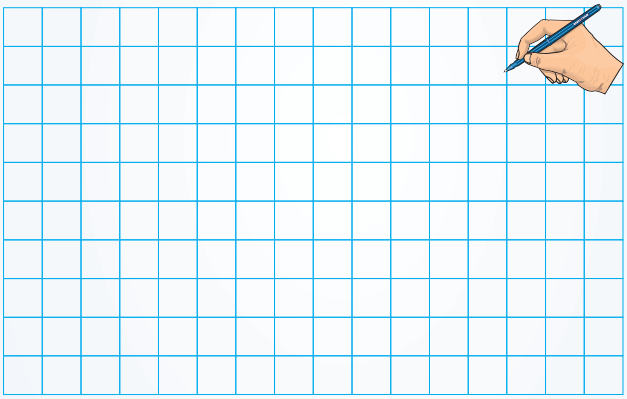
CE PG MJ02

Varistor-based spare module	Art. No.
PIVM7-150/M	**10 523**

DS

Function of remote monitor terminals
When the PIVM DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

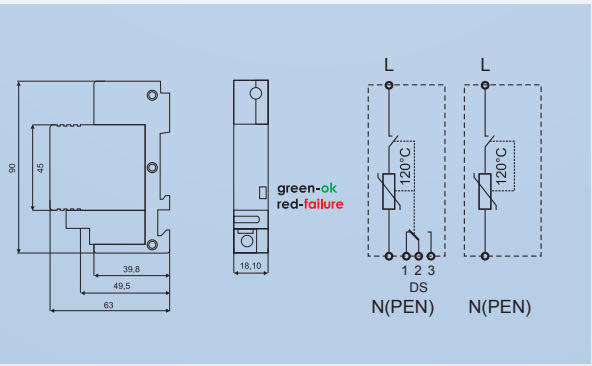
el. strength against surround. circuits	3750 V_{rms}
el. strength against network circuits	3750 V_{rms}
insulation resistance	2 x 10^7 Ω
max. switching current	~ 0,5 A
max. switching voltage	~ 250 V



Single-pole MOV lightning arrester

Type **PIVM7-275/PIVM7-275 DS**		
Max. continuous operating voltage	U_C	275 V AC
Lightning impulse current (10/350)	I_{imp}	7 kA
- charge	Q	3,5 As
- specific energy	W/R	12 kJ/Ω
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	30 kA
Temporary overvoltage (TOV)	U_T	335 V/5 sec
Voltage protection level at I_{imp}	U_p	< 1,2 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Weight	m	99 g
Article number		
PIVM7-275		10 021
PIVM7-275 DS		10 022





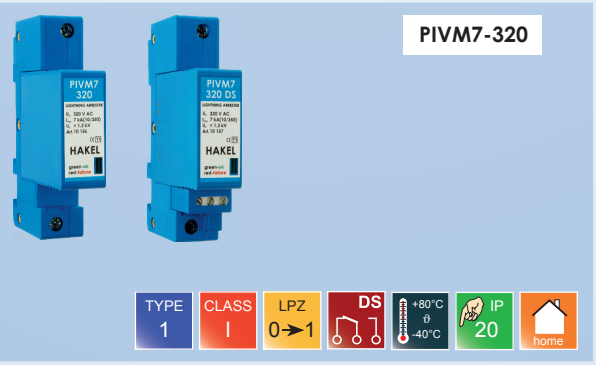


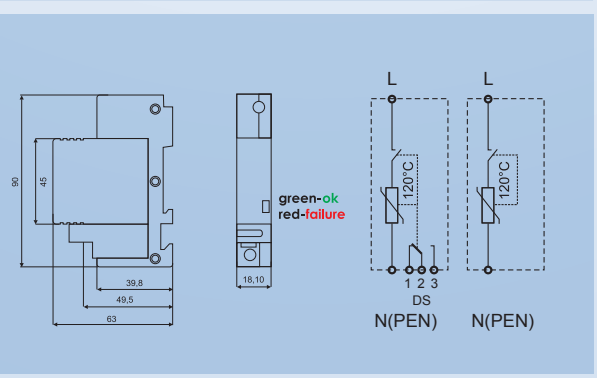
CE PCT M.I02

Varistor-based spare module	Art. No.
PIVM7-275/M	**10 524**

Single-pole MOV lightning arrester

Type **PIVM7-320/PIVM7-320 DS**		
Max. continuous operating voltage	U_C	320 V AC
Lightning impulse current (10/350)	I_{imp}	7 kA
- charge	Q	3,5 As
- specific energy	W/R	12 kJ/Ω
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	30 kA
Temporary overvoltage (TOV)	U_T	335 V/5 sec
Voltage protection level at I_{imp}	U_p	< 1,3 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Weight	m	106 g
Article number		
PIVM7-320		10 156
PIVM7-320 DS		10 157

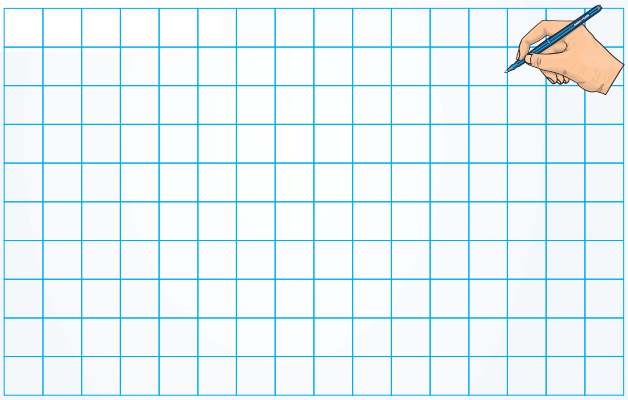






CE PCT M.I02

Varistor-based spare module	Art. No.
PIVM7-320/M	**10 525**



DS

Function of remote monitor terminals
When the PIVM DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

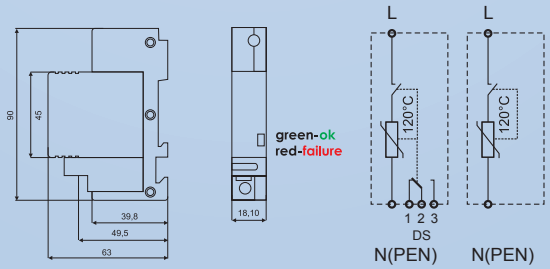
el. strength against surround. circuits	3750 V_{rms}
el. strength against network circuits	3750 V_{rms}
insulation resistance	2 x 10^7 Ω
max. switching current	~ 0,5 A
max. switching voltage	~ 250 V

Single-pole MOV lightning arrester

PIVM7-385



TYPE 1 | CLASS I | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | home



Type **PIVM7-385/PIVM7-385 DS**		
Max. continuous operating voltage	U_C	385 V AC
Lightning impulse current (10/350)	I_{imp}	7 kA
- charge	Q	3,5 As
- specific energy	W/R	12 kJ/Ω
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	30 kA
Temporary overvoltage (TOV)	U_T	-
Voltage protection level at I_{imp}	U_p	< 1,5 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Weight	m	106 g
Article number		
PIVM7-385		10 118
PIVM7-385 DS		10 119



CE PG MJ02

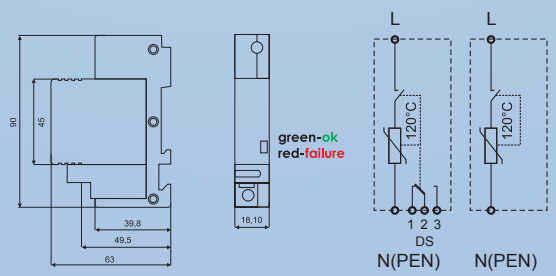
Varistor-based spare module	Art. No.
PIVM7-385/M	**10 526**

Single-pole MOV lightning arrester

PIVM7-440



TYPE 1 | CLASS I | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | home



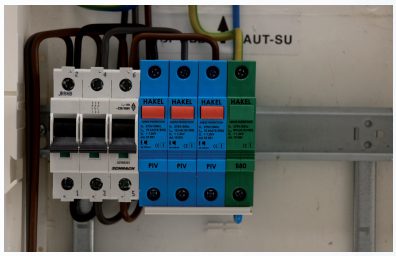
Type **PIVM7-440/PIVM7-440 DS**		
Max. continuous operating voltage	U_C	440 V AC
Lightning impulse current (10/350)	I_{imp}	7 kA
- charge	Q	3,5 As
- specific energy	W/R	12 kJ/Ω
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	30 kA
Temporary overvoltage (TOV)	U_T	580 V/5 sec
Voltage protection level at I_{imp}	U_p	< 1,7 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Weight	m	108 g
Article number		
PIVM7-440		10 028
PIVM7-440 DS		10 029



CE PG MJ02

Varistor-based spare module	Art. No.
PIVM7-440/M	**10 527**

LIGHTNING ARRESTERS - VARISTOR



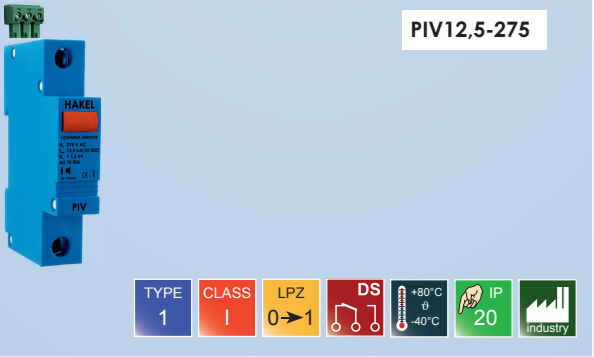
PIV is lightning arrester type 1 according to EN 61643-11. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 0 – 1 (according to IEC 1312-1 and EN 62305) for lightning current equipotential bonding and elimination of switching surges that originate in power supply systems entering the building.

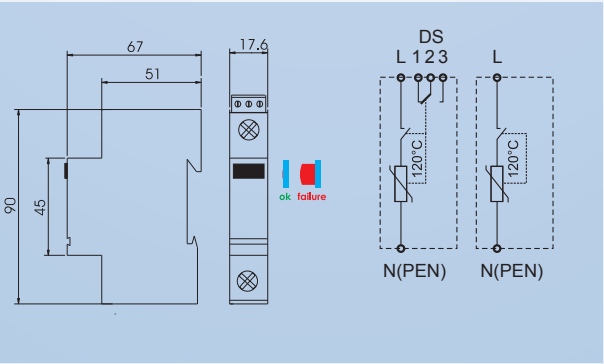
The PIV is mainly intended for use in TNC systems. For TNS and TT systems it is necessary to combine these arresters with lightning arrester B25, B50 or B80 which are intended for equipotential bonding between N and PE.

The main use of PIV12,5 arrester is in structures of LPL III – IV according to EN 62305, e.g. residential houses with cable supply and subdistribution boards of big industrial structures.

Single-pole MOV lightning arrester

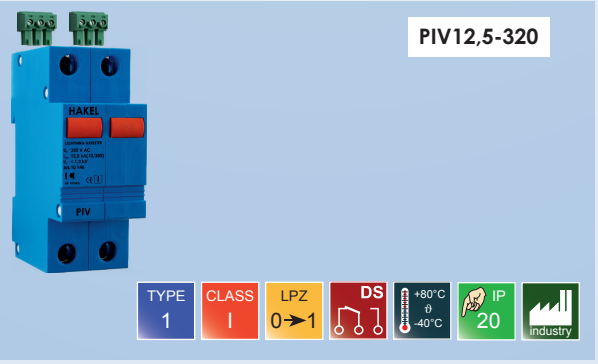
Type **PIV12,5-275/PIV12,5-275 DS**		
Max. continuous operating voltage	U_C	275 V AC
Lightning impulse current (10/350)	I_{imp}	12,5 kA
- charge	Q	6,25 As
- specific energy	W/R	39 kJ/Ω
Max. discharge current (8/20)	I_{max}	100 kA
Nominal discharge current (8/20)	I_n	50 kA
Temporary overvoltage (TOV)	U_T	335 V/5 sec
Voltage protection level at I_{imp}	U_p	< 1,2 kV
Response time	t_A	< 25 ns
Max. back-up fuse		250 AgL/gG
Lifetime		min.100 000 h
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Weight	m	140 g
Article number		
PIV12,5-275		10 006
PIV12,5-275 DS		10 020

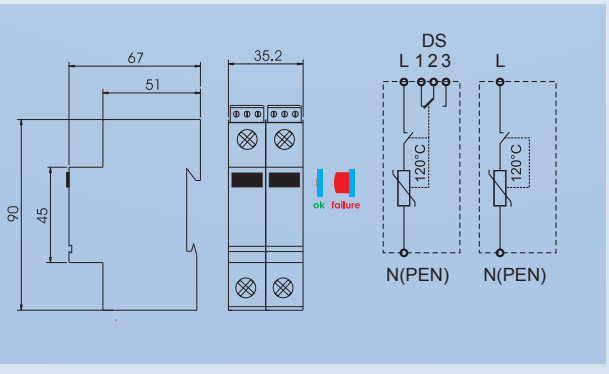


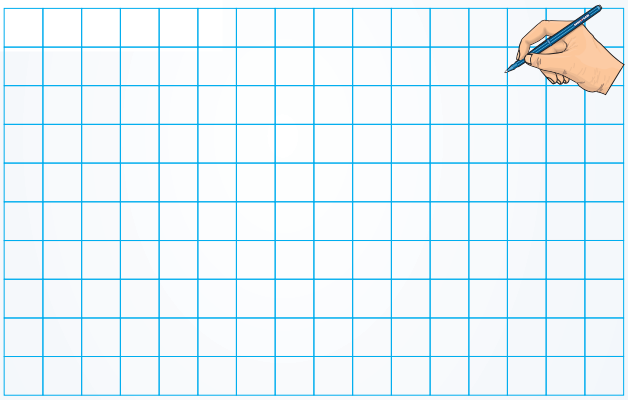


Single-pole MOV lightning arrester

Type **PIV12,5-320/PIV12,5-320 DS**		
Max. continuous operating voltage	U_C	320 V AC
Lightning impulse current (10/350)	I_{imp}	12,5 kA
- charge	Q	6,25 As
- specific energy	W/R	39 kJ/Ω
Max. discharge current (8/20)	I_{max}	100 kA
Nominal discharge current (8/20)	I_n	50 kA
Temporary overvoltage (TOV)	U_T	335 V/5 sec
Voltage protection level at I_{imp}	U_p	< 1,3 kV
Response time	t_A	< 25 ns
Max. back-up fuse		250 AgL/gG
Lifetime		min.100 000 h
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Weight	m	234 g
Article number		
PIV12,5-320		10 148
PIV12,5-320 DS		10 149







DS

Function of remote monitor terminals
When the PIVM DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

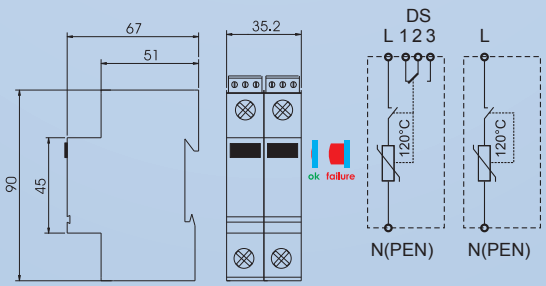
el. strength against surround. circuits	3750 V_{rms}
el. strength against network circuits	3750 V_{rms}
insulation resistance	2 x 10^7 Ω
max. switching current	~ 0,5 A
max. switching voltage	~ 250 V

Single-pole MOV lightning arrester



PIV12,5-385

TYPE 1 | CLASS I | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | industry



Type **PIV12,5-385/ PIV12,5-385 DS**		
Max. continuous operating voltage	U_C	385 V AC
Lightning impulse current (10/350)	I_{imp}	12,5 kA
- charge	Q	6,25 As
- specific energy	W/R	39 kJ/Ω
Max. discharge current (8/20)	I_{max}	100 kA
Nominal discharge current (8/20)	I_n	50 kA
Temporary overvoltage (TOV)	U_T	560 V/5 sec
Voltage protection level at I_{imp}	U_p	< 1,5 kV
Response time	t_A	< 25 ns
Max. back-up fuse		250 AgL/gG
Lifetime		min.100 000 h
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Weight	m	234 g
Article number		
PIV12,5-385		10 150
PIV12,5-385 DS		10 151

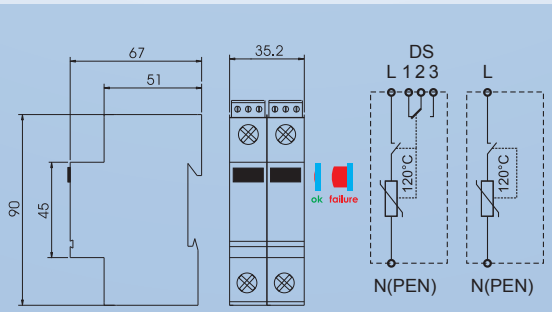
CE PG MJ02

Single-pole MOV lightning arrester



PIV12,5-440

TYPE 1 | CLASS I | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | industry



Type **PIV12,5-440/PIV12,5-440 DS**		
Max. continuous operating voltage	U_C	440 V AC
Lightning impulse current (10/350)	I_{imp}	12,5 kA
- charge	Q	6,25 As
- specific energy	W/R	39 kJ/Ω
Max. discharge current (8/20)	I_{max}	100 kA
Nominal discharge current (8/20)	I_n	50 kA
Temporary overvoltage (TOV)	U_T	580 V/5 sec
Voltage protection level at I_{imp}	U_p	< 1,6 kV
Response time	t_A	< 25 ns
Max. back-up fuse		250 AgL/gG
Lifetime		min.100 000 h
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Weight	m	236 g
Article number		
PIV12,5-440		10 014
PIV12,5-440 DS		10 024

CE PG MJ02

LIGHTNING ARRESTERS – GAS DISCHARGE TUBE

B25, B25M, B50, B80 and B100 are total current gas discharge tubes type 1 according to EN 61643-11 and are intended for use in TNS and TT systems (3+1 or 1+1) at the boundaries of LPZ 0 – 1. B25, B25M, B50, B80 and B100 are to be installed between N and PE only.



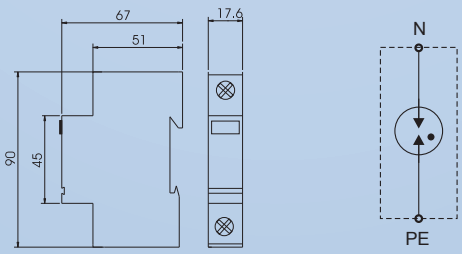
Single-pole Gas Discharge Tube

Type **B25**		
Max. continuous operating voltage	U_C	255 V AC
Insulation resistance	R_i	> 1000 MΩ
Lightning impulse current (10/350)	I_{imp}	25 kA
- charge	Q	12,5 As
- specific energy	W/R	156 kJ/Ω
Temporary overvoltage (TOV)	U_T	1200 V/0,2 sec
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	30 kA
Voltage protection level at I_{imp}	U_p	< 1,3 kV
Sparkover voltage 1,2/50µs		< 1,5 kV
Follow current interrupting rating at U_c	I_{fi}	100 A_{rms}
Response time	t_A	< 100 ns
Lifetime		min.100 000 h
Weight	m	72 g
Article number		30 024



B25

TYPE 1 | CLASS I | LPZ 0➔1 | +80°C ϑ -40°C | IP 20 | industry



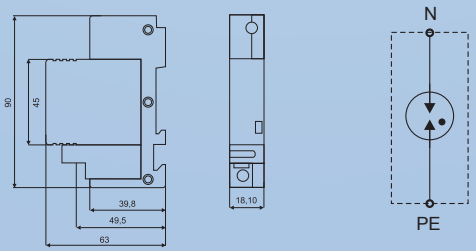
Single-pole Gas Discharge Tube

Type **B25M**		
Max. continuous operating voltage	U_C	255 V AC
Insulation resistance	R_i	> 1000 MΩ
Lightning impulse current (10/350)	I_{imp}	25 kA
- charge	Q	12,5 As
- specific energy	W/R	156 kJ/Ω
Temporary overvoltage (TOV)	U_T	1200 V/0,200 sec
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	30 kA
Voltage protection level at I_{imp}	U_p	< 1,3 kV
Sparkover voltage 1,2/50µs		< 1,5 kV
Follow current interrupting rating at U_c	I_{fi}	100 A_{rms}
Response time	t_A	< 100 ns
Lifetime		min.100 000 h
Weight	m	73 g
Article number		30 124



B25M

TYPE 1 | CLASS I | LPZ 0➔1 | +80°C ϑ -40°C | IP 20 | industry





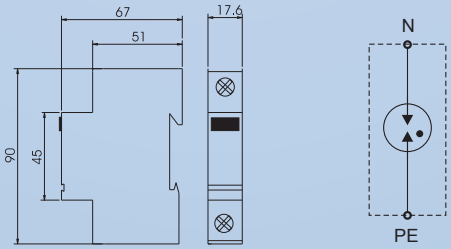
GDT-based spare module	Art. No.
B25M/M	**30 126**

Single-pole Gas Discharge Tube

B50/B80



TYPE 1 | CLASS I | LPZ 0➔1 | +80°C ϑ -40°C | IP 20 | industry



Type **B50/B80**		
Max. continuous operating voltage	U_C	255 V AC
Insulation resistance	R_i	> 1000 MΩ
Lightning impulse current (10/350)	I_{imp}	50 kA/ 80 kA
- charge	Q	25 As/ 40 As
- specific energy	W/R	625 kJ/Ω/ 1600 kJ/Ω
Temporary overvoltage (TOV)	U_T	1200 V/0,2 sec.
Max. discharge current (8/20)	I_{max}	75 kA
Nominal discharge current (8/20)	I_n	50 kA
Voltage protection level at I_{imp}	U_p	< 1,3 kV
Sparkover voltage 1,2/50µs		< 1,5 kV
Follow current interrupting rating at U_c	I_{fi}	100 A_{rms}
Response time	t_A	< 100 ns
Lifetime		min.100 000 h
Weight	m	116 g
Article number		
B50		10 050
B80		10 080

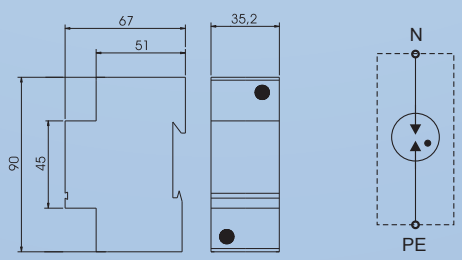
CE PG MJ02

Single-pole Gas Discharge Tube

B100



TYPE 1 | CLASS I | LPZ 0➔1 | +80°C ϑ -40°C | IP 20 | industry



Type **B100**		
Max. continuous operating voltage	U_C	255 V AC
Insulation resistance	R_i	> 1000 MΩ
Lightning impulse current (10/350)	I_{imp}	100 kA
- charge	Q	50 As
- specific energy	W/R	2500 kJ/Ω
Temporary overvoltage (TOV)	U_T	1200 V/0,2 sec
Max. discharge current (8/20)	I_{max}	150 kA
Nominal discharge current (8/20)	I_n	75 kA
Voltage protection level at I_{imp}	U_p	< 1,3 kV
Sparkover voltage 1,2/50µs		< 1,5 kV
Follow current interrupting rating at U_c	I_{fi}	100 A_{rms}
Response time	t_A	< 100 ns
Lifetime		min.100 000 h
Weight	m	228 g
Article number		10 001

CE PG MJ02

Application table

Type	Art. No.	Former type	TE	Weight (g)	No.of poles	Circuit	I_{imp} (kA)	U_C (V)	Mode of protection
PIVM7-75	**10 116**		1	98	1	1+0	7	75	L/N, L/PEN, L/PE
PIVM7-75 DS	**10 117**		1	98	1	1+0	7	75	L/N, L/PEN, L/PE
PIVM7-150	**10 018**	PIVT - 120	1	106	1	1+0	7	150	L/N, L/PEN, L/PE
PIVM7-150 DS	**10 019**	PIVT - 120 DS	1	106	1	1+0	7	150	L/N, L/PEN, L/PE
PIVM7-275	**10 021**	PIVT - 230	1	99	1	1+0	7	275	L/N, L/PEN, L/PE
PIVM7-275 DS	**10 022**	PIVT - 230 DS	1	99	1	1+0	7	275	L/N, L/PEN, L/PE
PIVM7-320	**10 156**		1	106	1	1+0	7	320	L/N, L/PEN, L/PE
PIVM7-320 DS	**10 157**		1	106	1	1+0	7	320	L/N, L/PEN, L/PE
PIVM7-385	**10 118**		1	106	1	1+0	7	385	L/N, L/PEN, L/PE
PIVM7-385 DS	**10 119**		1	106	1	1+0	7	385	L/N, L/PEN, L/PE
PIVM7-440	**10 028**	PIVT - 400	1	108	1	1+0	7	440	L/N, L/PEN, L/PE
PIVM7-440 DS	**10 029**	PIVT - 400 DS	1	108	1	1+0	7	440	L/N, L/PEN, L/PE
PIV12,5-275	**10 006**	PIV - 230	1	140	1	1+0	12,5	275	L/N, L/PEN, L/PE
PIV12,5-275 DS	**10 020**	PIV - 230 DS	1	140	1	1+0	12,5	275	L/N, L/PEN, L/PE
PIV12,5-320	**10 148**		2	234	1	1+0	12,5	320	L/N, L/PEN, L/PE
PIV12,5-320 DS	**10 149**		2	234	1	1+0	12,5	320	L/N, L/PEN, L/PE
PIV12,5-385	**10 150**		2	234	1	1+0	12,5	385	L/N, L/PEN, L/PE
PIV12,5-385 DS	**10 151**		2	234	1	1+0	12,5	385	L/N, L/PEN, L/PE
PIV12,5-440	**10 014**	PIV - 400	2	236	1	1+0	12,5	440	L/N, L/PEN, L/PE
PIV12,5-440 DS	**10 024**	PIV - 400 DS	2	236	1	1+0	12,5	440	L/N, L/PEN, L/PE
B25	**30 024**		1	72	1	0+1	25	255	N/PE
B25M	**30 124**		1	73	1	0+1	25	255	N/PE
B50	**10 050**		1	116	1	0+1	50	255	N/PE
B80	**10 080**		1	116	1	0+1	80	255	N/PE
B100	**10 001**		2	228	1	0+1	100	255	N/PE

Recommended sets for TNC system

Set	Consisting of	TE	Weight (g)	No.of poles	Circuit	I_{total} (kA)	Application
PIVM7-275/3+0	3xPIVM7-275	3	297	3	3+0	-	Residential houses with standard equipment,
PIVM7-275 DS/3+0	3xPIVM7-275 DS	3	297	3	3+0	-	industrial structures free of people and internal equipment
PIV12,5-275/3+0	3xPIV12,5-275	3	318	3	3+0	-	The main switchboard in family houses,
PIV12,5-275 DS/3+0	3xPIV12,5-275 DS	3	318	3	3+0	-	smaller office buildings and agricultural buildings
Recommended sets for TNS system							
PIVM7-275/4+0	4xPIVM7-275	4	396	4	4+0	-	Residential houses with standard equipment,
PIVM7-275 DS/4+0	4xPIVM7-275 DS	4	396	4	4+0	-	industrial structures free of people and internal equipment
PIV12,5-275/4+0	4xPIV12,5-275	4	560	4	4+0	-	The main switchboard in family houses,
PIV12,5-275 DS/4+0	4xPIV12,5-275 DS	4	560	4	4+0	-	smaller office buildings and agricultural buildings
Recommended sets for TNS and TT systems							
PIVM7-275/3+1	3xPIVM7-275 + 1xB25M	4	370	4	3+1	25	Residential houses with standard equipment,
PIVM7-275 DS/3+1	3xPIVM7-275 DS + 1xB25M	4	370	4	3+1	25	industrial structures free of people and internal equipment
PIV12,5-275/3+1	3xPIV12,5-275 + 1xB50	4	434	4	3+1	50	The main switchboard in family houses,
PIV12,5-275 DS/3+1	3xPIV12,5-275 DS + 1xB50	4	434	4	3+1	50	smaller office buildings and agricultural buildings

Spare module

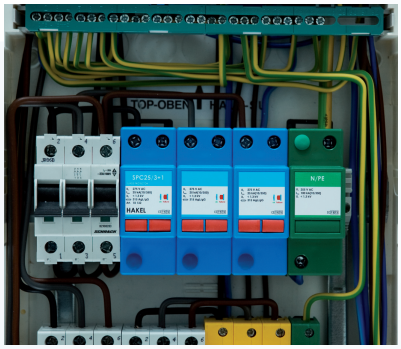
PIVM7-75/M	**10 522**
PIVM7-150/M	**10 523**
PIVM7-275/M	**10 524**
PIVM7-320/M	**10 525**
PIVM7-385/M	**10 526**
PIVM7-440/M	**10 527**
B25M/M	**30 126**

TE - dividing unit (17,5 mm)

Housing material - Polyamide **PA6**

Recommended cable cross-section of the connected conductors for B25, B50, B80, PIV and PIVM (at tightning torque of clamps 4Nm) **25 mm² (solid), 16 mm² (flexible)**

Recommended cable cross-section of the connected conductors for B100 (at tightning torque of clamps 4Nm) **35 mm² (solid), 25 mm² (flexible)**



LIGHTNING AND SURGE ARRESTERS - VARISTOR

SPC is lightning and surge arrester type 1+2 according to EN 61643-11. These are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 0 – 1 (according to IEC 1312-1 and EN 62305) for lightning current equipotential bonding and elimination of switching surges that originate in power supply systems entering the building.

The SPC 12,5 is intended for use in TNC systems (1+0 or 3+0). For TNS and TT systems (1+1 or 3+1) the SPC 12,5 is equipped with high energy gas discharge tube for equipotential bonding between N and PE.

The main use of SPC12,5 arrester is in structures of LPL II according to EN 62305, e.g. industrial and administration buildings, schools, supermarkets and cathedrals.

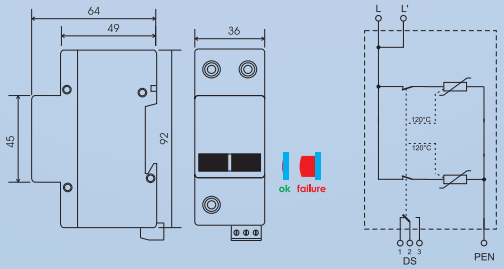
Single-pole MOV lightning and surge arrester

SPC12,5



TYPE 1+2 | CLASS I+II | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | home | industry

Basic circuit diagram of SPC12,5



Type **SPC12,5**		
Max. continuous operating voltage	U_c	275 V AC
Lightning impulse current (10/350)	I_{imp}	12,5 kA
- charge	Q	6 As
- specific energy	W/R	36 kJ/Ω
Total lightning current (10/350) L1➔PEN	I_{total}	12,5 kA
Nominal discharge current (8/20)	I_n	25 kA
Voltage protection level at I_{imp}	U_P	<1,2 kV
Response time	t_A	<25 ns
Temporary overvoltage (TOV)	U_T	335 V/5 sec.
Max. back-up fuse		315 AgL/gG
Max. back-up fuse ("V" connection)		63 AgL/gG
Short-circuit withstand capability at max.back-up fuse	I_P	80 kA_{rms}
Weight	m	240 g
Lifetime		min.100 000 h
Article number		
SPC12,5		10 744
SPC12,5 DS		10 644

CE PG M.I02

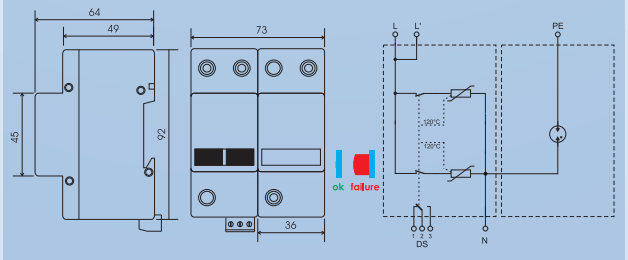
Single-pole MOV + GDT lightning and surge arrester

SPC12,5/1+1



TYPE 1+2 | CLASS I+II | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | home | industry

Basic circuit diagram of SPC12,5/1+1



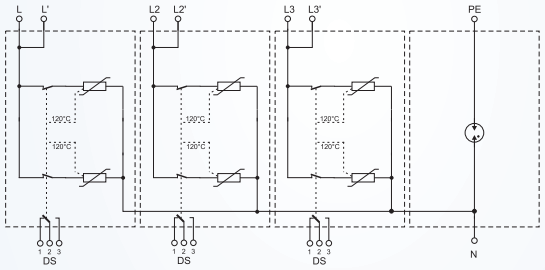
Type **SPC12,5/1+1**		
Max. continuous operating voltage	U_c	275 V AC
Lightning impulse current (10/350) L/N	I_{imp}	12,5 kA
- charge	Q	6 As
- specific energy	W/R	36 kJ/Ω
Lightning impulse current (10/350) N/PE	I_{imp}	25 kA
- charge	Q	12,5 As
- specific energy	W/R	156 kJ/Ω
Total lightning current (10/350) L1+N➔PE	I_{total}	25 kA
Nominal discharge current (8/20)	I_n	25 kA
Voltage protection level at I_{imp}	U_P	<1,2 kV
Response time L/N	t_A	<25 ns
Response time N/PE	t_A	<100ns
Temporary overvoltage (TOV), L/N	U_T	335 V/5 sec.
Temporary overvoltage (TOV), N/PE	U_T	1200 V/0,2 sec.
Max. back-up fuse		315 AgL/gG
Max. back-up fuse ("V" connection)		63 AgL/gG
Short-circuit withstand capability at max.back-up fuse	I_P	80 kA_{rms}
Weight	m	370 g
Lifetime		min.100 000 h
Article number		
SPC12,5/1+1		10 740
SPC12,5 DS/1+1		10 640

DS

Function of remote monitor terminals
When the SPC12,5 DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

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	~ 0,5 A
max. switching voltage	~ 250 V

Basic circuit diagram of SPC12,5/3+1



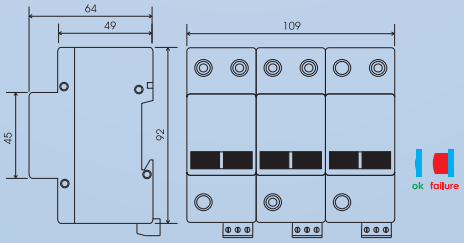
Three-pole MOV lightning and surge arrester

Type **SPC12,5/3+0**		
Max. continuous operating voltage	U_c	275 V AC
Lightning impulse current (10/350)	I_{imp}	12,5 kA
- charge	Q	6 As
- specific energy	W/R	36 kJ/Ω
Total lightning current (10/350) L1+L2+L3→PEN	I_{total}	37,5 kA
Nominal discharge current (8/20)	I_n	25 kA
Voltage protection level at I_{imp}	U_P	<1,2 kV
Response time	t_A	<25 ns
Temporary overvoltage (TOV)	U_T	335 V/5 sec.
Max. back-up fuse		315 AgL/gG
Max. back-up fuse ("V" connection)		63 AgL/gG
Short-circuit withstand capability at max.back-up fuse	I_P	80 kA_{rms}
Weight	m	720 g
Lifetime		min.100 000 h
Article number		
SPC12,5/3+0		10 734
SPC12,5 DS/3+0		10 634



SPC12,5/3+0

TYPE 1+2 | CLASS I+II | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | home | industry



CE PG
M.I102

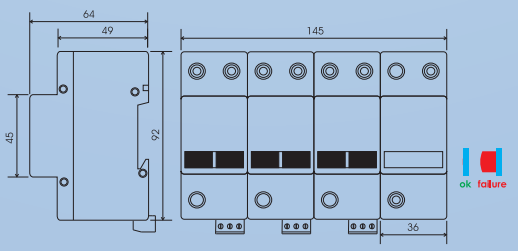
Three-pole MOV + GDT lightning and surge arrester

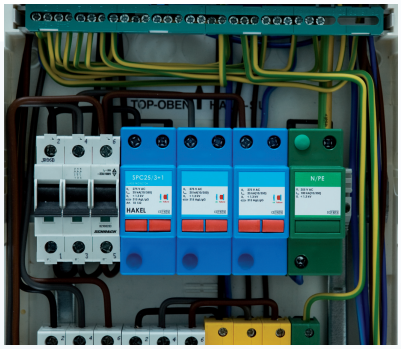
Type **SPC12,5/3+1**		
Max. continuous operating voltage	U_c	275 V AC
Lightning impulse current (10/350) L/N	I_{imp}	12,5 kA
- charge	Q	6 As
- specific energy	W/R	36 kJ/Ω
Lightning impulse current (10/350) N/PE	I_{imp}	50 kA
- charge	Q	25 As
- specific energy	W/R	625 kJ/Ω
Total lightning current (10/350) L1+L2+L3+N→PE	I_{total}	50 kA
Nominal discharge current (8/20)	I_n	25 kA
Voltage protection level at I_{imp}	U_P	<1,2 kV
Response time L/N	t_A	<25 ns
Response time N/PE	t_A	<100ns
Temporary overvoltage (TOV), L/N	U_T	335 V/5 sec.
Temporary overvoltage (TOV), N/PE	U_T	1200 V/0,2 sec.
Max. back-up fuse		315 AgL/gG
Max. back-up fuse ("V" connection)		63 AgL/gG
Short-circuit withstand capability at max.back-up fuse	I_P	80 kA_{rms}
Weight	m	1030 g
Lifetime		min.100 000 h
Article number		
SPC12,5/3+1		10 730
SPC12,5 DS/3+1		10 630



SPC12,5/3+1

TYPE 1+2 | CLASS I+II | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | home | industry





LIGHTNING AND SURGE ARRESTERS - VARISTOR

The SPC25 is intended for use in TNC systems (1+0 or 3+0). For TNS and TT systems (1+1 or 3+1) the SPC25 is equipped with high energy gas discharge tube for equipotential bonding between N and PE.

The main use of SPC12,5 arrester is in structures of LPL I according to EN 62305, e.g. hospitals, banks, mobile operator stations, water-stations, power plants, airport buildings for air traffic control and all structures with explosive risk.

To be installed in the main switchboard.

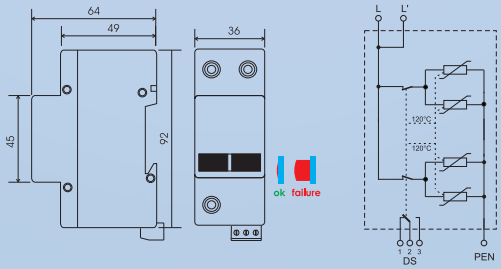
Single-pole MOV lightning and surge arrester

SPC25



TYPE 1+2 | CLASS I+II | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | industry

Basic circuit diagram of SPC25



Type **SPC25**		
Max. continuous operating voltage	U_c	275 V AC
Lightning impulse current (10/350)	I_{imp}	25 kA
- charge	Q	12,5 As
- specific energy	W/R	156 kJ/Ω
Total lightning current (10/350) L1➔PEN	I_{total}	25 kA
Nominal discharge current (8/20)	I_n	50 kA
Voltage protection level at I_{imp}	U_P	<1,3 kV
Response time	t_A	<25 ns
Temporary overvoltage (TOV)	U_T	335 V/5 sec.
Max. back-up fuse		315 AgL/gG
Max. back-up fuse ("V" connection)		63 AgL/gG
Short-circuit withstand capability at max.back-up fuse	I_P	80 kA_{rms}
Weight	m	300 g
Lifetime		min.100 000 h
Article number		
SPC25		10 746
SPC25 DS		10 646

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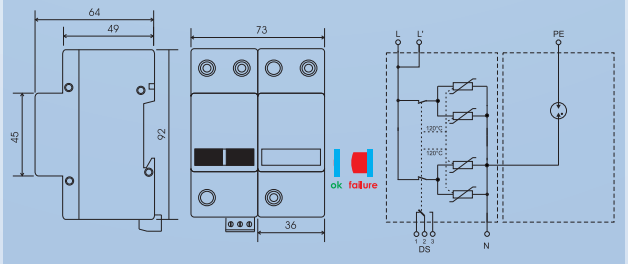
Single-pole MOV + GDT lightning and surge arrester

SPC25/1+1



TYPE 1+2 | CLASS I+II | LPZ 0➔1 | DS | +80°C ϑ -40°C | IP 20 | industry

Basic circuit diagram of SPC25/1+1



Typ **SPC25/1+1**		
Max. continuous operating voltage	U_c	275 V AC
Lightning impulse current (10/350) L/N	I_{imp}	25 kA
- charge	Q	12,5 As
- specific energy	W/R	156 kJ/Ω
Lightning impulse current (10/350) N/PE	I_{imp}	50 kA
- charge	Q	25 As
- specific energy	W/R	625 kJ/Ω
Total lightning current (10/350) L1+N➔PE	I_{total}	50 kA
Nominal discharge current (8/20)	I_n	50 kA
Voltage protection level at I_{imp}	U_P	<1,3 kV
Response time L/N	t_A	<25 ns
Response time N/PE	t_A	<100ns
Temporary overvoltage (TOV), L/N	U_T	335 V/5 sec.
Temporary overvoltage (TOV), N/PE	U_T	1200 V/0,2 sec.
Max. back-up fuse		315 AgL/gG
Max. back-up fuse ("V" connection)		63 AgL/gG
Short-circuit withstand capability at max.back-up fuse	I_P	80 kA_{rms}
Weight	m	460 g
Lifetime		min.100 000 h
Article number		
SPC25/1+1		10 742
SPC25 DS/1+1		10 642

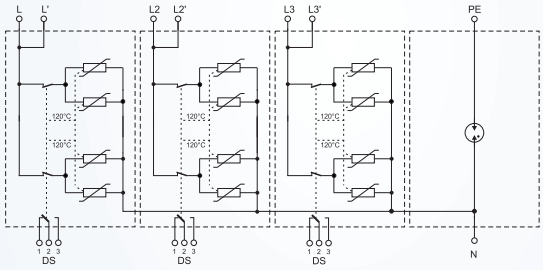
DS

Function of remote monitor terminals

When the SPC25 DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

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	~ 0,5 A
max. switching voltage	~ 250 V

Basic circuit diagram of SPC25/3+1



Three-pole MOV lightning and surge arrester

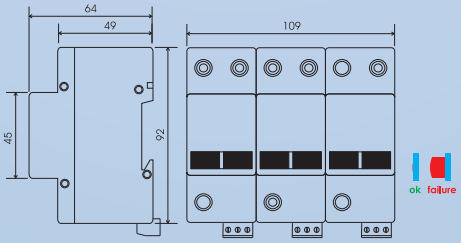
Type **SPC25/3+0**		
Max. continuous operating voltage	U_c	275 V AC
Lightning impulse current (10/350)	I_{imp}	25 kA
- charge	Q	12,5 As
- specific energy	W/R	156 kJ/Ω
Total lightning current (10/350) L1+L2+L3→PEN	I_{total}	75 kA
Nominal discharge current (8/20)	I_n	50 kA
Voltage protection level at I_{imp}	U_P	<1,3 kV
Response time	t_A	<25 ns
Temporary overvoltage (TOV)	U_T	335 V/5 sec.
Max. back-up fuse		315 AgL/gG
Max. back-up fuse ("V" connection)		63 AgL/gG
Short-circuit withstand capability at max.back-up fuse	I_P	80 kA_{rms}
Weight	m	900 g
Lifetime		min.100 000 h
Article number		
SPC25/3+0		10 736
SPC25 DS/3+0		10 636

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SPC25/3+0

TYPE 1+2 | CLASS I+II | LPZ 0→1 | DS | +80°C ϑ -40°C | IP 20 | industry



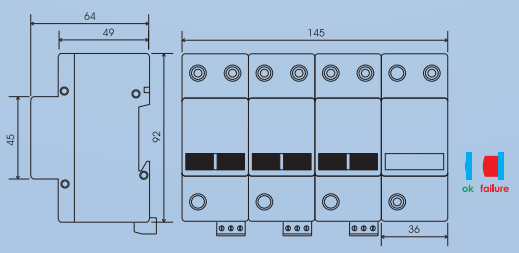
Three-pole MOV + GDT lightning and surge arrester

Type **SPC25/3+1**		
Max. continuous operating voltage	U_c	275 V AC
Lightning impulse current (10/350) L/N	I_{imp}	25 kA
- charge	Q	12,5 As
- specific energy	W/R	156 kJ/Ω
Lightning impulse current (10/350) N/PE	I_{imp}	100 kA
- charge	Q	50 As
- specific energy	W/R	2500 kJ/Ω
Total lightning current (10/350) L1+L2+L3+N→PE	I_{total}	100 kA
Nominal discharge current (8/20)	I_n	50 kA
Voltage protection level at I_{imp}	U_P	<1,3 kV
Response time L/N	t_A	<25 ns
Response time N/PE	t_A	<100ns
Temporary overvoltage (TOV), L/N	U_T	335 V/5 sec.
Temporary overvoltage (TOV), N/PE	U_T	1200 V/0,2 sec.
Max. back-up fuse		315 AgL/gG
Max. back-up fuse ("V" connection)		63 AgL/gG
Short-circuit withstand capability at max.back-up fuse	I_P	80 kA_{rms}
Weight	m	1125 g
Lifetime		min.100 000 h
Article number		
SPC25/3+1		10 732
SPC25 DS/3+1		10 632



SPC25/3+1

TYPE 1+2 | CLASS I+II | LPZ 0→1 | DS | +80°C ϑ -40°C | IP 20 | industry



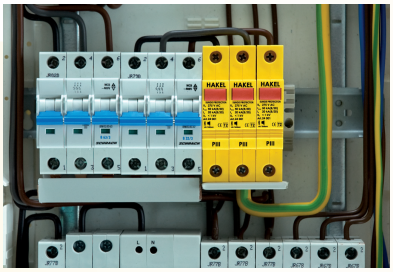
Application table									
Type	**Art. No.**	**Former type**	**TE**	**Weight (g)**	**No. of poles**	**Circuit**	**I_{imp}/I_{total} (kA)**	**U_C (V) L-N/N-PE**	**Mode of protection**
Industrial buildings, administration buildings, schools, supermarkets and cathedrals.									
SPC12,5	**10 744**	SPC 1.1 - 60 SPC 1.1 - 90	2	240	1	1+0	12,5/-	275/-	L/N, L/PEN, L/PE
SPC12,5 DS	**10 644**	SPC 1.1 - 60 DS SPC 1.1 - 90 DS	2	240	1	1+0	12,5/-	275/-	L/N, L/PEN, L/PE
SPC12,5/1+1	**10 740**	SPC 1-60 SPC 1-90 SPC 1.0 - 60 SPC 1.0 - 90	4	370	2	1+1	12,5/25	275/255	L/N, N/PE
SPC12,5 DS/1+1	**10 640**	SPC 1 - 60 DS SPC 1 - 90 DS SPC1.0-60 DS SPC1.0-90 DS	4	370	2	1+1	12,5/25	275/255	L/N, N/PE
SPC12,5/3+0	**10 734**	SPC 3.1 - 60 SPC 3.1 - 90	6	720	3	3+0	12,5/-	275/-	L/PEN
SPC12,5 DS/3+0	**10 634**	SPC 3.1 - 60 DS SPC 3.1 - 90 DS	6	720	3	3+0	12,5/-	275/-	L/PEN
SPC12,5/3+1	**10 730**	SPC 3 - 60 SPC 3 - 90 SPC 3.0 - 60 SPC 3.0 - 90	8	1030	4	3+1	12,5/50	275/255	L/N, N/PE
SPC12,5 DS/3+1	**10 630**	SPC 3 - 60 DS SPC 3 - 90 DS SPC3.0-60 DS SPC3.0-90 DS	8	1030	4	3+1	12,5/50	275/255	L/N, N/PE

Application table									
Type	**Art. No.**	**Former type**	**TE**	**Weight (g)**	**No. of poles**	**Circuit**	**I_{imp}/I_{total} (kA)**	**U_C (V) L-N/N-PE**	**Mode of protection**
Hospitals, banks, mobile operator stations, water-stations, power plants, airport buildings for air traffic control and all structures with explosive risk.									
SPC25	**10 746**	SPC 1.1 - 120 SPC 1.1 - 150	2	300	1	1+0	25/-	275/-	
SPC25 DS	**10 646**	SPC 1.1 - 120 DS SPC 1.1 - 150 DS	2	300	1	1+0	25/-	275/-	L/N, L/PEN, L/PE
SPC25/1+1	**10 742**	SPC 1 - 120 SPC 1 - 150 SPC 1.0 - 120 SPC 1.0 - 150	4	460	2	1+1	25/50	275/255	L/N, N/PE
SPC25 DS/1+1	**10 642**	SPC 1 - 120 DS SPC 1 - 150 DS SPC1.0-120 DS SPC1.0-150 DS	4	460	2	1+1	25/50	275/255	L/N, N/PE
SPC25/3+0	**10 736**	SPC 3.1 - 120 SPC 3.1 - 150	6	900	3	3+0	25/-	275/-	L/PEN
SPC25 DS/3+0	**10 636**	SPC 3.1 - 120 DS SPC 3.1 - 150 DS	6	900	3	3+0	25/-	275/-	L/PEN
SPC25/3+1	**10 732**	SPC 3 - 120 SPC 3 - 150 SPC 3.0 - 120 SPC 3.0 - 150	8	1125	4	3+1	25/100	275/255	L/N, N/PE
SPC25 DS/3+1	**10 632**	SPC 3 - 120 DS SPC 3 - 150 DS SPC3.0-120 DS SPC3.0-150 DS	8	1125	4	3+1	25/100	275/255	L/N, N/PE

TE - dividing unit (17,5 mm)

Housing material - Polyamide **PA6**

Recommended cable cross-sections of the connected conductors (at tightening torque of clamps 4Nm) **35 mm² (solid), 25 mm² (flexible)**



SURGE ARRESTERS - VARISTOR

PIII is surge arrester type 2 according to EN 61643-11. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 (according to IEC 1312-1 and EN 62305) for equipotential bonding and elimination of transient overvoltage that originate during atmospheric discharges or switching processes. The combination of PIII + B20 is suitable for use in TNS and TT systems.

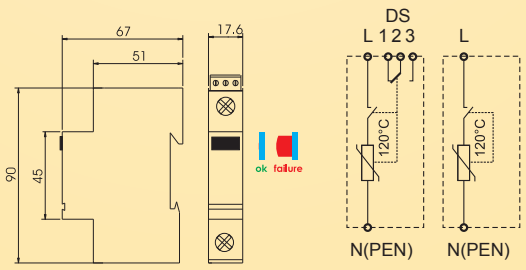
The main use of PIII arrester is in all kinds of industry, residential and administration buildings. They are to be placed into the secondary switchboards or into the control box.

Single-pole MOV surge arrester

PIII-75



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



Type PIII-75/PIII-75 DS		
Max. continuous operating voltage	U_c	75 V AC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Temporary overvoltage (TOV)	U_T	-
Voltage protection level at I_n	U_p	< 400 V
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	80 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIII-75		24 002
PIII-75 DS		24 021

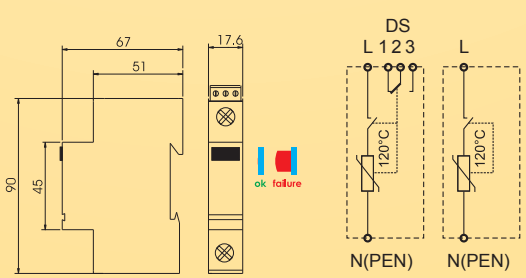
CE PG ML102

Single-pole MOV surge arrester

PIII-150



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



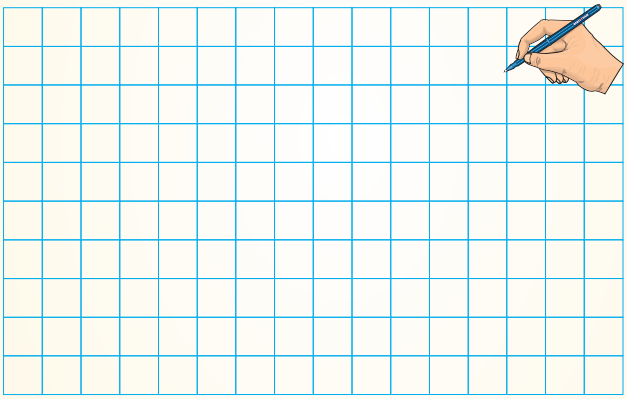
Type PIII-150/PIII-150 DS		
Max. continuous operating voltage	U_c	150 V AC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Temporary overvoltage (TOV)	U_T	-
Voltage protection level at I_n	U_p	< 850 V
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	84 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIII-150		24 120
PIII-150 DS		24 121

CE PG ML102

DS

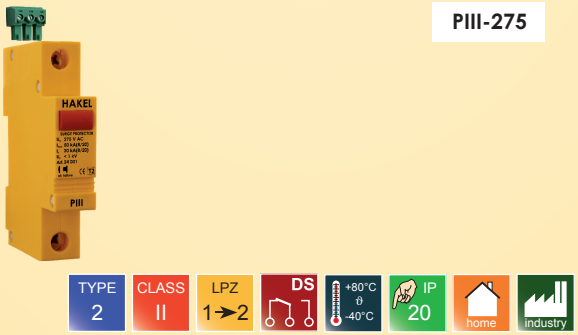
Function of remote monitor terminals
When the PIII DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

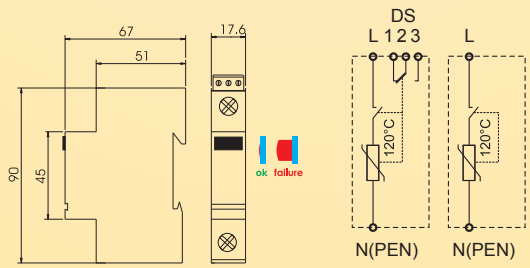
el. strength against surround. circuits	3750 V_{rms}
el. strength against network circuits	3750 V_{rms}
insulation resistance	2 x 10^7 Ω
max. switching current	~ 0,5 A
max. switching voltage	~ 250 V



Single-pole MOV surge arrester

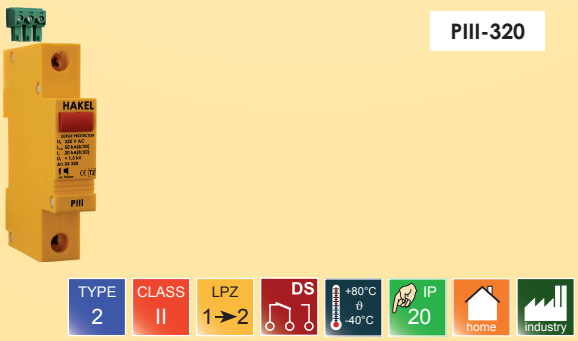
Type PIII-275/PIII-275 DS		
Max. continuous operating voltage	U_c	275 V AC
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	20 kA
Temporary overvoltage (TOV)	U_T	335 V/5 sec
Voltage protection level at I_n	U_p	<1,3 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	96 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIII-275		24 001
PIII-275 DS		24 020

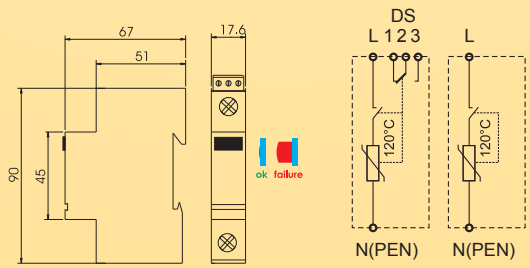




Single-pole MOV surge arrester

Type PIII-320/PIII-320 DS		
Max. continuous operating voltage	U_c	320 V AC
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	20 kA
Temporary overvoltage (TOV)	U_T	335 V/5 sec
Voltage protection level at I_n	U_p	<1,3 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	98 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIII-320		24 320
PIII-320 DS		24 321



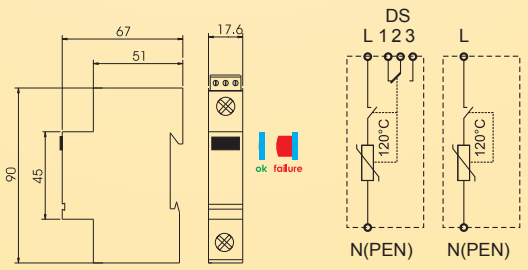


Single-pole MOV surge arrester

PIII-385



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



Type PIII-385/PIII-385 DS		
Max. continuous operating voltage	U_c	385 V AC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Temporary overvoltage (TOV)	U_T	560/5 sec
Voltage protection level at I_n	U_p	< 1,5 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	95 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIII-385		24 322
PIII-385 DS		24 323

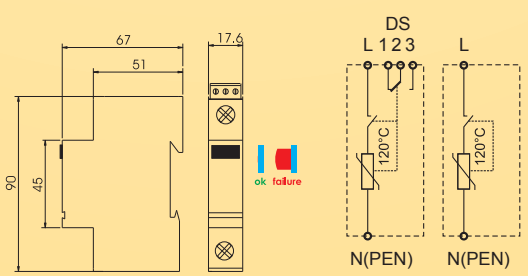
CE PG MJ102

Single-pole MOV surge arrester

PIII-440



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



Type PIII-440/PIII-440 DS		
Max. continuous operating voltage	U_c	440 V AC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Temporary overvoltage (TOV)	U_T	580 V/5 sec
Voltage protection level at I_n	U_p	< 2 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	103 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIII-440		24 009
PIII-440 DS		24 040

CE PG MJ102

DS

Function of remote monitor terminals

When the PIII DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

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	~ 0,5 A
max. switching voltage	~ 250 V

Single-pole MOV surge arrester

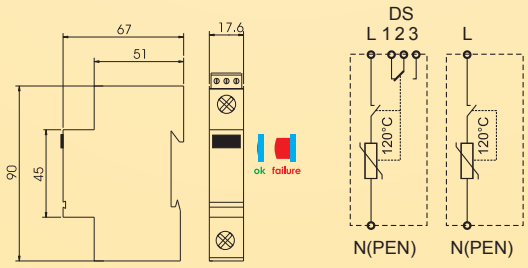
Type PIII-600/PIII-600 DS		
Max. continuous operating voltage	U_c	600 V AC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Temporary overvoltage (TOV)	U_T	750 V/5 sec
Voltage protection level at I_n	U_p	< 2,5 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	110 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIII-600		24 010
PIII-600 DS		24 025

M.102

PIII-600



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry





SURGE ARRESTERS - VARISTOR

PIIIM is surge arrester type 2 according to EN 61643-11. Complete device consists of a base part and pluggable module. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 (according to IEC 1312-1 and EN 62305) for equipotential bonding and elimination of transient overvoltage that originate during atmospheric discharges or switching processes. The combination of PIIIM + B20M is suitable for use in TNS and TT systems.

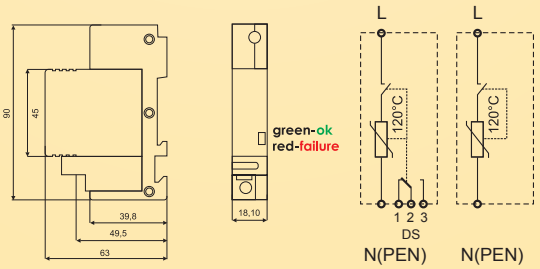
The main use of PIIIM arrester is in all kinds of industry, residential and administration buildings. They are to be placed into the secondary switchboards or into the control box.

Single-pole MOV surge arrester

PIIIM-75



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



Type PIIIM-75/PIIIM-75 DS		
Max. continuous operating voltage	U_c	75 V AC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Temporary overvoltage (TOV)	U_T	-
Voltage protection level at I_n	U_p	< 580 V
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	82 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIIIM-75		24 050
PIIIM-75 DS		24 051



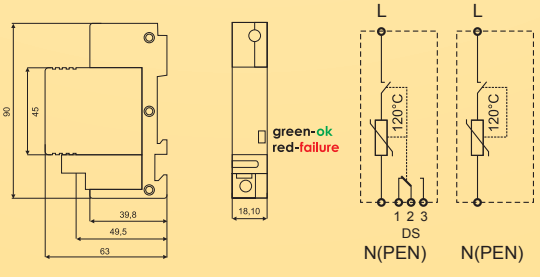
Varistor-based spare module	Art. No.
PIIIM-75/M	**24 360**

Single-pole MOV surge arrester

PIIIM-150



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



Type PIIIM-150/PIIIM-150 DS		
Max. continuous operating voltage	U_c	150 V AC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Temporary overvoltage (TOV)	U_T	-
Voltage protection level at I_n	U_p	< 1 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	85 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIIIM-150		24 052
PIIIM-150 DS		24 053



Varistor-based spare module	Art. No.
PIIIM-150/M	**24 361**

DS

Function of remote monitor terminals
When the PIIIM DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

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	~ 0,5 A
max. switching voltage	~ 250 V

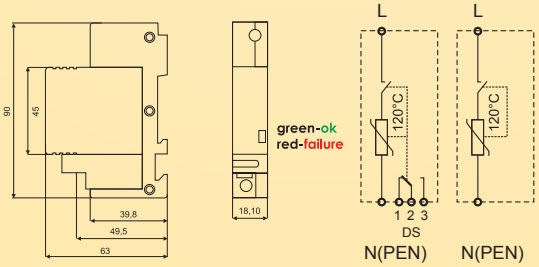
Single-pole MOV surge arrester

Type PIIIM-275/PIIIM-275 DS		
Max. continuous operating voltage	U_c	275 V AC
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	20kA
Temporary overvoltage (TOV)	U_T	335 V/5 sec
Voltage protection level at I_n	U_p	<1,3 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	90 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIIIM-275		24 054
PIIIM-275 DS		24 055



PIIIM-275

TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry





Varistor-based spare module	Art. No.
PIIIM-275/M	24 362

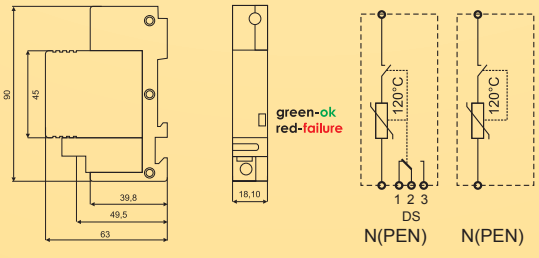
Single-pole MOV surge arrester

Type PIIIM-320/PIIIM-320 DS		
Max. continuous operating voltage	U_c	320 V AC
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	20 kA
Temporary overvoltage (TOV)	U_T	335 V/5 sec
Voltage protection level at I_n	U_p	<1,45 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	92 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIIIM-320		24 056
PIIIM-320 DS		24 057



PIIIM-320

TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry





Varistor-based spare module	Art. No.
PIIIM-320/M	24 363

DS

Function of remote monitor terminals
When the PIIIM DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

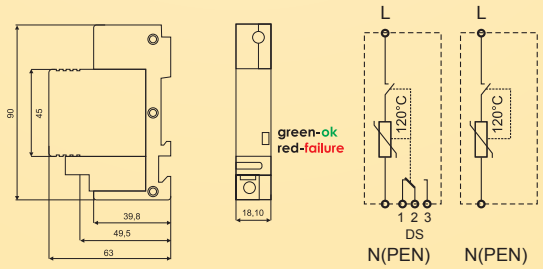
el. strength against surround. circuits	3750 V_{rms}
el. strength against network circuits	3750 V_{rms}
insulation resistance	2 x 10^7 Ω
max. switching current	~ 0,5 A
max. switching voltage	~ 250 V

Single-pole MOV surge arrester

PIIIM-385



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



Type PIIIM-385/PIIIM-385 DS		
Max. continuous operating voltage	U_c	385 V AC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Temporary overvoltage (TOV)	U_T	560/5 sec
Voltage protection level at I_n	U_p	< 1,65 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	92 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIIIM-385		24 043
PIIIM-385 DS		24 044

CE PG M.I102



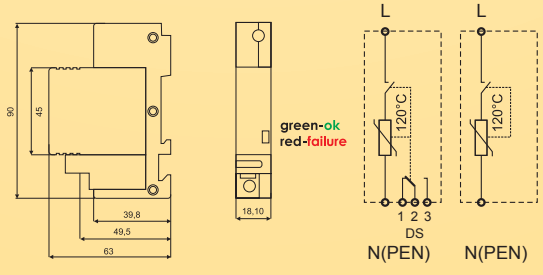
Varistor-based spare module	Art. No.
PIIIM-385/M	**24 364**

Single-pole MOV surge arrester

PIIIM-440



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



Type PIIIM-440/PIIIM-440 DS		
Max. continuous operating voltage	U_c	440 V AC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Temporary overvoltage (TOV)	U_T	580 V/5 sec
Voltage protection level at I_n	U_p	< 2,15 kV
Response time	t_A	< 25 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	98 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
PIIIM-440		24 058
PIIIM-440 DS		24 059

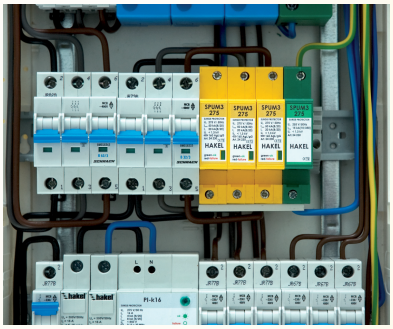
CE PG M.I102



Varistor-based spare module	Art. No.
PIIIM-440/M	**24 365**

SURGE ARRESTERS - GAS DISCHARGE TUBE

B20 and B20M are gas discharge tubes type 2 according to EN 61643-11. Indication "M" specifies the pluggable module construction. These arresters are intended for use in TNS and TT systems (3+1 or 1+1) at the boundaries of LPZ 1-2. B20 and B20M are to be installed between N and PE only.



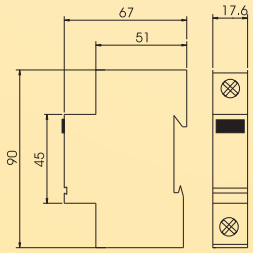
Single-pole GDT surge arrester

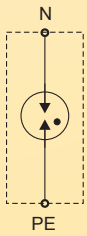
Type B20		
Max. continuous operating voltage	U_C	255 V AC
Insulation resistance	R_i	> 1000 MΩ
Lightning impulse current (10/350)	I_{imp}	20 kA
- charge	Q	10 As
- specific energy	W/R	100 kJ/Ω
Temporary overvoltage (TOV)	U_T	1200 V/200ms
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	20 kA
Voltage protection level at I_n	U_p	< 1,3 kV
Lightning impulse sparkover voltage 1,2/50µs		< 1,5 kV
Follow current interruptig rating at U_C	I_{fi}	100 A_{rms}
Response time	t_A	< 100 ns
Lifetime		min.100 000 h
Weight	m	78 g
Article number		30 022



B20

TYPE 2 | CLASS II | LPZ 1➔2 | +80°C ϑ -40°C | IP 20 | home | industry





CE PG ML102

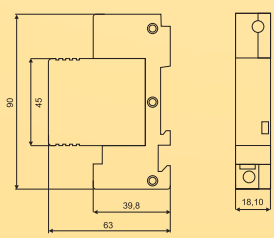
Single-pole GDT surge arrester

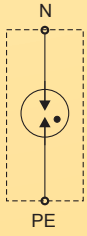
Type B20M		
Max. continuous operating voltage	U_C	255 V AC
Insulation resistance	R_i	> 1000 MΩ
Lightning impulse current (10/350)	I_{imp}	20 kA
- charge	Q	10 As
- specific energy	W/R	100 kJ/Ω
Temporary overvoltage (TOV)	U_T	1200 V/200 ms
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	20 kA
Voltage protection level at I_n	U_p	< 1,3 kV
Lightning impulse sparkover voltage 1,2/50µs		< 1,5 kV
Follow current interruptig rating at U_C	I_{fi}	100 A_{rms}
Response time	t_A	< 100 ns
Lifetime		min.100 000 h
Weight	m	76 g
Article number		30 122



B20M

TYPE 2 | CLASS II | LPZ 1➔2 | +80°C ϑ -40°C | IP 20 | home | industry

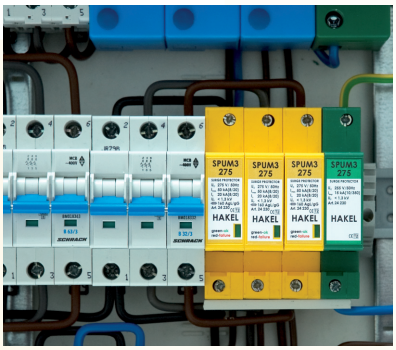




CE PG ML102



Varistor-based spare module	Art. No.
B20M/M	24 367



SURGE ARRESTERS - VARISTOR + GDT

SPU is a combination of one-phase or three-phase MOV surge protection and power gas discharge tube connected in 1+1 or 3+1 circuits. SPU is surge arrester type 2 according to EN 61643-11. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 (according to IEC 1312-1 and EN 62305) for equipotential bonding and elimination of transient overvoltage that originate during atmospheric discharges or switching processes. Combined surge arrester SPU is suitable for use in TNS and TT systems.

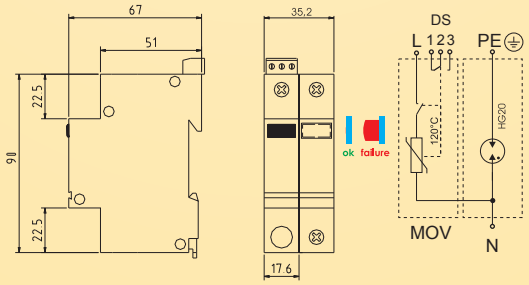
The main use of SPU arrester is in all kinds of industry, residential and administration buildings. They are to be placed into the secondary switchboards or into the control box.

Single-pole MOV + GDT surge arrester

SPU1-275



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry

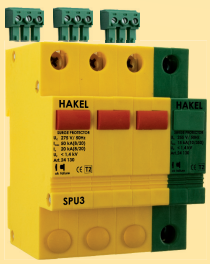


Type SPU1-275/SPU1-275 DS		
Max. continuous operating voltage	U_c	275 V AC
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	20 kA
Temporary overvoltage (TOV) L/N	U_T	335 V/5 sec
Temporary overvoltage (TOV) N/PE	U_T	1200 V/0,2 sec
Voltage protection level at I_n	U_p	<1,3 kV
Follow current interruptig rating at U_C (N/PE)	I_{fi}	100 A_{rms}
Response time L/N	t_A	< 25 ns
Response time N/PE	t_A	< 100 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	166 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
SPU1-275		24 034
SPU1-275 DS		24 033

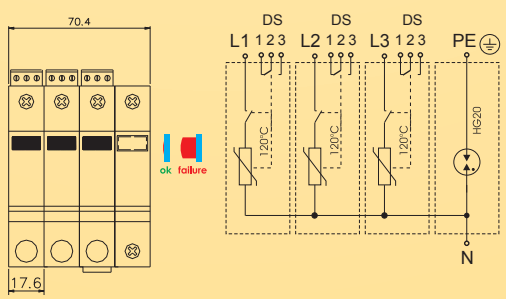
CE PG MJ02

Single-pole MOV + GDT surge arrester

SPU3-275



TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



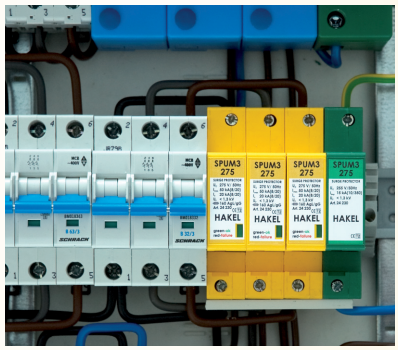
Type SPU1-275/SPU1-275 DS		
Max. continuous operating voltage	U_c	275 V AC
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	20 kA
Temporary overvoltage (TOV) L/N	U_T	335 V/5 sec
Temporary overvoltage (TOV) N/PE	U_T	1200 V/0,2 sec
Voltage protection level at I_n	U_p	<1,3 kV
Follow current interruptig rating at U_C (N/PE)	I_{fi}	100 A_{rms}
Response time L/N	t_A	< 25 ns
Response time N/PE	t_A	< 100 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	350 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
SPU3-275		24 130
SPU3-275 DS		24 030

CE PG MJ02

SURGE ARRESTERS - VARISTOR + GDT

SPUM is a combination of one-phase or three-phase MOV surge protection and power gas discharge tube connected in 1+1 or 3+1 circuits. SPUM is surge arrester type 2 according to EN 61643-11. Complete device consists of a base part and pluggable modules. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 (according to IEC 1312-1 and EN 62305) for equipotential bonding and elimination of transient overvoltage that originate during atmospheric discharges or switching processes. Combined surge arrester SPUM is suitable for use in TNS and TT systems.

The main use of SPUM arrester is in all kinds of industry, residential and administration buildings. They are to be placed into the secondary switchboards or into the control box.



Three-pole MOV + GDT surge arrester

Type SPUM1-275/SPUM1-275 DS		
Max. continuous operating voltage	U_c	275 V AC
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	20 kA
Temporary overvoltage (TOV) L/N	U_T	335 V/5 sec
Temporary overvoltage (TOV) N/PE	U_T	1200 V/0,2 sec
Voltage protection level at I_n	U_p	<1,3 kV
Follow current interruptig rating at U_C (N/PE)	I_{fi}	100 A_{rms}
Response time L/N	t_A	< 25 ns
Response time N/PE	t_A	< 100 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	167 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
SPUM1-275		24 333
SPUM1-275 DS		24 233

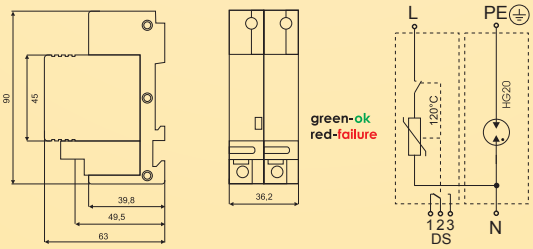


Varistor-based spare module	Art. No.
SPUM1-275/M	24 368



SPUM1-275

TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



Three-pole MOV + GDT surge arrester

Type SPUM3-275/SPUM3-275 DS		
Max. continuous operating voltage	U_c	275 V AC
Max. discharge current (8/20)	I_{max}	50 kA
Nominal discharge current (8/20)	I_n	20 kA
Temporary overvoltage (TOV) L/N	U_T	335 V/5 sec
Temporary overvoltage (TOV) N/PE	U_T	1200 V/0,2 sec
Voltage protection level at I_n	U_p	<1,3 kV
Follow current interruptig rating at U_C (N/PE)	I_{fi}	100 A_{rms}
Response time L/N	t_A	< 25 ns
Response time N/PE	t_A	< 100 ns
Max. back-up fuse		160 AgL/gG
Lifetime		min.100 000 h
Weight	m	347 g
Short-circuit withstand capability at max.back-up fuse	I_p	60 kA_{rms}
Article number		
SPUM3-275		24 230
SPUM3-275 DS		24 240

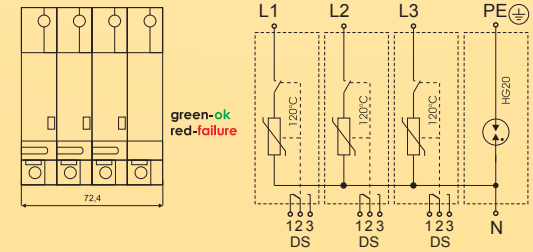


Varistor-based spare module	Art. No.
SPUM3-275/M	24 369



SPUM3-275

TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



Application table

Type	Art. No.	Former type	TE	Weight (g)	No. of poles	Circuit	I_{max} (kA)	U_C (V)	Mode of protection
PIII-75	**24 002**	PIII - 60	1	80	1	1+0	40	75	L/N, L/PEN, L/PE
PIII-75 DS	**24 021**	PIII - 60 DS	1	86	1	1+0	40	75	L/N, L/PEN, L/PE
PIII-150	**24 120**	PIII - 120	1	84	1	1+0	40	150	L/N, L/PEN, L/PE
PIII-150 DS	**24 121**	PIII - 120 DS	1	92	1	1+0	40	150	L/N, L/PEN, L/PE
PIII-275	**24 001**	PIII - 230	1	93	1	1+0	50	275	L/N, L/PEN, L/PE
PIII-275 DS	**24 020**	PIII - 230 DS	1	96	1	1+0	50	275	L/N, L/PEN, L/PE
PIII-320	**24 320**	PIII - 280	1	98	1	1+0	50	320	L/N, L/PEN, L/PE
PIII-320 DS	**24 321**	PIII - 280 DS	1	100	1	1+0	50	320	L/N, L/PEN, L/PE
PIII-385	**24 322**		1	95	1	1+0	40	385	L/N, L/PEN, L/PE
PIII-385 DS	**24 323**		1	102	1	1+0	40	385	L/N, L/PEN, L/PE
PIII-440	**24 009**	PIII - 400	1	103	1	1+0	40	440	L/N, L/PEN, L/PE
PIII-440 DS	**24 040**	PIII - 400 DS	1	110	1	1+0	40	440	L/N, L/PEN, L/PE
PIII-600	**24 010**	PIII - 500	1	109	1	1+0	40	600	L/N, L/PEN, L/PE
PIII-600 DS	**24 025**	PIII - 500 DS	1	110	1	1+0	40	600	L/N, L/PEN, L/PE
PIIIM-75	**24 050**		1	78	1	1+0	40	75	L/N, L/PEN, L/PE
PIIIM-75 DS	**24 051**		1	82	1	1+0	40	75	L/N, L/PEN, L/PE
PIIIM-150	**24 052**	PIIIM - 120	1	82	1	1+0	40	150	L/N, L/PEN, L/PE
PIIIM-150 DS	**24 053**	PIIIM - 120 DS	1	85	1	1+0	40	150	L/N, L/PEN, L/PE
PIIIM-275	**24 054**	PIIIM - 230	1	85	1	1+0	50	275	L/N, L/PEN, L/PE
PIIIM-275 DS	**24 055**	PIIIM - 230 DS	1	89	1	1+0	50	275	L/N, L/PEN, L/PE
PIIIM-320	**24 056**	PIIIM - 280	1	80	1	1+0	50	320	L/N, L/PEN, L/PE
PIIIM-320 DS	**24 057**	PIIIM - 280 DS	1	90	1	1+0	50	320	L/N, L/PEN, L/PE
PIIIM-385	**24 043**		1	92	1	1+0	40	385	L/N, L/PEN, L/PE
PIIIM-385 DS	**24 044**		1	100	1	1+0	40	385	L/N, L/PEN, L/PE
PIIIM-440	**24 058**	PIIIM - 400	1	98	1	1+0	40	440	L/N, L/PEN, L/PE
PIIIM-440 DS	**24 059**	PIIIM - 400 DS	1	106	1	1+0	40	440	L/N, L/PEN, L/PE
PIIIM-600	**24 060**	PIIIM - 500	1	100	1	1+0	40	600	L/N, L/PEN, L/PE
PIIIM-600 DS	**24 061**	PIIIM - 500 DS	1	106	1	1+0	40	600	L/N, L/PEN, L/PE
B20	**30 022**	B20/C	1	76	1	0+1	50	255	N/PE
B20M	**30 122**		1	74	1	0+1	50	255	N/PE

Recommended sets for TNS and TT systems

Type	Art. No.	Former type	TE	Weight (g)	No. of poles	Circuit	I_{max} (kA)	Application
SPU1-150	**24 132**	SPU 1 - 120	2	158	2	1+1	40	Secondary switchboard, control box
SPU1-150 DS	**24 032**	SPU 1 - 120 DS	2	162	2	1+1	40	Secondary switchboard, control box
SPU1-275	**24 034**	SPU 1 - 240	2	162	2	1+1	50	Secondary switchboard, control box
SPU1-275 DS	**24 033**	SPU 1 - 240 DS	2	166	2	1+1	50	Secondary switchboard, control box
SPUM1-275	**24 333**	SPUM 1 - 240	2	165	2	1+1	50	Secondary switchboard, control box
SPUM1-275 DS	**24 233**	SPUM 1 - 240 DS	2	167	2	1+1	50	Secondary switchboard, control box
SPU3-150	**24 131**	SPU 3 - 120	4	322	4	3+1	40	Secondary switchboard, control box
SPU3-150 DS	**24 031**	SPU 3 - 120 DS	4	330	4	3+1	40	Secondary switchboard, control box
SPU3-275	**24 130**	SPU 3 - 240	4	336	4	3+1	50	Secondary switchboard, control box
SPU3-275 DS	**24 030**	SPU 3 - 240 DS	4	349	4	3+1	50	Secondary switchboard, control box
SPUM3-275	**24 230**	SPUM 3 - 240	4	330	4	3+1	50	Secondary switchboard, control box
SPUM3-275 DS	**24 240**	SPUM 3 - 240 DS	4	347	4	3+1	50	Secondary switchboard, control box

Recommended sets for TNC system

Set	Consisting of	TE	Weight (g)	No. of poles	Circuit	I_{max} (kA)	Application
PIII-275/3+0	3xPIII-275	3	279	3	3+0	50	Secondary switchboard, control box
PIII-275 DS/3+0	3xPIII-275 DS	3	288	3	3+0	50	Secondary switchboard, control box
PIIIM-275/3+0	3xPIIIM-275	3	255	3	3+0	50	Secondary switchboard, control box
PIIIM-275 DS/3+0	3xPIIIM-275 DS	3	267	3	3+0	50	Secondary switchboard, control box

Spare module	Art. No.
PIIIM-75/M	**24 360**
PIIIM-150/M	**24 361**
PIIIM-275/M	**24 362**
PIIIM-320/M	**24 363**
PIIIM-385/M	**24 364**
PIIIM-440/M	**24 365**
PIIIM-600/M	**24 366**
B20M/M	**24 367**
SPUM1-275/M	**24 368**
SPUM3-275/M	**24 369**

TE - dividing unit (17,5 mm)

Housing material - Polyamide **PA6**

Recommended cable cross-section of the connected conductors (at tightning torque of clamps 4Nm) **25 mm^2 (solid), 16 mm^2 (flexible)**



SURGE ARRESTERS – VARISTOR & EMC/EMI filter

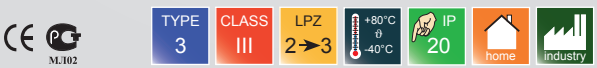
PI-k and PD*DS are a single-phase surge arresters type 3 with a high-frequency filter according to EN 61643-11. They are produced for nominal current within the range of 8, 16, 25, 32, 50, 80, 120 and 150A for application use in TNS systems. The types PI-k8, 16, 25, 32A and PD*DS are constructed for 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).

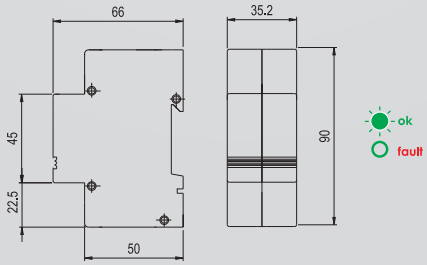
The types PI-k8, 16, 25 and 32 are fitted with a green LED diode signalizing the right functioning, types PI-k16 DS, PI-k25 DS and PD*DS indicate the failure by target disconnection of mechanical thermal fuses.

Two stage MOV surge arrester & EMC/EMI filter

PI-k8





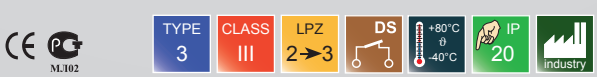


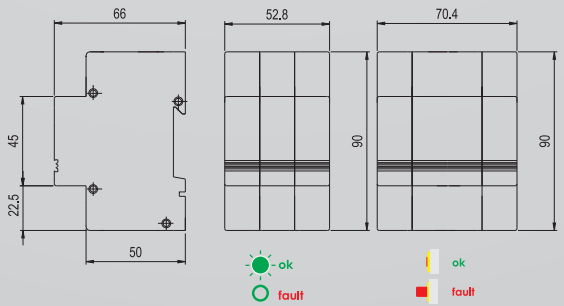
Type PI-k8		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	8 A
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <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		30 080

Two stage MOV surge arrester & EMC/EMI filter

PI-k16, PI-k16DS, PD * DS







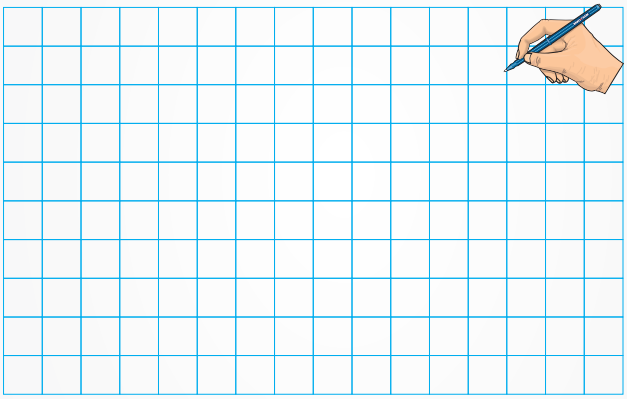
PI-k16 PI-k16DS

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) <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 1,8 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		16 A
Lifetime		min. 100.000 h
Weight	m	170/224 g
Article number		
PI-k16		30 004
PI-k16 DS		30 027

DS

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.

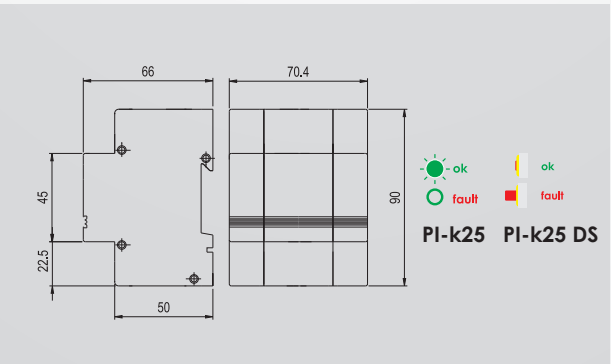
el. strength against surround. circuits	3750 V_{rms}
el. strength against network circuits	3750 V_{rms}
insulation resistance	2 x 10^7 Ω
max. switching current	~ 3 A
max. switching voltage	~ 250 V



Two stage MOV surge arrester & EMC/EMI filter

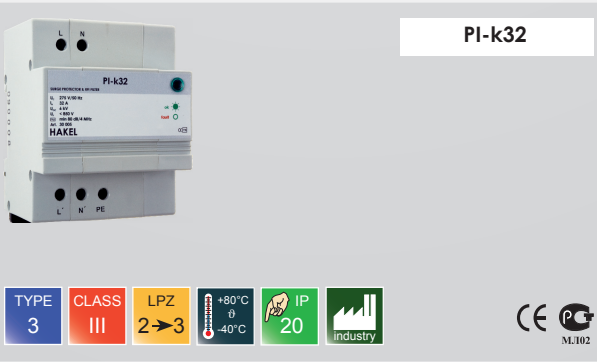
Type PI-k25/PI-k25 DS		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	25 A
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 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

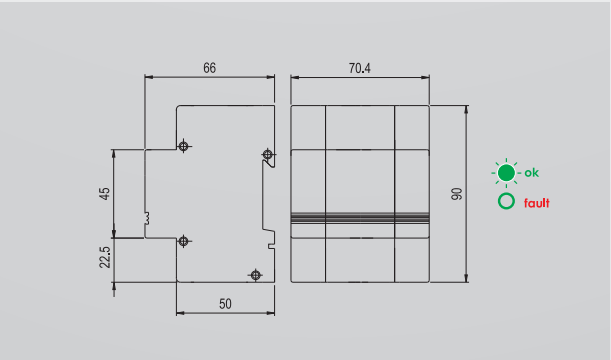


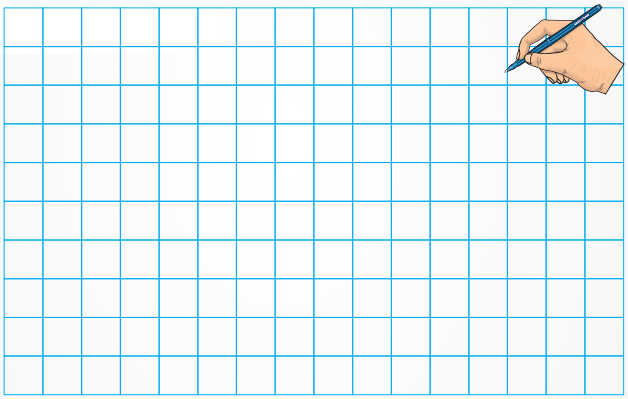


Two stage MOV surge arrester & EMC/EMI filter

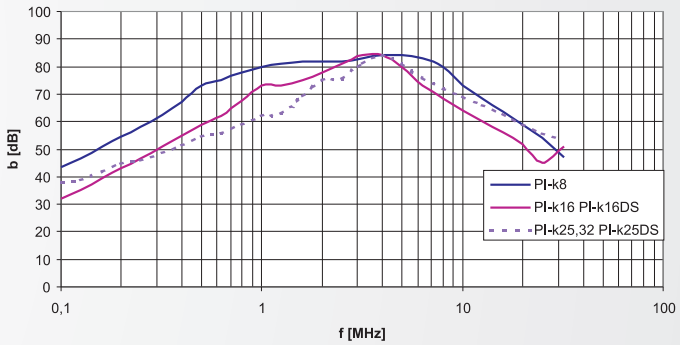
Type PI-k32		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	32 A
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <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





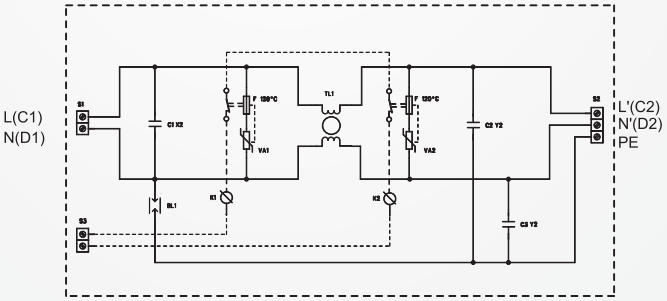


Assymetrical attenuation 50Ω/50Ω

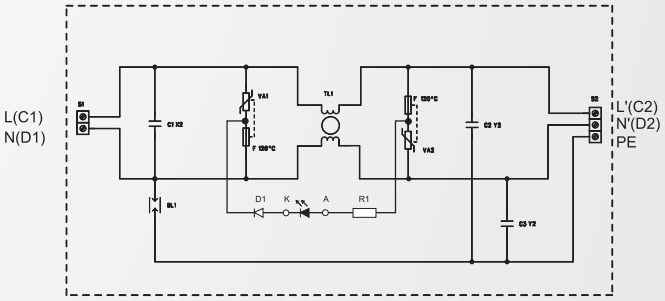


Basic circuit diagram of

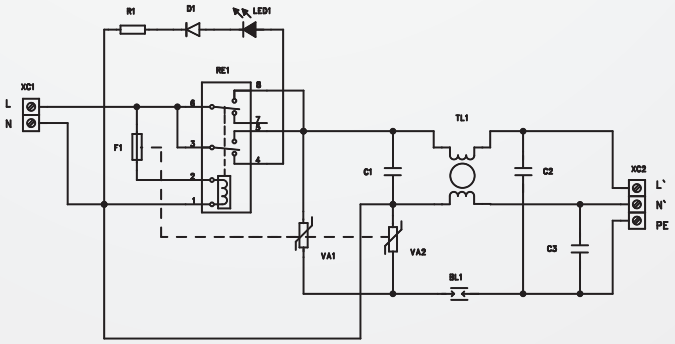
PI-k16 DS, PI-K25 DS



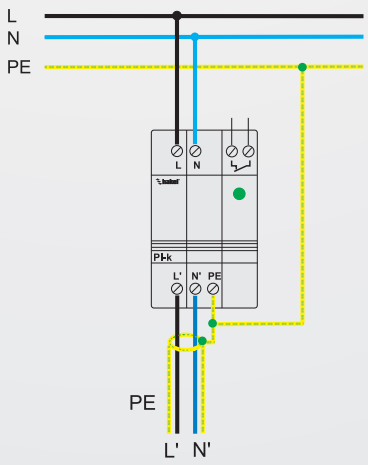
PI-k8, 16, 25, 32

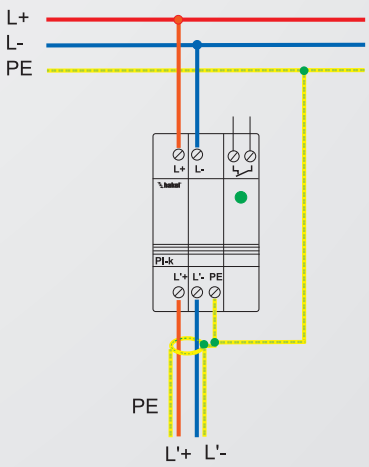


PI-k8 OFF and PI-k16 OFF
fault indication by power interruption



Recommended connection of PI-k



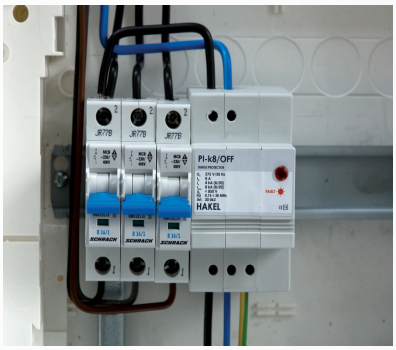


Recommended cross-section for grounding	
PI-k8	2,5 mm^2 Cu
PI-k16	4 mm^2 Cu
PI-k25	6 mm^2 Cu
PI-k32	6 mm^2 Cu

SURGE ARRESTERS - VARISTOR & EMC/EMI filter

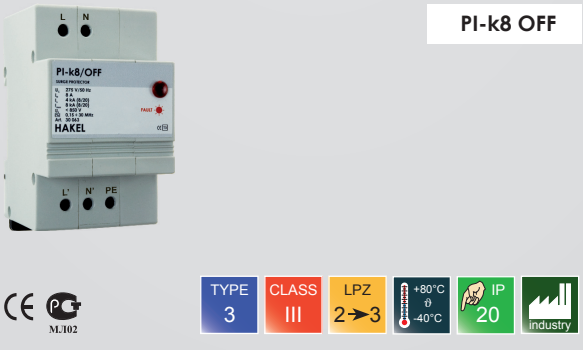
PI-k8 OFF and PI-k16 OFF are single-phase arresters type 3 with a high-frequency filter according to EN 61643-11. They are produced for nominal current within the range of 8 and 16A for application use in TNS systems. The types PI-k8 OFF and PI-k16 OFF are constructed for mounting on DIN rail 35mm. PI-k*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

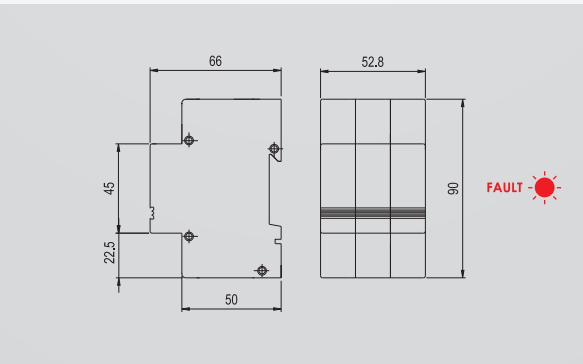
In case of failure the red LED diode turns on and the power supply gets interrupted.



Two stage MOV surge arrester & EMC/EMI filter

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

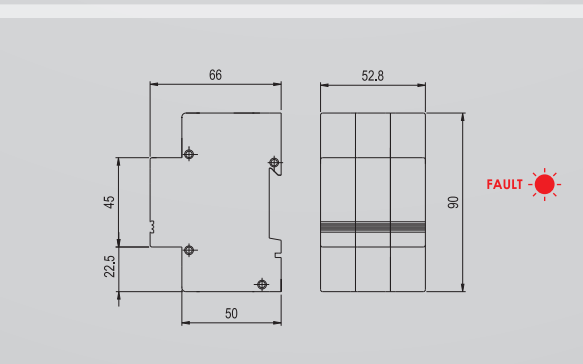


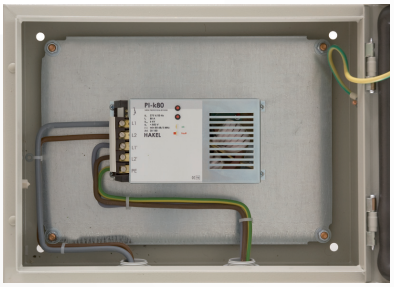


Two stage MOV surge arrester & EMC/EMI filter

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







SURGE ARRESTERS - VARISTOR & EMC/EMI filter

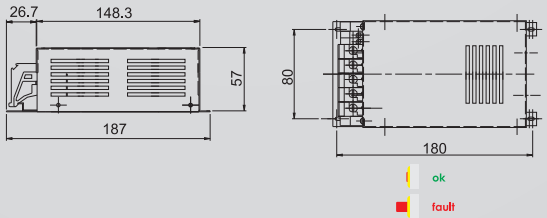
While mounting surge arresters PI-k50, 63, 80, 120 and 150 it is necessary to ensure that the ventilation holes in their housing are not covered. These arresters are to be placed as near to the protected appliance as possible, for example near to the electronic control systems of NC machines, electronics 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



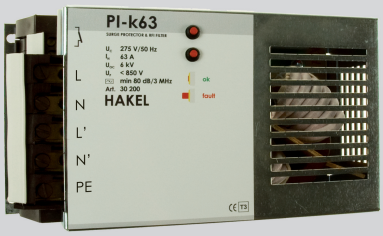
TYPE 3 | CLASS III | LPZ 2→3 | DS | +80°C ϑ -40°C | IP 20 | industry



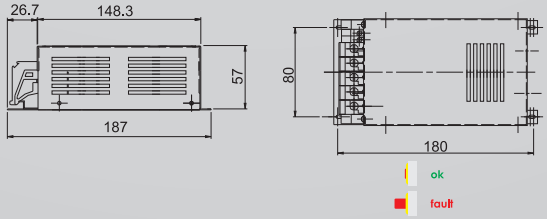
Type PI-k50		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	50 A
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <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 C_y L	M68 22 nF 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 ϑ -40°C | IP 20 | industry

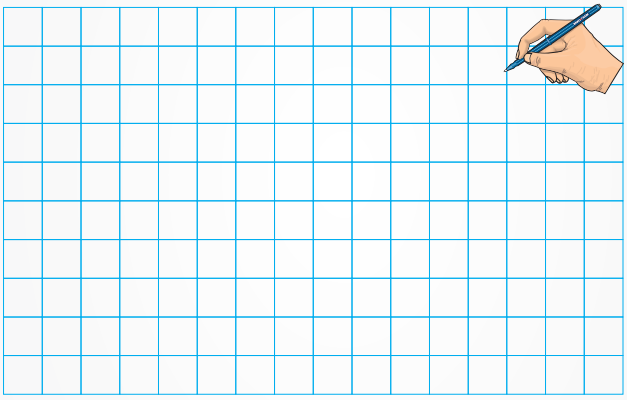


Type PI-k63		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	63 A
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <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 C_y L	M68 22 nF 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

DS

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



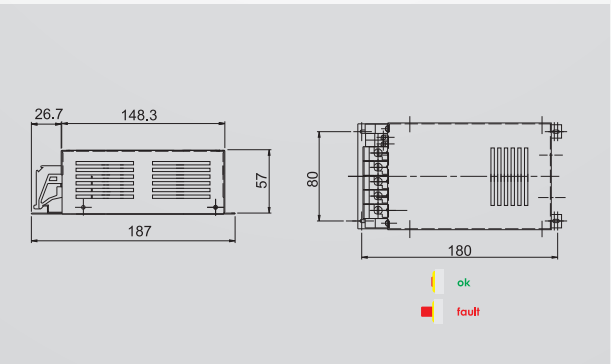
Two stage MOV surge arrester & EMC/EMI filter

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



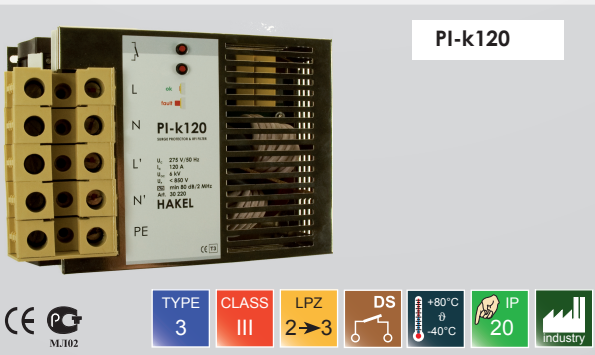
PI-k80

M.102 | TYPE 3 | CLASS III | LPZ 2➔3 | DS | +80°C ϑ -40°C | IP 20 | industry



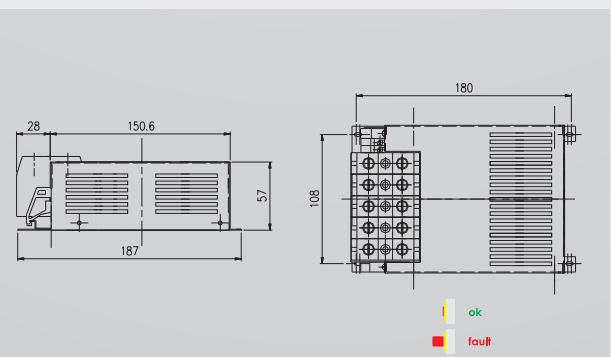
Two stage MOV surge arrester & EMC/EMI filter

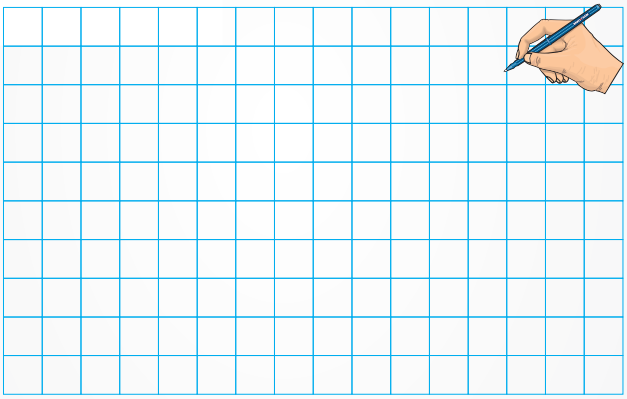
Type PI-k120		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	120 A
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <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



PI-k120

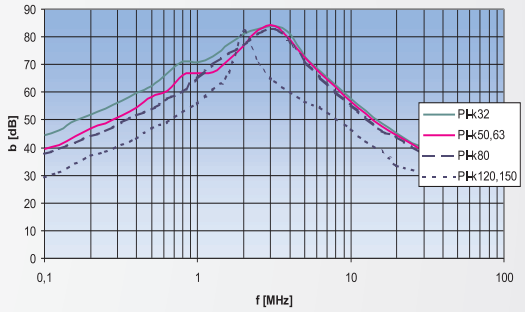
M.102 | TYPE 3 | CLASS III | LPZ 2➔3 | DS | +80°C ϑ -40°C | IP 20 | industry

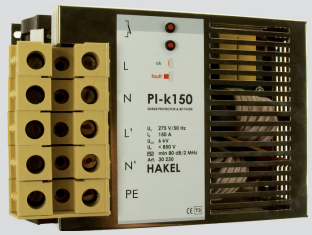




Two stage MOV surge arrester & EMC/EMI filter

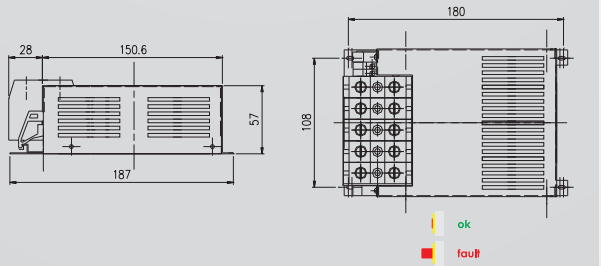
Assymetrical attenuation 50Ω/50Ω





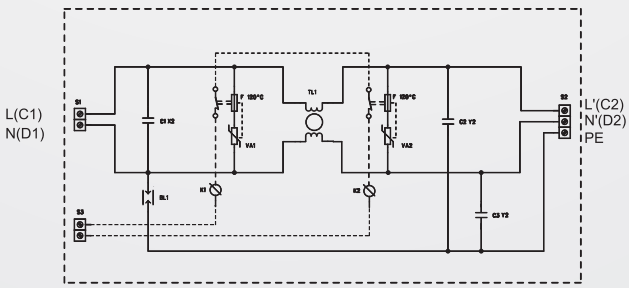
PI-k150

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



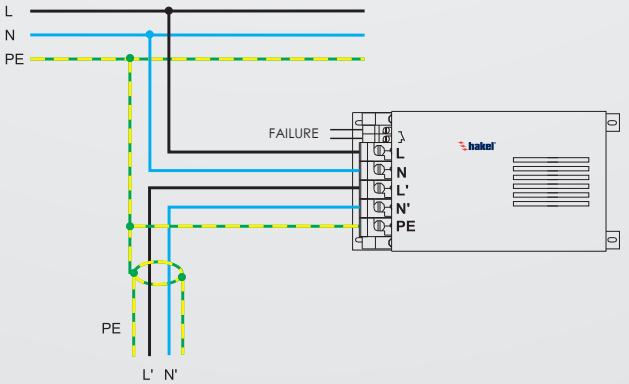
Type PI-k150		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	150 A
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 kV (L/PE) <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

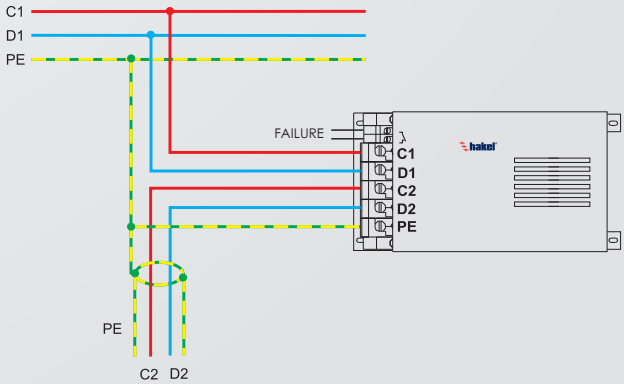
Basic circuit diagram of PI-k50, 63, 80, 120, 150



Recommended cross-section for grounding	
PI-k50	16 mm² Cu
PI-k63	16 mm² Cu
PI-k80	16 mm² Cu
PI-k120	25 mm² Cu
PI-k150	25 mm² Cu

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





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).

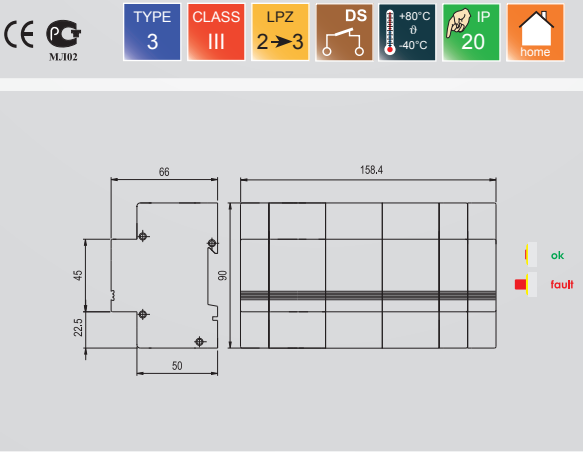
The function failure of varistors is indicated by target disconnection of mechanical thermal fuses which react to varistors overheating above c. 120°C.

Two stage MOV surge arrester & EMC/EMI filter

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

PI-3k16



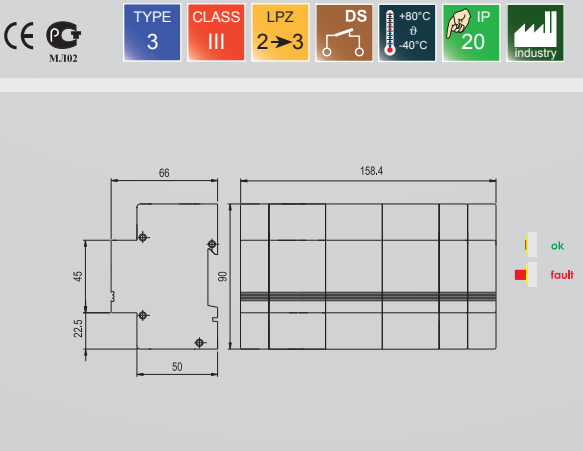


Two stage MOV surge arrester & EMC/EMI filter

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

PI-3k25







SURGE ARRESTER - VARISTOR & EMC/EMI filter

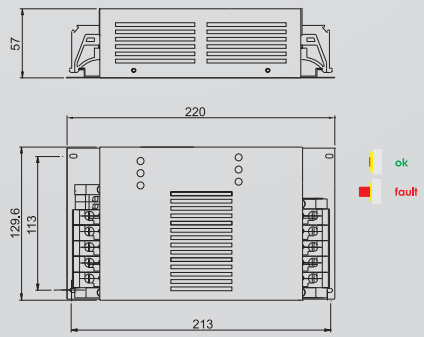
While mounting surge arresters PI-3k32, 50, 63, 80 and 120 it is necessary to ensure that the ventilation holes in their housing are not covered. These arresters are to be placed as near to the protected appliance as possible, for example near to the electronic control systems of NC machines, electronics 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

PI-3k32



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



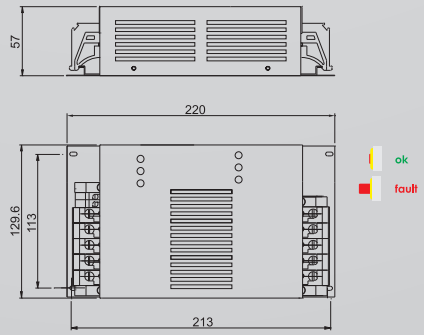
Type PI-3k32		
Nominal voltage	U_N	230/400 V AC
Max. continuous operating voltage	U_C	275/480 V AC
Nominal current	I_N	32 A
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<850 V (L/N) <1,5 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

PI-3k50



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



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

DS

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

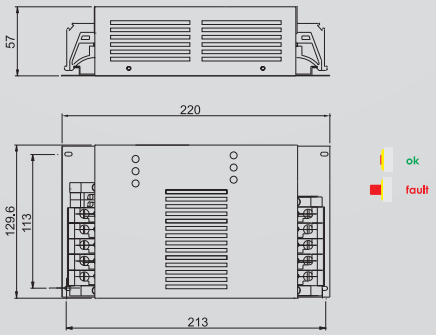
Two stage MOV surge arrester & EMC/EMI filter

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



PI-3k63

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



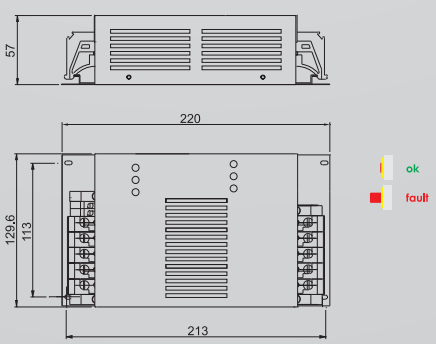
Two stage MOV surge arrester & EMC/EMI filter

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

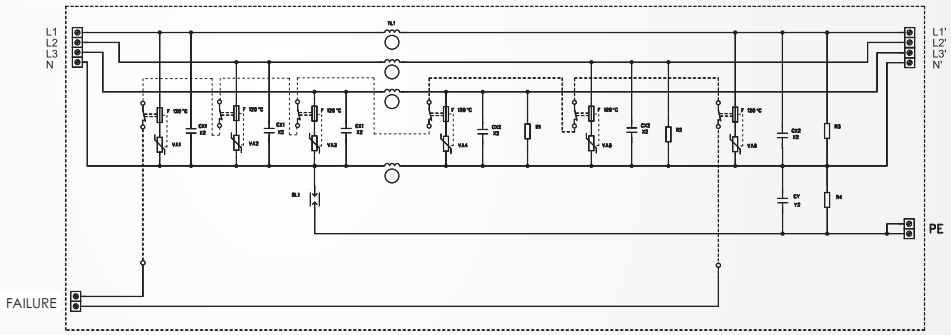


PI-3k80

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

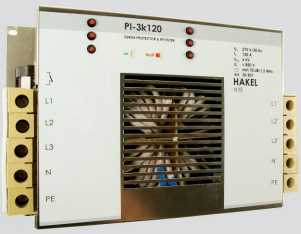


Basic circuit diagram of PI-3k



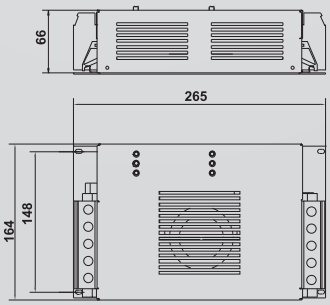
Two stage MOV surge arrester & EMC/EMI filter

PI-3k120



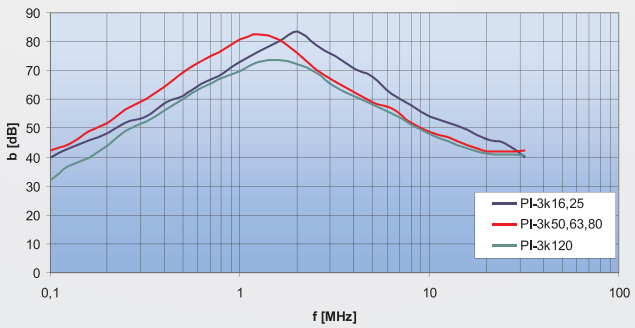
ML102

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



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

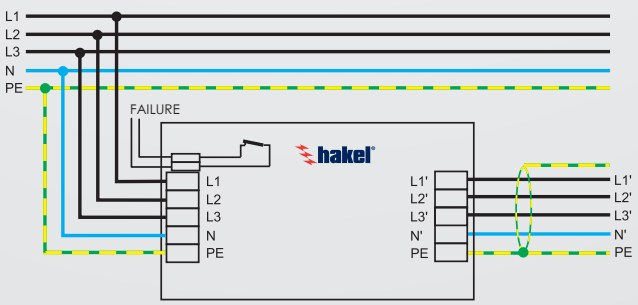


Recommended cross-section for grounding

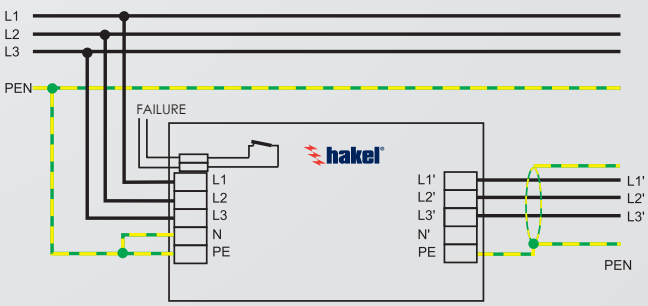
PI-3k16	6 mm² Cu
PI-3k25	6 mm² Cu
PI-3k32	16 mm² Cu
PI-3k50	16 mm² Cu
PI-3k63	16 mm² Cu
PI-3k80	16 mm² Cu
PI-3k120	25 mm² Cu

Recommended connection of PI-3k

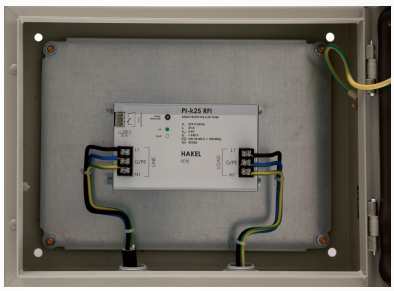
System TNS



System TNC



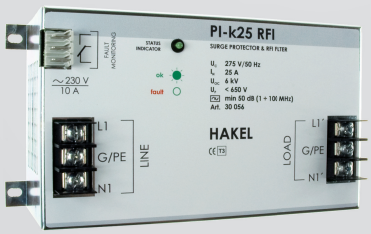
SURGE ARRESTERS - VARISTOR & EMC/EMI filter



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 160 V 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.

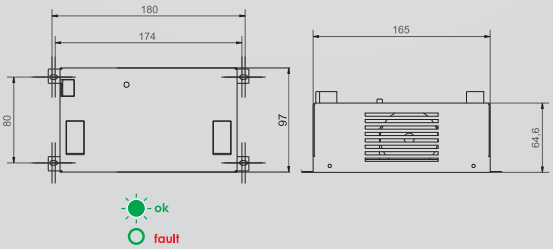
Type PI-k25RFI		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	25 A
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE,N/PE)
Voltage protection level at U_{OC}	U_P	<650 V (L/N,L/PE,N/PE)
Asymmetrical attenuation of filter		min. 50 dB (1 - 100 MHz)
(band-stop filter)		30 - 50 dB (0,1 - 1 MHz)
Filters constants	C_x	220 nF + 3x4,7 μF
	C_y	2x47 nF
	L	2x1 μH + 2x44 μH
	R	68 kΩ
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



PI-k25RFI

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



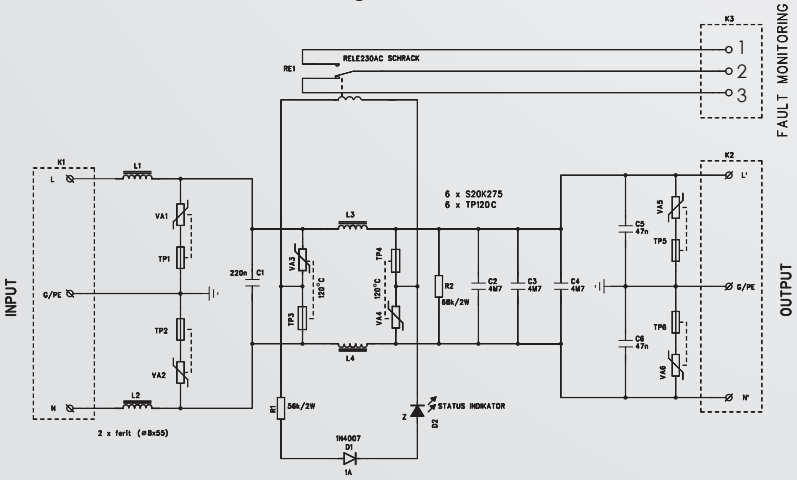
DS

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

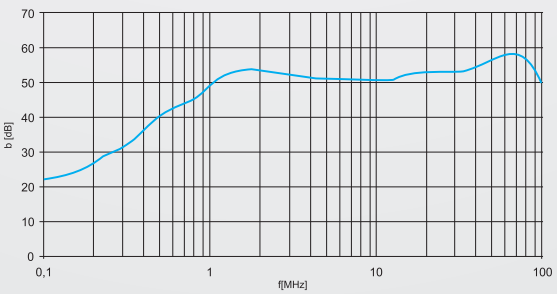
Function of remote monitor terminals

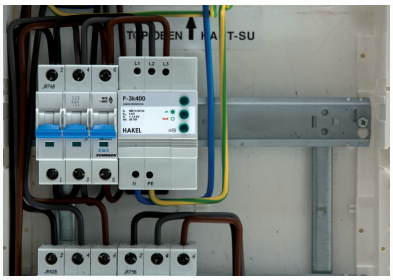
When the PI-k25RFI is operating correctly, the switching contact for remote monitoring is connected. Once the thermal fuse reacts to varistor overheating the switching contact for remote monitoring will disconnect.

Basic circuit diagram of PI-k25RFI



Assymetrical attenuation 50Ω/50Ω





SURGE ARRESTERS - VARISTOR

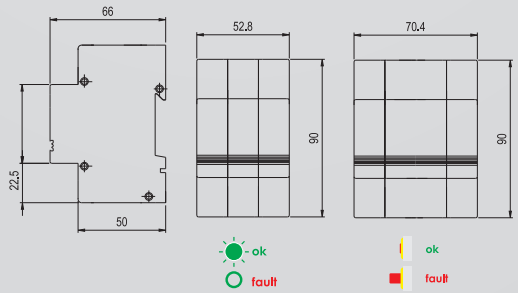
P-3k is a three-phase surge arrester type 3 according to EN 61643-11 suitable for use in TNS, TNC and TT systems. These are parallel devices intended for protection of electronic appliances against impulse surge. All varistors in P-3k device are fitted with thermal fuses to prevent short and also permanent 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



P-3k230

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



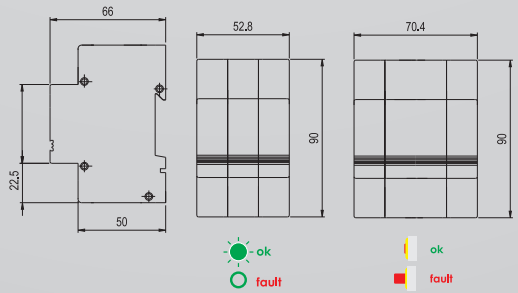
Type P-3k230/P-3k230 DS		
Nominal voltage	U_N	230/400 V AC
Max. continuous operating voltage	U_C	275/480 V AC
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<1,5 kV (L/N) <1,5 kV (L/PE) <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



P-3k400

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



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)
Voltage protection level at U_{OC}	U_P	<1,5 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	140/205 g
Article number		
P-3k400		30 101
P-3k400 DS		30 103

DS

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 x 10^7 Ω
max. switching current	~ 3 A
max. switching voltage	~ 250 V

MOV + GDT surge arrester

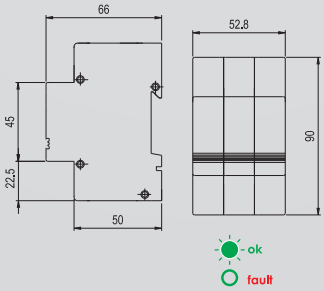
Type P-3k500		
Nominal voltage	U_N	500 V AC
Max. continuous operating voltage	U_C	600 V AC
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<1,8 kV (L/N) <1,5 kV (L/PE) <1,5 kV (N/PE)
Power 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

P-3k500



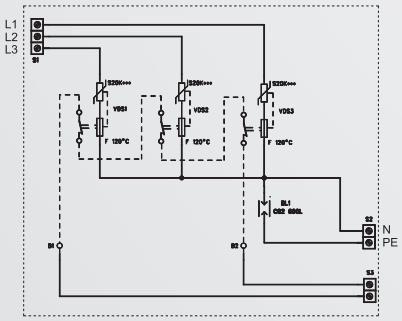
MLI02

TYPE 3 | CLASS III | LPZ 2➔3 | +80°C ϑ -40°C | IP 20 | industry

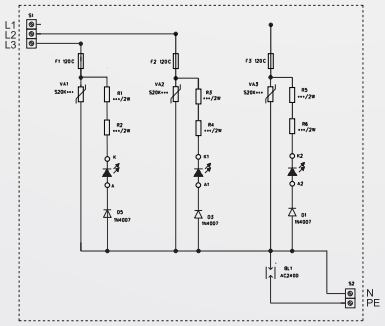


Recommnded cross-section for grounding	
P-3k230, P-3k400, P-3k500	4 mm^2 Cu

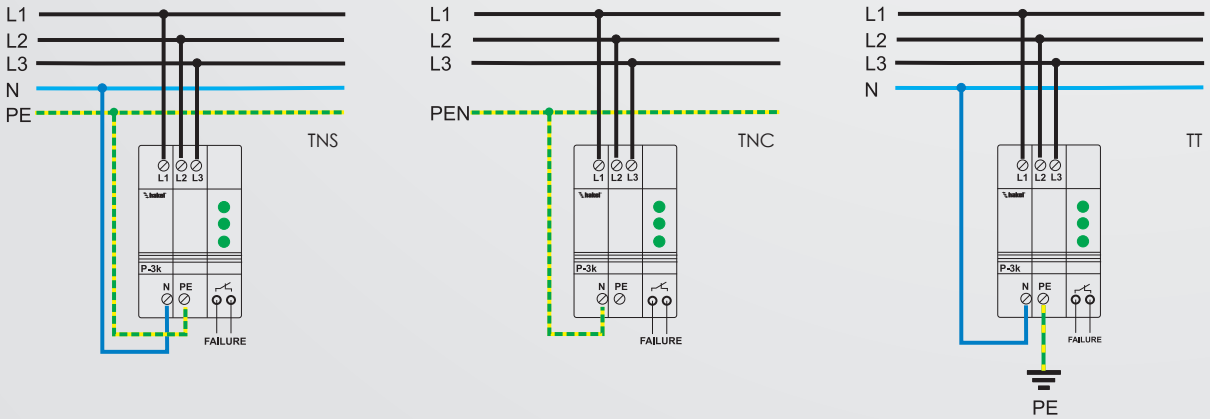
Basic circuit diagram of P-3k230DS, P-3k400DS

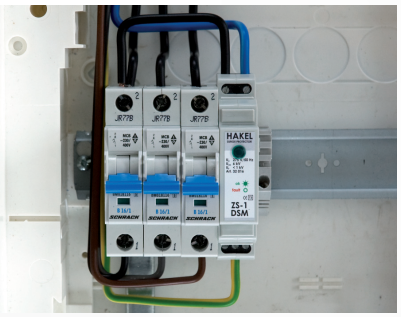


Basic circuit diagram of P-3k230, P-3k400, P-3k500



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





SURGE ARRESTERS - VARISTOR

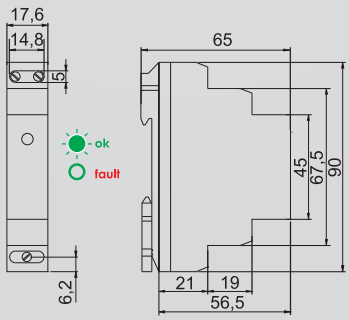
ZS-1DSM is a single-phase surge arrester type 3 according to EN 61643-11 suitable for use in TNS and TNC systems. It is designed for universal application for protection of electrical appliances connected to L.V. supply system against impulse surge effects. The right function is indicated by fitted green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

MOV + GDT surge arrester

ZS-1DSM

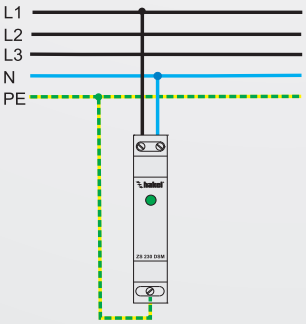


TYPE 3 | CLASS III | LPZ 2➔3 | +80°C ϑ -40°C | IP 20 | industry

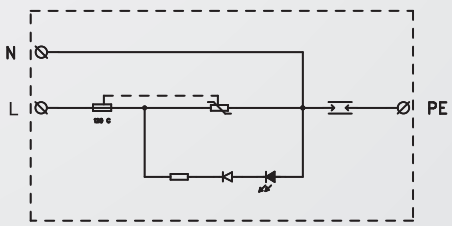


Type ZS-1DSM		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<1 kV (L/N) <1,2 kV (L/PE) <1,2 kV (N/PE)
Power loss 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	45 g
Article number		32 016

Recommended connection of ZS-1DSM

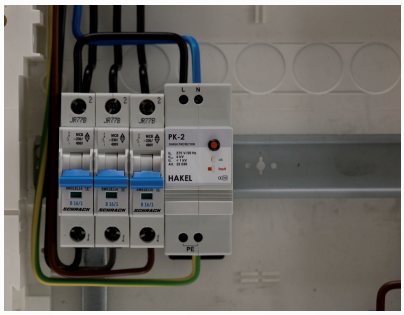


Basic circuit diagram of ZS-1DSM



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.



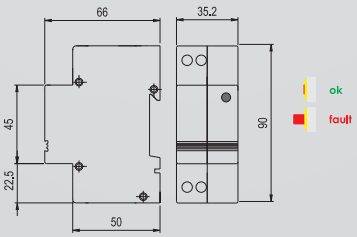
Type Pk2		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal discharge current I_n(8/20)	I_n	3 kA (L/N, L/PE) 5 kA (N/PE)
Combined impulse	U_{OC}	6 kV (L/N,L/PE) 10 kV (N/PE)
Voltage protection level at U_{OC}	U_P	<1 kV (L/N) <1,2 kV (L/PE) <1,2 kV (N/PE)
Power loss 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

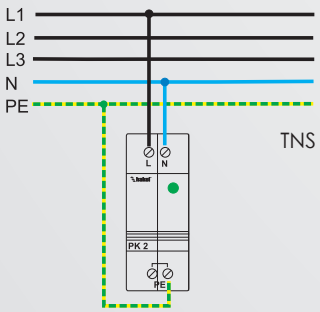
Pk2

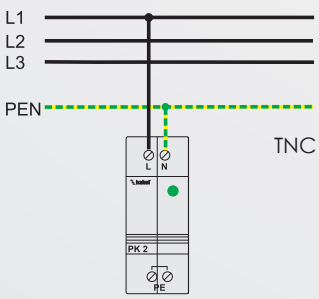


TYPE 3 | CLASS III | LPZ 2➔3 | +80°C ϑ -40°C | IP 20 | industry

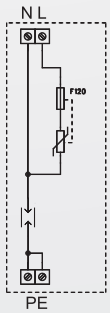


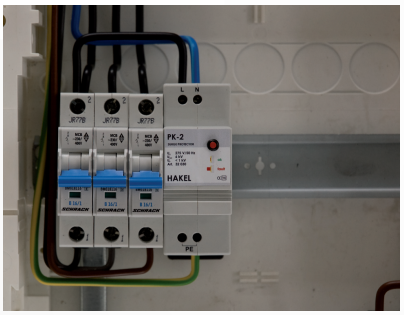
Recommended connection of Pk2





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.

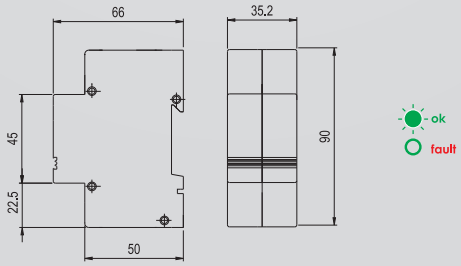
MOV + GDT surge arrester

P-k16/12 DC



TYPE 3 | CLASS III | LPZ 2➔3 | +80°C ϑ -40°C | IP 20 | industry

ML102



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-)
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

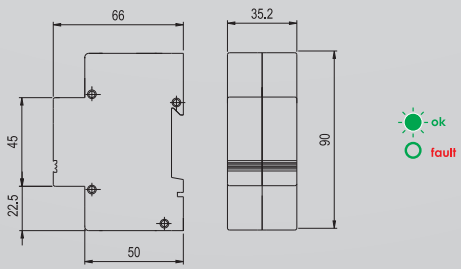
MOV + GDT surge arrester

P-k16/24 DC



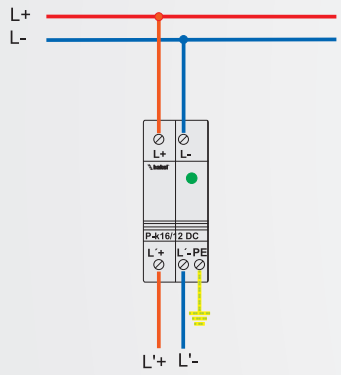
TYPE 3 | CLASS III | LPZ 2➔3 | +80°C ϑ -40°C | IP 20 | industry

ML102

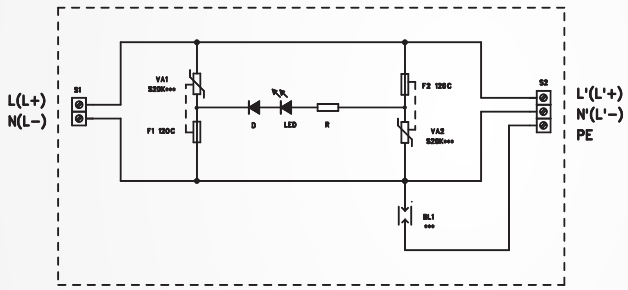


Type P-k16/24 DC		
Nominal voltage	U_N	24 V DC
Max. continuous operating voltage	U_C	36 V DC
Nominal discharge current I_n(8/20)	I_n	3 kA
Combined impulse	U_{OC}	6 kV (L+/L-, PE) 10 kV (L-/PE)
Voltage protection level at U_{OC}	U_P	< 120 V (L+/L-) < 660 V (L/PE)
Response time	t_A	< 25 ns (L+/L-) 100 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



MOV + GDT surge arrester

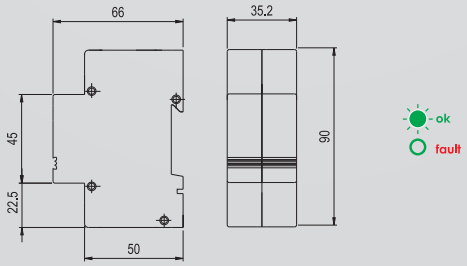
Type P-k16/48 DC		
Nominal voltage	U_N	48 V DC
Max. continuous operating voltage	U_C	80 V DC
Nominal discharge current I_n(8/20)	I_n	3 kA
Combined impulse	U_{OC}	6 kV (L+/L-, PE) 10 kV (L-/PE)
Voltage protection level at U_{OC}	U_P	< 230 V (L+/L-)
Response time	t_A	< 25 ns (L+/L-) 100 ns (L, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	90 g
Article number		30 014

P-k16/48 DC



M.102

TYPE 3 | CLASS III | LPZ 2➔3 | +80°C ϑ -40°C | IP 20 | industry



MOV + GDT surge arrester

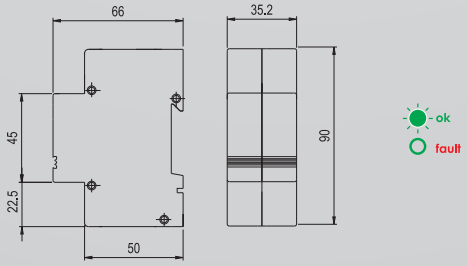
Type P-k16/110 DC		
Nominal voltage	U_N	110 V DC
Max. continuous operating voltage	U_C	170V DC
Nominal discharge current I_n(8/20)	I_n	3 kA
Combined impulse	U_{OC}	6 kV (L+/L-, PE) 10 kV (L-/PE)
Voltage protection level at U_{OC}	U_P	< 440 V (L+/L-) < 800 V (L/PE)
Response time	t_A	< 25 ns (L+/L-) 100 ns (L, N/PE)
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	90 g
Article number		30 012

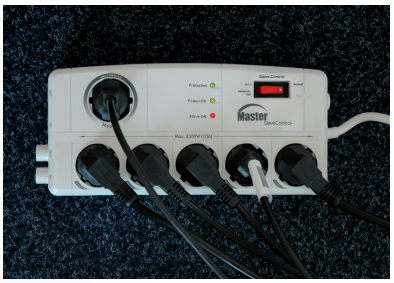
P-k16/110 DC



M.102

TYPE 3 | CLASS III | LPZ 2➔3 | +80°C ϑ -40°C | IP 20 | industry





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

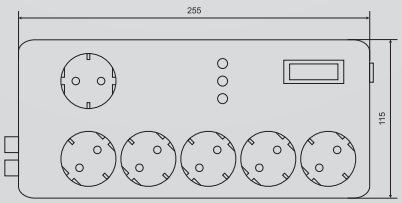
All socket outlets have child-protection. The length of connecting cable is 1,8m.

MOV + GDT surge arrester

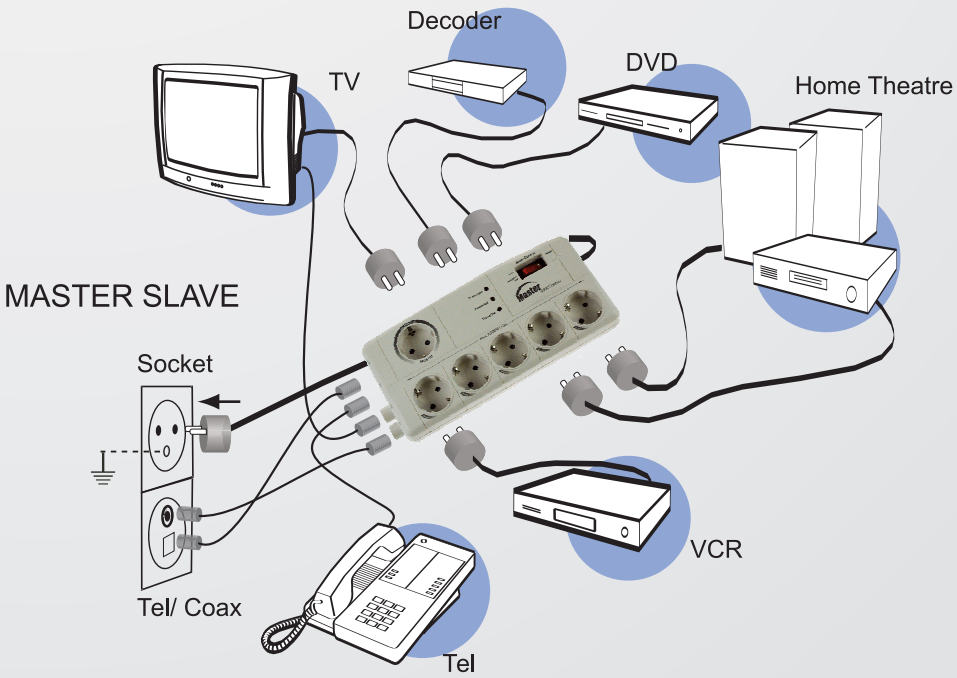
PROTECTOR MS FULL



TYPE 3 | CLASS III | LPZ 2➔3 | +80°C ϑ -40°C | IP 20 | home



Type PROTECTOR MS FULL		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal current	I_N	10 A
Nominal discharge current I_n(8/20)	I_n	2,5 kA
Combined impulse	U_{OC}	5 kV
Voltage protection level at U_{OC}	U_P	<1,5 kV (L/N) <300 V (TEL/TV)
Number of socket outlets with child-protection		6 pcs.
Length of connecting cable		2 m
Response time	t_A	<25 ns (L/N)
Recommended backup fuse		10 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	730 g
Article number		47 006



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.

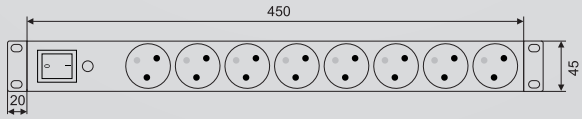
PDU-F-807A3 is a two-stage surge protection containing MOV+GDT and EMC/EMI filter
PDU-F-807A2 is a single-stage surge protection containing MOV+GDT

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



PDU-F-807A3

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

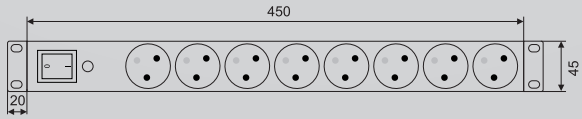


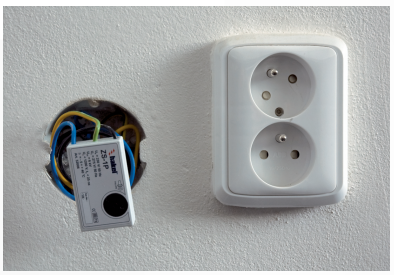
Power Distribution Unit - MOV + GDT surge arrester



PDU-F-807A2

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





SURGE ARRESTER - VARISTOR

ZS-1I, 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-1I 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



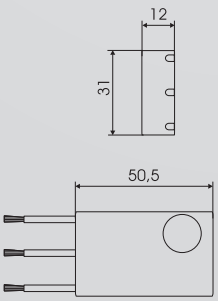
ZS-1I



ZS-1P

MJ02

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





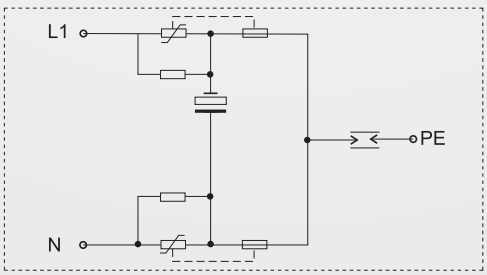
ZS-1I



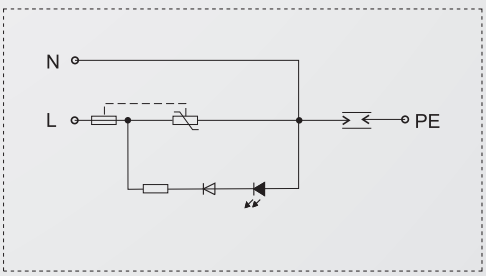
ZS-1P

Type ZS-1I/ZS-1P		
Nominal voltage	U_N	230 V AC
Max. continuous operating voltage	U_C	275 V AC
Nominal discharge current In(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 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 ZS-1I ZS-1P		 green LED diode inbuilt piezosiren
Weight	m	20/30 g
Article number		
ZS-1I		32 004
ZS-1P		32 006

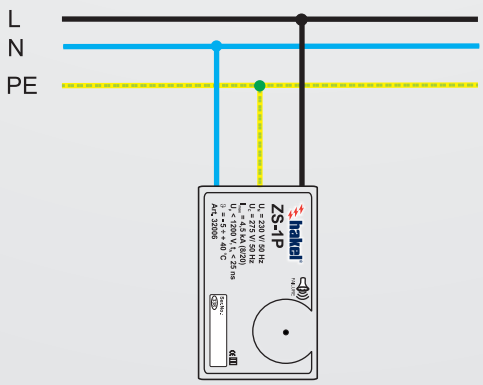
Basic circuit diagram of ZS-1P



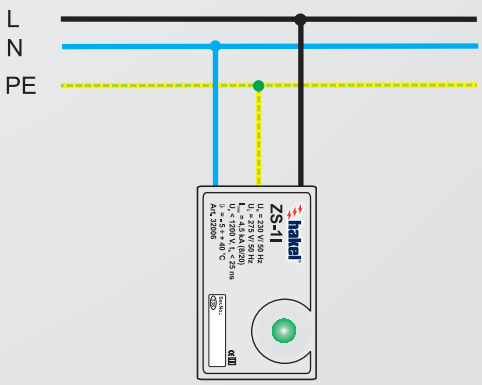
Basic circuit diagram of ZS-1I



Recommended connection of ZS-1P



Recommended connection of ZS-1I



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**



DECOUPLING INDUCTORS

Decoupling inductors (sometimes called decoupling impedance) intended for nominal currents within the range of 16, 32, 63, 80 and 120A ensure energy coordination between arresters type 1 and type 2 or arresters type 2 and type 3 according to IEC 1024-1 and EN 61643-11 especially in the places where there is no adequate distance between arresters (e.g. when there are two successive arrester types placed in one switchboard). If the energy coordination of surge protection is not achieved, the lightning current impulse can damage some arrester type of the protection cascade. If there is at least 5m distance between two successive arrester types (in case of two successive arrester types in two different switchboards), this section impedance can be considered as adequate.

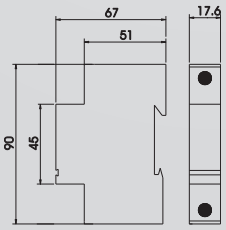
Decoupling Elements



PI-L16

ML102

home | +80°C ϑ -40°C | IP 20 | industry



Type PI-L16, PI-L16/15		
Nominal voltage	U_N	500 V AC
Nominal current	I_N	16 A
Inductance	L	6 μH ± 10% / 15 μH ± 10%
DC resistance		<0,01 Ω
Recommended cross-section of connected conductors (at tightening moment 3 Nm)		4 mm^2
Recommended backup fuse		16 A
Lifetime		min. 100.000 h
Weight	m	141/157 g
Article number		
PI-L16		30 000
PI-L16/15		30 036

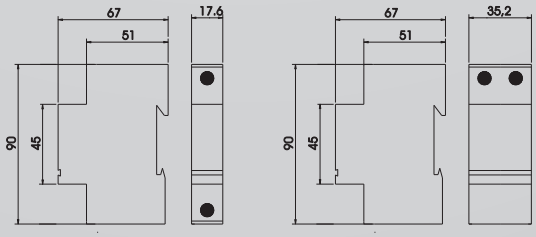
Decoupling Elements



PI-L32

ML102

home | +80°C ϑ -40°C | IP 20 | industry



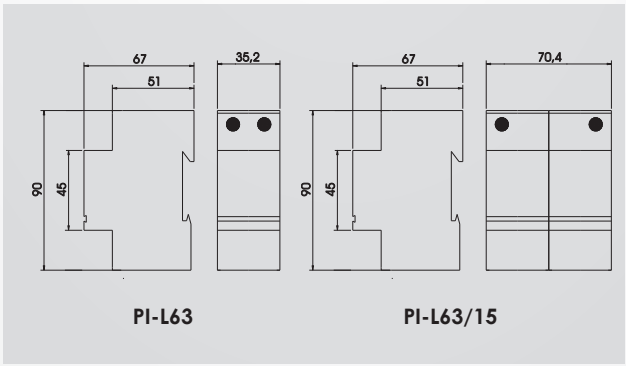
PI-L32 PI-L32/15

Type PI-L32, PI-L32/15		
Nominal voltage	U_N	500 V AC
Nominal current	I_N	32 A
Inductance	L	6 μH ± 10% / 15 μH ± 10%
DC resistance		<0,01 Ω
Recommended cross-section of connected conductors (at tightening moment 3 Nm)		6 mm^2
Recommended backup fuse		32 A
Lifetime		min. 100.000 h
Weight	m	157/330 g
Article number		
PI-L32		30 030
PI-L32/15		30 035

Type PI-L63, PI-L63/15		
Nominal voltage	U_N	500 V AC
Nominal current	I_N	63 A
Inductance	L	6 μH ± 10% / 15 μH ± 10%
DC resistance		<0,01 Ω
Recommended cross-section of connected conductors (at tightening moment 3 Nm)		16 mm^2
Recommended backup fuse		63 A
Lifetime		min. 100.000 h
Weight	m	360/630 g
Article number		
PI-L63		30 060
PI-L63/15		30 065

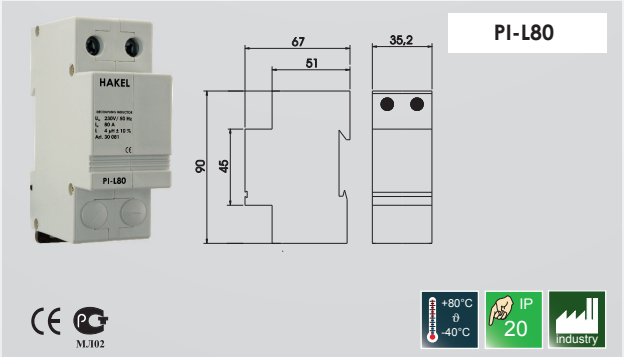
Decoupling Elements





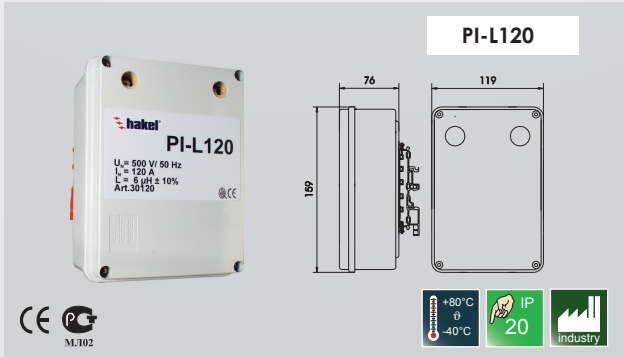
Type PI-L80		
Nominal voltage	U_N	500 V AC
Nominal current	I_N	80 A
Inductance	L	4 μH ± 10%
DC resistance		<0,01 Ω
Recommended cross-section of connected conductors (at tightening moment 3 Nm)		25 mm^2
Recommended backup fuse		80 A
Lifetime		min. 100.000 h
Weight	m	360 g
Article number		
PI-L80		30 081

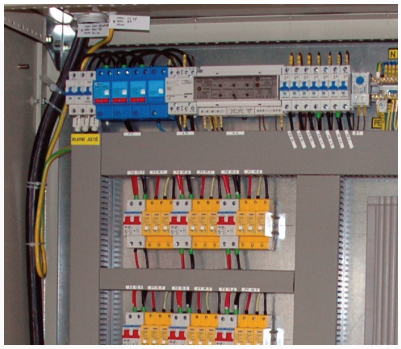
Decoupling Elements



Type PI-L120		
Nominal voltage	U_N	500 V AC
Nominal current	I_N	120 A
Inductance	L	6 μH ± 10%
DC resistance		<0,01 Ω
Recommended cross-section of connected conductors (at tightening moment 3 Nm)		50 mm^2
Recommended backup fuse		120 A
Lifetime		min. 100.000 h
Weight	m	1153 g
Article number		
PI-L120		30 120

Decoupling Elements





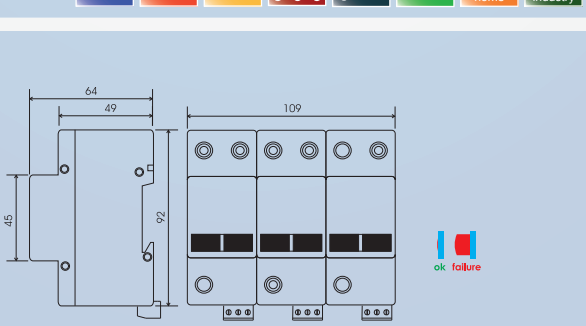
LIGHTNING AND SURGE ARRESTERS - VARISTOR

SPC PV is lightning arrester type 1+2 according to EN 61643-11. It is designed for protection of positive and negative busbars of photovoltaic systems against the surge effects. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 0-1 (according to IEC 1312-1and EN 62305). Particular varistor sectors connected between terminals L+, L- and PE are equipped with fitted internal disconnectors which are activated when varistors fail (overheat). Failure indication of these disconnectors is partly mechanical (by red signaling target) and partly remote monitoring (by potential free switching contacts).

Three-pole MOV lightning and surge arrester

SPC PV 600





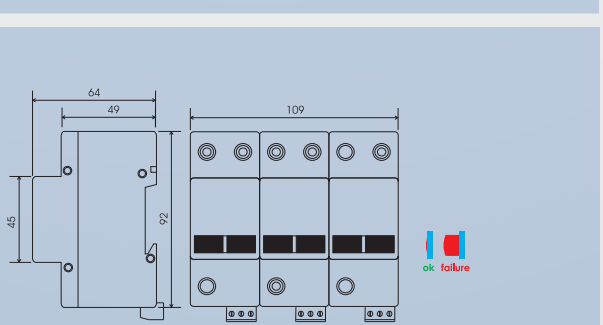
Type SPC PV 600/ SPC PV 600 DS		
Max. continuous operating voltage	U_c	600 V DC
Lightning impulse current (10/350)	I_{imp}	12,5 kA
- charge	Q	6 As
- specific energy	W/R	36 kJ/Ω
Application		L+/L-, L+/PE, L-/PE
Nominal discharge current (8/20)	I_n	25 kA
Voltage protection level at I_{imp}	U_P	<2 kV
Response time	t_A	<25 ns
Max. back-up fuse ("V" connection)		63 AgL/gG
Max. back-up fuse		315 AgL/gG
Weight	m	720 g
Lifetime		min.100 000 h
Article number		
SPC PV 600		10 168
SPC PV 600 DS		10 068

MJ102

Three-pole MOV lightning and surge arrester

SPC PV 800



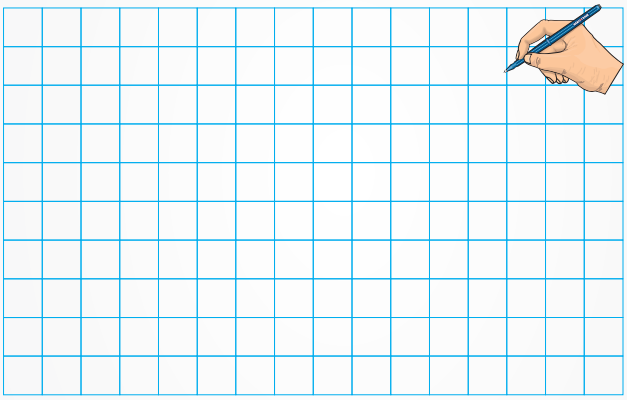


Type SPC PV 800/ SPC PV 800 DS		
Max. continuous operating voltage	U_c	800 V DC
Lightning impulse current (10/350)	I_{imp}	12,5 kA
- charge	Q	6 As
- specific energy	W/R	36 kJ/Ω
Application		L+/L-, L+/PE, L-/PE
Nominal discharge current (8/20)	I_n	25 kA
Voltage protection level at I_{imp}	U_P	<2,4 kV
Response time	t_A	<25 ns
Max. back-up fuse ("V" connection)		63 AgL/gG
Max. back-up fuse		315 AgL/gG
Weight	m	720 g
Lifetime		min.100 000 h
Article number		
SPC PV 800		10 169
SPC PV 800 DS		10 069

MJ102

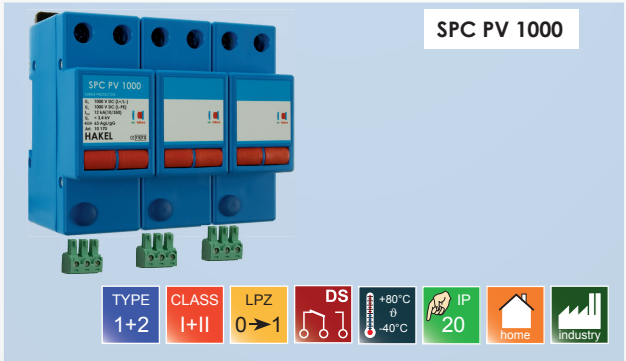
Function of remote monitor terminals
When the SPC PV DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

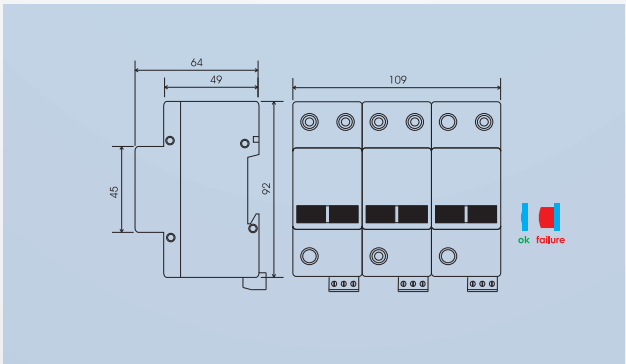
el. strength against surround. circuits	3750 V_{rms}
el. strength against network circuits	3750 V_{rms}
insulation resistance	2 x 10^7 Ω
max. switching current	~ 0,5 A
max. switching voltage	~ 250 V



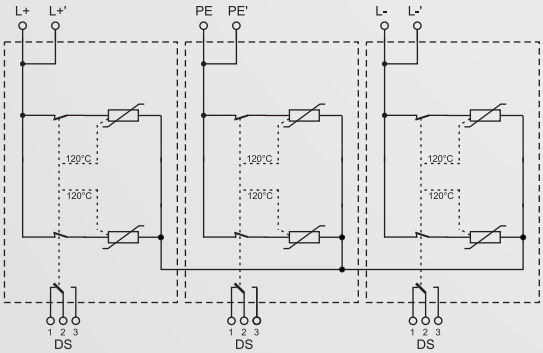
Three-pole MOV lightning and surge arrester

Type SPC PV 1000/ SPC PV 1000 DS		
Max. continuous operating voltage	U_C	1000 V DC
Lightning impulse current (10/350)	I_{imp}	12,5 kA
- charge	Q	6 As
- specific energy	W/R	36 kJ/Ω
Application		L+/L-, L+/PE, L-/PE
Nominal discharge current (8/20)	I_n	25 kA
Voltage protection level at I_{imp}	U_P	<3,4 kV
Response time	t_A	<25 ns
Max. back-up fuse ("V" connection)		63 AgL/gG
Max. back-up fuse		315 AgL/gG
Weight	m	720 g
Lifetime		min.100 000 h
Article number		
SPC PV 1000		10 170
SPC PV 1000 DS		10 070



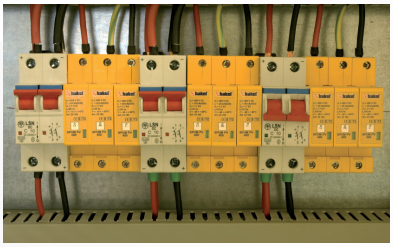


Basic circuit diagram of SPC PV



Housing material - Polyamide **PA6**

Recommended cable cross-sections of the connected conductors (at tightening torque of clamps 4Nm) **35 mm² (solid), 25 mm² (flexible)**



SURGE ARRESTERS - VARISTOR

SPUM PV is surge arrester type 2 according to EN 61643-11. Complete device consists of a base part and pluggable modules. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 (according to IEC 1312-1 and EN 62305) for equipotential bonding of positive and negative busbars of photovoltaic systems and elimination of transient overvoltage that originate during atmospheric discharges or switching processes.

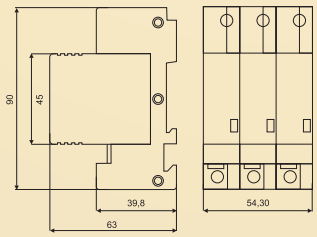
Failure indication of these disconnectors is partly visual (discoloration of the signal field) and partly remote monitoring by potential free switching contacts (only SPUM PV* DS type).

Three-pole MOV surge arrester



SPUM PV 200

TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



green-ok
red-failure

Type SPUM PV 200/ SPUM PV 200 DS		
Max. continuous operating voltage	U_c	200 V DC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Application		L+/L-, L+/PE, L-/PE
Voltage protection level at I_n	U_P	<0,95 kV
Response time	t_A	<25 ns
Max. back-up fuse		125 AgL/gG
Weight	m	300 g
Lifetime		min.100 000 h
Article number		
SPUM PV 200		24 181
SPUM PV 200 DS		24 081



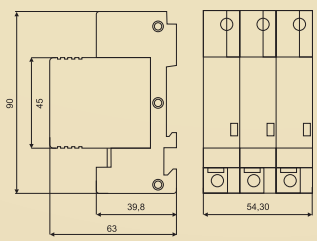
Varistor-based spare module	Art. No.
SPUM PV 200/M	**24 381**

Three-pole MOV surge arrester



SPUM PV 400

TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



green-ok
red-failure

Type SPUM PV 400/ SPUM PV 400 DS		
Max. continuous operating voltage	U_c	400 V DC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	20 kA
Application		L+/L-, L+/PE, L-/PE
Voltage protection level at I_n	U_P	<1,7 kV
Response time	t_A	<25 ns
Max. back-up fuse		125 AgL/gG
Weight	m	300 g
Lifetime		min.100 000 h
Article number		
SPUM PV 400		24 182
SPUM PV 400 DS		24 082



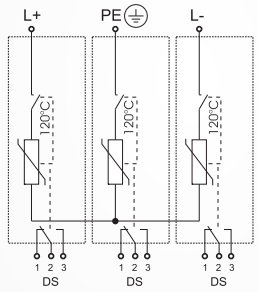
Varistor-based spare module	Art. No.
SPUM PV 400/M	**24 382**

DS

Function of remote monitor terminals
When the SPUM PV DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

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	~ 0,5 A
max. switching voltage	~ 250 V

Basic circuit diagram



Three-pole MOV surge arrester

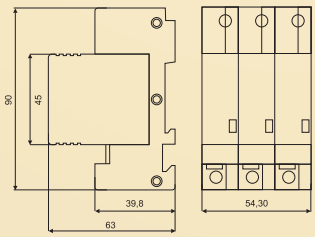
Type SPUM PV 600/ SPUM PV 600 DS		
Max. continuous operating voltage	U_c	600 V DC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	20 kA
Application		L+/L-, L+/PE, L-/PE
Voltage protection level at I_n	U_P	<2,5 kV
Response time	t_A	<25 ns
Max. back-up fuse		125 AgL/gG
Weight	m	300 g
Lifetime		min.100 000 h
Article number		
SPUM PV 600		24 183
SPUM PV 600 DS		24 083



SPUM PV 600

TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



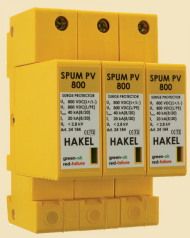


green-ok
red-failure

Varistor-based spare module	Art. No.
SPUM PV 600/M	**24 383**

Three-pole MOV surge arrester

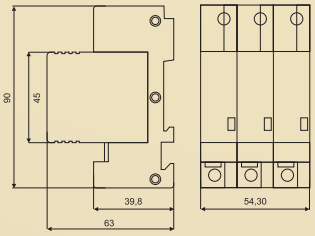
Type SPUM PV 800/ SPUM PV 800 DS		
Max. continuous operating voltage	U_c	800 V DC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	20 kA
Application		L+/L-, L+/PE, L-/PE
Voltage protection level at I_n	U_P	<2,8 kV
Response time	t_A	<25 ns
Max. back-up fuse		125 AgL/gG
Weight	m	300 g
Lifetime		min.100 000 h
Article number		
SPUM PV 800		24 184
SPUM PV 800 DS		24 084



SPUM PV 800

TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry

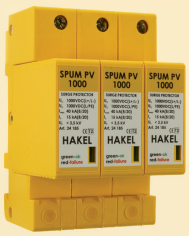




green-ok
red-failure

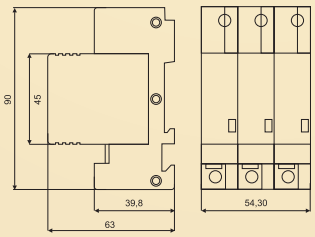
Varistor-based spare module	Art. No.
SPUM PV 800/M	**24 384**

Three-pole MOV surge arrester



SPUM PV 1000

TYPE 2 | CLASS II | LPZ 1➔2 | DS | +80°C ϑ -40°C | IP 20 | home | industry



green-ok
red-failure

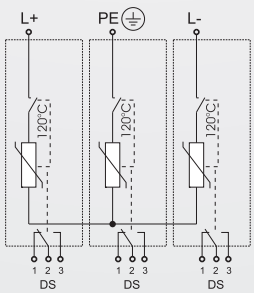
Type SPUM PV 1000/ SPUM PV 1000 DS		
Max. continuous operating voltage	U_c	1000 V DC
Max. discharge current (8/20)	I_{max}	40 kA
Nominal discharge current (8/20)	I_n	15 kA
Application		L+/L-, L+/PE, L-/PE
Voltage protection level at I_n	U_P	<3,5 kV
Response time	t_A	<25 ns
Max. back-up fuse		125 AgL/gG
Weight	m	300 g
Lifetime		min.100 000 h
Article number		
SPUM PV 1000		24 185
SPUM PV 1000 DS		24 085



MJ102

Varistor-based spare module	Art. No.
SPUM PV 1000/M	**24 385**

Basic circuit diagram of SPUM PV



DS

Function of remote monitor terminals
When the SPUM PV DS is operating correctly, the terminations 1-2 are connected to normally closed contacts, 2-3 are normally open. If the internal varistor component is damaged as a result of thermal overloading, terminations 1-2 will then be open and 2-3 closed.

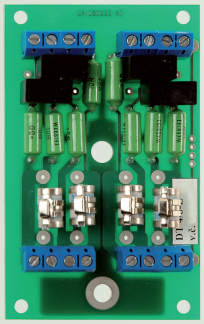
el. strength against surround. circuits	3750 V_{rms}
el. strength against network circuits	3750 V_{rms}
insulation resistance	2 x 10^7 Ω
max. switching current	~ 0,5 A
max. switching voltage	~ 250 V

Housing material - Polyamide **PA6**

Recommended cable cross-sections of the connected conductors (at tightening torque of clamps 4Nm) **16 mm² (solid), 10 mm² (flexible)**



SURGE PROTECTION DEVICES FOR INFORMATION TECHNOLOGY SYSTEMS AND EQUIPMENT

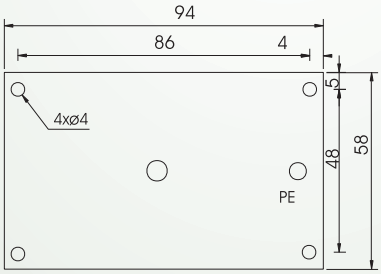


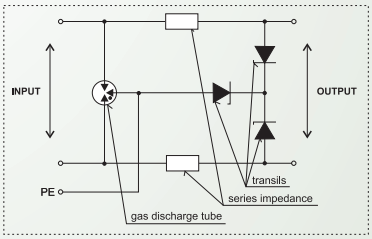
DT

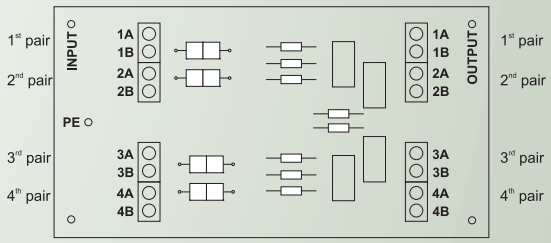
LPZ 0➔1 | +80°C ϑ -40°C | IP 00

DT is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ -1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,1A.

These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-170V. Maximum discharge current is 10kA (8/20), in case of "L" design the maximum discharge current is 20kA (8/20). For the protection of telephone lines it is recommended to use DT type with nominal voltage U_N=170V (with code mark "T").







Technical data Number of protected pairs	1 2 3 4	DT 1/6 DT 2/6 DT 3/6 DT 4/6	DT 1/12 DT 2/12 DT 3/12 DT 4/12	DT 1/24 DT 2/24 DT 3/24 DT 4/24	DT 1/48 DT 2/48 DT 3/48 DT 4/48	DT 1/T DT 2/T DT 3/T DT 4/T
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Nominal current	I_N	100 mA	100 mA	100 mA	100 mA	100 mA
Max. discharge current (8/20)	I_{max}	10 kA	10 kA	10 kA	10 kA	10 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_p	15 V	28 V	64 V	160 V	500 V
Voltage protection level at 1kV/µs	U_p	9 V	18 V	34 V	66 V	260 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		48 101 48 201 48 301 48 401	48 102 48 202 48 302 48 402	48 103 48 203 48 303 48 403	48 104 48 204 48 304 48 404	48 105 48 205 48 305 48 405

MJ102

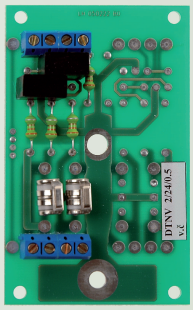
Technical data Number of protected pairs	1 2 3 4	DT 1/6-L DT 2/6-L DT 3/6-L DT 4/6-L	DT 1/12-L DT 2/12-L DT 3/12-L DT 4/12-L	DT 1/24-L DT 2/24-L DT 3/24-L DT 4/24-L	DT 1/48-L DT 2/48-L DT 3/48-L DT 4/48-L	DT 1/T-L DT 2/T-L DT 3/T-L DT 4/T-L
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Nominal current	I_N	100 mA	100 mA	100 mA	100 mA	100 mA
D1 Total lightning impulse current (10/350)	I_{total}	5 kA	5 kA	5 kA	5 kA	5 kA
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA	2,5 kA	2,5 kA	2,5 kA	2,5 kA
Max. discharge current (8/20)	I_{max}	20 kA	20 kA	20 kA	20 kA	20 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_p	15 V	28 V	64 V	160 V	500 V
Voltage protection level at 1kV/µs	U_p	9 V	18 V	34 V	66 V	260 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		49 101 49 201 49 301 49 401	49 102 49 202 49 302 49 402	49 103 49 203 49 303 49 403	49 104 49 204 49 304 49 404	49 105 49 205 49 305 49 405

MJ102

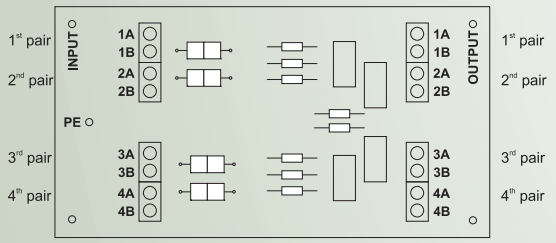
DTNV 0,5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,5A.

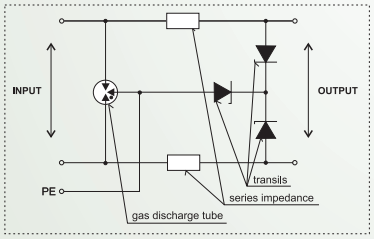
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-48V. Maximum discharge current is 10kA (8/20), in case of "L" design the maximum discharge current is 20kA (8/20).

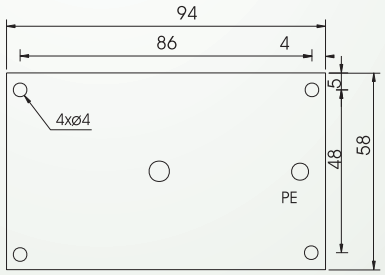
DTNV 0,5



LPZ 0➔1 | +80°C ϑ -40°C | IP 00





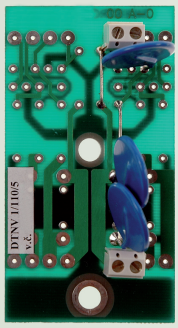


Technical data Number of protected pairs		1 2 3 4	DTNV 1/6/0,5 DTNV 2/6/0,5 DTNV 3/6/0,5 DTNV 4/6/0,5	DTNV 1/12/0,5 DTNV 2/12/0,5 DTNV 3/12/0,5 DTNV 4/12/0,5	DTNV 1/24/0,5 DTNV 2/24/0,5 DTNV 3/24/0,5 DTNV 4/24/0,5	DTNV 1/48/0,5 DTNV 2/48/0,5 DTNV 3/48/0,5 DTNV 4/48/0,5
Nominal voltage		U_N	6 V	12 V	24 V	48 V
Max. continous operating voltage		U_C	7,2 V	14,4 V	28,6 V	57,6 V
Nominal current		I_N	0,5 A	0,5 A	0,5 A	0,5 A
C2 Max. discharge current (8/20)		I_{max}	10 kA	10 kA	10 kA	10 kA
Nominal discharge current (8/20)		I_n	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)		U_P	15 V	28 V	64 V	160 V
Voltage protection level at 1kV/µs		U_P	9 V	18 V	34 V	66 V
Response time		t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate			1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line			4,7 µH	4,7 µH	4,7 µH	4,7 µH
Parasitic capacitance		C	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range		ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section			0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000			A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number			50 101 50 201 50 301 50 401	50 102 50 202 50 302 50 402	50 104 50 204 50 304 50 404	50 106 50 206 50 306 50 406

CE PG ML102

Technical data Number of protected pairs		1 2 3 4	DTNV 1/6/0,5-L DTNV 2/6/0,5-L DTNV 3/6/0,5-L DTNV 4/6/0,5-L	DTNV 1/12/0,5-L DTNV 2/12/0,5-L DTNV 3/12/0,5-L DTNV 4/12/0,5-L	DTNV 1/24/0,5-L DTNV 2/24/0,5-L DTNV 3/24/0,5-L DTNV 4/24/0,5-L	DTNV 1/48/0,5-L DTNV 2/48/0,5-L DTNV 3/48/0,5-L DTNV 4/48/0,5-L
Nominal voltage		U_N	6 V	12 V	24 V	48 V
Max. continous operating voltage		U_C	7,2 V	14,4 V	28,6 V	57,6 V
Nominal current		I_N	0,5 A	0,5 A	0,5 A	0,5 A
D1 Total lightning impulse current (10/350)		I_{imp}	5 kA	5 kA	5 kA	5 kA
D1 Lightning impulse current (10/350) line/PE		I_{imp}	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 Max. discharge current (8/20)		I_{max}	20 kA	20 kA	20 kA	20 kA
Nominal discharge current (8/20)		I_n	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)		U_P	15 V	28 V	64 V	160 V
Voltage protection level at 1kV/µs		U_P	9 V	18 V	34 V	66 V
Response time		t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate			1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line			4,7 µH	4,7 µH	4,7 µH	4,7 µH
Parasitic capacitance		C	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range		ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section			0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000			A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number			51 101 51 201 51 301 51 401	51 102 51 202 51 302 51 402	51 104 51 204 51 304 51 404	51 106 51 206 51 306 51 406

CE PG ML102

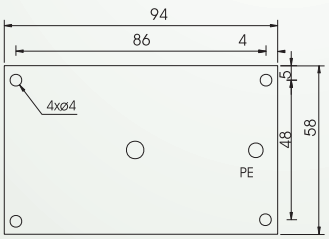


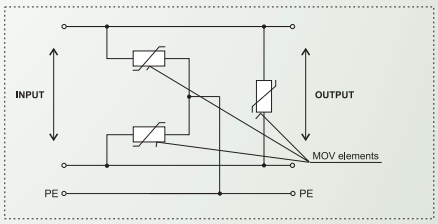
DTNV 5

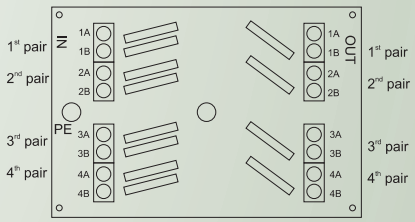
LPZ 0➔1 | +80°C ϑ -40°C | IP 00

DTNV 5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 5A.

These devices consist of MOVs only. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 12V-110V. Maximum discharge current is different according to various types from 2kA (8/20) to 8kA (8/20).







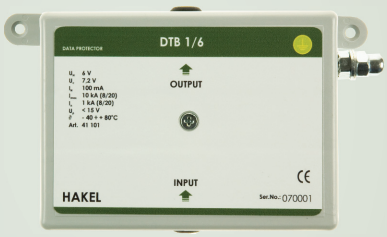
Technical data Number of protected pairs	1 2 3 4	**DTNV 1/12/5** **DTNV 2/12/5** **DTNV 3/12/5** **DTNV 4/12/5**	**DTNV 1/24/5** **DTNV 2/24/5** **DTNV 3/24/5** **DTNV 4/24/5**	**DTNV 1/48/5** **DTNV 2/48/5** **DTNV 3/48/5** **DTNV 4/48/5**	**DTNV 1/80/5** **DTNV 2/80/5** **DTNV 3/80/5** **DTNV 4/80/5**	**DTNV 1/110/5** **DTNV 2/110/5** **DTNV 3/110/5** **DTNV 4/110/5**
Nominal voltage	U_N	12 V	24 V	48 V	80 V	110 V
Max. continous operating voltage	U_C	14,4 V	28,6 V	57,6 V	96 V	132 V
Nominal current	I_N	5 A	5 A	5 A	5 A	5 A
C2 Max. discharge current (8/20)	I_{max}	2 kA	2 kA	2 kA	6,5 kA	8 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	56 V	90 V	170 V	280 V	400 V
Voltage protection level at 1kV/µs	U_P	27 V	51 V	118 V	200 V	310 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Parasitic capacitance	C	10 nF	10 nF	10 nF	10 nF	10 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		50 103 50 203 50 303 50 403	50 105 50 205 50 305 50 405	50 107 50 207 50 307 50 407	50 108 50 208 50 308 50 408	50 109 50 209 50 309 50 409

CE PG MJ102

DTB, DTB-R is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,1A.

These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-170V. Maximum discharge current is 10kA (8/20) for type DTB and 2kA (8/20) for DTB-R type. For the protection of telephone lines it is recommended to use DTB type with nominal voltage U_N = 170V (with code mark "T"). The connection of protected lines is carried out by screw terminals for type DTB and by RJ45 connectors for type DTB-R.

DTB, DTB-R



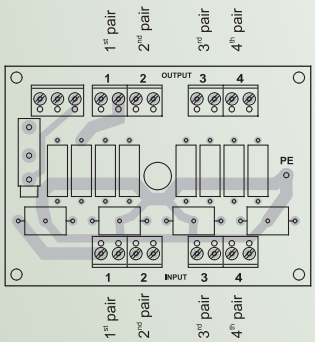
LPZ 0➔1 | +80°C ϑ -40°C | IP 20 | CE | PG ML102

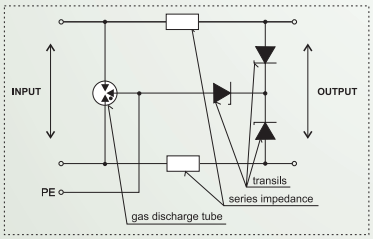
Connection of RJ45 pins acc.to EIA/TIA 568, type B

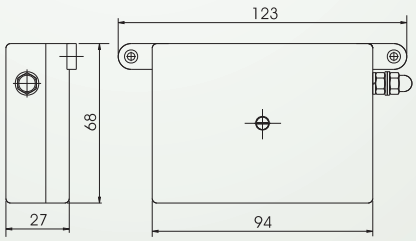
- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair









Technical data Number of protected pairs	1 2 3 4	**DTB 1/6** **DTB 2/6** **DTB 3/6** **DTB 4/6**	**DTB 1/12** **DTB 2/12** **DTB 3/12** **DTB 4/12**	**DTB 1/24** **DTB 2/24** **DTB 3/24** **DTB 4/24**	**DTB 1/48** **DTB 2/48** **DTB 3/48** **DTB 4/48**	**DTB 1/T** **DTB 2/T** **DTB 3/T** **DTB 4/T**
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Nominal current	I_N	100 mA	100 mA	100 mA	100 mA	100 mA
C2 Max. discharge current (8/20)	I_{max}	10 kA	10 kA	10 kA	10 kA	10 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	15 V	28 V	64 V	160 V	500 V
Voltage protection level at 1kV/µs	U_P	9 V	18 V	34 V	66 V	260 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 101 42 101 43 101 44 101	41 102 42 102 43 102 44 102	41 103 42 103 43 103 44 103	41 104 42 104 43 104 44 104	41 105 42 105 43 105 44 105

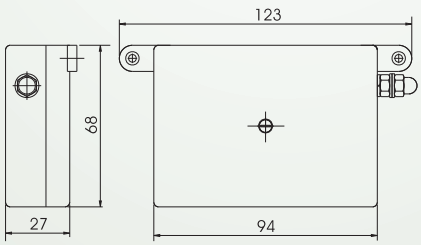
Technical data Number of protected pairs	1 2 3 4	**DTB 1/6 R** **DTB 2/6 R** **DTB 3/6 R** **DTB 4/6 R**	**DTB 1/12 R** **DTB 2/12 R** **DTB 3/12 R** **DTB 4/12 R**	**DTB 1/24 R** **DTB 2/24 R** **DTB 3/24 R** **DTB 4/24 R**	**DTB 1/48 R** **DTB 2/48 R** **DTB 3/48 R** **DTB 4/48 R**	**DTB 1/T R** **DTB 2/T R** **DTB 3/T R** **DTB 4/T R**
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Nominal current	I_N	100 mA	100 mA	100 mA	100 mA	100 mA
C2 Max. discharge current (8/20)	I_{max}	2 kA	2 kA	2 kA	2 kA	2 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	15 V	28 V	64 V	160 V	500 V
Voltage protection level at 1kV/µs	U_P	9 V	18 V	34 V	66 V	260 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		10 MBit/s	10 MBit/s	10 MBit/s	10 MBit/s	10 MBit/s
Series impedance per line		1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 111 42 111 43 111 44 111	41 112 42 112 43 112 44 112	41 113 42 113 43 113 44 113	41 114 42 114 43 114 44 114	41 115 42 115 43 115 44 115

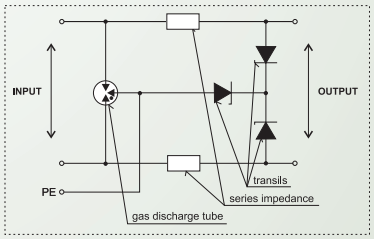


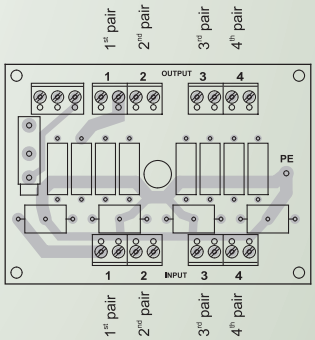
DTB-L, DTB-AR DTB-ART

DTB-L, DTB-AR and DTB-ART is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,1A.

These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-170V. DTB-AR and DTB-ART types are designed for the protection of equipment using DSL technology. Maximum discharge current of DTB-L is 20kA (8/20) and 2kA (8/20) for DTB-AR and DTB-ART types. For the protection of telephone lines it is recommended to use a type with nominal voltage U_N=170V (with code mark "T"). The connection of protected lines is carried out by screw terminals for type DTB-L and by RJ45 connectors for types DTB-AR and DTB-ART.



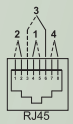




Connection of RJ45 pins acc.to EIA/TIA 568, type B

- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair



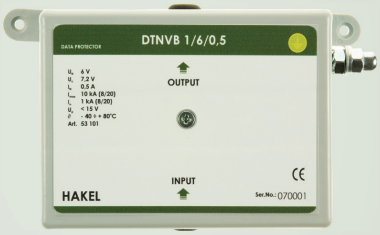
Technical data Number of protected pairs	1 2 3 4	**DTB 1/6-L** **DTB 2/6-L** **DTB 3/6-L** **DTB 4/6-L**	**DTB 1/12-L** **DTB 2/12-L** **DTB 3/12-L** **DTB 4/12-L**	**DTB 1/24-L** **DTB 2/24-L** **DTB 3/24-L** **DTB 4/24-L**	**DTB 1/48-L** **DTB 2/48-L** **DTB 3/48-L** **DTB 4/48-L**	**DTB 1/T-L** **DTB 2/T-L** **DTB 3/T-L** **DTB 4/T-L**
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Nominal current	I_N	100 mA	100 mA	100 mA	100 mA	100 mA
D1 Total lightning impulse current (10/350)	I_{total}	5 kA	5 kA	5 kA	5 kA	5 kA
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 Max. discharge current (8/20)	I_{max}	20 kA	20 kA	20 kA	20 kA	20 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	15 V	28 V	64 V	160 V	500 V
Voltage protection level at 1kV/µs	U_P	9 V	18 V	34 V	66 V	260 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 001 42 001 43 001 44 001	41 002 42 002 43 002 44 002	41 003 42 003 43 003 44 003	41 004 42 004 43 004 44 004	41 005 42 005 43 005 44 005

Technical data Number of protected pairs	1 2	**DTB 1/AR** **DTB 2/AR**	**DTB 1/ART** **DTB 2/ART**
Nominal voltage	U_N	120 V	170 V
Max. continous operating voltage	U_C	144 V	204 V
Nominal current	I_N	100 mA	100 mA
C2 Max. discharge current (8/20)	I_{max}	2 kA	2 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA
Voltage protection level at 1kV/µs	U_P	360 V	520 V
Response time	t_A	< 30 ns	< 30 ns
Data rate		10 MBit/s	10 MBit/s
Series impedance per line		1,5 -10 Ω	1,5 -10 Ω
Parasitic capacitance	C	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,3 mm²	0,3 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 116 42 116	41 117 42 117

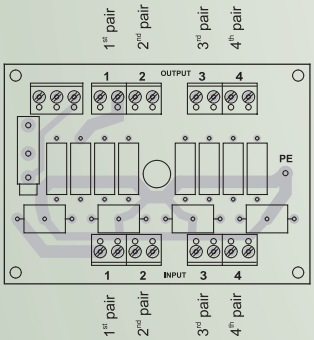
DTNVB 0,5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,5A.

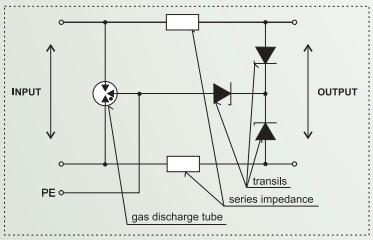
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-48V. Maximum discharge current is 10kA (8/20).

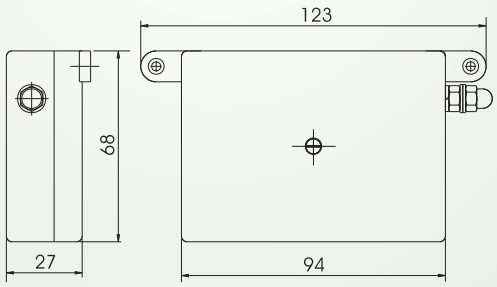
DTNVB 0,5



LPZ 0➔1 | +80°C ϑ -40°C | IP 20







Technical data Number of protected pairs	1 2 3 4	**DTNVB 1/6/0,5** **DTNVB 2/6/0,5** **DTNVB 3/6/0,5** **DTNVB 4/6/0,5**	**DTNVB 1/12/0,5** **DTNVB 2/12/0,5** **DTNVB 3/12/0,5** **DTNVB 4/12/0,5**	**DTNVB 1/24/0,5** **DTNVB 2/24/0,5** **DTNVB 3/24/0,5** **DTNVB 4/24/0,5**	**DTNVB 1/48/0,5** **DTNVB 2/48/0,5** **DTNVB 3/48/0,5** **DTNVB 4/48/0,5**
Nominal voltage	U_N	6 V	12 V	24 V	48 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V
Nominal current	I_N	0,5 A	0,5 A	0,5 A	0,5 A
C2 Max. discharge current (8/20)	I_{max}	10 kA	10 kA	10 kA	10 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	15 V	28 V	64 V	160 V
Voltage protection level at 1kV/µs	U_P	9 V	18 V	34 V	66 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		4,7 µH	4,7 µH	4,7 µH	4,7 µH
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		53 101 53 201 53 301 53 401	53 102 53 202 53 302 53 402	53 104 53 204 53 304 53 404	53 106 53 206 53 306 53 406

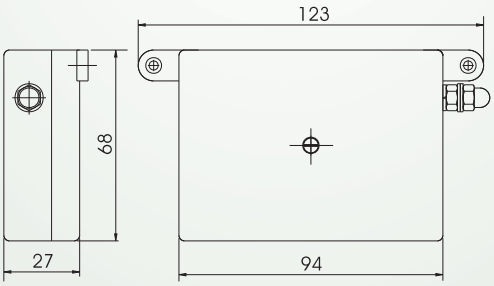
CE M.102

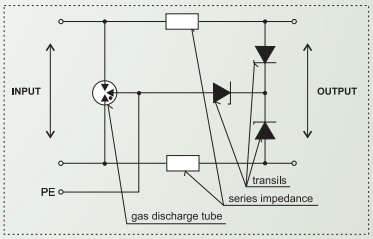


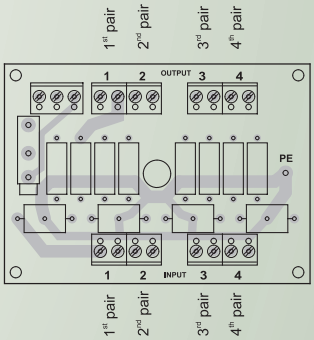
DTNVB 0,5-L

DTNVB 0,5-L is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,5A.

These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-48V. Maximum discharge current is 20kA (8/20).







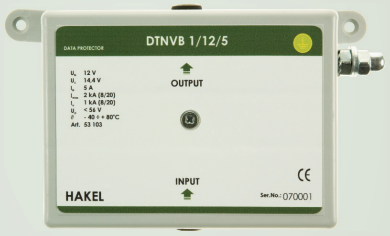
Technical data Number of protected pairs	1 2 3 4	**DTNVB 1/6/0,5-L** **DTNVB 2/6/0,5-L** **DTNVB 3/6/0,5-L** **DTNVB 4/6/0,5-L**	**DTNVB 1/12/0,5-L** **DTNVB 2/12/0,5-L** **DTNVB 3/12/0,5-L** **DTNVB 4/12/0,5-L**	**DTNVB 1/24/0,5-L** **DTNVB 2/24/0,5-L** **DTNVB 3/24/0,5-L** **DTNVB 4/24/0,5-L**	**DTNVB 1/48/0,5-L** **DTNVB 2/48/0,5-L** **DTNVB 3/48/0,5-L** **DTNVB 4/48/0,5-L**
Nominal voltage	U_N	6 V	12 V	24 V	48 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V
Nominal current	I_N	0,5 A	0,5 A	0,5 A	0,5 A
D1 Total lightning impulse current (10/350)	I_{total}	5 kA	5 kA	5 kA	5 kA
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 Max. discharge current (8/20)	I_{max}	20 kA	20 kA	20 kA	20 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_p	15 V	28 V	64 V	160 V
Voltage protection level at 1kV/µs	U_p	9 V	18 V	34 V	66 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		4,7 µH	4,7 µH	4,7 µH	4,7 µH
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		54 101 54 201 54 301 54 401	54 102 54 202 54 302 54 402	54 104 54 204 54 304 54 404	54 106 54 206 54 306 54 406

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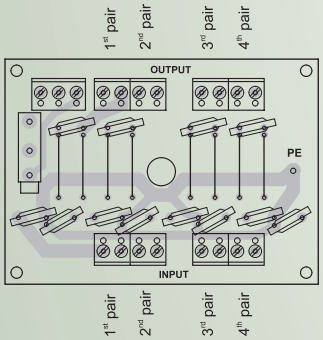
DTNVB 5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 5A.

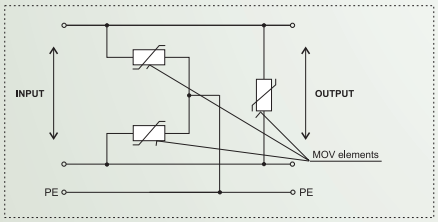
These devices consist of MOVs only. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 12V-110V. Maximum discharge current is different according to various types from 2kA (8/20) to 8kA (8/20).

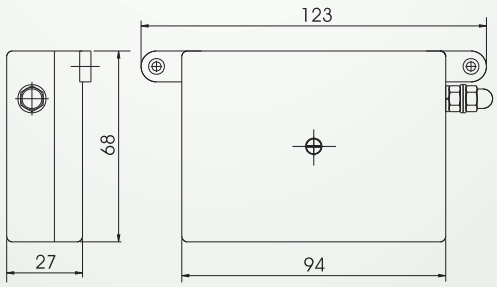
DTNVB 5



LPZ 0➔1 | +80°C ϑ -40°C | IP 20







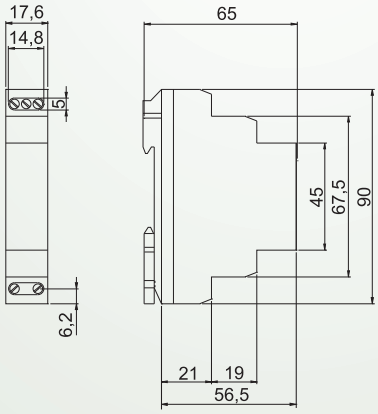
Technical data Number of protected pairs	1 2 3 4	**DTNVB 1/12/5** **DTNVB 2/12/5** **DTNVB 3/12/5** **DTNVB 4/12/5**	**DTNVB 1/24/5** **DTNVB 2/24/5** **DTNVB 3/24/5** **DTNVB 4/24/5**	**DTNVB 1/48/5** **DTNVB 2/48/5** **DTNVB 3/48/5** **DTNVB 4/48/5**	**DTNVB 1/80/5** **DTNVB 2/80/5** **DTNVB 3/80/5** **DTNVB 4/80/5**	**DTNVB 1/110/5** **DTNVB 2/110/5** **DTNVB 3/110/5** **DTNVB 4/110/5**
Nominal voltage	U_N	12 V	24 V	48 V	80 V	110 V
Max. continous operating voltage	U_C	14,4 V	28,6 V	57,6 V	96 V	132 V
Nominal current	I_N	5 A	5 A	5 A	5 A	5 A
C2 Max. discharge current (8/20)	I_{max}	2 kA	2 kA	2 kA	6,5 kA	8 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	56 V	90 V	170 V	280 V	400 V
Voltage protection level at 1kV/µs	U_P	27 V	51 V	118 V	200 V	310 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Parasitic capacitance	C	10 nF	10 nF	10 nF	10 nF	10 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		53 103 53 203 53 303 53 403	53 105 53 205 53 305 53 405	53 107 53 207 53 307 53 407	53 108 53 208 53 308 53 408	53 109 53 209 53 309 53 409

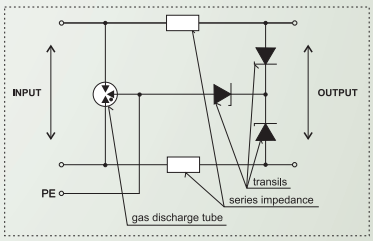
CE PCT ML102

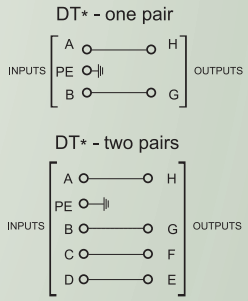


DTE is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,1A.

These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage within the range of 6V-170V. Maximum discharge current is 10kA (8/20). For the protection of telephone lines it is recommended to use a type with nominal voltage U_N=170V (with code mark "T").







Technical data Number of protected pairs	1 2	DTE 1/6 DTE 2/6	DTE 1/12 DTE 2/12	DTE 1/24 DTE 2/24	DTE 1/48 DTE 2/48	DTE 1/T DTE 2/T
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Nominal current	I_N	100 mA	100 mA	100 mA	100 mA	100 mA
C2 Max. discharge current (8/20)	I_{max}	10 kA	10 kA	10 kA	10 kA	10 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	15 V	28 V	64 V	160 V	500 V
Voltage protection level at 1kV/µs	U_P	9 V	18 V	34 V	66 V	260 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 301 42 301	41 302 42 302	41 303 42 303	41 304 42 304	41 306 42 306

CE PCT MJ102

DTE-L is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,1A.

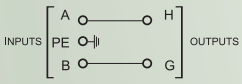
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage within the range of 6V-170V. Maximum discharge current is 20kA (8/20). For the protection of telephone lines it is recommended to use a type with nominal voltage U_N=170V (with code mark "T").

DTE-L

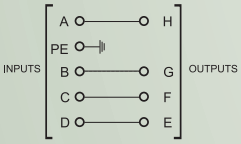


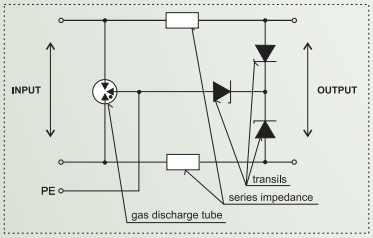
LPZ 0➔1 | +80°C ϑ -40°C | IP 20

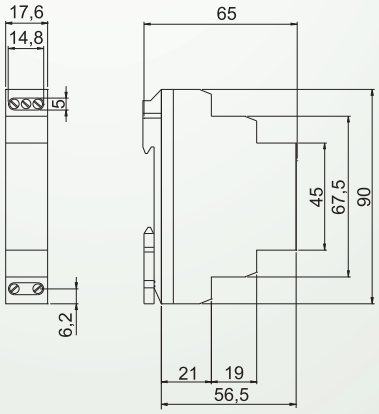
DT* - one pair



DT* - two pairs







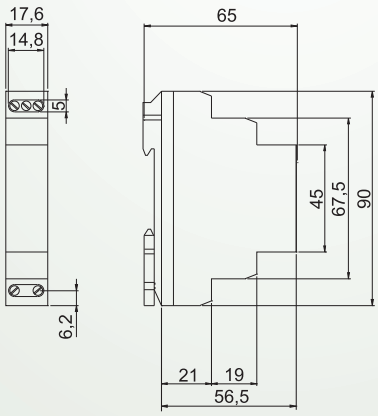
Technical data Number of protected pairs	1 2	DTE 1/6-L DTE 2/6-L	DTE 1/12-L DTE 2/12-L	DTE 1/24-L DTE 2/24-L	DTE 1/48-L DTE 2/48-L	DTE 1/T-L DTE 2/T-L
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Nominal current	I_N	100 mA	100 mA	100 mA	100 mA	100 mA
D1 Total lightning impulse current (10/350)	I_{imp}	5 kA	5 kA	5 kA	5 kA	5 kA
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 Max. discharge current (8/20)	I_{max}	20 kA	20 kA	20 kA	20 kA	20 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	15 V	28 V	64 V	160 V	500 V
Voltage protection level at 1kV/µs	U_P	9 V	18 V	34 V	66 V	260 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω	1,5 -10 Ω
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 401 42 314	41 402 42 402	41 403 42 312	41 404 42 313	41 406 42 253

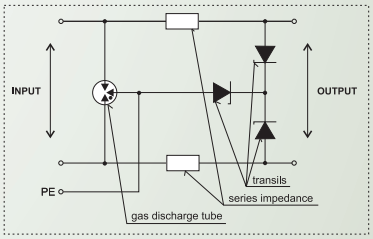
CE PCT M.102

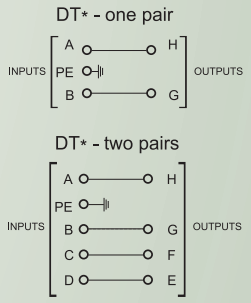


DTNVE 0,5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,5A.

These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage within the range of 6V-115V. Maximum discharge current is 10kA (8/20).







Technical data Number of protected pairs	1 2	DTNVE 1/6/0,5 DTNVE 2/6/0,5	DTNVE 1/12/0,5 DTNVE 2/12/0,5	DTNVE 1/24/0,5 DTNVE 2/24/0,5	DTNVE 1/30/0,5 DTNVE 2/30/0,5
Nominal voltage	U_N	6 V	12 V	24 V	30 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V	36 V
Nominal current	I_N	0,5 A	0,5 A	0,5 A	0,5 A
D1 Total lightning impulse current (10/350)	I_{imp}	5 kA	5 kA	5 kA	5 kA
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 Max. discharge current (8/20)	I_{max}	10 kA	10 kA	10 kA	10 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	15 V	28 V	64 V	75 V
Voltage protection level at 1kV/µs	U_P	9 V	18 V	34 V	54 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		4,7 µH	4,7 µH	4,7 µH	4,7 µH
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 313 42 323	41 324 42 316	41 308 42 308	41 309 42 309

Technical data Number of protected pairs	1 2	DTNVE 1/48/0,5 DTNVE 2/48/0,5	DTNVE 1/80/0,5 DTNVE 2/80/0,5	DTNVE 1/110/0,5 DTNVE 2/110/0,5	DTNVE 1/115/0,5 DTNVE 2/115/0,5
Nominal voltage	U_N	48 V	80 V	110 V	115 V
Max. continous operating voltage	U_C	57,6 V	96 V	132 V	138 V
Nominal current	I_N	0,5 A	0,5 A	0,5 A	0,5 A
D1 Total lightning impulse current (10/350)	I_{imp}	5 kA	5 kA	5 kA	5 kA
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 Max. discharge current (8/20)	I_{max}	10 kA	10 kA	10 kA	2,5 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	85 V	500 V	687 V	700 V
Voltage protection level at 1kV/µs	U_P	66 V	120 V	160 V	160 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		4,7 µH	4,7 µH	4,7 µH	4,7 µH
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 310 42 311	41 338 42 322	41 337 42 337	41 333 42 334

DTNVE 0,5-L is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,5A.

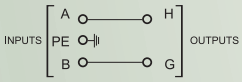
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage within the range of 6V-80V. Maximum discharge current is 20kA (8/20).

DTNVE 0,5-L

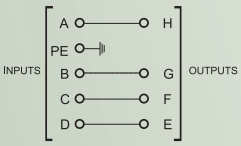


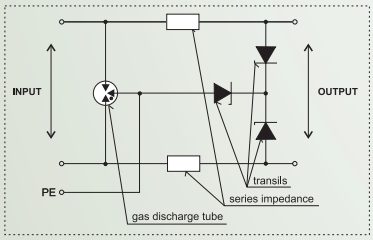
LPZ 0➔1 | +80°C ϑ -40°C | IP 20

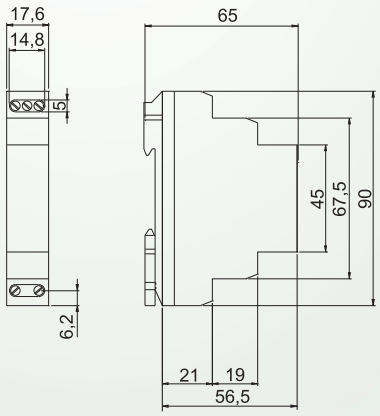
DT* - one pair



DT* - two pairs







M.102

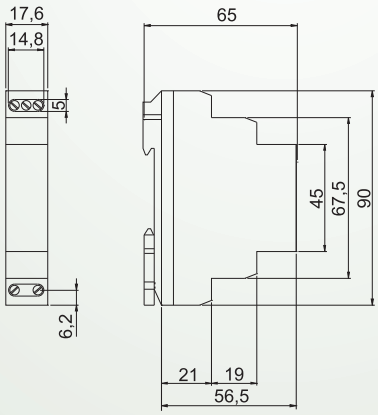
Technical data Number of protected pairs	1 2	DTNVE 1/6/0,5-L DTNVE 2/6/0,5-L	DTNVE 1/12/0,5-L DTNVE 2/12/0,5-L	DTNVE 1/24/0,5-L DTNVE 2/24/0,5-L
Nominal voltage	U_N	6 V	12 V	24 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	28,6 V
Nominal current	I_N	0,5 A	0,5 A	0,5 A
D1 Total lightning impulse current (10/350)	I_{imp}	5 kA	5 kA	5 kA
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA	2,5 kA	2,5 kA
C2 Max. discharge current (8/20)	I_{max}	20 kA	20 kA	20 kA
Voltage protection level at I_n (8/20)	U_P	15 V	28 V	64 V
Voltage protection level at 1kV/µs	U_P	9 V	18 V	34 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		4,7 µH	4,7 µH	4,7 µH
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 328 42 423	41 329 42 324	41 408 42 318

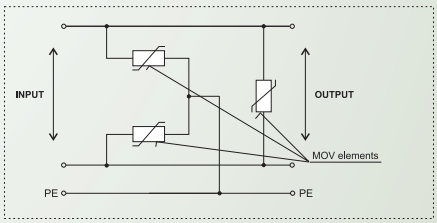
Technical data Number of protected pairs	1 2	DTNVE 1/30/0,5-L DTNVE 2/30/0,5-L	DTNVE 1/48/0,5-L DTNVE 2/48/0,5-L	DTNVE 1/80/0,5-L DTNVE 2/80/0,5-L
Nominal voltage	U_N	30 V	48 V	80 V
Max. continous operating voltage	U_C	36 V	57,6 V	96 V
Nominal current	I_N	0,5 A	0,5 A	0,5 A
D1 Total lightning impulse current (10/350)	I_{imp}	5 kA	5 kA	5 kA
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA	2,5 kA	2,5 kA
C2 Max. discharge current (8/20)	I_{max}	20 kA	20 kA	20 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	75 V	85 V	500 V
Voltage protection level at 1kV/µs	U_P	54 V	66 V	120 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	1 MBit/s
Series impedance per line		4,7 µH	4,7 µH	4,7 µH
Parasitic capacitance	C	1,5 nF	1,5 nF	1,5 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 409 42 409	41 317 42 315	41 326 42 326



DTNVE 5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 5A.

These devices consist of MOVs only. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage within the range of 12V-230V. Maximum discharge current is different according to various types from 2kA (8/20) to 10kA (8/20).

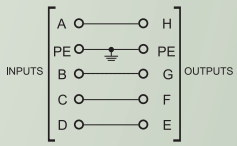




DTNV* 5A - one pair



DTNV* 5A - two pairs



Technical data Number of protected pairs	1 2	**DTNVE 1/12/5** **DTNVE 2/12/5**	**DTNVE 1/24/5** **DTNVE 2/24/5**	**DTNVE 1/48/5** **DTNVE 2/48/5**	**DTNVE 1/80/5** **DTNVE 2/80/5**	**DTNVE 1/230/5** **DTNVE 2/230/5**
Nominal voltage	U_N	12 V	24 V	48 V	80 V	230 V
Max. continous operating voltage	U_C	14,4 V	28,6 V	57,6 V	96 V	275 V
Nominal current	I_N	5 A	5 A	5 A	5 A	5 A
C2 Max. discharge current (8/20)	I_{max}	2 kA	2 kA	2 kA	6,5 kA	10 kA
Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_p	56 V	90 V	170 V	280 V	800 V
Voltage protection level at 1kV/µs	U_p	27 V	51 V	118 V	200 V	575 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Parasitic capacitance	C	10 nF	10 nF	10 nF	10 nF	10 nF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 312 42 317	41 307 42 307	41 318 42 321	41 334 42 328	41 305 42 305

CE PG MJ102

DTB 485 is a complex range of surge protection devices designed for protection of lines interface RS485 against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,1A.

These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage of 6V. Maximum discharge current is 10kA (8/20) for type DTB, 20kA (8/20) for type DTB-L and 2kA (8/20) for type DTB-R. The connection of protected lines is carried out by screw terminals for type DTB and by RJ45 connectors for type DTB-R.

DTB 485

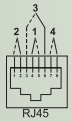


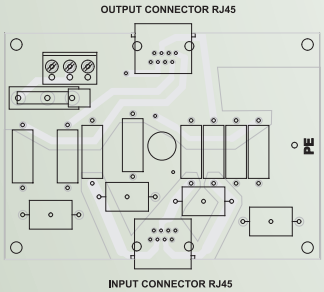
LPZ 0➔1 | +80°C ϑ -40°C | IP 20

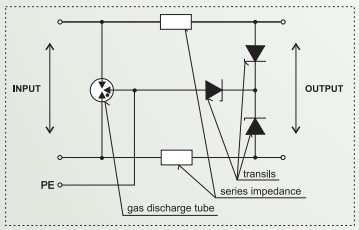
Connection of RJ45 pins acc.to EIA/TIA 568, type B

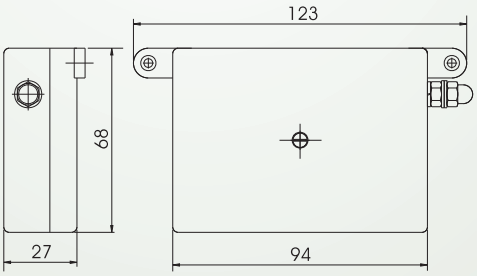
- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair



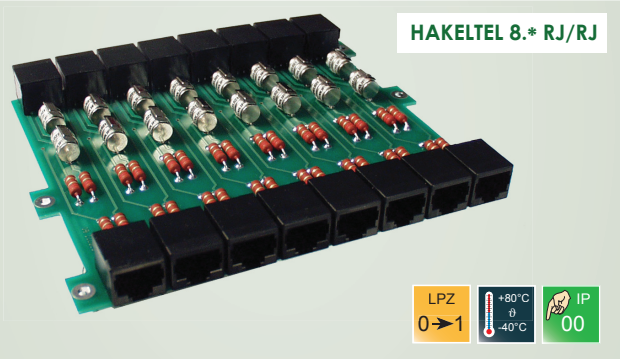


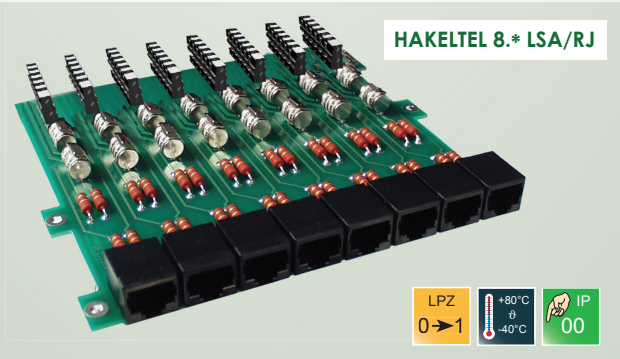




Technical data		DTB 485	DTB 485-L	DTB 485 R
Number of protected pairs	2	DTB 2/485	DTB 2/485-L	DTB 2/485 R
Nominal voltage	U_N	6 V	6 V	6 V
Max. continous operating voltage	U_C	7,2 V	7,2 V	7,2 V
Nominal current	I_N	100 mA	100 mA	100 mA
D1 Total lightning impulse current (10/350)	I_{imp}	5 kA	5 kA	-
D1 Lightning impulse current (10/350) line/PE	I_{imp}	-	2,5 kA	-
C2 Max. discharge current (8/20)	I_{max}	10 kA	20 kA	2 kA
Voltage protection level at I_n (8/20)	U_P	15 V	15 V	15 V
Voltage protection level at 1kV/µs	U_P	9 V	9 V	9 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns
Data rate		1 MBit/s	1 MBit/s	10 MBit/s
Series impedance per line		1,5 Ω	1,5 Ω	1,5 Ω
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm²	0,25 - 1,5 mm²	0,25 - 1,5 mm²
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		41 585 41 586	41 485 41 486	41 785 41 786

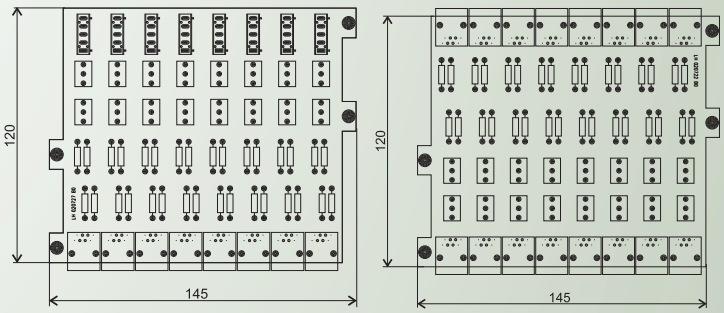
CE PG M/102



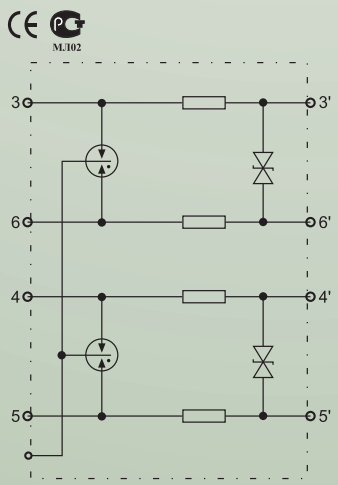


Hakeltel is a complex range of protection devices specially designed for the protection of analog telecommunication appliances against surges. These devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of protection zones LPZ $0_{A(B)}$ - 1 according to EN 62305.

HAKELTEL is produced in two basic versions intended in preference for mounting to metal panel PSK 24 which is appropriate for installation into 19" rackmounts. These types provide effective protection against surge for 8 telephone lines. The number of protected pairs of each telephone line is optional (1 or 2 pairs).



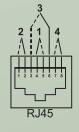
Technical data		HAKELTEL 8.1 RJ/RJ	HAKELTEL 8.2 RJ/RJ	HAKELTEL 8.1 LSA/RJ	HAKELTEL 8.2 LSA/RJ
No. of telephone lines		8	8	8	8
No. of protected pairs per line		1	2	1	2
Nominal voltage	U_N	170 V DC	170 V DC	170 V DC	170 V DC
Max. continous operating voltage	U_C	204 V	204 V	204 V	204 V
Nominal current	I_N	150 mA	150 mA	150 mA	150 mA
Nominal discharge current (8/20)	I_n	2,5 kA	2,5 kA	5 kA	5 kA
Voltage protection level at I_n					
line/line line/PE	U_P	< 250 V < 600 V	< 250 V < 600 V	< 275 V < 600 V	< 275 V < 600 V
Voltage protection level at 1 kV/µs					
line/line line/PE	U_P	< 230 V < 600 V	< 230 V < 600 V	< 230 V < 600 V	< 230 V < 600 V
Response time	t_A				
line/line line/PE		< 25 ns < 100 ns	< 25 ns < 100 ns	< 25 ns < 100 ns	< 25 ns < 100 ns
Data rate		10 MBit/s	10 MBit/s	10 MBit/s	10 MBit/s
Series impedance per line		10 Ω	10 Ω	10 Ω	10 Ω
Parasitic capacitance					
line/line line/PE	C	300 pF 15 pF	300 pF 15 pF	300 pF 15 pF	300 pF 15 pF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Input/Output		RJ45/RJ45	RJ45/RJ45	LSA-PLUS/RJ45	LSA-PLUS/RJ45
Pinning		4/5	3/6, 4/5	4/5	3/6, 4/5
Article number		45 024	45 026	45 025	45 027



Connection of RJ45 pins acc.to EIA/TIA 568, type B

- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair



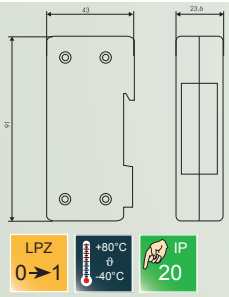
PSK 24 is a metal panel suitable for fitting in 19" rackmounts. It is possible to mount up to 3 pieces of HAKELTEL 8.4 into this panel.



Hakelnet 4/250M 6 cat is designed to protect 5E/6 data and communications lines. All protected lines are equipped with Transient Voltage Suppressor Diode which eliminates common mode and differential mode surge effects during computer networks operation.

Hakelnet 4/250M 6cat consists of a plastic box and patch cords which are terminated with RJ45 connectors. Required length of patch cords (a, b) is to be specified by customer.

HAKELNET 4/250M 6cat

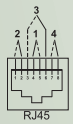


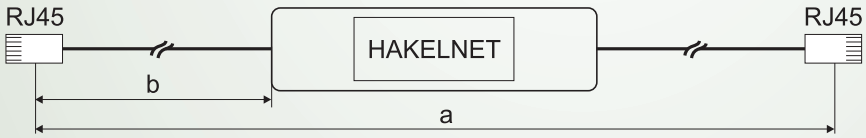


Connection of RJ45 pins
acc.to EIA/TIA 568, type B

- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair





Technical data		HAKELNET 4/250M 6cat	HAKELNET 4/250M 6cat/48V
Number of protected pairs		4	4
Nominal voltage	U_N	6 V	48 V
Max. continous operating voltage	U_C	7,2	56 V
Nominal current	I_L	200 mA	200 mA
Mode of protection		line-line, line-G(PE)	line-line, line-G(PE)
Frequency handling		250 MHz	250 MHz
C2 Nominal discharge current (8/20) line/line	I_n	20 A	150 A
C2 Nominal discharge current (8/20) line/G(PE)	I_n	20 A	2 kA
C2 Voltage potection level at I_n line/line	U_P	-	< 190 V
C2 Voltage potection level at I_n line/G(PE)	U_P	-	< 600 V
C3 Voltage potection level at I_n line/line at 1 kV/µs	U_P	< 15 V	< 145 V
C3 Voltage potection level at I_n line/G(PE) at 1 kV/µs	U_P	< 15 V	< 500 V
Insertion loss for 250 MHz		< 3 dB	< 2 dB
Parasitic capacitance line/line	c	max. 5 pF	max. 160 pF
Parasitic capacitance line-G(PE)	c	max. 5 pF	max. 260 pF
Operating temperature range	ϑ	- 20 ÷ + 60 °C	- 20 ÷ + 60 °C
Mounting on		DIN rail 35 mm	DIN rail 35 mm
Input/Otput, pinning		RJ45/RJ45, 1/2, 3/6, 4/5, 7/8	RJ45/RJ45, 1/2, 3/6, 4/5, 7/8
Length of patch cords		acc. to customer's specification, a+b < 3 m	acc. to customer's specification, a+b < 3 m
Grounding method		trough DIN rail 35 mm by special metal clip on the back side of box	
Housing material		POLYAMID PA6	POLYAMID PA6
Colour		grey	grey
Category tested acc. to		IEC 61643-21	IEC 61643-21
Approvals and certifications		Cat. 6, ISO/IEC 11801	Cat. 6, ISO/IEC 11801
Article number		45 034	45 037

CE PG M.102

COMPUTER NETWORK PROTECTION FOR 5TH CATEGORY

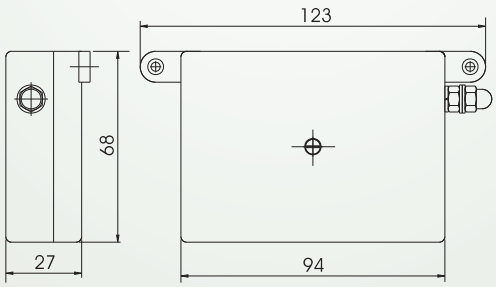
DTB 2/100M 5cat, DTB 4/100M 5cat, HAKELNET 1.2 RJ/RJ

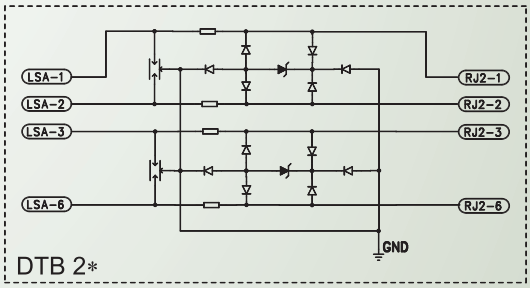


These surge protection devices intended for computer networks are specially designed for securing a faultless data transfer within computer networks category 5. They protect input electronic circuits of network cards against damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ -1 and higher according to EN 62305. It is recommended to use these protection devices at the input of protected equipment.

Models:
DTB*/100M 5cat is suitable for mounting on a wall. DTB 2/100M 5cat protects two pairs and DTB 4/100M 5cat protects four pairs of conductors.

Hakelnet 1.2RJ/RJ protects one line with two protected pairs. It is supplyed in a plastic housing enabling bolt fastening on a wall. Alternatively, it can be attached to the protected appliance with a double-sided tape. Connectors RJ45 are at the input and output side of the device.

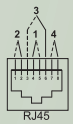




Connection of RJ45 pins
acc.to EIA/TIA 568, type B

- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair



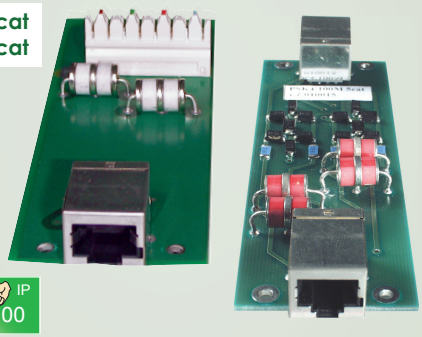
Technical data		DTB 2/100M 5cat	DTB 4/100M 5cat	HAKELNET 1,2 RJ/RJ
Number of protected pairs		2	4	2
Input/Output		RJ45/RJ45	RJ45/RJ45	RJ45/RJ45
Nominal voltage	U_N	6 V	6 V	6 V
Max. continous operating voltage	U_C	7,2 V	7,2 V	7,2 V
Nominal current	I_N	300 mA	300 mA	300 mA
C2 Max. discharge current (8/20)	I_{max}	2 kA	2 kA	-
C2 Nominal discharge current (8/20)	I_n	1 kA	1 kA	20 A
Voltage protection level at I_n (8/20)	U_P	10 V	10 V	25 V
Voltage protection level at 1kV/µs	U_P	< 10 V	< 10 V	< 10 V
Data rate		max. 100 Mbit/s	max. 100 Mbit/s	max. 100 Mbit/s
Max. attenuation		< 0,4 dB (at 100 MHz)	< 0,4 dB (at 100 MHz)	< 0,4 dB (at 100 MHz)
Near-end crosstalk		> 40 dB (at 100 MHz)	> 40 dB (at 100 MHz)	> 40 dB (at 100 MHz)
Return loss		< 14 dB (at 100 MHz)	< 14 dB (at 100 MHz)	< 14 dB (at 100 MHz)
Series impedance per line		1,5 Ω	1,5 Ω	1,5 Ω
Characteristic impedance		100 Ω	100 Ω	100 Ω
Response time	t_A	< 25 ns	< 25 ns	< 25 ns
Parasitic capacitance	C	<42 pF	<42 pF	<47 pF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		45 107	45 109	45 020

CE PG
MJ102

These surge protection devices intended for computer networks are specially designed for securing a faultless data transfer within computer networks category 5. They protect input electronic circuits of network cards against damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 and higher according to EN 62305. It is recommended to use these protection devices at the input of protected equipment.

Models:
PSK*/100M 5cat is a printed circuit board intended for mounting into PSK 10 which is appropriate for installation into 19" rackmounts.
PSK 2/100M 5cat designed for protection of two pairs has LSA-PLUS connector at the input side and RJ45 connector at the output side.
PSK 4/100M 5cat designed for protection of four pairs has RJ45 connector at the input and output sides.

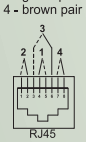
PSK 2/100M 5 cat
PSK 4/100M 5 cat

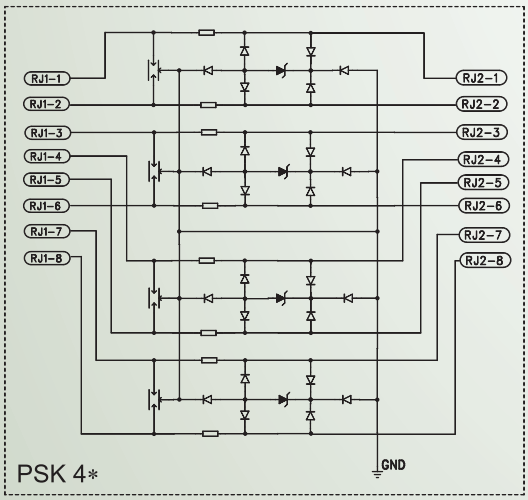


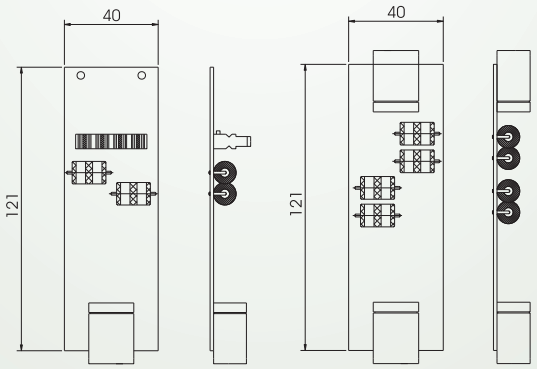
Connection of RJ45 pins
acc.to EIA/TIA 568, type B

- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair



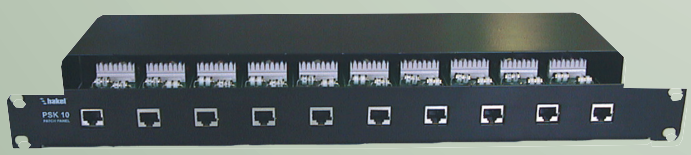


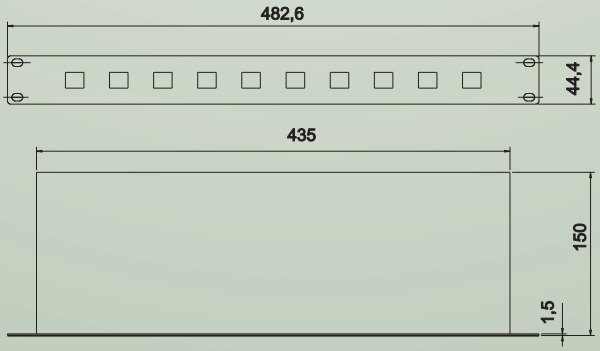


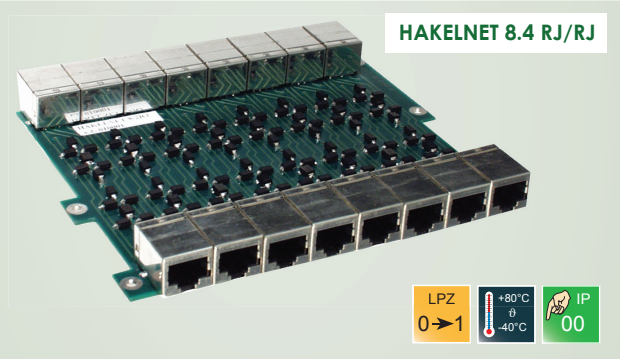
Technical data		PSK 2/100M 5cat	PSK 4/100M 5cat
Number of protected pairs		2	4
Input/Output		LSA-PLUS/RJ45	RJ45/RJ45
Nominal voltage	U_N	6 V	6 V
Max. continous operating voltage	U_C	7,2 V	7,2 V
Nominal current	I_N	300 mA	300 mA
C2 Max. discharge current (8/20)	I_{max}	10 kA	2 kA
C2 Nominal discharge current (8/20)	I_n	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	10 V	10 V
Voltage protection level at 1kV/µs	U_P	< 10 V	< 10 V
Response time	t_A	< 25 ns	< 25 ns
Parasitic capacitance	C	< 42 pF	< 42 pF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		45 011	45 012

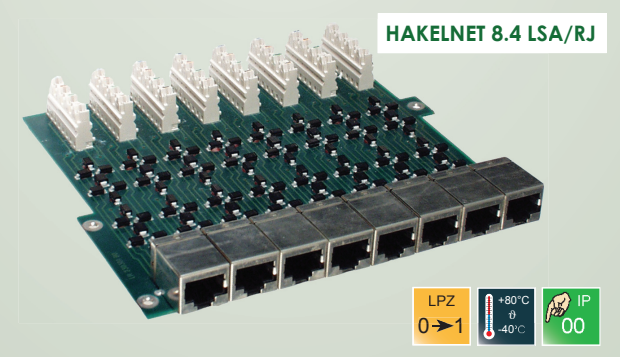
CE PCT M/102

PSK 10 is a metal panel suitable for fitting in 19" rackmounts. It is possible to mount up to 10 pieces of PSK*/100M 5cat into this panel.



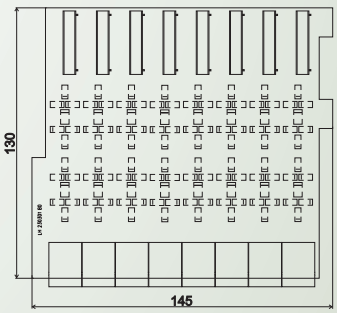


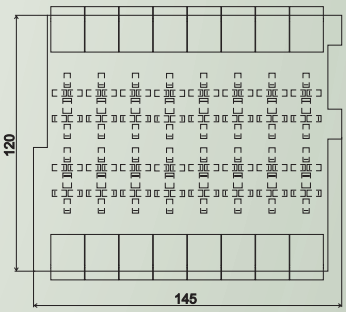




Hakelnet is a complex range of protection devices specially designed for faultless data transfers within computer networks category 5. They protect the input electronic circuits of network cards against a damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ -1 and higher according to EN 62305. It is recommended to use these protection devices at the input of protected equipment.

Models:
HAKELNET 8.4 RJ/RJ designed for protection of eight lines with four protected pairs has RJ45 connectors at the input and output sides of the device.
HAKELNET 8.4 LSA/RJ designed for protection of eight lines with four protected pairs has LSA-PLUS connectors at the input side and RJ45 connectors at the output side of the device.



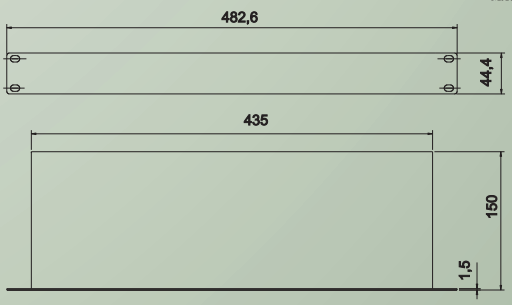


Technical data		HAKELNET 8,4 RJ/RJ	HAKELNET 8,4 LSA/RJ
Number of protected pairs		8	8
No. of protected pairs per line		4	4
Input/Output		RJ45/RJ45	LSA-PLUS/RJ45
Nominal voltage	U_N	6 V	6 V
Max. continous operating voltage	U_C	7,2 V	7,2 V
Nominal current	I_N	300 mA	300 mA
C2 Nominal discharge current (8/20)	I_n	20 A	20 A
Voltage protection level at I_n (8/20)	U_P	25 V	25 V
Voltage protection level at 1kV/µs	U_P	< 10 V	< 10 V
Data rate		max. 100 Mbit/s	max. 100 Mbit/s
Max. attenuation		< 0,4 dB (at 100 MHz)	< 0,4 dB (at 100 MHz)
Near-end crosstalk		> 40 dB (at 100 MHz)	> 40 dB (at 100 MHz)
Return loss		< 14 dB (at 100 MHz)	< 14 dB (at 100 MHz)
Series impedance per line		1,5 Ω	1,5 Ω
Characteristic impedance		100 Ω	100 Ω
Response time	t_A	< 25 ns	< 25 ns
Parasitic capacitance	C	< 47 pF	< 47 pF
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		45 021	45 022

MJ102

PSK 24 is a metal panel suitable for fitting in 19" rackmounts. It is possible to mount up to 3 pieces of HAKELNET 8.4 into this panel.

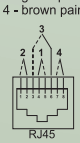




Connection of RJ45 pins
acc.to EIA/TIA 568, type B

- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

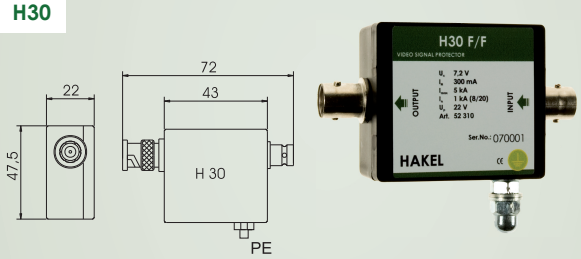
1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair

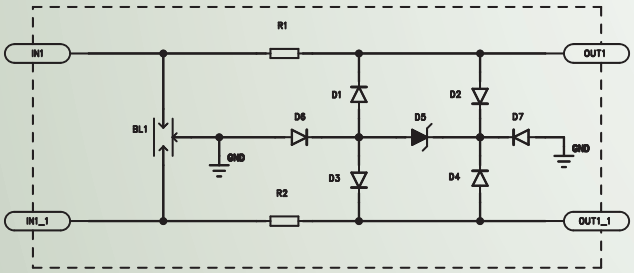


H30 and H30-L are designed for coaxial lines protection of 50Ω or 75Ω against induced surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305.

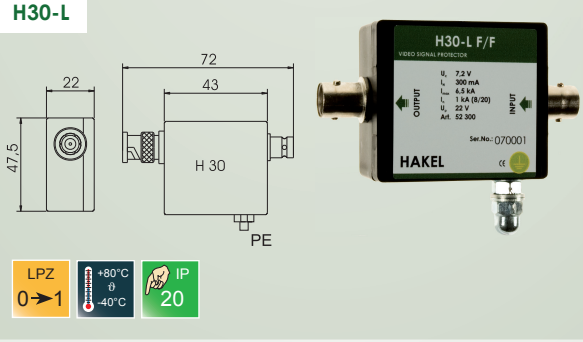
These devices are mainly used for protection of cameras and video signal concentrators. They are applicable to security and fire systems. H30-L version is equipped with more efficient nonlinear elements to reach higher discharge current up to 6,5kA (8/20).

H30

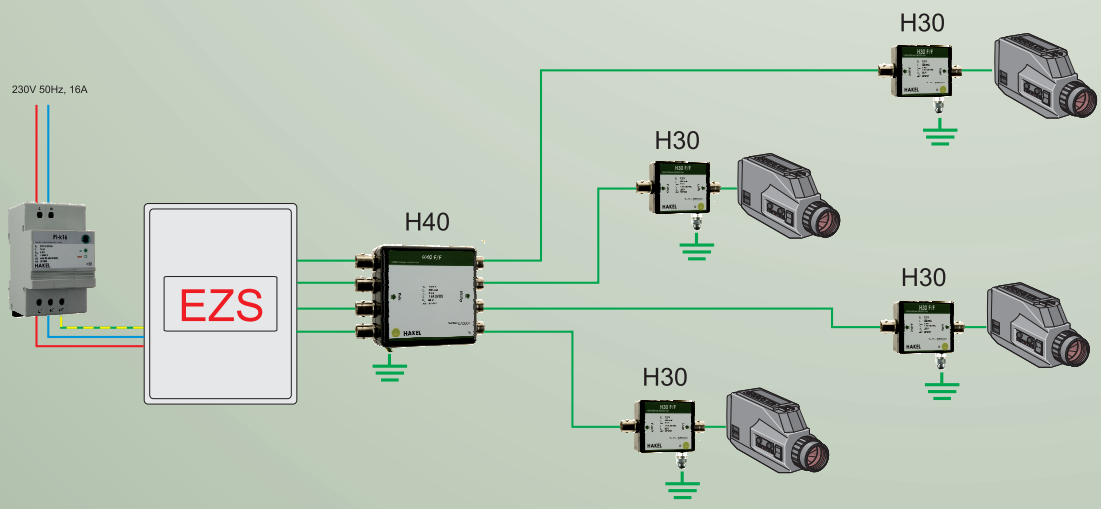




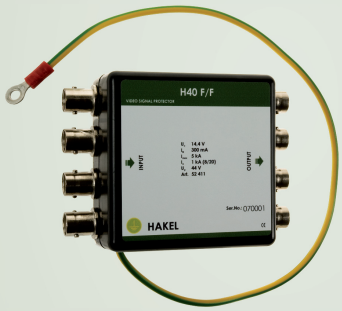
H30-L



Technical data		H30/6	H30/12	H30-L/6	H30-L/12
Number of protected pairs		1	1	1	1
Connector type		BNC (F/F, F/M)	BNC (F/F, F/M)	BNC (F/F, F/M)	BNC (F/F, F/M)
Nominal voltage	U_N	6 V	12 V	6 V	12 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	7,2 V	14,4 V
Nominal current	I_N	300 mA	300 mA	300 mA	300 mA
C2 Max. discharge current (8/20)	I_{max}	5 kA	5 kA	6,5 kA	6,5 kA
C2 Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	22 V	44 V	22 V	44 V
Voltage protection level at 1kV/µs	U_P	10 V	20 V	10 V	20 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Parasitic capacitance	C	< 27 pF	< 27 pF	< 27 pF	< 27 pF
Series impedance per line		10 Ω	10 Ω	10 Ω	10 Ω
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		52 310	52 312	52 300	52 313

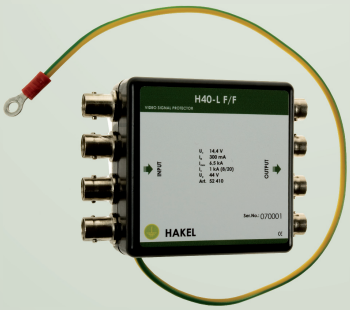


H40



LPZ 0➔1 | +80°C ϑ -40°C | IP 20

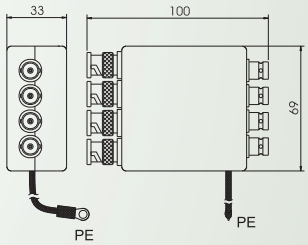
H40-L

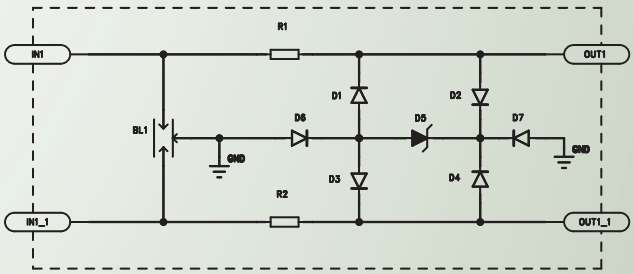


LPZ 0➔1 | +80°C ϑ -40°C | IP 20

H40 and H40-L are designed for coaxial lines protection of 50Ω or 75Ω against induced surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305.

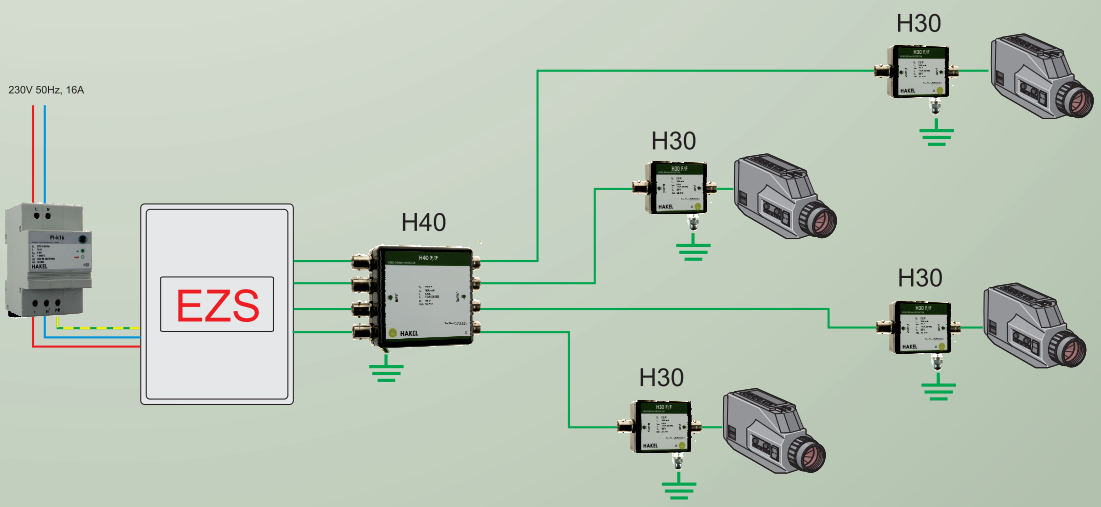
These devices are especially used for protection of cameras and video signal concentrators. They are applicable to security and fire systems. H40-L version is equipped with more efficient nonlinear elements to reach higher discharge current up to 6,5kA (8/20).

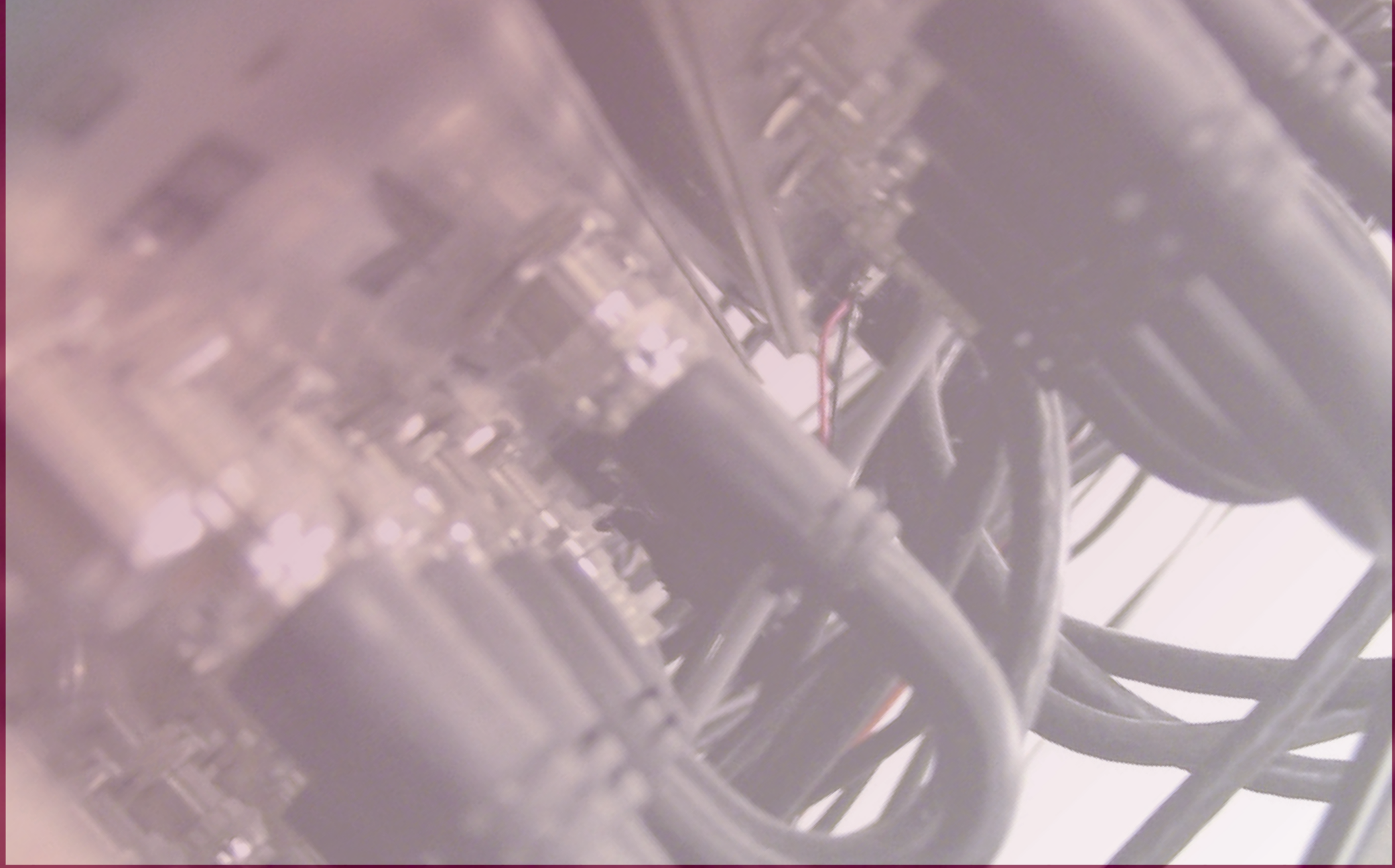




Technical data		H40/6	H40/12	H40-L/6	H40-L/12
Number of protected pairs		4	4	4	4
Connector type		BNC (F/F, F/M)	BNC (F/F, F/M)	BNC (F/F, F/M)	BNC (F/F, F/M)
Nominal voltage	U_N	6 V	12 V	6 V	12 V
Max. continous operating voltage	U_C	7,2 V	14,4 V	7,2 V	14,4 V
Nominal current	I_N	300 mA	300 mA	300 mA	300 mA
C2 Max. discharge current (8/20)	I_{max}	5 kA	5 kA	6,5 kA	6,5 kA
C2 Nominal discharge current (8/20)	I_n	1 kA	1 kA	1 kA	1 kA
Voltage protection level at I_n (8/20)	U_P	22 V	44 V	22 V	44 V
Voltage protection level at 1kV/µs	U_P	10 V	20 V	10 V	20 V
Response time	t_A	< 30 ns	< 30 ns	< 30 ns	< 30 ns
Parasitic capacitance	C	< 47 pF	< 47 pF	< 47 pF	< 47 pF
Series impedance per line		10 Ω	10 Ω	10 Ω	10 Ω
Operating temperature range	ϑ	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C	-40°C ÷ + 80°C
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		52 410	52 412	52 400	52 413

CE PG MJ102



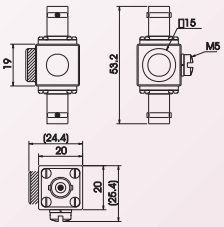


COAXIAL HIGH-FREQUENCY PROTECTION

COAXIAL PROTECTION

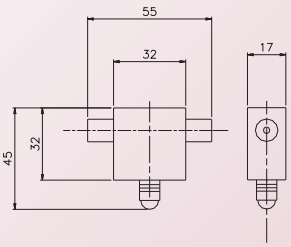
KO*G





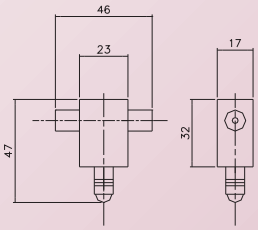
KO*P





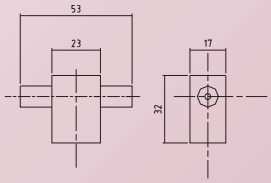
KO-9P





KO-10P



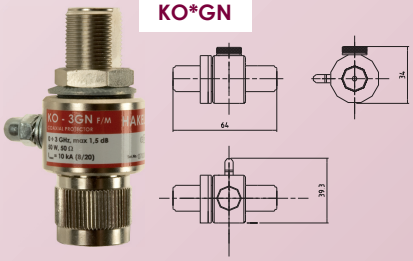


KO* is an innovated coaxial high-frequency protection range designed for protection of equipment connected to an aerial system by means of coaxial cables. Special gas discharge tubes with maximum discharge current I_{max} (8/20) = 10kA (or 20 kA in case of KO-5GN) ensure a reliable protection of the receiving and transmitting systems even against a lightning stroke nearby. Hakel company offers a wide range of coaxial protectors for various connector types and transmission power grades enabling usage in many applications. These coaxial protectors are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ -1 and higher according to EN 62305.

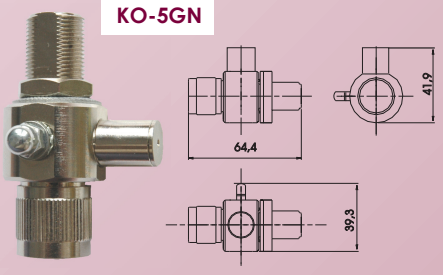
Technical data		KO-1G	KO-2G	KO-1P	KO-2P	KO-9P	KO-10P
Connector type		BNC	BNC	BNC	BNC	F	TV
Max. continous operating voltage	U_C	72 V	200 V	72 V	200 V	72 V	72 V
Nominal current	I_N	2,5 A	2,5 A	2,5 A	2,5 A	0,5 A	0,5 A
D1 Max. lightning impulse current (10/350)	I_{imp}	2 kA	2 kA	2 kA	2 kA	2 kA	2 kA
C2 Max. discharge current (8/20)	I_{max}	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
C2 Nominal discharge current (8/20)	I_n	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA
Voltage protection level at 1kV/µs	U_p	500 V	600 V	500 V	600 V	500 V	500 V
Frequency range		0-1 GHz	0-1 GHz	0-1 GHz	0-1 GHz	0-2 GHz	0-1 GHz
Max. transmission power capacity		50 W	400 W	50 W	400 W	50 W	50 W
Insertion loss		< 0,2 dB	< 0,2 dB	< 0,2 dB	< 0,2 dB	< 0,5 dB	< 1,2 dB
Return loss		> 20 dB	> 20 dB	> 20 dB	> 20 dB	> 20 dB	> 20 dB
Characteristic impedance		50 Ω	50 Ω	50 Ω	50 Ω	75 Ω	75 Ω
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		55 001	55 002	55 007	55 015	55 016	55 017

CE PG ML102

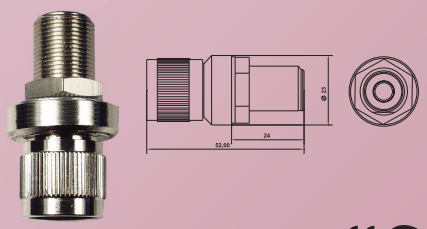
KO*GN



KO-5GN



KO-6GN



CE PG ML102

Technical data		KO-3GN (F/F)	KO-3GN (F/M)	KO-4GN (F/F)	KO-4GN (F/M)	KO-5GN (F/F)	KO-5GN (F/M)	KO-6GN (F/M)
Connector type		N	N	N	N	N	N	N
Max. continous operating voltage	U_C	72 V	72 V	200 V	200 V	-	-	135 V
Nominal current	I_N	5 A	5 A	5 A	5 A	-	-	5 A
D1 Max. lightning impulse current (10/350)	I_{imp}	2 kA	2 kA	2 kA	2 kA	5 kA	5 kA	1 kA
C2 Max. discharge current (8/20)	I_{max}	10 kA	10 kA	10 kA	10 kA	20 kA	20 kA	10 kA
C2 Nominal discharge current (8/20)	I_n	5 kA	5 kA	5 kA	5 kA	10 kA	10 kA	5 kA
Voltage protection level at 1kV/µs	U_p	500 V	500 V	600 V	600 V	<2 V	<2 V	< 500 V
Frequency range		0-3 GHz	0-3 GHz	0-3 GHz	0-3 GHz	5-5,4 GHz	5-5,4 GHz	0-5,8 GHz
Max. transmission power capacity		50 W	50 W	400 W	400 W	200 W	200 W	50 W
Insertion loss		< 1,5 dB	< 1,5 dB	< 1,5 dB	< 1,5 dB	< 0,2 dB	< 0,2 dB	< 0,2 dB
Return loss		> 20 dB	> 20 dB	> 20 dB	> 20 dB	> 20 dB	> 20 dB	> 20 dB
Characteristic impedance		50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Article number		55 018	55 019	55 020	55 021	55 024	55 025	55 026

KO-7/16-R

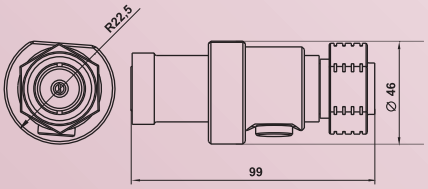


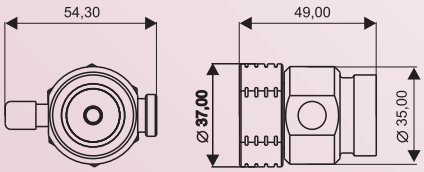
KO-7/16 FM

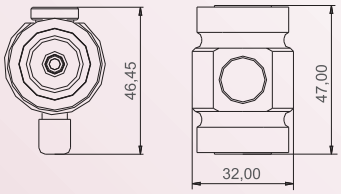


KO-7/16 FF





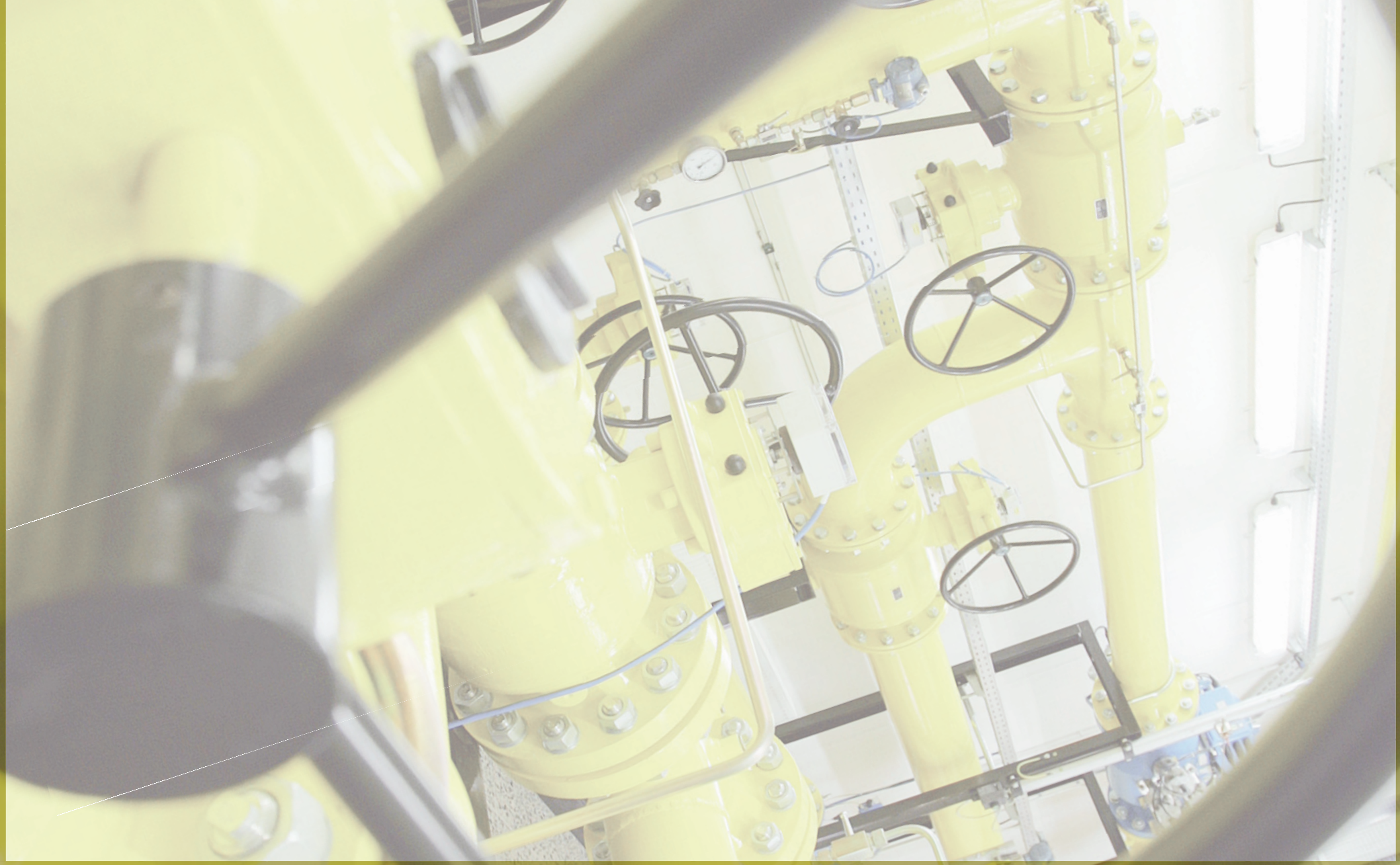




KO-7/16 is an innovated coaxial high-frequency protection range designed for protection of equipment connected to an aerial system by means of coaxial cables. Special gas discharge tubes with maximum discharge current I_{max} (8/20) = 10kA (or 20 kA in case of KO-7/16-R) ensure a reliable protection of the receiving and transmitting systems even against a lightning stroke nearby. This range is produced with 7/16" connector type for various transmission power grades enabling usage in many applications. They are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ -1 and higher according to EN 62305.

Technical data		KO-7/16-R (F/M)	KO-7/16 (F/M)	KO-7/16 (F/F)
Connector type		7/16"	7/16"	7/16"
Max. continous operating voltage	U_C	600 V	350 V	350 V
Nominal current	I_N	12 A	5 A	5 A
D1 Max. lightning impulse current (10/350)	I_{imp}	3 kA	2 kA	2 kA
C2 Max. discharge current (8/20)	I_{max}	20 kA	10 kA	10 kA
C2 Nominal discharge current (8/20)	I_n	10 kA	5 kA	5 kA
Voltage protection level at 1kV/µs	U_P	950 V	850 V	850 V
Frequency range		0-2,6 Ghz	0-2,6 Ghz	0-2,6 Ghz
Max. transmission power capacity		900 W	400 W	400 W
Insertion loss		< 0,2 dB	< 0,5 dB	< 0,5 dB
Return loss		> 20 dB	> 15 dB	> 15 dB
Characteristic impedance		50 Ω	50 Ω	50 Ω
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	A2, B2, C2, C3, D1	A2, B2, C2, C3, D1
Weight		510 g	175 g	165 g
Article number		55 034	55 033	55 032

M.102



EQUIPOTENTIAL BONDING OF CONDUCTING PARTS OF THE ELECTRICAL INSTALLATION BY HIGH POWER GAS DISCHARGE TUBE



HIGH POWER GAS DISCHARGE TUBE

HGS100 and HGS100 EB are a separating high power gas discharge tubes intended for equipotential bonding of an installation parts of buildings, which are not interconnected. In case of origin of p.d. (potential diference) between those parts, the high power gas discharge tube ignites and interconnects both parts for a transient time (typical value of internal resistance at startup of HGS100 is 0,001 ÷ 0,002 Ω).

Recommended installation is inside of the buildings, outdoors, in the damp rooms as well as in the subterraneous areas.

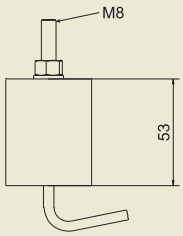
For lightning protection equipotential bonding in accordance with IEC 61024-1 as well as for the use in IT - installations in accordance with IEC 60364-5-54.

Gas discharge tube

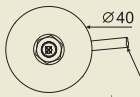
HGS100











The length of the flexible connecting cable is 200mm and it is ended with a loop GPH12 of cross section 13mm.

Type HGS100		
DC-Sparkover voltage		400 ÷ 650 V DC
AC-Sparkover voltage (50Hz)	U_{aw}	275 ÷ 450 V AC
Rated AC withstand voltage (50Hz)	$U_{w/AC}$	250 V
Impulse sparkover voltage at 5 kV/μs - for 99% of measured values (wave 1,2/50 μs, 6 kV)		< 1 kV
Max. impulse discharge current (8/20)	I_{max}	150 kA
Nominal impulse discharge current (8/20)	I_n	75 kA
Max. lightning impulse current (10/350)	I_{imp}	100 kA
- Charge	Q	50 As
- Specific energy	W/R	2500 kJ/Ω
Insulation resistance at 100 V DC	R_i	>1 GΩ
Capacitance at 1 MHz	C	5 pF
Casing		corundum/binary resin with an external steel coat, resistant to climatic effects
Lifetime		min. 100.000 h
Weight	m	320 g
Article number		10 005

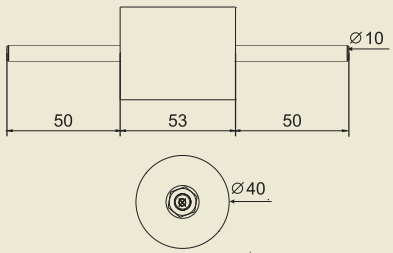
CE PG M.102

Gas discharge tube

HGS100 EB





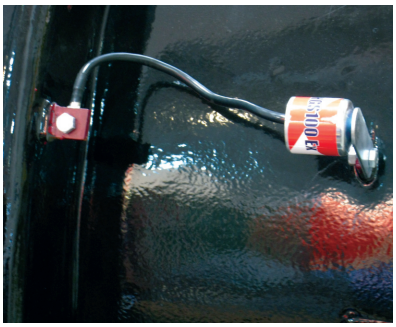




Type HGS100 EB		
DC-Sparkover voltage		400 ÷ 650 V DC
AC-Sparkover voltage (50Hz)	U_{aw}	275 ÷ 450 V AC
Rated AC withstand voltage (50Hz)	$U_{w/AC}$	250 V
Impulse sparkover voltage at 5 kV/μs - for 99% of measured values (wave 1,2/50 μs, 6 kV)		< 1 kV
Max. impulse discharge current (8/20)	I_{max}	150 kA
Nominal impulse discharge current (8/20)	I_n	75 kA
Max. lightning impulse current (10/350)	I_{imp}	100 kA
- Charge	Q	50 As
- Specific energy	W/R	2500 kJ/Ω
Insulation resistance at 100 V DC	R_i	>1 GΩ
Capacitance at 1 MHz	C	5 pF
Casing		corundum/binary resin with an external steel coat, resistant to climatic effects
Lifetime		min. 100.000 h
Weight	m	320 g
Article number		10 009

CE PG M.102

HIGH POWER GAS DISCHARGE TUBE



HGS100 Ex - Separating high power gas discharge tube HGS100 Ex for use in explosion hazards areas. It is intended for equipotential bonding of the installation parts of buildings or technological entities which are not interconnected operationaly. In case of p.d. (potential difference) origin between those parts, the high power gas discharge tube ignites and interconnects both parts for a transient time (typical value of internal resistance at startup of HGS100 Ex is 0,001÷ 0,002Ω). Recommended installation is inside of the buildings, outdoors, in the damp rooms as well as in the subterraneous areas.

It is an explosion-proof gas discharge tube with flexible connecting cable for equipotential bonding acc. to IEC 61024-1 and also for the use in IT installations acc. to IEC 60364-5-54. It complies with EN 50014 and EN 50028 standards. It is recommended for insulated flanges and insulated screw joints bridging in cathodic protected parts of industrial technology.

Type HGS100 Ex		
EC-Type examination certificate		Ex II2G Ex mb II T6 Ex II2D Ex mD 21 T135°C
Class of lightning impulse current strength acc. to EN 50164-3		H
Approvals, certification		FTZU 04 ATEX 0255X
DC-Sparkover voltage		400 ÷ 650 V DC
AC-Sparkover voltage (50Hz)	U_{aw}	275 ÷ 450 V AC
Rated AC withstand voltage (50 Hz)	$U_{W/AC}$	250 V
Impulse sparkover voltage at 5 kV/ μs - for 99% of measured values (wave 1,2/50 μs, 6 kV)	U_{rimp}	< 1 kV
Max. impulse discharge current (8/20)	I_{max}	150 kA
Max. lightning impulse current (10/350)	I_{imp}	100 kA
- Charge	Q	50 As
- Specific energy	W/R	2500 kJ/Ω
Insulation resistance at 100 V DC	R_i	>1 GΩ
Capacitance at 1 MHz	C	5 pF
Casing		corundum/binary resin with an external steel coat, resistant to climatic effects
Lifetime		min. 100.000 h
Weight	m	535 g
Article number		10 004

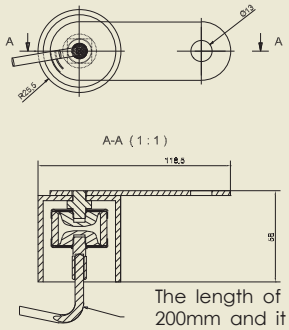
CE PG M.102

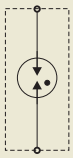
Gas discharge tube



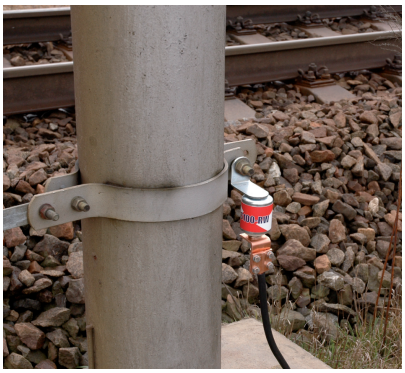
HGS100 Ex

+90°C ϑ -40°C | IP 66 | industry





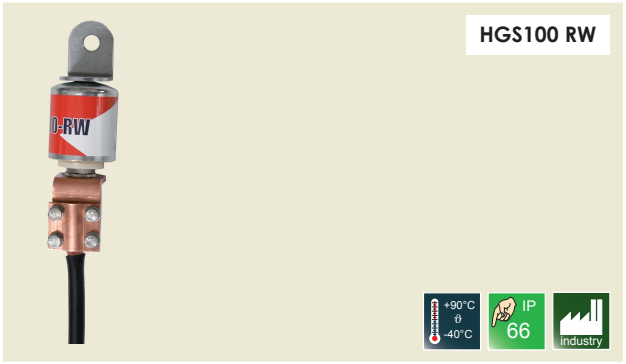
The length of the flexible connecting cable is 200mm and it is ended with a loop GPH12 of diameter 13mm.

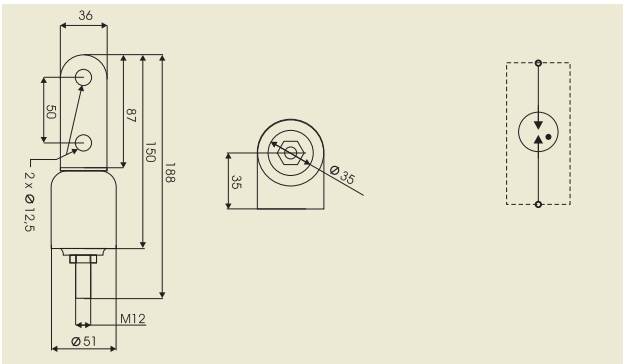


HIGH POWER GAS DISCHARGE TUBE

HGS100 RW is a voltage limiter designed for overvoltage protection of personnel and equipment in DC and AC rail traction systems. It is recommended to install this limiter between the current return path and non-electrified parts of structures laying adjacent to the rails. In case of overvoltage, HGS100 RW generates a durable conductive path between the overloaded area and the railway's substation. This results in increased current loads that are sensed at the substation, tripping the safety switch and thus protecting personnel and equipment. In addition, all overvoltages generated by lightning are effectively limited by Hakel's internal construction of HGS100 RW. All requirements given by EN 50 123-5:2003 relating to electrical safety and earthing for this specific use are also fulfiled.

Gas discharge tube





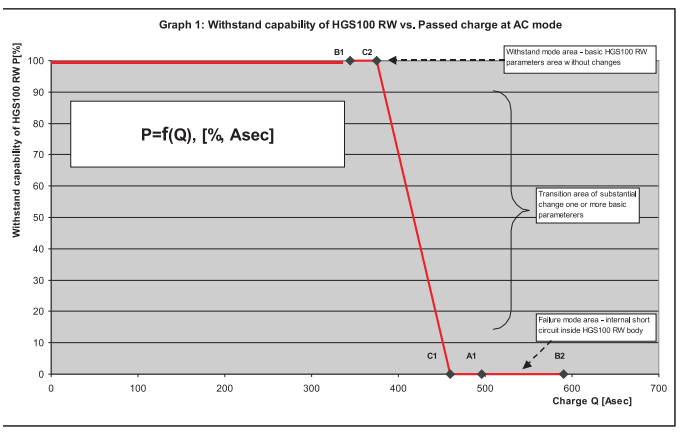
Type HGS100 RW		
Examinations according to		EN 616 43-11/A11, EN 50 123-5:20003
DC-Sparkover voltage		300 ÷ 500 V DC*
AC-Sparkover voltage		> 250 V_{rms}
Impulse sparkover voltage at 5 kV/ μs - for 99% of measured values (wave 1,2/50 μs, 6 kV)		< 1200 V
Max. impulse discharge current (8/20)	I_{max}	150 kA
Nominal impulse discharge current (8/20)	I_n	75 kA
Max. lightning impulse current (10/350)	I_{imp}	100 kA
- Charge	Q	50 As
- Specific energy	W/R	2500 kJ/Ω
Insulation resistance at 100 V DC	R_i	>1 GΩ
Capacitance at 1 MHz	C	5 pF
Casing		corundum/binary resin with an external steel coat, resistant to climatic effects
Lifetime		min. 100.000 h
Weight	m	575 g
Article number		10 002

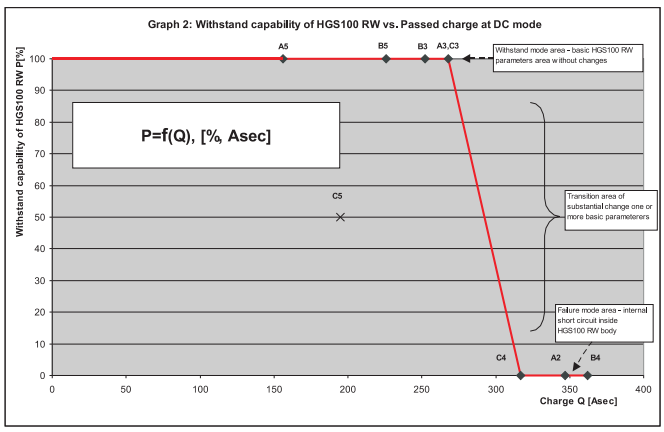
* Special HGS100 RW for 200 ÷ 300 V is available on demand.

ML102

Advantages:

- Potential difference is limited to a safe voltage level in typical area about 30 V, when the HGS100 RW device is in operation mode.
- Favourable level of static DC sparkover voltage in area 300 ÷ 500 V DC.
- Temperature independent device triggering voltage in the range of - 40° ÷ + 80 °C.
- Guaranteed reversibility for 100 m_{sec} and short circuit current up to 4 kA_{rms} (AC-mode), for protection against the danger of rail potential difference.
- Guaranteed reversibility for 20 m_{sec} and short circuit current up to 15 kA (DC-mode), for protection against the danger of rail potential difference.
- Guaranteed change of HGS100 RW behaviour to short circuit mode in case of current & time overloading over 300 A_{sec} (DC-mode) or 400 A_{sec} (AC - mode).
- Three-year warranty.





HIGH POWER GAS DISCHARGE TUBE



HGS150 RW is range of voltage limiters designed for overvoltage protection of personnel and equipment in DC and AC rail traction systems. It is recommended to install this limiter between the current return path and non-electrified parts of structures laying adjacent to the rails. In case of overvoltage, HGS150 RW generates a durable conductive path between the overloaded area and the railway's substation. This results in increased current loads that are sensed at the substation, tripping the safety switch and thus protecting personnel and equipment. In addition, all overvoltages generated by lightning are effectively limited by Hakel's internal construction of HGS150 RW. All requirements given by EN 50122-1 and EN 50123-5:2003 relating to electrical safety earthing for this specific use are also fulfiled. Hakel company offers this voltage limiter in three modifications which differ in their external cover construction.

Gas discharge tube

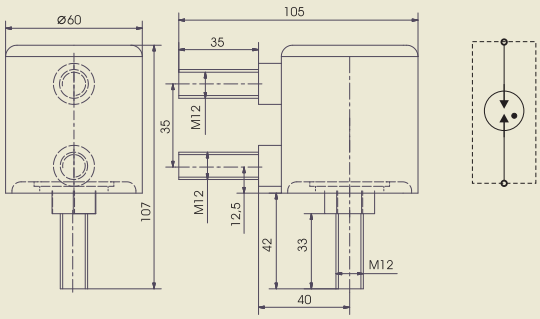
Type HGS150 RW1		
Examinations according to		EN 616 43-11/A11, EN 50 123-5:20003
DC-Sparkover voltage		300 ÷ 500 V DC*
AC-Sparkover voltage		> 250 V_{rms}
Impulse sparkover voltage at 5 kV/ μs - for 99% of measured values (wave 1,2/50 μs, 6 kV)		< 1200 V
Max. impulse discharge current (8/20)	I_{max}	200 kA
Nominal impulse discharge current (8/20)	I_n	100 kA
Max. lightning impulse current (10/350)	I_{imp}	150 kA
- Charge	Q	75 As
- Specific energy	W/R	5500 kJ/Ω
Insulation resistance at 100 V DC	R_i	>1 GΩ
Capacitance at 1 MHz	C	5 pF
Casing		an external steel coat, resistant to climatic effects
Recommended installation to rail		min. 50mm^2 Fe conductor with isolation
Method connection of HGS to non-electrical part		by one pair of M12 nut & washer
Lifetime		min. 100.000 h
Weight	m	925 g
Article number		10 111

* Special HGS150 RW for 200 ÷ 300 V is available on demand.

M.102

HGS150 RW1





Gas discharge tube

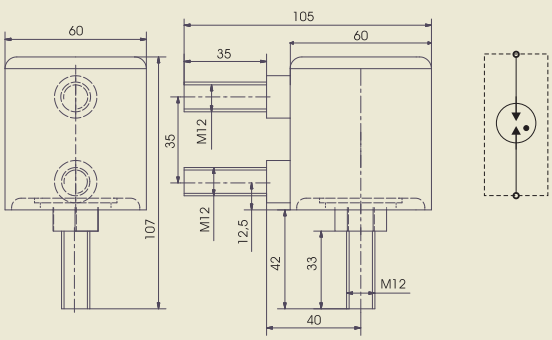
Type HGS150 RW2		
Examinations according to		EN 616 43-11/A11, EN 50 123-5:20003
DC-Sparkover voltage		300 ÷ 500 V DC*
AC-Sparkover voltage		> 250 V_{rms}
Impulse sparkover voltage at 5 kV/ μs - for 99% of measured values (wave 1,2/50 μs, 6 kV)		< 1200 V
Max. impulse discharge current (8/20)	I_{max}	200 kA
Nominal impulse discharge current (8/20)	I_n	100 kA
Max. lightning impulse current (10/350)	I_{imp}	150 kA
- Charge	Q	75 As
- Specific energy	W/R	5500 kJ/Ω
Insulation resistance at 100 V DC	R_i	>1 GΩ
Capacitance at 1 MHz	C	5 pF
Casing		an external steel coat, resistant to climatic effects
Recommended installation to rail		min. 50mm^2 Fe conductor with isolation
Method connection of HGS to non-electrical part		by one pair of M12 nut & washer
Lifetime		min. 100.000 h
Weight	m	1060 g
Article number		10 112

* Special HGS150 RW for 200 ÷ 300 V is available on demand.

M.102

HGS150 RW2

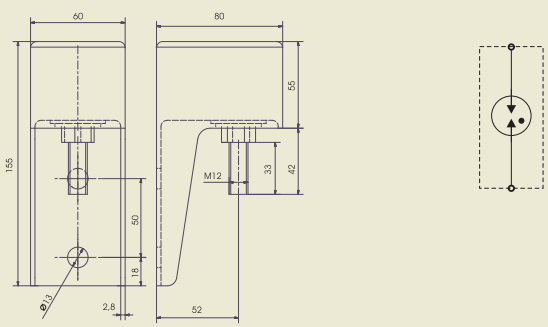




Gas discharge tube

HGS100 RW3



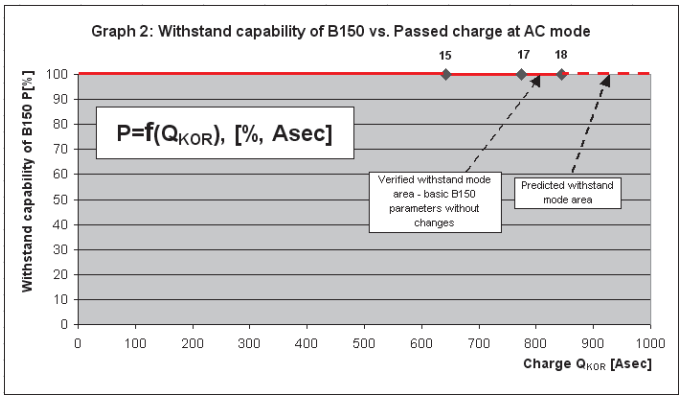


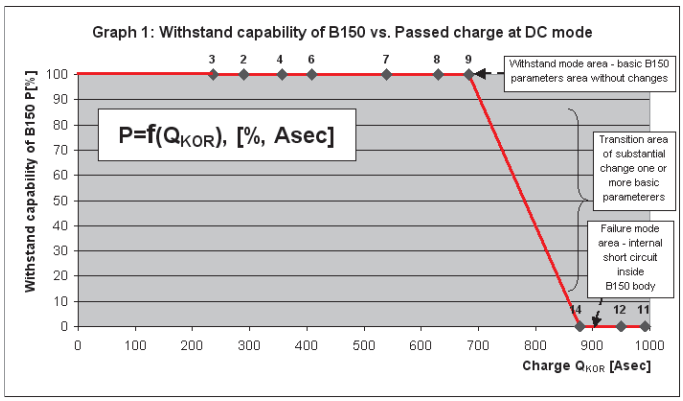
Type HGS150 RW3		
Examinations according to		EN 616 43-11/A11, EN 50 123-5:20003
DC-Sparkover voltage		300 ÷ 500 V DC*
AC-Sparkover voltage		> 250 V_{rms}
Impulse sparkover voltage at 5 kV/ μs - for 99% of measured values (wave 1,2/50 μs, 6 kV)		< 1200 V
Max. impulse discharge current (8/20)	I_{max}	200 kA
Nominal impulse discharge current (8/20)	I_n	100 kA
Max. lightning impulse current (10/350)	I_{imp}	150 kA
- Charge	Q	75 As
- Specific energy	W/R	5500 kJ/Ω
Insulation resistance at 100 V DC	R_i	>1 GΩ
Capacitance at 1 MHz	C	5 pF
Casing		an external steel coat, resistant to climatic effects
Recommended installation to rail		min. 50mm^2 Fe conductor with isolation
Method connection of HGS to non-electrical part		by one pair of M12 screw & nut & washer
Lifetime		min. 100.000 h
Weight	m	1260 g
Article number		10 113

* Special HGS150 RW for 200 ÷ 300 V is available on demand.

Advantages:

- Each limiter is equipped with special connecting bracket for interconnection to rail
- Potential difference is limited to a safe voltage level in typical area up to 30 V, when the HGS150 RW device is in operation mode
- Favourable level of static DC sparkover voltage in area 300 ÷ 500 V DC
- Temperature independent device triggering voltage in the range of - 40° ÷ + 80 °C
- Guaranteed reversibility for 100 m_{sec} and short circuit current up to 8 kA_{rms} (AC-mode), for protection against the danger of rail potential difference
- Guaranteed reversibility for 30 m_{sec} and short circuit current up to 20 kA (DC-mode), for protection against the danger of rail potential difference
- Guaranteed change of HGS150 RW behaviour to short circuit mode in case of current & time overloading over 800 A_{sec} (AC-mode) or 600 A_{sec} (DC-mode)
- Three-year warranty







Digital lightning strike counter

DIGITAL LIGHTNING STRIKE COUNTER

PBI-3 is a digital lightning strike counter intended for counting of surge currents as a result of lightning effects. The counter operates without the external source of energy and therefore requires no maintenance. Life time of inbuilt Li-battery is longer than 10 years.

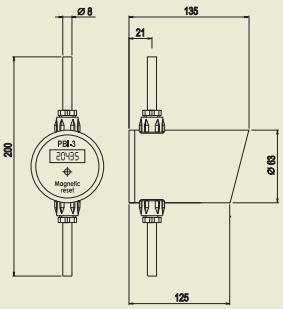
Installation instructions:
This counter has to be connected in the conductor path carrying the surge current. The best installation position is between the equipotential bonding bar and the earthing system. This conductor has to be interrupted and PBI counter has to be inserted in lightning current path with the help of two suitable parallel connecting clamps.

Warning: Opening the equipment can cause its destruction and invalidates the warranty!

PBI-3



+80°C -40°C | IP 64 | industry



Type PBI-3		
Response range		2 kA - 100 kA (8/20)
Counter range		0 ÷ 99999999
Diameter of connected conductors		Ø 8mm
Recommended position		vertical
Installation		Permanent
Weight	m	535 g
Article number		70 042

CE PG ML102

The number of strikes can be easily cleared down anytime by applying a magnet to a following mark on the front panel: ⌖