Surge Protection
for Data/Signal Lines

ISKRA ZAŠČITE

BE ON THE SAFE SIDE

Users of electronic communications equipment such as telephones, instrumentation and control, and data-processing systems must face the problem of keeping these systems operational despite an environment where surges and transient over-voltages are an ever present source of equipment damage and operational downtime.

There are several contributors to this problem:

- The high level of integration of electronic components in today's equipment makes it particularly susceptible to damage from over-voltages.
- Interruptions of service and operational downtime are one of the biggest contributors to loss in revenue.
- Data transmission networks cover large areas and as such are inherently exposed to voltage pickup and disturbances.

The Surge Protection Device (SPD) is a recognized and effective solution to the over-voltage problem. To perform correctly, it must be chosen to meet both the risk exposure and the operating conditions.

The following catalog provides guidance on such selection.

The quality of our products is maintained by means of regular testing. At the same time the acquired ISO 9001 certificate and strict supervision enable us to achieve the highest quality of products and our customers' satisfaction.

As a ISO 9001 certified company we are committed to the work of international standardization both in efforts to make the development, manufacturing and supply of our products more efficient, safer and cleaner, and in their ability to make trade between countries easier and fairer. Attention to quality at Iskra Zaščite is in grained in all employees. We recognize that in the competitive environment we now find ourselves in, quality must be fundamental to our corporate culture if we are to succeed. We realize that the synergies that come from a quality product and a strong partnership with our customers are the core to our continued growth.


Baseefa

QUALITY ASSURANCE NOTIFICATION


IQNet

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

ISKRA ZAŠČITE d.o.o.
Ljubljana, Slovenija

Development, production and sale of overvoltage protective devices, main distribution frames and protective sistems

Management System

ISO 9001:2008

Registration Number: SI – Q-207


SIQ

ISKRA ZAŠČITE d.o.o.
Ljubljana

Razvoj, proizvodnja in prodaja prenapetostnih zaščit, glavnih delilnikov in sistemov zaščit

ISO 9001:2008

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QUICK PRODUCT SELECTION

Surge Protective Devices for Data/Signal Systems

Product Group	Description	Product Name	Page	Product Photo	Connection/Signal
Data/Signal Lines	• Universal Single-pair Data SPD for Shielded Cables • Coarse and Fine Protection	**SMH-SH**	13	 NEW	- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
	• Universal Single-pair Data SPD for Shielded Cables • Coarse and Fine Protection	**SMH-RC**	14	 NEW	- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
	• Single-pair SPD; 2-pair SPD • Coarse and Fine Protection • Iimp= 5kA/per pair	**SMI, SMI2**	15	 NEW	- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
	• Universal Single-pair Data SPD • Coarse and Fine Protection • Over-current Protection	**SMH-TC**	16		- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
	• Universal 2-pair Data SPD • Coarse and Fine Protection • Over-current Protection	**SMH2-TC**	17		- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
	• Compact Universal Single-pair Data SPD • Coarse and Fine Protection	**NMH-TC**	18		- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
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	• Single-pair SPD, 2-pair SPD • Coarse and Fine Protection • Over-current Protection	**IM-TD**	20		- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
	• Single-pair SPD • Coarse and Fine Protection	**IMH-TC**	22		- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
	• Single-pair Data SPD • Coarse and Fine Protection • Insulation Resistance to Earth • Separated signal ground (RS232)	**SMH-SG**	24		- Analogue tel. line - RS 232, - RS 485 - Thermal probe PT 100
	• Single-pair SPD • Coarse and Fine Protection • Insulation Resistance to Earth	**VMS-TC**	25		- Analogue tel. line - RS 485 - Thermal probe PT 100
	• Single-pair SPD • Coarse and Fine Protection	**VMO**	27		- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
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	• 2-pair SPD • Coarse Protection only • Coordination Elements	**SMH2-TDR**	30		- Analogue tel. Line
	• Single-pair SPD • Coarse Protection only • Coordination Elements	**VM-TDR**	31		- Analogue tel. Line

TECHNICAL CHARACTERISTICS

U_n (V_{DC})	U_c (V_{DC})	I_L at 25°C (A)	I_n (8/20) (kA)	I_{max} (8/20) (kA)	Housing IP 20 Dimensions DIN 43880
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	20	30	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	Compact 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	0.8	10	20	Compact 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	0.145, 1	10	20	Modular 1TE
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	Modular 1TE
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	Modular 1TE
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	20	30	Modular 1TE
110	170	0.3	10	20	Modular 12mm
110	170	0.3	10	20	Modular 12mm
110	170	0.3	10	20	Modular 1TE

QUICK PRODUCT SELECTION

Surge Protective Devices for Data/Signal Systems

Product Group	Description	Product Name	Page	Product Photo	Connection/Signal
Data/Signal Lines	• Single-pair SPD • Fine Protection only	SMH2-DF	32	 NEW	- 20 mA current loop
	• Single-pair SPD • Fine Protection only	IM-VF	33	 NEW	- 20 mA current loop
	• Single-pair SPD • Fine Protection only	IM-DF	34		- 20 mA current loop
	• Single-pair SPD • Coarse and Fine Protection • Increased Sparkover Voltage • Overcurrent Protection	SMH-20K	35		- Analogue tel. Line - 20 mA current loop - Thermal probe PT 100
	• 2-pair SPD • Coarse and Fine Protection • Increased Sparkover Voltage • Overcurrent Protection	SMH2-20K SMH2-20D	36		- Analogue tel. Line - 20 mA current loop - Thermal probe PT 100
	• SPD for DC power supplies and data lines (CAN bus) • Coarse and Fine Protection • Over-current Protection	SMH-TC+PS	37		- DC power supply + 1 data line - CAN bus
	• Single-pair SPD, PCB assembly • Coarse and Fine Protection • Over-current Protection	LZ-SMH	38		- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
xDSL Technologies	• Single-pair SPD • For xDSL Transmission • Coarse and Fine Protection	IM-xDSL	39		- Analogue tel. line - xDSL (VDSL class 1 only)
DC Power Supplies	• Single-pair SPD for xDSL transmission • For DC Power Supplies • Coarse and Fine Protection	SMH-PS	41		- DC power system
	• Single-pair SPD • For DC Power Supplies • Coarse and Fine Protection	VM-DC	42		- DC power system
	• SPD for DC Power Supplies • Class I/Type 1/B • Iimp= 10kA • Mechanical Flag + Remote Contacts (R)	DC PROTEC B(R) 10	43		- DC power system
	• SPD for DC Power Supplies • Class II/Type 2/C • Mechanical Flag + Remote Contacts (R)	DC PROTEC C(R) 40	44		- DC power system
	• DC and AC Power Supplies • Class III / Type 3 / D • U_{OC}/I_{SC} (1.2/50, 8/20)= 4kV/2kA, 6kV/3kA • Remote contacts + LED	PROTEC DMDR 20	45	 NEW	- DC and AC power system
	• Single-pole SPD • Class II/Type 2/C • Mechanical Flag + Remote Contacts (R)	PROTEC C(R) 40	46		- DC and AC power system
	• Single-pole SPD • Class II/Type 2/C • Mechanical Flag + Remote Contacts (R)	PROTEC CN(R) 40	47		- DC and AC power system

TECHNICAL CHARACTERISTICS

U_n (V_{DC})	U_c (V_{DC})	I_L at 25°C (A)	I_n (8/20) (kA)	I_{max} (8/20) (kA)	Housing IP 20 Dimensions DIN 43880
5, 12, 24, 60	7, 15, 28, 64	1	0.5	1	Modular 12mm
24	31	10	0.5	1	Compact 6mm
5, 12, 24, 60	7, 15, 28, 64	10	0.5, 0.5, 0.25, 0.1	/	Compact 6mm
230 24, 60	320 28, 64	5 0.145	10 10	20 20	Modular 12mm
230 24, 60	320 28, 64	5 0.145	10 10	20 20	Modular 12mm
24	28	1	10	20	Modular 12mm
12, 24	15, 28	1	10	20	/
120	170	0.2	10	20	Modular 1TE
12, 24, 48	15, 28, 52	4	10	20	Modular 12mm
12, 24	15, 28	10	10	20	Modular 1TE
24, 48	30, 60	/	20	60	Compact 4TE
24, 48	30, 60	/	20	40	Compact 2TE
24, 48, 60, 120	34/44, 60, 75, 150$V_{AC/DC}$	/	1.2, 2.5, 2.5, 4	3, 6, 6, 10	Modular 1TE
/	75/100$V_{AC/DC}$	/	20	40	Modular 1TE
/	75/100$V_{AC/DC}$	/	20	40	Compact 1TE

QUICK PRODUCT SELECTION

Surge Protective Devices for Data/Signal Systems

Product Group	Description	Product Name	Page	Product Photo	Connection/Signal
Data Protocol	• 4-wire (2 lines) Data SPD designed for RS-485 • Coarse and Fine Protection	**VM-RS**	48		- RS 422 - V.11 - RS 485
	• D-SUB, 9-pole SPD • All Pins Protected	**IM-DB 9**	50		- RS 232
	• D-SUB, 15-pole SPD • Coarse and Fine Protection	**IM-DB 15RS**	51		- RS 422 - V.11 - X.21
Local Area Networks	• LAN Protector (1 way) • All 4 Pairs Protected • Freq. < 100MHz, Cat. 5 Capable • Termination: RJ45, **Cat 5** Connectors	**LZ-NET** **LZ-NET PoE** **LZ-NET STP**	52		- LAN (up to Cat. 5)
	• LAN Protector (1 way) • All 4 Pairs Protected • Freq. < 250MHz, **Cat 6** Capable • Termination: RJ45, Shielded	**LZ-NET 6**	53		- LAN (up to Cat. 6)
	• LAN Protector • 19″ Rack Patch Panel up to 24 way • All 4 Pairs Protected • Freq. < 100MHz, Cat. 5 Capable • Termination: RJ45, **Cat 5** Connectors	**LZ-24NET 19** **LZ-24NET 19 PoE**	54		- LAN (up to Cat. 5)
	• Combined POWER/LAN Protector • All 4 Pairs in the UTB Protected • Freq. < 100MHz, Cat. 5 Capable • Termination: RJ45, **Cat 5** Connectors	**ZE 200 NET**	55		- LAN (up to Cat. 5)
Combined Plug-in Surge Protection	• Combined POWER/LAN Protector • All 4 Pairs in the UTB Protected • Freq. < 100MHz, Cat. 5 Capable • Termination: RJ45, Cat. 5 Connectors • Compact, Ergonomic Packaging	**ZES-76 TEL-TV**	56		- TV, telephone line
	• Combined POWER/DATA Protector • Coax Protected • Tel. Protected • Termination: RJ11, IEC Connector • Compact, Ergonomic Packaging	**ZES-7 TEL-TV**	57		- TV, telephone line
	• Combined POWER/DATA Protector • Coax Protected • Tel. Protected • Termination: RJ11, IEC Connector • Master-slave Function	**ZES 1M+5S**	58		- TV, telephone line
	• Combined POWER/DATA Protector • Coax Protected • Tel. Protected • Termination: RJ11, IEC Connector • Master-slave Function (USB, Hub)	**ZES 1M+4S** **TEL-NET USB Hub**	59		- TV, telephone line - LAN (up to Cat. 5)
	• POWER Protector • Uoc = 3kV • Compact, Ergonomic Packaging	**ZES 6**	60		

TECHNICAL CHARACTERISTICS

U_n (V_{DC})	U_c (V_{DC})	I_L at 25°C (A)	I_n (8/20) (kA)	I_{max} (8/20) (kA)	Housing IP 20 Dimensions DIN 43880
5	**6**	**0.5**	**20**	/	**Compact 2TE**
12	**15**	/	**0.1** (line-line)	**0.2** (line-line)	**Compact**
5	**6**	**0,5**	**20**	/	**Compact**
5 **48** **5**	**6** **58** **6**	/	**0.3** (line-line; line-PG) **0.06** (line-line; line-PG) **0.3** (line-line; line-PG)	/	**Compact**
48	**48**	**1**	**0.15** (line-line) **10** (lines-PG)	/	**Compact 19mm**
5 **48**	**6** **58**	/	**0.3** (line-line; line-PG) **0.06** (line-line; line-PG)	/	**Compact** /
5 230V / 50Hz	**6** 275V / 50Hz	/	**0.3** (line-line; line-PG) 3kA (L(N) - PE, L-N) 10kA (L+N-PE)	/	**Compact** /
110 (Tel.); **50** (Coax.) 230V / 50Hz	**170** (Tel.); **70** (Coax.) 275V / 50Hz	/	**2.5** (Tel.); **5** (Coax)	/	**Compact** /
110 (Tel.); **50** (Coax.) 230V / 50Hz	**170** (Tel.); **70** (Coax.) 275V / 50Hz	/	**2.5** (Tel.); **5** (Coax.)	/	**Compact** /
110 (Tel.); **50** (Coax.) 230V / 50Hz	**170** (Tel.); **70** (Coax.) 275V / 50Hz	/	**2.5** (Tel.); **5** (Coax.)	/	**Compact** /
110 230V / 50Hz	**170** 275V / 50Hz	/	**2.5**	/	**Compact** /
230V / 50Hz	275V / 50Hz	/	/	/	**Compact** /

QUICK PRODUCT SELECTION

Surge Protective Devices for Data/Signal Systems

Product Group	Description	Product Name	Page	Product Photo	Connection/Signal
Coaxial/RF	• Coaxial BNC Protector • For CCTV and Arcnet • Coarse and Fine Protection • Indirect Shield Earthing	**ZV-BNC**	61		- Arcnet
	• Coaxial Protector • For TV and Cable TV • Direct Shield Earthing	**ZV-1** **ZV1-F**	62		- TV - Cable TV
	• Coaxial Protector • For RF Anntena System • Freq.: DC to 2.4GHz • GDT	**CCP-BNC**	63		- Analog video
	• Coaxial Protector • For Base Station RF Antenna System • Freq.: DC to 2.5GHz • GDT	**CCP-7/16**	64		- GSM - GPS - Radio systems
	• Coaxial Protector • For RF Antenna System • Freq.: DC to 2.4GHz • GDT	**CCP-N**	65		- GSM - GPS - Radio systems
	• Coaxial Protector • For RF Antenna System • Freq.: DC to **6.0GHz** • GDT	**CCP-N-6G**	66		- GSM - GPS - Radio systems
	• Coaxial Protector • For RF Antenna System • Freq.: DC to 600MHz • GDT	**CCP-UHF**	67		- Radio systems
	• Coaxial Protector • For RF Antenna System (USA CCTV and CATV System) • Freq.: DC to 2.0GHz • GDT	**CCP-F**	68		- Cable TV
	• Coaxial Protector • For RF Antenna System (EU CCTV and CATV System) • Freq.: DC to 2.0GHz • GDT	**CCP-TV**	69		- TV
	• Coaxial Protector • For RF Antenna System • Freq.: DC to 865-965MHz, 1700-1950MHz	**CCP-L/4-7/16**	70		- GSM
	• Coaxial Protector • For RF Antenna System • Freq.: DC to 865-965MHz, 1700-1950MHz	**CCP-L/4-N**	71		- GSM

TECHNICAL CHARACTERISTICS

U_n (V_{DC})	U_c (V_{DC})	I_L at 25°C (A)	I_n (8/20) (kA)	I_{max} (8/20) (kA)	Termination
5, 12	6, 14	0.1	10	/	BNC - Type M-F and F-F
48 48	66 60	0.1 0.1	5 5	/ /	IEC F
/	70, 180, 280	/	10	20	BNC - Type M-F and F-F
/	70, 180, 280	/	10	20	7/16 - Type M-F
/	70, 180, 280	/	10	20	N - Type M-F and F-F
/	180	/	10	20	N - Type M-F and F-F
/	70, 180, 280	/	10	20	UHF - Type M-F and F-F
/	70, 180	/	10	20	F - Type M-F and F-F
/	70, 180	/	10	20	TV - Type M-F and F-F
/	0	/	15	30	L/4-7/16 - Type M-F and F-F
/	0	/	15	30	L/4-N - Type M-F and F-F

QUICK PRODUCT SELECTION

Surge Protective Devices for Data/Signal Systems

Product Group	Description	Product Name	Page	Product Photo	Connection/Signal
Ex	• Single-pair SPD • For Hazardous Areas (Ex) • Coarse and Fine Protection • Insulation Resistance to Earth Ⓔx II 1 G EEx ia IIC T4 Baseefa 04 ATEX 0209X	**IM-15Ex** **IM-30Ex**	72		- Hazardous Areas Ⓔx
Line Fitting	• Single-pair SPD • For 3/4" Pipe Installations • Coarse and Fine Protection • tA < 1ns	**PLP**	73		- 20mA current loop
Terminal Connection	• OEM PCB module • Single-pair SPD • Coarse Protection Only • PCB Hybrid • Flying Leads or Screw Terminals	**IM-GD**	74		- Analogue tel. line - xDSL (VDSL class 1 only) - EIB
PCB Mounting	• OEM PCB module • Single-pair SPD • Coarse and Fine Protection • PCB Hybrid • PCB Pins	**IM-NF**	75		- RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100 - TTL

TECHNICAL CHARACTERISTICS

U_n (V_{DC})	U_c (V_{DC})	I_L at 25°C (A)	I_n (8/20) (kA)	I_{max} (8/20) (kA)	Housing dim. Degree of protection
15 30	18 33	0.5 0.5	10 10	20 20	1TE IP20
24	28	0.145	10 10	20 20	IP 55
110	120	6	5	10	IP20
5, 15, 24	6, 18, 28	0.145	5	10	IP20

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Available voltages:	**5, 12, 15, 24, 30, 48, 60V_{DC}, 110V_{AC}**
Frequency range:	**30Mhz**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**1A**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminals:	**Multi-strand to 4 mm²**

The SMH-SH series of low voltage protective devices has been developed to protect against the effects of induced voltages onto data, signal and communication circuits.

The circuit topology consists of a multi-stage protector providing both common (longitudinal) mode and differential (transverse) mode protection.

Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon avalanche diodes or metal oxide varistor stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

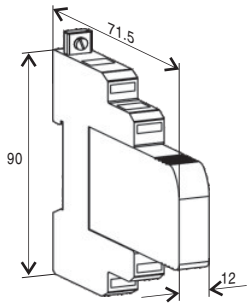
Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault. Both common (longitudinal) mode and differential (transverse) mode protection is provided.

If the module is unplugged out of the base, the connection lines remain enabled.

Technical characteristics

Type		SMH-SH 5V	12V	15V	24V	30V	48V	60V	110 V
Protection construction		two parts: base + replaceable plug-in module							
Number of protected pairs		1 (2 conductors)							
Nominal operating voltage	U_n	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	U_c	6V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(SH-PG)	184 - 276V	184 - 276V	184 - 276V	184 - 276V	184 - 276V	184 - 276V	184 - 276V	184 - 276V
	(a-b), (a, b-PG)	7 - 10V	16 - 21V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Rated operating current at 25°C	I_L	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)	(line-line)	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Response time of overvoltage protection	t_A (a, b), (a, b-PG)	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 25ns
Response time of overvoltage protection	t_A (SH-PG)	100ns	100ns	100ns	100ns	100ns	100ns	100ns	100ns
Insulation resistance of the protection	(a-b), (a, b-PG)	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
	(SH-PG)	> 1GΩ / 100V							
Serial resistance	R	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω
Transverse capacitance	C (a, b), (a, b-PG)	50pF	50pF	50pF	50pF	50pF	50pF	50pF	50pF
	(SH-PG)	5pF	5pF	5pF	5pF	5pF	5pF	5pF	5pF
Limit frequency	f_G	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz
Terminal cross section		Multi-strand to 4 mm²							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; gray, extinguishing degree V-O							
Dimensions DIN 43880		2/3TE							
Mounting EN 60715		On a 35mm DIN rail							
Ordering code	Base + Replaceable plug-in module	**708 201**	**708 202**	**708 203**	**708 204**	**708 205**	**708 206**	**708 207**	**708 208**
	Replaceable plug-in module	**708 211**	**708 212**	**708 213**	**708 214**	**708 215**	**708 216**	**708 217**	**708 218**

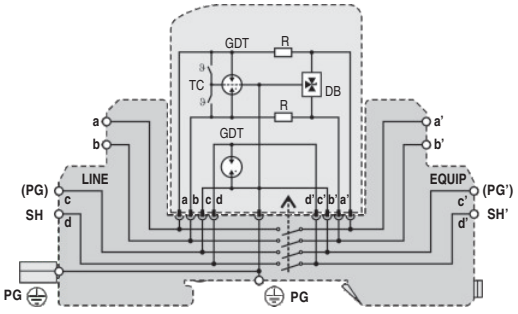
Dimensional drawing



Connection diagram

Legend:

TC	*thermo-clip*
GDT	*gas discharge tube*
R	*resistor*
DB	*diode block*
PG	*protective grounding*



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module 12 mm**
Available voltages:	**5, 12, 15, 24, 30, 48, 60, 110V_{DC}**
Freq:	**30MHz**
Surge Discharge Ratings:	**I_n:10kA 8/20µs, I_{max}: 20kA 8/20µs**
Load current:	**1A**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminal:	**Multi-strand to 4mm^2**

The SMH-RC series provides the same level of protection and technical performance as the SMH-TC series, but also provides the feature of an additional set of voltage free contacts which can be used for remote signalization and monitoring of the device's status. If the unit fails, the contacts change state.

These barriers provide both coarse and fine protection stages and offer longitudinal and transverse protection.

The initial protection stage comprises a three-pole gas discharge tube and is designed to divert the primary surge energy. The subsequent fine protection stage is implemented using fast bi-directional silicon avalanche diodes. Special design techniques have been employed in the design of the fine protection stage to avoid capacitive line loading and thereby ensure a low insertion loss and wide operating frequency range.

Series line impedance are used to ensure energy co-ordination between the coarse and fine protection stages irrespective of the magnitude of the incident surge. To protect against the hazards of electric shock and fire, which may result when power frequency contact occurs between power and communication lines (often called mains incursion), a thermo-clip is included in the primary protection stage to divert the power frequency current to ground.

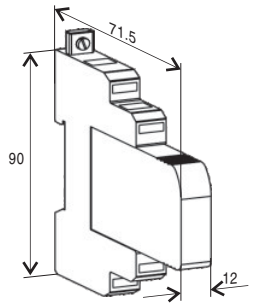
The plug-in module/base design facilitates replacement of a failed module without the need to remove system wiring.

If the module is unplugged from the base, the through-connection is maintained, allowing continued operations while a replacement module is ordered.

Technical characteristics

Type		SMH-RC							
		5V	**12V**	**15V**	**24V**	**30V**	**48V**	**60V**	**110 V**
Protection construction		Two parts: base and extractable insert							
Number of protected pairs		1 (2 conductors)							
Nominal operating voltage	U_n	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	U_c	6V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(a/b-PG)	7 - 10V	16 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
	(a-b)	7 - 10V	16 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
Rated operating current at 25°C	I_L	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5kA (8/20µs)		< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Response time	t_A	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns
Thermal protection		Thermo-clip							
Insulation resistance of the protection		≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance	R	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω
Transverse capacitance	C	50pF	50pF	50pF	50pF	50pF	50pF	50pF	50pF
Limit frequency	f_G	30MHz	30MHz	30MHz	30MHz	30MHz	30MHz	30MHz	30Mhz
Terminal cross section		Multi-strand to 4 mm^2							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; gray, extinguishing degree V-O							
Dimensions DIN 43880		12mm							
Mounting EN 60715		On a 35mm DIN rail							
Ordering code Base + Replaceable plug-in module		**708 221**	**708 222**	**708 223**	**708 224**	**708 225**	**708 226**	**708 227**	**708 228**
Replaceable plug-in module		**708 231**	**708 232**	**708 233**	**708 234**	**708 235**	**708 236**	**708 237**	**708 238**

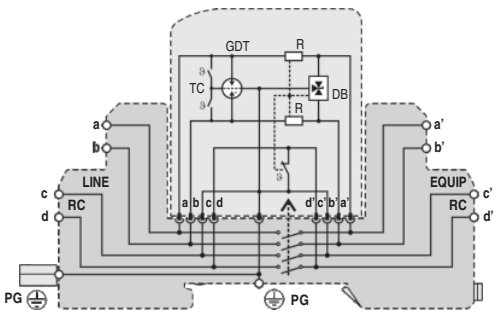
Dimensional drawings



Connection diagram

Legend:

TC	*thermo-clip*
GDT	*gas discharge tube*
R	*resistor*
DB	*diode block*
RC	*remote control (NC)*
PG	*protective grounding*



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module 12 mm**
Available voltages:	**5, 12, 15, 24, 30, 48, 60, 110V_{DC}**
Freq:	**30MHz**
Surge Discharge Ratings:	**I_n:20kA 8/20µs; I_{max}: 30kA 8/20µs; I_{imp}: 10kA 10/350µs**
Load current:	**1A**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminal:	**Multi-strand to 4mm^2**

The SMI2 series provides the same electrical performance as the SMH2-TC series but with a greater surge withstand level or Iimp 10kA, (2,5 kA per line). It is intended for operation in electrical environments where higher exposure to the effects of direct or partially direct lightning currents may be experienced. These include wind turbines and PV installations where lightning exposures are more severe, but where protection of sensitive electronics, such as environmental sensors, is just as crucial. These barriers provide both coarse and fine protection stages and offer longitudinal and transverse protection.

The initial protection stage comprises a three-pole gas discharge tube and is designed to divert the primary surge energy. The subsequent fine protection stage is implemented using fast bi-directional silicon avalanche diodes. Special design techniques have been employed in the design of the fine protection stage to avoid capacitive line loading and thereby ensure a low insertion loss and wide operating frequency range. Series line impedance are used to ensure energy co-ordination between the coarse and fine protection stages irrespective of the magnitude of the incident surge. To protect against the hazards of electric shock and fire, which may result when power frequency contact occurs between power and communication lines (often called mains incursion), a thermo-clip is included in the primary protection stage to divert the power frequency current to ground.

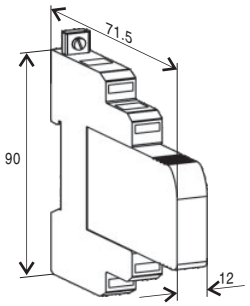
The plug-in module/base design facilitates replacement of a failed module without the need to remove system wiring.

If the module is unplugged from the base, the through-connection is maintained, allowing continued operations while a replacement module is ordered.

Technical characteristics

Type		SMI2 5V	12V	15V	24V	30V	48V	60V	110V
Protection construction		Two parts: base and extractable insert							
Number of protected pairs		2 (4 conductors)							
Nominal operating voltage	U_n	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	U_c	6V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(a/b-PG)	7 - 10V	16 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
	(a-b)	7 - 10V	16 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
Rated operating current at 25°C	I_L	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	I_n	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Max. discharge current (8/20µs)	I_{max}	30kA	30kA	30kA	30kA	30kA	30kA	30kA	30kA
Lightning impulse current (10/350µs)	I_{imp}	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Residual voltage at 5 kA (8/20µs)		< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Response time	t_A	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns
Thermal protection		Thermo-clip							
Insulation resistance of the protection		≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance	R	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω
Transverse capacitance	C	50pF	50pF	50pF	50pF	50pF	50pF	50pF	50pF
Limit frequency	f_G	30MHz	30MHz	30MHz	30MHz	30MHz	30MHz	30MHz	30Mhz
Terminal cross section		Multi-strand to 4 mm^2							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; gray, extinguishing degree V-O							
Dimensions DIN 43880		12mm							
Mounting EN 60715		on a 35mm DIN rail							
Ordering code	Base + Replaceable plug-in module	**708 301**	**708 302**	**708 303**	**708 304**	**708 305**	**708 306**	**708 307**	**708 308**
	Replaceable plug-in module	**708 311**	**708 312**	**708 313**	**708 314**	**708 315**	**708 316**	**708 317**	**708 318**

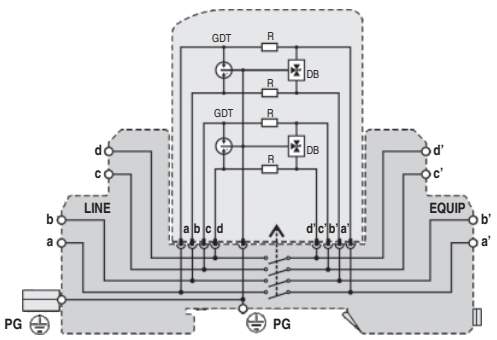
Dimensional drawings



Connection diagram

Legend:

GDT	*gas discharge tube*
R	*resistor*
DB	*diode block*
PG	*protective grounding*



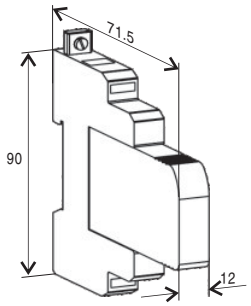
IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module 12 mm**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Available voltages:	**5, 12, 15, 24, 30, 48, 60, 110V_{DC}**
Freq:	**30MHz**
Surge Discharge Ratings:	**I_n:10kA 8/20µs, I_{max}: 20kA 8/20µs**
Load current:	**1A**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminal:	**Multi-strand to 4mm^2**

These efficient overvoltage barriers contain both coarse and fine protection stages and provide longitudinal and a transverse surge protection.
The initial protection stage comprises a three-pole gas discharge tube and is designed to divert the primary surge energy. The subsequent fine protection stage is carried out using fast bi-directional silicon avalanche diodes. Care is taken in the design of this fine protection stage to avoid capacitive line loading and thereby ensuring a low insertion loss and wide operating frequency range.
Series line impedances ensure energy co-ordination between the coarse and a fine protection stages at all levels of the insident surge. To protect against the hazards of electric shock and fire which often results when power frequency contact occurrs between power and communication lines (often called mains incursion), a thermo-clip is included on the primary protection stage to divert the power frequency current to ground.
The plug-in module/base design facilitates replacement of a failed module without the need to remove system wiring.
If the module is unplugged out of the base, the connection lines remain enabled.

Technical characteristics

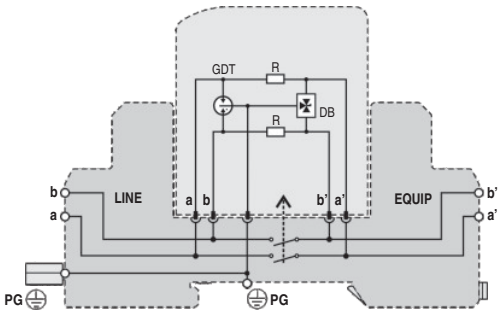
Type		SMH-TC							
		5V	**12V**	**15V**	**24V**	**30V**	**48V**	**60V**	**110 V**
Protection construction		Two parts: base and extractable insert							
Number of protected pairs		1 (2 conductors)							
Nominal operating voltage	U_n	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	U_c	6V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(a/b-PG)	8 - 10V	17 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
	(a-b)	8 - 10V	17 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
Rated operating current at 25°C	I_L	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5kA (8/20µs)		< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Response time	t_A	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns
Thermal protection		Thermo-clip							
Insulation resistance of the protection		≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance	R	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω
Transverse capacitance	C	50pF	50pF	50pF	50pF	50pF	50pF	50pF	50pF
Limit frequency	f_G	30MHz	30MHz	30MHz	30MHz	30MHz	30MHz	30MHz	30Mhz
Terminal cross section		Multi-strand to 4 mm^2							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; gray, extinguishing degree V-O							
Dimensions DIN 43880		12mm							
Mounting EN 60715		on a 35mm DIN rail							
Ordering code Base + Replaceable plug-in module		**708 062**	**708 063**	**708 064**	**708 065**	**708 066**	**708 067**	**708 068**	**708 061**
Replaceable plug-in module		**708 052**	**708 053**	**708 054**	**708 055**	**708 056**	**708 057**	**708 058**	**708 051**

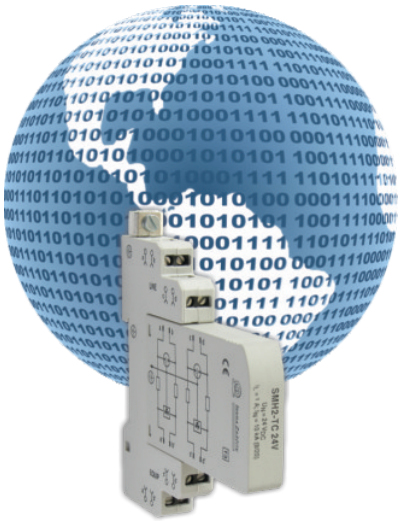
Dimensional drawings



Connection diagram

Legend:	
GDT	*gas discharge tube*
R	*resistor*
DB	*diode block*
PG	*protective grounding*





IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module 12 mm**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Available voltages:	**5, 12, 15, 24, 30, 48, 60, 110V_{DC}**
Freq:	**30MHz**
Surge Discharge Ratings:	**I_n:10kA 8/20µs, I_{max}: 20kA 8/20µs**
Load current:	**1A**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminal:	**Multi-strand to 4mm^2**

Like the SMH-TC series, the SMH2-TC provides the same level of protection to two independent circuits (pairs). A number of protection voltages are available to ensure the user is able to select the closest clamping voltage to the normal signal operation of the equipment being protected.

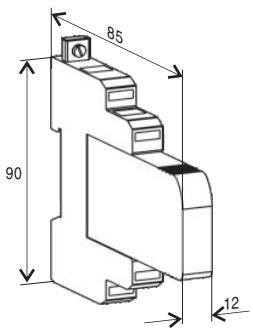
The plug-in module/base design facilitates replacement of a failed module without the need to remove system wiring.

If the module is unplugged out of the base, the connection lines remain enabled.

Technical characteristics

Type		SMH2-TC 5V	12V	15V	24V	30V	48V	60V	110 V
Protection construction		Two parts: base and extractable insert							
Number of protected pairs		2 (4 conductors)							
Nominal operating voltage	U_n	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	U_c	6V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(a/b-PG)	8 - 10V	17 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
	(a-b)	8 - 10V	17 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
Rated operating current at 25°C	I_L	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)		< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Response time	t_A	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns
Thermal protection		Thermo-clip							
Insulation resistance of the protection		≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance	R	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω	1.6-2.0Ω
Transverse capacitance	C	50pF	50pF	50pF	50pF	50pF	50pF	50pF	50pF
Limit frequency	f_G	30MHz	30MHz	30MHz	30MHz	30MHz	30MHz	30MHz	30Mhz
Terminal cross section		Multi-strand to 4 mm^2							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; gray, extinguishing degree V-O							
Dimensions DIN 43880		12mm							
Mounting EN 60715		on a 35mm DIN rail							
Ordering code Base + Replaceable plug-in module		**708 012**	**708 013**	**708 014**	**708 015**	**708 016**	**708 017**	**708 018**	**708 011**
Replaceable plug-in module		**708 002**	**708 003**	**708 004**	**708 005**	**708 006**	**708 007**	**708 008**	**708 001**

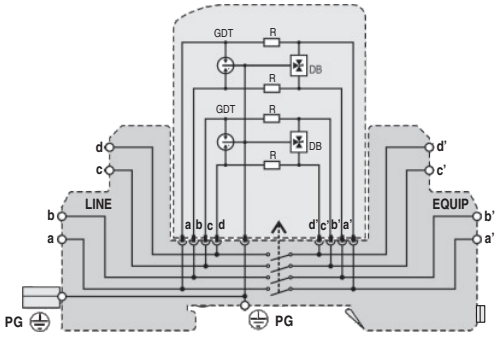
Dimensional drawings

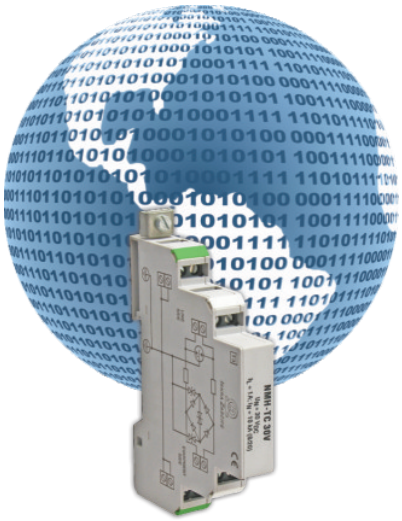


Connection diagram

Legend:

GDT	*gas discharge tube*
R	*resistor*
DB	*diode block*
PG	*protective grounding*





IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Compact housing 12 mm**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Available voltages:	**5, 12, 15, 24, 30, 48, 60, 110V_{DC}**
Freq:	**10 - 35 MHz (see specification sheet)**
Surge Discharge Ratings:	**I_n:10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**1A**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminals:	**Multi-strand to 4mm^2**

These efficient overvoltage barriers contain both coarse and fine protection stages and provide longitudinal and a transverse surge protection.

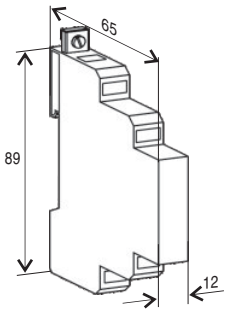
The initial protection stage comprises a three-pole gas discharge tube and is designed to divert the primary surge energy. The subsequent fine protection stage is carried out using multiple metal-oxide varistors or with fast bi-directional silicon avalanche diodes. Care is taken in the design of this fine protection stage to avoid capacitive line loading and thereby ensuring a low insertion loss and wide operating frequency range.

Care is taken to ensure energy co-ordination between the coarse and a fine protection stages at all levels of the insident surge. To protect against the hazards of electric shock and fire which often results when power frequency contact occurrs between power and communication lines (often called mains incursion), a thermo-clip is included on the primary protection stage to divert the power frequency current to ground.

Technical characteristics

Type		NMH-TC							
		5V	**12V**	**15V**	**24V**	**30V**	**48V**	**60V**	**110 V**
Protection construction		Protective module							
Number of protected pairs		1 (2 conductors)							
Nominal operating voltage	U_n	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	U_C	6V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(a/b-PG)	7 - 10V	16 - 21V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
	(a-b)	7 - 10V	16 - 21V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Rated operating current at 25°C	I_L	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)		< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Response time of overvoltage protection	t_A	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 25ns
Thermal protection		Thermo-clip							
Insulation resistance of the protection		≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance	R	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω
Transverse capacitance	C	30pF	30pF	30pF	30pF	30pF	30pF	30pF	150pF
Limit frequency	f_G	35MHz	35MHz	35MHz	35MHz	35MHz	35MHz	35MHz	10Mhz
Terminal cross section		Multi-strand to 4 mm^2							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; gray, extinguishing degree V-O							
Dimensions DIN 43880		12mm							
Mounting EN 60715		on a 35mm DIN rail							
Ordering code		**707 002**	**707 003**	**707 004**	**707 005**	**707 006**	**707 007**	**707 008**	**707 001**

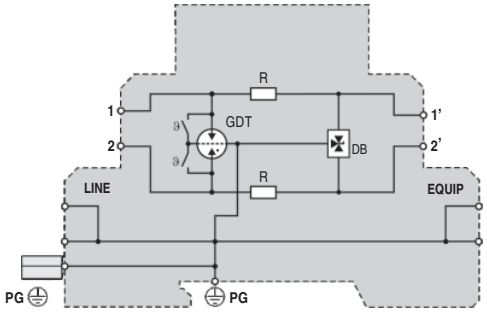
Dimensional drawings

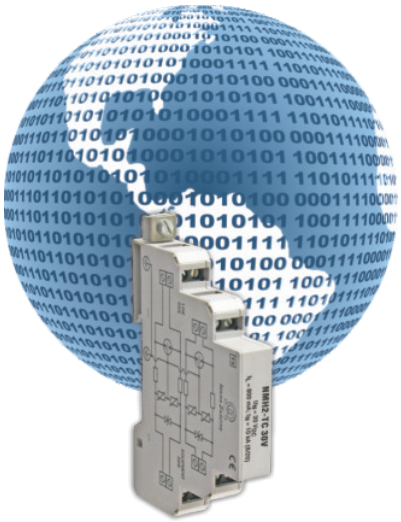


Connection diagram

Legend:

TC	*thermo-clip*
GDT	*gas discharge tube*
R	*resistor*
D	*diode*
DB	*diode block*
PG	*protective grounding*





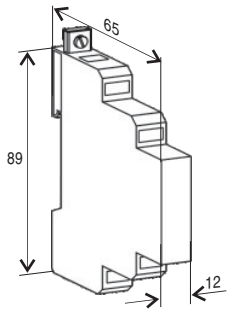
IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Compact housing 12 mm**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Available voltages:	**5, 12, 15, 24, 30, 48, 60, 110V_{DC}**
Freq:	**3-5 MHz (see specification sheet)**
Surge Discharge Ratings:	**I_n:10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**0.8A**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminals:	**Multi-strand to 4mm^2**

Like the NMH-TC series, the NMH2-TC provides the same level of protection but in a compact enclosure which can provide protection to two independent circuits (pairs). A number of protection voltages are available to ensure the user is able to select the closest clamping voltage to the normal signal operation of the equipment being protected.

Technical characteristics

Type		NMH2-TC							
		5V	**12V**	**15V**	**24V**	**30V**	**48V**	**60V**	**110 V**
Protection construction		Protective module							
Number of protected pairs		2 (4 conductors)							
Nominal operating voltage	**U_n**	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	**U_c**	6V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(a/b-PG)	7 - 10V	16 - 21V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
	(a-b)	7 - 10V	16 - 21V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Rated operating current at 25°C	**I_L**	0.8A	0.8A	0.8A	0.8A	0.8A	0.8A	0.8A	0.8A
Nominal discharge current (8/20µs)	**I_n**	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	**I_{max}**	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)	(line-line)	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Response time of overvoltage protection	**t_A**	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns
Thermal protection		Thermo-clip							
Insulation resistance of the protection		≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance	**R**	< 0.5Ω	< 0.5Ω	< 0.5Ω	< 0.5Ω	< 0.5Ω	< 0.5Ω	< 0.5Ω	< 0.5Ω
Transverse capacitance	**C**	500pF	500pF	500pF	500pF	500pF	500pF	500pF	250pF
Limit frequency	**f_G**	3MHz	3MHz	3MHz	3MHz	3MHz	3MHz	3MHz	5Mhz
Terminal cross section		Multi-strand to 4 mm^2							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; gray, extinguishing degree V-O							
Dimensions DIN 43880		12mm							
Mounting EN 60715		On a 35mm DIN rail							
Ordering code		**707 202**	**707 203**	**707 204**	**707 205**	**707 206**	**707 207**	**707 208**	**707 201**

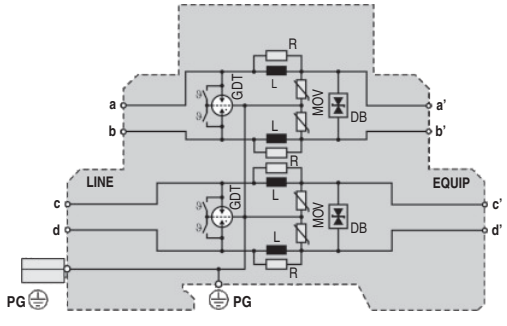
Dimensional drawings

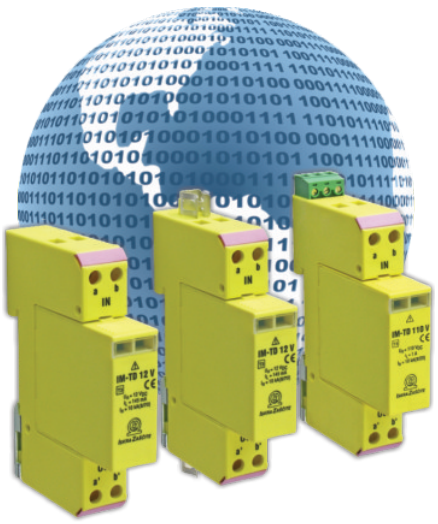


Connection diagram

Legend:

GDT	*gas discharge tube*
R	*resistor*
DB	*diode block*
L	*coil*
PG	*protective grounding*





IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Available voltages:	**5, 12, 15, 24, 30, 48, 60, 110V_{DC}**
Freq:	**0.6 -10 MHz (see specification sheet)**
Surge Discharge Ratings:	**I_n:10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**145 mA (1A for 110V version)**
Safety:	**Internal thermal runaway disconnector**
Indication:	**2 x end-of-life status flag**
Enclosure:	**DIN 43880 1TE, DIN rail mount**
Terminals:	**Multi-strand to 6mm²**

The IM-TD series of low voltage protective devices has been developed to protect against the effects of induced voltages onto data, signal and communication circuits.

It consists of a multi-stage protector providing both common (longitudinal) mode and differential (transverse) mode protection.

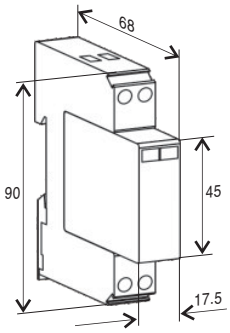
Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon avalanche diodes or metal oxide varistor stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

Over current protection is provided by a PTC element, which provides a level of protection against short circuit or mains incursion. Internal thermal disconnectors are also employed to reduce the hazards of thermal runaway during fault conditions.

Technical characteristics

Type		IM-TD							
		5V	**12V**	**15V**	**24V**	**30V**	**48V**	**60V**	**110V**
Protection construction		Two parts: base and extractable insert							
Number of protected pairs		1 (2 conductors)							
Nominal operating voltage	U_n	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	U_C	6V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(a/b-PG)	6 .5- 9V	16 - 20V	20 - 24V	30 - 36V	35- 43V	55 - 68V	67 - 85V	184 - 264V
	(a-b)	6.5 - 9V	16 - 20V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Rated operating current at 25°C	I_L	145mA	145mA	145mA	145mA	145mA	145mA	145mA	1A
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)		< 20V	< 39V	< 45V	< 65V	< 77V	< 135V	< 150V	< 450V
Response time of overvoltage protection	t_A	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 25ns
Thermal protection		Thermal disconnection in lines a and b							
Overcurrent protection		**PTC resistors at I ≥ 0.3 A**							/
Insulation resistance of the protection		≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance	R	9-11Ω	9-11Ω	9-11Ω	9-11Ω	9-11Ω	9-11Ω	9-11Ω	ca 1Ω
Transverse capacitance	C	7nF	4.5nF	3.3nF	2.9nF	2.1nF	1.2nF	1nF	90pF
Limit frequency	f_G	0.6MHz	0.9MHz	1.1MHz	1.4MHz	1.8MHz	2.2MHz	3MHz	10Mhz
Terminal cross section		Multi-strand to 6 mm²							
Operating temperature		- 25°C ... + 50°C							- 40°C ... + 80°C
Degree of protection		IP 20							
Housing material		Thermoplastic; yellow, extinguishing degree V-O							
Dimensions DIN 43880		1TE							
Mounting EN 60715		on a 35mm DIN rail							
Ordering code									
Base + Replaceable plug-in module		**700 010**	**700 016**	**700 022**	**700 028**	**700 034**	**700 040**	**700 046**	**700 003**
Base S-GDT + Replaceable plug-in module		**700 011**	**700 017**	**700 023**	**700 029**	**700 035**	**700 041**	**700 047**	**700 004**
Base RC + Replaceable plug-in module		**700 012**	**700 018**	**700 024**	**700 030**	**700 036**	**700 042**	**700 048**	**700 005**
Base 2GND + Replaceable plug-in module		**700 013**	**700 019**	**700 025**	**700 031**	**700 037**	**700 043**	**700 049**	**700 006**
Replaceable plug-in module		**700 009**	**700 015**	**700 021**	**700 027**	**700 033**	**700 039**	**700 045**	**700 002**

Dimensional drawings



IM base | IM S-GDT base | IM RC base | IM 2GND base

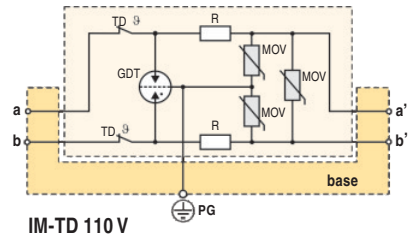
Connection diagram

Various options for the base unit exist including:

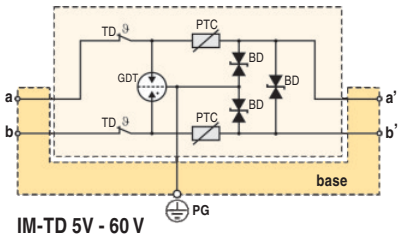
S-GDT base: where a coaxial shield is used and equipotential ground equalization is required.

RC base: Provides remote contacts to signify if an internal thermal disconnect has operated.

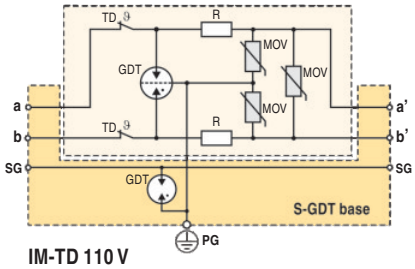
2 GND base: where a second ground terminal (in addition to the DIN rail ground strip) is provided for installations not utilizing DIN rail.



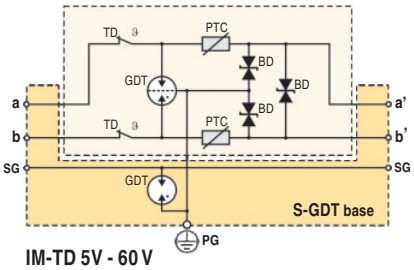
IM-TD 110 V



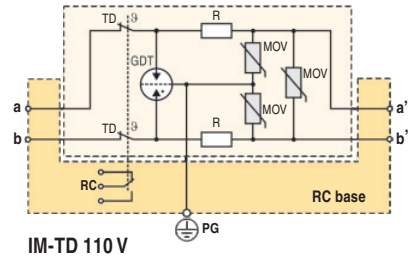
IM-TD 5V - 60 V



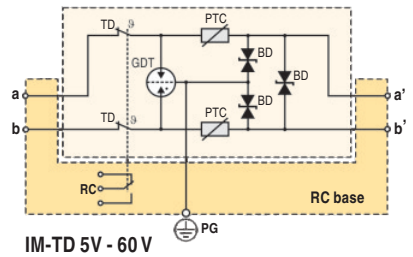
IM-TD 110 V



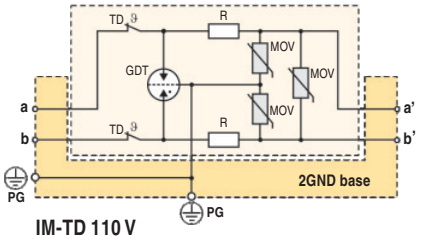
IM-TD 5V - 60 V



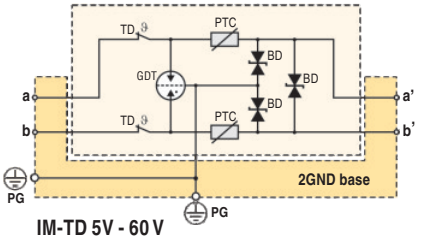
IM-TD 110 V



IM-TD 5V - 60 V



IM-TD 110 V



IM-TD 5V - 60 V

Legend:

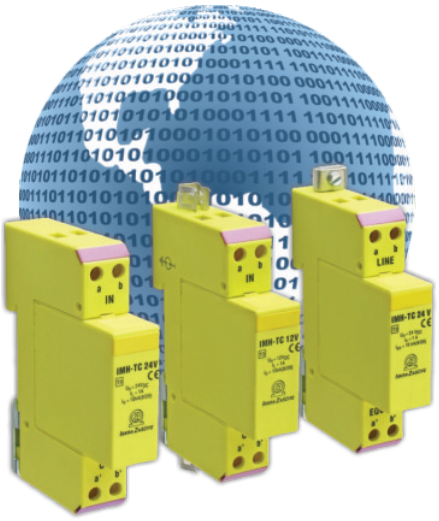
TD	*thermal decoupler*
GDT	*gas discharge tube*
MOV	*varistor*
PTC	*resistor with a positive temperature coeficient*
R	*resistor*
BD	*bi-directional TVS diode*
SG	*signal grounding*
PG	*protective grounding*

Accessory Part for IM-TD

Testing module IM TEST

A testing module IM TEST is intended for performing measurements on the IM bases.
A module enables performing of the measurements on both input and output sides.
It is equipped with five banana sockets with D = 2 mm. Red terminals are connected to the module's output, blue ones are connected to the module's input, whereas yellow one is connected to the grounding contact.

Type	**IMTest**
Ordering code	**127 145**



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Available voltages:	**5, 12, 15, 24, 30, 48, 60, 110V_{DC}**
Freq:	**35 MHz (see specification sheet)**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**1A**
Enclosure:	**DIN 43880 1TE, DIN rail mount**
Terminals:	**Multi-strand to 6 mm^2**

The IMH-TC series of low voltage protective devices has been developed to protect against the effects of induced voltages onto data, signal and communication circuits.

The circuit used is designed to minimize inter-capacitance, and shunt capacitance, thereby maximizing the operating frequency to 35 MHz in most cases.

The circuit topology consists of a multi-stage protector providing both common (longitudinal) mode and differential (transverse) mode protection.

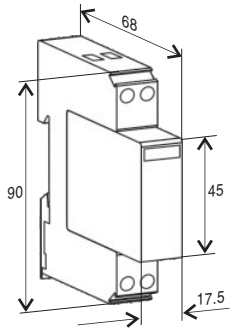
Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon avalanche diodes or metal oxide varistor stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault.

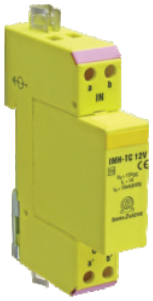
Technical characteristics

Type		IMH-TC							
		5V	**12V**	**15V**	**24V**	**30V**	**48V**	**60V**	**110 V**
Protection construction		Two parts: base and extractable insert							
Number of protected pairs		1 (2 conductors)							
Nominal operating voltage	U_n	$5V_{DC}$	$12V_{DC}$	$15V_{DC}$	$24V_{DC}$	$30V_{DC}$	$48V_{DC}$	$60V_{DC}$	$110V_{DC}$
Max. continuous operating voltage	U_c	$6V_{DC}$	$15V_{DC}$	$18V_{DC}$	$28V_{DC}$	$33V_{DC}$	$52V_{DC}$	$64V_{DC}$	$170V_{DC}$
Rated spark overvoltage	(a/b-PG)	7 - 10V	15 - 19V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
	(a-b)	7 - 10V	15 - 19V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Rated operating current at 25°C	I_L	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)		< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Response time of overvoltage protection	t_A	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 25ns
Thermal protection		Thermo clip							
Insulation resistance of the protection		≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance	R	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω
Transverse capacitance	C	30pF	30pF	30pF	30pF	30pF	30pF	30pF	150pF
Limit frequency	f_G	35MHz	35MHz	35MHz	35MHz	35MHz	35MHz	35MHz	10Mhz
Terminal cross section		Multi-strand to 6 mm^2							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; yellow, extinguishing degree V-O							
Dimensions DIN 43880		1TE							
Mounting EN 60715		On a 35mm DIN rail							
Ordering code									
Base + Replaceable plug-in module		**701 007**	**701 012**	**701 017**	**701 022**	**701 027**	**701 032**	**701 037**	**701 002**
Base S-GDT + Replaceable plug-in module		**701 008**	**701 013**	**701 018**	**701 023**	**701 028**	**701 033**	**701 038**	**701 003**
Base 2GND + Replaceable plug-in module		**701 009**	**701 014**	**701 019**	**701 024**	**701 029**	**701 034**	**701 039**	**701 004**
Replaceable plug-in module		**701 006**	**701 011**	**701 016**	**701 021**	**701 026**	**701 031**	**701 036**	**701 001**

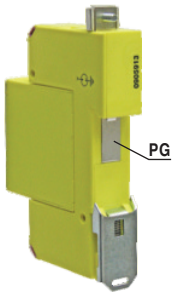
Dimensional drawings



IM base



IM S-GDT base



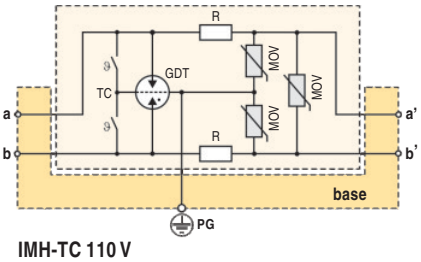
IM 2GND base

Connection diagram

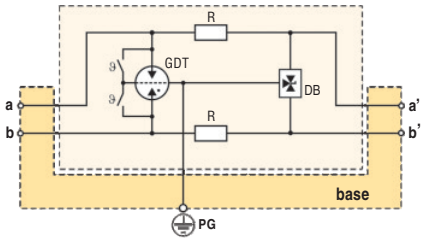
Various options for the base unit exist including:

S-GDT base: where a coaxial shield is used and equipotential ground equalization is required.

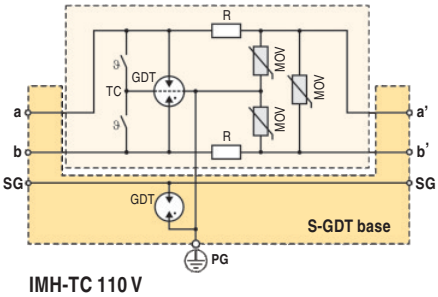
2 GND base: where a second ground terminal (in addition to the DIN rail ground strip) is provided for installations not utilizing DIN rail.



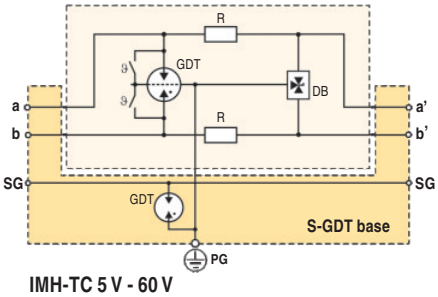
IMH-TC 110 V



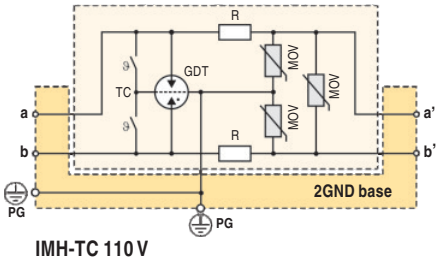
IMH-TC 5 V - 60 V



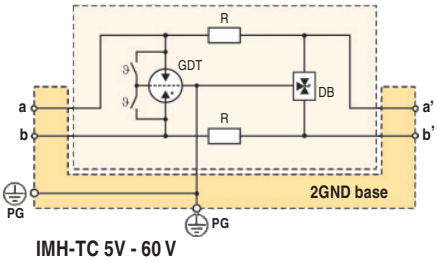
IMH-TC 110 V



IMH-TC 5 V - 60 V



IMH-TC 110 V



IMH-TC 5V - 60 V

Legend:

TD	*thermal decoupler*
GDT	*gas discharge tube*
MOV	*varistor*
R	*resistor*
D	*diode*
DB	*diode bloc*
SG	*signal grounding*
PG	*protective grounding*

Accessory Part for IMH-TC

Testing module IM TEST

A testing module IM TEST is intended for performing measurements on the IM bases.
A module enables performing of the measurements on both input and output sides.
It is equipped with five banana sockets with D = 2 mm. Red terminals are connected to the module's output, blue ones are connected to the module's input, whereas yellow one is connected to the grounding contact.

Type	**IMTest**
Ordering code	**127 145**

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Available voltages:	**5, 12, 15, 24, 30, 48, 60 V_{DC}, 110V_{AC}**
Freq:	**30 Mhz**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**1A**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminals:	**Multi-strand to 4 mm^2**

The SMH-SG series of low voltage protective devices has been developed to protect against the effects of induced voltages onto data, signal and communication circuits.

It is intended for those applications where high ground potential rises may frequently occur, such as in locations close to electric railways.

The circuit topology consists of a multi-stage protector providing both common (longitudinal) mode and differential (transverse) mode protection.

Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon avalanche diodes or metal oxide varistor stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

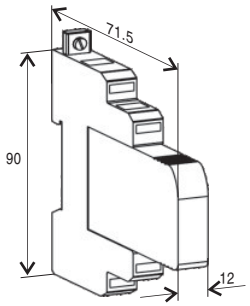
Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault. Both common (longitudinal) mode and differential (transverse) mode protection is provided.

If the module is unplugged out of the base, the connection lines remain enabled.

Technical characteristics

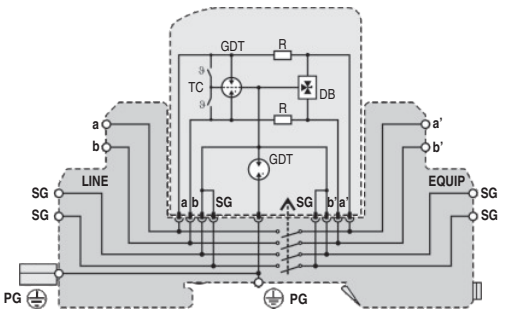
Type		SMH-SG 5V	12V	15V	24V	30V	48V	60V	110 V
Protection construction		Two parts: base + replaceable plug-in module							
Number of protected pairs		1 (2 conductors)							
Nominal operating voltage	U_n	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	U_c	6V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(SG-PG)	280 - 420V	280 - 420V	280 - 420V	280 - 420V	280 - 420V	280 - 420V	280 - 420V	280 - 420V
	(a-b), (a, b-SG)	7 - 10V	15 - 19V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Rated operating current at 25°C	I_L	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)	(line-line)	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Response time of overvoltage protection	t_A (a, b-SG)	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 25ns
Response time of overvoltage protection	t_A (SG-PG)	100ns	100ns	100ns	100ns	100ns	100ns	100ns	100ns
Insulation resistance of the protection	(a-b)	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
	(SG-PG)	> 1GΩ / 100V							
Serial resistance	R	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω
Transverse capacitance	C (a, b-SG)	50pF	50pF	50pF	50pF	50pF	50pF	50pF	50pF
	(SG-PG)	5pF	5pF	5pF	5pF	5pF	5pF	5pF	5pF
Limit frequency	f_G	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz
Terminal cross section		Multi-strand to 4 mm^2							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; gray, extinguishing degree V-O							
Dimensions DIN 43880		2/3TE							
Mounting EN 60715		On a 35mm DIN rail							
Ordering code	Base + Replaceable plug-in module	**708 142**	**708 143**	**708 144**	**708 145**	**708146**	**708 147**	**708 148**	**708 141**
	Replaceable plug-in module	**708 132**	**708 133**	**708 134**	**708 135**	**708 136**	**708 137**	**708 138**	**708 131**

Dimensional drawing



Connection diagram

Legend:	
TC	*thermo-clip*
GDT	*gas discharge tube*
R	*resistor*
BD	*bi-directional TVS diode*
SG	*signal grounding*
PG	*protective grounding*



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Available voltages:	**5, 12, 15, 24, 30, 48, 60 V_{DC}, 110V_{AC}**
Freq:	**0.6 - 3 MHz (see specification sheet)**
Surge Discharge Ratings:	**I_n: 10kA 8/20 µs, I_{max}: 20kA 8/20µs**
Series load current:	**1A**
Enclosure:	**DIN 43880 1TE, DIN rail mount**
Terminals:	**Multi-strand to 6 mm^2**

The VMS-TC series of low voltage protective devices has been developed to protect against the effects of induced voltages onto data, signal and communication circuits.

It is intended for those applications where high ground potential rises may frequently occur, such as in locations close to electric railways.

The circuit topology consists of a multi-stage protector providing both common (longitudinal) mode and differential (transverse) mode protection.

Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon avalanche diodes or metal oxide varistor stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

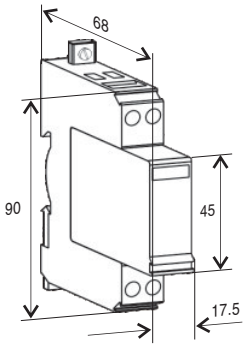
Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault.

Both common (longitudinal) mode and differential (transverse) mode protection is provided.

Technical characteristics

Type		VMS-TC							
		5V	**12V**	**15V**	**24V**	**30V**	**48V**	**60V**	**110 V**
Protection construction		Two parts: base + replaceable plug-in module							
Number of protected pairs		1 (2 conductors)							
Nominal operating voltage	**U_n**	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	**U_c**	7V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(a/b-PG)	280 - 500V	280 - 500V	280 - 500V	280 - 500V	280 - 500V	280 - 500V	280 - 500V	400 - 680V
	(a-b)	6.5 - 9V	6.5 - 9V	6.5 - 9V	6.5 - 9V	6.5 - 9V	6.5 - 9V	6.5 - 9V	16 - 20V
Rated operating current at 25°C	**I_L**	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	**I_n**	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	**I_{max}**	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)	(line-line)	< 20V	< 39V	< 45V	< 65V	< 77V	< 135V	< 150V	< 450V
Response time of overvoltage protection	**t_A** (a-b)	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 25ns
Response time of overvoltage protection	**t_A** (a/b-PG)	100ns	100ns	100ns	100ns	100ns	100ns	100ns	100ns
Insulation resistance of the protection	(a-b)	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
	(a/b-PG)	> 1GΩ / 100V							
Serial resistance	**R**	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω
Transverse capacitance	**C** (a-b)	5nF	3nF	2.2nF	1.9nF	1.4nF	0.82nF	0.7nF	90pF
	(a/b-PG)	8pF	8pF	8pF	8pF	8pF	8pF	8pF	8pF
Limit frequency	**f_G**	0.6MHz	0.9MHz	1.1MHz	1.4MHz	1.8MHz	2.2MHz	3.0MHz	10Mhz
Terminal cross section		Multi-strand to 6 mm^2							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; yellow, extinguishing degree V-O							
Dimensions DIN 43880		1TE							
Mounting EN 60715		on a 35mm DIN rail							
Ordering code	Base + Replaceable plug-in module	**702 005**	**702 008**	**702 011**	**702 014**	**702 017**	**702 020**	**702 023**	**702 002**
	Replaceable plug-in module	**702 004**	**702 007**	**702 010**	**702 013**	**702 016**	**702 019**	**702 022**	**702 001**

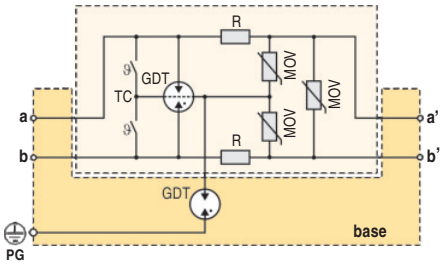
Dimensional drawings



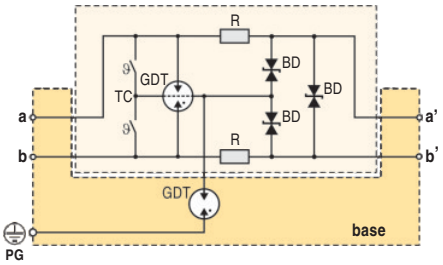
VM Base

Connection diagram

Legend:	
TC	*thermo-clip*
GDT	*gas discharge tube*
MOV	*varistor*
R	*resistor*
BD	*bi-directional TVS diode*
PG	*protective grounding*



VMS-TC 110 V



VMS-TC 5 V - 60 V

Accessory Part for VMS-TC

Testing module VM TEST

A testing module VM TEST is intended for performing measurements on the VM-TD, VMS-TC, VMO bases.
A module enables performing of the measurements on both input and output sides.
It is equipped with five banana sockets with D = 2 mm. Red terminals are connected to the module's output, blue ones are connected to the module's input, whereas yellow one is connected to the grounding contact.

Type	**VMTest**
Ordering code	**127 144**

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**2 x 2 terminal GDT,**
	1 x 3 terminal GDT
Available voltages:	**5, 12, 15, 24, 30, 48, 60 V_{DC}, 110V_{AC}**
Freq:	**0.6 - 3 MHz (see specification sheet)**
Surge Discharge Ratings:	**I_n: 20kA 8/20µs, I_{max}: 30kA 8/20µs**
Series load current:	**1A**
Enclosure:	**DIN 43880 1TE, DIN rail mount**
Terminals:	**Multi-strand to 6 mm^2**

The VMO series of low voltage protective devices has been developed to protect against the effects of induced voltages onto data, signal and communication circuits.

It is intended for those applications where higher than normal surge discharge levels may be experienced.

Coarse protection is provided by 2, two terminal gas discharge tubes. A second stage of protection is provided using a three terminal gas discharge tube which assists in common mode protection.

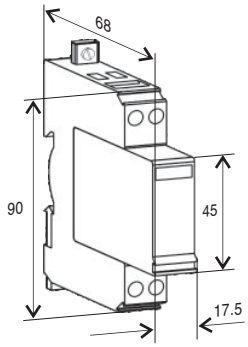
Fine protection is provided using a high speed silicon avalanche diodes or metal oxide varistor stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

Both common (longitudinal) mode and differential (transverse) mode protection is provided.

Technical characteristics

Type		VMO							
		5V	**12V**	**15V**	**24V**	**30V**	**48V**	**60V**	**110 V**
Protection construction		Two parts: base + replaceable plug-in module							
Number of protected pairs		1 (2 conductors)							
Nominal operating voltage	**U_n**	5V_{DC}	12V_{DC}	15V_{DC}	24V_{DC}	30V_{DC}	48V_{DC}	60V_{DC}	110V_{DC}
Max. continuous operating voltage	**U_c**	7V_{DC}	15V_{DC}	18V_{DC}	28V_{DC}	33V_{DC}	52V_{DC}	64V_{DC}	170V_{DC}
Rated spark overvoltage	(a/b-PG)	6.5 - 9V	16 - 20V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
	(a-b)	6.5 - 9V	16 - 20V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Rated operating current at 25°C	**I_L**	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	**I_n**	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Max. discharge current (8/20µs)	**I_{max}**	30kA	30kA	30kA	30kA	30kA	30kA	30kA	30kA
Lightning impulse current (10/350µs)	**I_{imp}**	5kA	5kA	5kA	5kA	5kA	5kA	5kA	5kA
Residual voltage at 5 kA (8/20µs)		< 20V	< 39V	< 45V	< 65V	< 77V	< 135V	< 150V	< 450V
Response time of overvoltage protection	**t_A**	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 25ns
Insulation resistance of the protection		≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance	**R**	ca 2Ω	ca 2Ω	ca 2Ω	ca 2Ω	ca 2Ω	ca 2Ω	ca 2Ω	ca 2Ω
Transverse capacitance	**C**	7nF	4.5nF	3.3nF	2.9nF	2.1nF	1.2nF	1.0nF	150pF
Limit frequency	**f_G**	0.6MHz	0.9MHz	1.1MHz	1.4MHz	1.8MHz	2.2MHz	3.0MHz	10Mhz
Terminal cross section		Multi-strand to 6 mm^2							
Operating temperature		- 40°C ... + 80°C							
Degree of protection		IP 20							
Housing material		Thermoplastic; yellow, extinguishing degree V-O							
Dimensions DIN 43880		1TE							
Mounting EN 60715		on a 35mm DIN rail							
Ordering code	Base + Replaceable plug-in module	**702 505**	**702 508**	**702 511**	**702 514**	**702 517**	**702 520**	**702 523**	**702 502**
	Replaceable plug-in module	**702 504**	**702 507**	**702 510**	**702 513**	**702 516**	**702 519**	**702 522**	**702 501**

Dimensional drawings

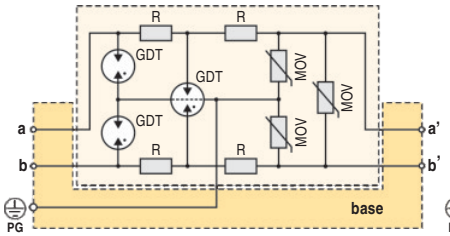


VM Base

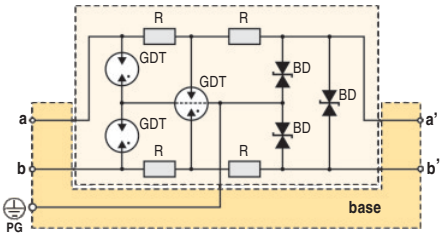
Connection diagram

Legend:

GDT	*gas discharge tube*
MOV	*varistor*
R	*resistor*
BD	*bi-directional TVS diode*
PG	*protective grounding*



VMO 110 V



VMO 5V - 60 V

Accessory Part for VMO

Testing module VM TEST

A testing module VM TEST is intended for performing measurements on the VM-TD, VMS-TC, VMO bases.
A module enables performing of the measurements on both input and output sides.
It is equipped with five banana sockets with D = 2 mm. Red terminals are connected to the module's output, blue ones are connected to the module's input, whereas yellow one is connected to the grounding contact.

Type	**VMTest**
Ordering code	**127 144**

SMH-TDR

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Number of protected pairs:	**1 (2 lines)**
Coarse Protection:	**3 terminal GDT**
Nom. Operating Voltage U_n:	**110V_{DC}**
Max. Operating Voltage U_c:	**170V_{DC}**
Series Resistance:	**9 - 11Ω**
Freq:	**< 16MHz**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**300mA**
Enclosure:	**DIN 43880 1TE, DIN rail mount**
Terminals:	**Multi-strand to 4 mm²**

The SMH-TDR has been developed as a generic protector for use on data transmission circuits.

Coarse protection is provided by a three terminal gas discharge tube.

Internal thermal disconnectors are used to reduce the hazards of thermal runaway during fault conditions, or if mains incursion onto the low voltage data circuit, occurs.

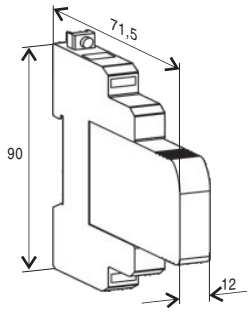
To protect against the hazards of electric shock and fire which often results when power frequency contact occurrs between power and communication lines (often called mains incursion), a thermo-clip is included on the primary protection stage to divert the power frequency current to ground.

If the module is unplugged out of the base, the connection lines remain enabled.

Technical characteristics

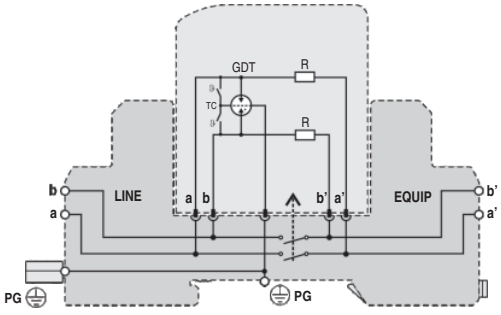
Type		SMH-TDR 110V
Protection construction		Two parts: base + replaceable plug-in module
Number of protected pairs		1 (2 conductors)
Nominal operating voltage	U_n	110V_{DC}
Max. continuous operating voltage	U_c	170V_{DC}
Rated spark overvoltage	(a/b-PG)	184V - 276V
	(a-b)	184V - 550V
Rated operating current at 25°C	I_L	300mA
Nominal discharge current (8/20µs)	I_n	10kA
Max. discharge current (8/20µs)	I_{max}	20kA
Residual voltage at 5 kA (8/20µs)		< 500V
Response time of overvoltage protection	t_A	< 100 ns
Thermal protection		Thermo-clip
Insulation resistance of the protection		≥ 1GΩ
Serial resistance	R	9 - 11Ω
Transverse capacitance	C	10 pF
Limit frequency	f_G	16 MHz
Terminal cross section		Multi-strand to 4 mm²
Operating temperature		-40°C ... +80°C
Degree of protection		IP 20
Housing material		Thermoplastic; gray, extinguishing degree V-O
Dimensions DIN 43880		2/3TE
Mounting EN 60715		on a 35mm DIN rail
Ordering code Base + Replaceable plug-in module		**708 150**
Replaceable plug-in module		**708 152**

Dimensional drawings



Connection diagram

Legend:	
TC	*thermo-clip*
GDT	*gas discharge tube*
R	*resistor*
PG	*protective grounding*



SMH2-TDR

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Number of protected pairs:	**2 (4 lines)**
Coarse Protection:	**3 terminal GDT**
Nom. Operating Voltage U_n:	**110V_{DC}**
Max. Operating Voltage U_c:	**170V_{DC}**
Series Resistance:	**9 - 11Ω**
Freq:	**< 16MHz**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**300mA**
Enclosure:	**DIN 43880 1TE, DIN rail mount**
Terminals:	**Multi-strand to 4 mm²**

The SMH2-TDR has been developed as a generic protector for use on data transmission circuits.

Coarse protection is provided by a three terminal gas discharge tube.

Internal thermal disconnectors are used to reduce the hazards of thermal runaway during fault conditions, or if mains incursion onto the low voltage data circuit, occurs.

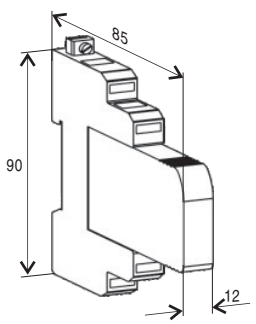
To protect against the hazards of electric shock and fire which often results when power frequency contact occurrs between power and communication lines (often called mains incursion), a thermo-clip is included on the primary protection stage to divert the power frequency current to ground.

If the module is unplugged out of the base, the connection lines remain enabled.

Technical characteristics

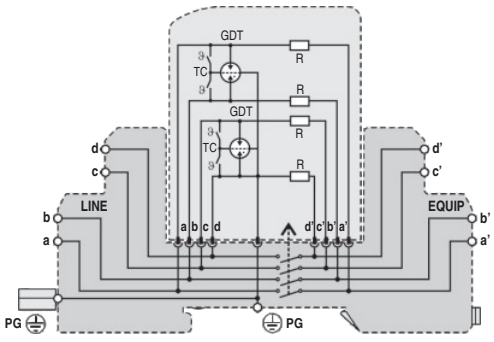
Type		SMH2-TDR 110V
Protection construction		Two parts: base + replaceable plug-in module
Number of protected pairs		2 (4 conductors)
Nominal operating voltage	U_n	110V_{DC}
Max. continuous operating voltage	U_c	170V_{DC}
Rated spark overvoltage	(a/b-PG)	184V - 276V
	(a-b)	184V - 550V
Rated operating current at 25°C	I_L	300mA
Nominal discharge current (8/20µs)	I_n	10kA
Max. discharge current (8/20µs)	I_{max}	20kA
Residual voltage at 5 kA (8/20µs)		< 500V
Response time of overvoltage protection	t_A	< 100 ns
Thermal protection		Thermo-clip
Insulation resistance of the protection		≥ 1GΩ
Serial resistance	R	9 - 11Ω
Transverse capacitance	C	10 pF
Limit frequency	f_G	16 MHz
Terminal cross section		Multi-strand to 4 mm²
Operating temperature		-40°C ... +80°C
Degree of protection		IP 20
Housing material		Thermoplastic; gray, extinguishing degree V-O
Dimensions DIN 43880		2/3TE
Mounting EN 60715		on a 35mm DIN rail
Ordering code	Base + Replaceable plug-in module	**708 151**
	Replaceable plug-in module	**708 153**

Dimensional drawings



Connection diagram

Legend:	
TC	*thermo-clip*
GDT	*gas discharge tube*
R	*resistor*
PG	*protective grounding*



VM-TDR

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Number of protected pairs:	**1 (2 lines)**
Coarse Protection:	**3 terminal GDT**
Nom. Operating Voltage U_n:	**110V_{DC}**
Max. Operating Voltage U_c:	**170V_{DC}**
Series Resistance:	**9 - 11Ω**
Freq:	**< 16 MHz**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**300mA**
Safety:	**Internal thermal runaway disconnector**
Indication:	**1x end-of-life status flag**
Enclosure:	**DIN 43880 1TE, DIN rail mount**
Terminals:	**Multi-strand to 6 mm²**

The VM-TDR series has been developed as a generic protector for use on data transmission circuits.

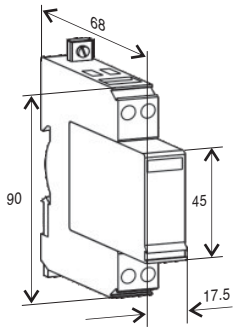
Coarse protection is provided by a three terminal gas discharge tube.

Internal thermal disconnectors are used to reduce the hazards of thermal runaway during fault conditions, or if mains incursion onto the low voltage data circuit, occurs.

Technical characteristics

Type		VM-TDR 110V
Protection construction		Two parts: base + replaceable plug-in module
Number of protected pairs		1 (2 conductors)
Nominal operating voltage	U_n	110V_{DC}
Max. continuous operating voltage	U_c	170V_{DC}
Rated spark overvoltage	(a/b-PG)	184V - 276V
	(a-b)	184V - 550V
Rated operating current at 25°C	I_L	300mA
Nominal discharge current (8/20µs)	I_n	10kA
Max. discharge current (8/20µs)	I_{max}	20kA
Residual voltage at 5 kA (8/20µs)		< 500V
Response time of overvoltage protection	t_A	< 100 ns
Thermal protection		Thermal disconnection in lines a and b
Insulation resistance of the protection		≥ 1GΩ
Serial resistance	R	9 - 11Ω
Transverse capacitance	C	10 pF
Limit frequency	f_G	16 MHz
Terminal cross section		Multi-strand to 6 mm²
Operating temperature		-40°C ... +80°C
Degree of protection		IP 20
Housing material		Thermoplastic; yellow, extinguishing degree V-O
Dimensions DIN 43880		1TE
Mounting EN 60715		On a 35mm DIN rail
Ordering code	Base + Replaceable plug-in module	**703 052**
	Replaceable plug-in module	**703 051**

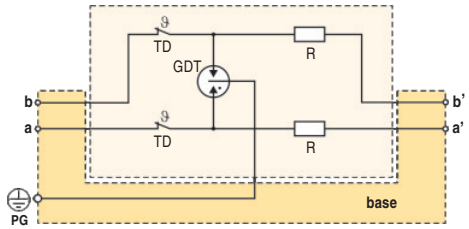
Dimensional drawings



Connection diagram

Legend:

TD	*thermal decoupler*
GDT	*gas discharge tube*
R	*resistor*
PG	*protective grounding*



SMH2-DF

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Number of protected pairs:	**2 (4 lines)**
Fine Protection:	**Bi-directional SAD**
Nom. Operating Voltage U_n:	**12, 24V_{DC}**
Max. Operating Voltage U_c:	**15, 28V_{DC} respectively**
Freq:	**< 30MHz**
Surge Discharge Ratings:	**I_n: 500A, 250A, 100A respectively**
Series load current:	**10A**
Enclosure:	**DIN 43880 6mm DIN rail mount**
Terminals:	**Multi-strand to 2.5mm²**

The SMH2-DF series has been developed to protect data transmission circuits or low voltage alarm circuits such as fire or security.

They only provide fine protection using a high speed, bi-directional, silicon stage.

Where necessary, the SMH2-DF may be used with a higher energy coarse protection unit such as the SMH2-TDR series.

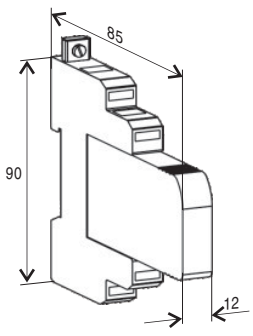
The plug-in module/base design facilities replacement of a failure module without the need to remove system wiring.

If the module is unplugged out of the base, the connection lines remain enabled.

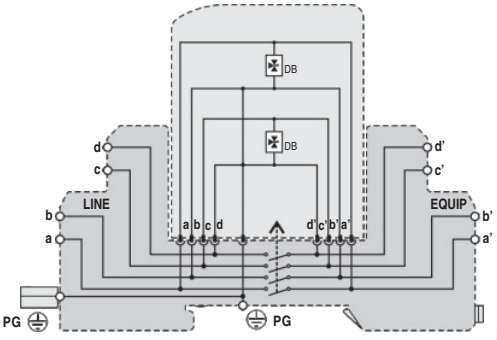
Technical characteristics

Type		SMH2-DF	
		12V	**24V**
Protection construction		Protective module	
Number of protected pairs		2(4 conductors)	
Nominal operating voltage	U_n	12V_{DC}	24V_{DC}
Max. continuous operating voltage	U_c	15V_{DC}	28V_{DC}
Rated spark overvoltage	(a/b-PG)	18V - 21V	30V - 37V
	(a-b)	18V - 21V	30V - 37V
Rated operating current at 25°C	I_L	10A	10A
Nominal discharge current (8/20µs)	I_n	500A	250A
Residual voltage at I_N (8/20µs)		< 48V	< 70V
Response time of overvoltage protection	t_A	< 1ns	< 1ns
Insulation resistance of the protection		≥ 15MΩ	≥ 28MΩ
Serial resistance	R	< 0.1Ω	< 0.1Ω
Transverse capacitance	C	< 50pF	< 50pF
Terminal cross section		Multi-strand to 6 mm²	
Operating temperature		-40°C ... +80°C	
Degree of protection		IP 20	
Housing material		Thermoplastic; gray, extinguishing degree V-O	
Dimensions DIN 43880		12mm	
Mounting EN 60715		on a 35mm DIN rail	
Ordering code		**7082.58**	**7082.59**

Dimensional drawings



Connection diagram



Legend:	
DB	*diode block*
PG	*protective grounding*

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Compact module**
Number of protected pairs:	**1 line**
Fine Protection:	**MOV**
Nom. Operating Voltage U_n:	**15, 30V_{DC}**
Max. Operating Voltage U_c:	**22, 38V_{DC} respectively**
Freq:	**< 0.5MHz**
Surge Discharge Ratings:	**I_n: 500A respectively**
Series load current:	**10A**
Enclosure:	**DIN 43880 6mm DIN rail mount**
Terminals:	**Multi-strand to 2.5mm²**

The IM-VF series has been developed to protect data transmission circuits or low voltage alarm circuits such as fire or security.

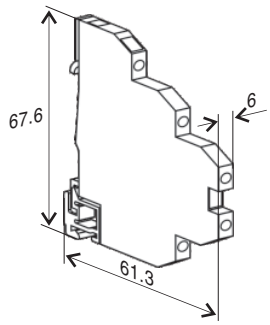
They only provide fine protection using a MOV.

Where necessary, the IM-VF may be used with a higher energy coarse protection unit such as the VM-TDR series.

Technical characteristics

Type		IM-VF	
		15V	**30V**
Protection construction		Protective module	
Number of protected pairs		(1 conductor)	
Nominal operating voltage	U_n	15V_{DC}	30V_{DC}
Max. continuous operating voltage	U_c	22V_{DC}	38V_{DC}
Rated spark overvoltage		24V - 30V	42V - 52V
Rated operating current at 25°C	I_L	10A	10A
Nominal discharge current (8/20µs)	I_n	500A	500A
Residual voltage at I_N (8/20µs)		< 53V	< 93V
Response time of overvoltage protection	t_A	< 25ns	< 25ns
Insulation resistance of the protection		≥ 1.5MΩ	≥ 3MΩ
Serial resistance	R	< 0.1Ω	< 0.1Ω
Transverse capacitance	C	< 10nF	< 6nF
Terminal cross section		Multi-strand to 6 mm²	
Operating temperature		-40°C ... +80°C	
Degree of protection		IP 20	
Housing material		Thermoplastic; brown (beige), extinguishing degree V-O	
Dimensions DIN 43880		6mm	
Mounting EN 60715		on a 35mm DIN rail	
Ordering code		**704 550**	**704 551**

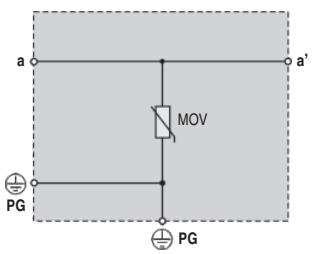
Dimensional drawings



Connection diagram

Legend:

MOV	*varistor*
PG	*protective grounding*



IM-DF Series

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Compact module**
Number of protected pairs:	**1 (2 lines)**
Fine Protection:	**Bi-directional SAD**
Nom. Operating Voltage U_n:	**5, 12, 24, 60V_{DC}**
Max. Operating Voltage U_c:	**7, 15, 28, 64V_{DC} respectively**
Freq:	**< 3MHz**
Surge Discharge Ratings:	**I_n: 500A, 250A, 100A respectively**
Series load current:	**10A**
Enclosure:	**DIN 43880 6mm DIN rail mount**
Terminals:	**Multi-strand to 2.5mm²**

The IM-DF series has been developed to protect data transmission circuits or low voltage alarm circuits such as fire or security.

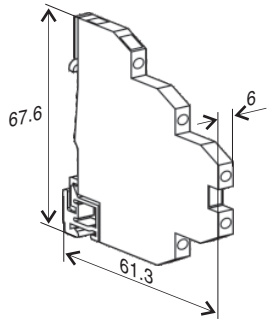
They only provide fine protection using a high speed, bi-directional, silicon stage.

Where necessary, the IM-DF may be used with a higher energy coarse protection unit such as the VM-TDR series.

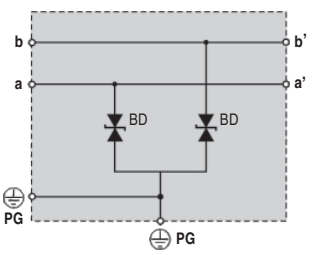
Technical characteristics

Type		IM-DF			
		5V	**12V**	**24V**	**60V**
Protection construction		Protective module			
Number of protected pairs		1 (2 conductors)			
Nominal operating voltage	U_n	5V_{DC}	12V_{DC}	24V_{DC}	60V_{DC}
Max. continuous operating voltage	U_c	6V_{DC}	15V_{DC}	28V_{DC}	64V_{DC}
Rated spark overvoltage	(a/b-PG)	8V - 10V	15V - 19V	30V - 36V	67V - 85V
	(a-b)	16V - 20V	30V - 38V	60V - 72V	134V - 170V
Rated operating current at 25°C	I_L	10A	10A	10A	10A
Nominal discharge current (8/20µs)	I_n	500A	500A	250A	100A
Residual voltage at I_N (8/20µs)		< 20V	< 39V	< 65V	< 150V
Response time of overvoltage protection	t_A	< 1ns	< 1ns	< 1ns	< 1ns
Insulation resistance of the protection		≥ 6KΩ	≥ 15MΩ	≥ 28MΩ	≥ 64MΩ
Serial resistance	R	< 0.1Ω	< 0.1Ω	< 0.1Ω	< 0.1Ω
Transverse capacitance	C	< 7nF	< 3nF	< 1nF	< 0.5nF
Terminal cross section		Multi-strand to 6 mm²			
Operating temperature		-40°C ... +80°C			
Degree of protection		IP 20			
Housing material		Thermoplastic; brown (beige), extinguishing degree V-O			
Dimensions DIN 43880		6mm			
Mounting EN 60715		on a 35mm DIN rail			
Ordering code		**704 508**	**704 502**	**704 504**	**704 506**

Dimensional drawings

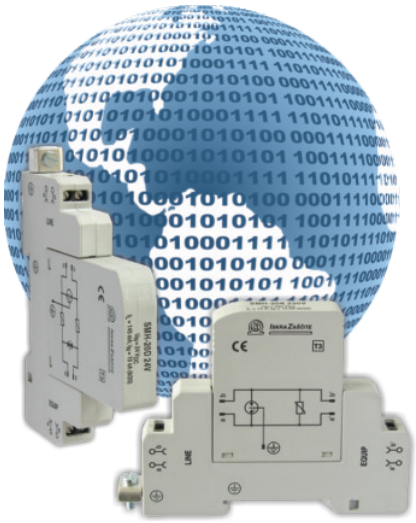


Connection diagram



Legend:

BD	*bi-directional TVS diode*
PG	*protective grounding*



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Coarse Protection:	**3 terminal GDT**
Nom. Operating Voltage U_n:	**24, 60, 230V_{DC}**
Max. Operating Voltage U_C:	**28, 64, 320V_{DC} respectively**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**145mA, (5A for 230V version)**
Safety:	**PTC I > 0.3A (24 and 60V versions)**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminals:	**Multi-strand to 4mm^2**

The SMH-20 series of low voltage protective devices has been developed as a generic protector for low voltage application and provides both common (longitudinal) mode and differential (transverse) mode protection.

Coarse protection is provided using a three terminal gas discharge tube while fine protection is provided using a high speed silicon or metal oxide varistor stage.

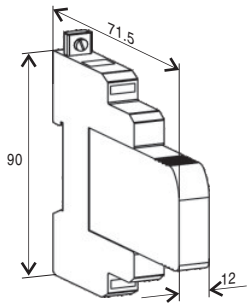
Over current protection is provided using a PTC element, which provides a level of protection against short circuit fault conditions.

If the module is unplugged out of the base, the connection lines remain enabled.

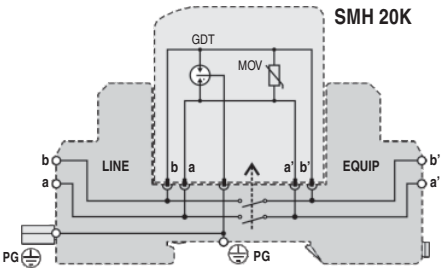
Technical characteristics

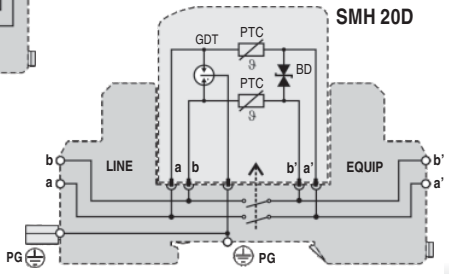
Type		SMH-20K 230V	SMH-20D 24V	SMH-20D 48V
Protection construction		Two parts: base + replaceable plug-in module		
Number of protected pairs		1 (2 conductors)		
Nominal operating voltage	U_n	230V_{DC}	24V_{DC}	60V_{DC}
Max. continuous operating voltage	U_c	320V_{DC}	28V_{DC}	64V_{DC}
Rated spark overvoltage	(a/b-PG)	350V - 504V	350V - 504V	350V - 504V
	(a-b)	351V - 429V	30V - 36V	67V - 85V
Rated operating current at 25°C	I_L	5A	145mA	145mA
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)	(line-line)	< 450V	< 65V	< 135V
Response time of overvoltage protection	t_A	< 25ns	< 1ns	< 1ns
Overcurrent protection		/	PTC resistors at I > 0.3A	PTC resistors at I > 0.3A
Insulation resistance of the protection		≥ 320MΩ	≥ 28MΩ	≥ 64MΩ
Serial resistance	R	< 0.1Ω	9-11Ω	9-11Ω
Transverse capacitance	C	< 1nF	< 3nF	< 1.2nF
Terminal cross section		Multi-strand to 4 mm^2	Multi-strand to 4 mm^2	Multi-strand to 4 mm^2
Operating temperature		-40°C ... +80°C	-25°C ... +50°C	-25°C ... +50°C
Degree of protection		IP 20		
Housing material		Thermoplastic; gray, extinguishing degree V-O		
Dimensions DIN 43880		2/3TE		
Mounting EN 60715		on a 35mm DIN rail		
Ordering code	Base + Replaceable plug-in module	**708 154**	**708 155**	**708 156**
	Replaceable plug-in module	**708 157**	**708 158**	**708 159**

Dimensional drawings



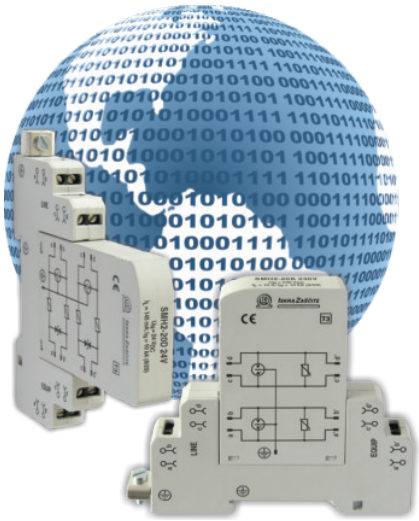
Connection diagram





Legend:

PTC	*resistor with a positive temp. coeficient*
GDT	*gas discharge tube*
BD	*bi-directional TVS diode*
MOV	*varistor*
PG	*protective grounding*



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Coarse Protection:	**3 terminal GDT**
Nom. Operating Voltage U_n:	**24, 60, 230V_{DC}**
Max. Operating Voltage U_c:	**28, 64, 320V_{DC} respectively**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**145mA, (5A for 230V version)**
Safety:	**PTC I > 0.3A (24 and 60V versions)**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminals:	**Multi-strand to 4mm^2**

The SMH2-20 series of low voltage protective devices has been developed as a generic protector for low voltage application and provides both common (longitudinal) mode and differential (transverse) mode protection.

Coarse protection is provided using a three terminal gas discharge tube while fine protection is provided using a high speed silicon or metal oxide varistor stage.

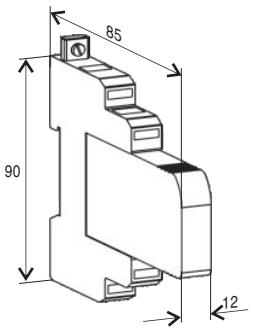
Over current protection is provided using a PTC element, which provides a level of protection against short circuit fault conditions.

If the module is unplugged out of the base, the connection lines remain enabled.

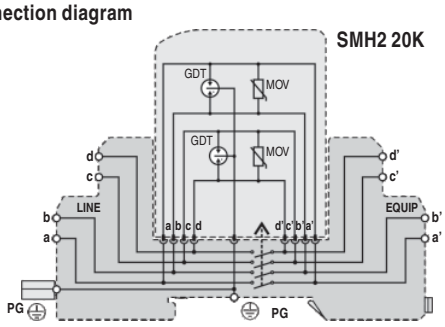
Technical characteristics

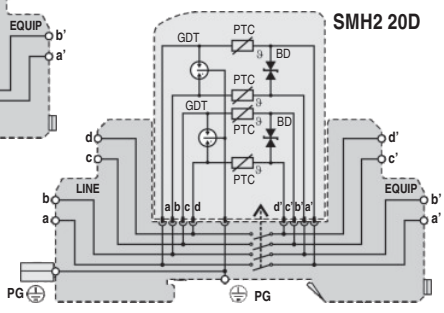
Type		SMH2-20K 230V	SMH2-20D 24V	SMH2-20D 48V
Protection construction		Two parts: base + replaceable plug-in module		
Number of protected pairs		2 (4 conductors)		
Nominal operating voltage	U_n	230V_{DC}	24V_{DC}	60V_{DC}
Max. continuous operating voltage	U_c	320V_{DC}	28V_{DC}	64V_{DC}
Rated spark overvoltage	(a/b-PG)	350V - 504V	350V - 504V	350V - 504V
	(a-b)	351V - 429V	30V - 36V	67V - 85V
Rated operating current at 25°C	I_L	5A	145mA	145mA
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)	(line-line)	< 450V	< 65V	< 135V
Response time of overvoltage protection	t_A	< 25ns	< 1ns	< 1ns
Overcurrent protection		/	PTC resistors at I > 0.3A	PTC resistors at I > 0.3A
Insulation resistance of the protection		≥ 320MΩ	≥ 28MΩ	≥ 64MΩ
Serial resistance	R	< 0.1Ω	9-11Ω	9-11Ω
Transverse capacitance	C	< 1nF	< 3nF	< 1.2nF
Terminal cross section		Multi-strand to 4 mm^2	Multi-strand to 4 mm^2	Multi-strand to 4 mm^2
Operating temperature		-40°C ... +80°C	-25°C ... +50°C	-25°C ... +50°C
Degree of protection		IP 20		
Housing material		Thermoplastic; gray extinguishing degree V-O		
Dimensions DIN 43880		2/3TE		
Mounting EN 60715		on a 35mm DIN rail		
Ordering code	Base + Replaceable plug-in module	**708 160**	**708 161**	**708 162**
	Replaceable plug-in module	**708 163**	**708 164**	**708 165**

Dimensional drawings



Connection diagram

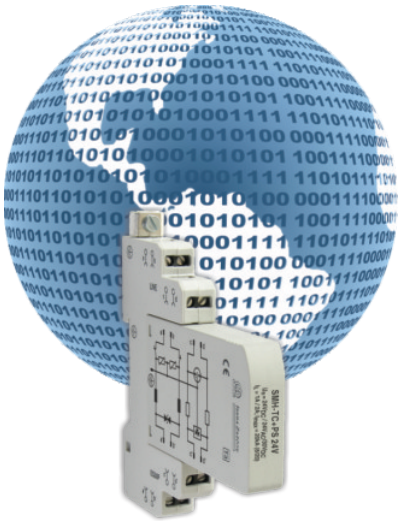




Legend:

PTC	*resistor with a positive temp. coeficient*
GDT	*gas discharge tube*
BD	*bi-directional TVS diode*
MOV	*varistor*
PG	*protective grounding*

SMH-TC+PS



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module 12 mm**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT (data line), MOVs (PS line)**
Available voltages:	**24V_{DC}**
Freq:	**30MHz**
Surge Discharge Ratings:	**I_n:10kA 8/20µs, I_{max}: 20kA 8/20µs**
Load current:	**1A (data line), 3A (PS line)**
Enclosure:	**DIN 43880 2/3TE, DIN rail mount**
Terminal:	**Multi-strand to 4mm^2**

The SMH-TC+PS has been developed for protection of systems with 1 supplying and one signal line (CAN bus, DeviceNet,...)

This efficient overvoltage protective device is intended to protect line from over voltage surges and electrostatic discharges created by switching transients in buildings.

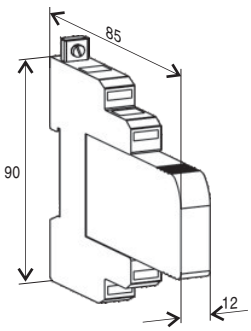
The signal line circuit is designed to minimize intercapacitance, and shunt capacitance, thereby maximizing the operating frequency to 35MHz.

If the module is unplugged out of the base, the connection lines remain enabled.

Technical characteristics

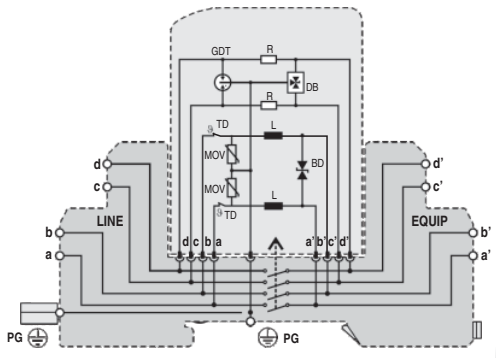
Type		SMH-TC+PS 24V	
		Data line	**Power supply line**
Protection construction		Two parts: base and extractable insert	
Number of protected pairs		2 (1 data line + 1 power supply line	
Nominal operating voltage	U_n	24V_{DC}	24V_{AC} / 30V_{DC}
Max. continuous operating voltage	U_c	28V_{DC}	28V_{AC} / 40V_{DC}
Rated spark overvoltage	(a/b-PG), (c/d-PG)	31 - 37V	42 - 52V
	(a-b), (c-d)	31 - 37V	90 - 110V
Rated operating current at 25°C	I_L	1A	3A
Nominal discharge current (8/20µs)	I_n	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA
Residual voltage at 5 kA (8/20µs)		< 70V	< 100V
Response time	t_A	< 1ns	< 1ns
Insulation resistance of the protection	(a-b)	≥ 28MΩ	≥ 40MΩ
Serial resistance	R	1.6-1.8Ω	< 0.2Ω
Serial inductivity	L	-	15µH
Transverse capacitance	C	50pF	6nF
Limit frequency	f_G	30MHz	1kHz
Terminal cross section		Multi-strand to 4 mm^2	
Operating temperature		- 40°C ... + 80°C	
Degree of protection		IP 20	
Housing material		Thermoplastic; gray, extinguishing degree V-O	
Dimensions DIN 43880		12mm	
Mounting EN 60715		On a 35mm DIN rail	
Ordering code Base + Replaceable plug-in module		**708 181**	
Replaceable plug-in module		**708 182**	

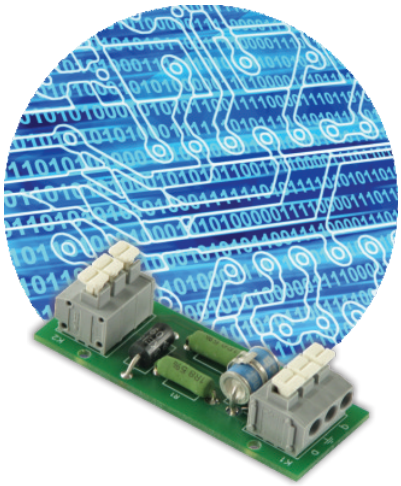
Dimensional drawings



Connection diagram

Legend:	
GDT	*gas discharge tube*
R	*resistor*
DB	*diode block*
TD	*thermal protection*
MOV	*varistor*
BD	*bi-directional TVS diode*
L	*coil*
PG	*protective grounding*





IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**PCB assembly**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Available voltages:	**12, 24V_{DC}**
Freq:	**30MHz**
Surge Discharge Ratings:	**I_n:10kA 8/20µs, I_{max}: 20kA 8/20µs**
Load current:	**1A**
Terminal:	**Multi-strand to 1.5mm²**

These efficient overvoltage barriers contain both coarse and fine protection stages and provide longitudinal and a transverse surge protection.

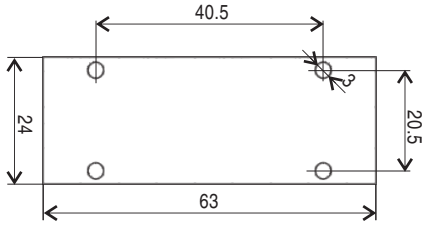
The initial protection stage comprises a three-pole gas discharge tube and is designed to divert the primary surge energy. The subsequent fine protection stage is carried out using fast bi-directional silicon avalanche diodes. Care is taken in the design of this fine protection stage to avoid capacitive line loading and thereby ensuring a low insertion loss and wide operating frequency range.

Series line impedances ensure energy co-ordination between the coarse and a fine protection stages at all levels of the insident surge. To protect against the hazards of electric shock and fire which often results when power frequency contact occurrs between power and communication lines (often called mains incursion), a thermo-clip is included on the primary protection stage to divert the power frequency current to ground.

Technical characteristics

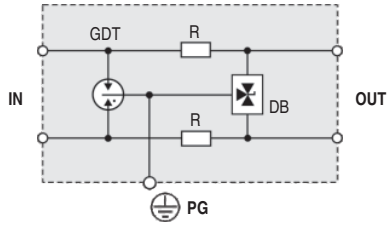
Type		LZ-SMH	
		12V	**24V**
Protection construction		PCB assembly	
Number of protected pairs		1 (2 conductors)	
Nominal operating voltage	**U_n**	12V_{DC}	24V_{DC}
Max. continuous operating voltage	**U_C**	15V_{DC}	28V_{DC}
Rated spark overvoltage	(a/b-PG)	17 - 21V	31 - 37V
	(a-b)	17 - 21V	31 - 37V
Rated operating current at 25°C	**I_L**	1A	1A
Nominal discharge current (8/20µs)	**I_n**	10kA	10kA
Max. discharge current (8/20µs)	**I_{max}**	20kA	20kA
Residual voltage at 5 kA (8/20µs)		< 48V	< 70V
Response time	**t_A**	< 1ns	< 1ns
Thermal protection		Thermo-clip	
Insulation resistance of the protection	(a-b)	≥ 15MΩ	≥ 28MΩ
Serial resistance	**R**	1.6-1.8Ω	1.6-1.8Ω
Transverse capacitance	**C**	50pF	50pF
Limit frequency	**f_G**	30MHz	30MHz
Terminal cross section		Multi-strand to 1.5 mm²	
Operating temperature		- 40°C ... + 80°C	
Ordering code		**127 555**	**127 556**

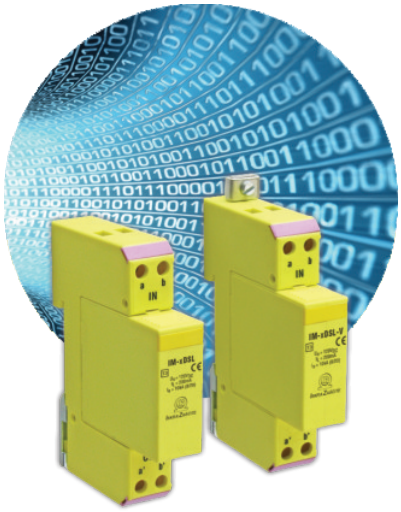
Dimensional drawings



Connection diagram

Legend:	
GDT	*gas discharge tube*
R	*resistor*
DB	*diode block*
PG	*protective grounding*





IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Number of protected pairs:	**1 (2 lines)**
Coarse Protection:	**3 terminal GDT**
Nom. Operating Voltage U_n:	**120V_{DC}**
Max. Operating Voltage U_c:	**170V_{DC}**
Series Elements typical:	**0.3Ω/50µH**
Freq:	**14 - 22MHz (ref. specification sheet)**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs I_{max}: 20kA 8/20µs**
Series load current:	**200mA**
Enclosure:	**DIN 43880 1TE, DIN rail mount**
Terminals:	**Multi-strand to 6 mm²**

The IM-xDSL series has been developed to protect class I ADSL transmission. It can also be used to protect ISDN, SDSL and HDSL protocol.

Coarse protection is provided by a three terminal gas discharge tube which provides symmetrical common (longitudinal) mode protection from each line to protective ground.

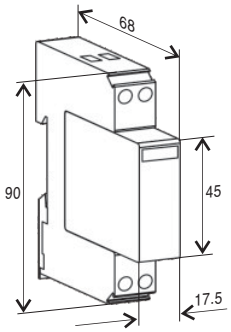
In more complex versions, a three terminal Sidactor or varistor provides fine differential (transverse) mode protection between lines.

Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault.

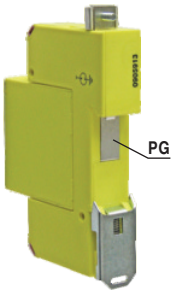
Technical characteristics

Type		IM-xDSL	IM-xDSL-V	IM-xDSL-T
Protection construction			Two parts: base and extractable insert	
Number of protected pairs			1 (2 conductors)	
Nominal operating voltage	U_n	120V_{DC}	120V_{DC}	120V_{DC}
Max. continuous operating voltage	U_c	170V_{DC}	170V_{DC}	170V_{DC}
Rated spark overvoltage	(a/b-PG)	184 - 276V	184 - 276V	184 - 260V
	(a-b)	184 - 550V	184 - 264V	184 - 260V
Rated operating current at 25°C	I_L	200mA	200mA	200mA
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)		< 700V	< 500V	< 350V
Response time of overvoltage protection	t_A	< 100ns	< 25ns	< 1ns
Thermal protection			Thermo-clip	
Insulation resistance of the protection		170MΩ	170MΩ	170MΩ
Serial resistance	R	approx. 0.3Ω	approx. 0.3Ω	approx. 0.3Ω
Serial inductance	L	approx. 50µH	approx. 50µH	approx. 50µH
Inductance in the loop		< 0.5µH	< 0.5µH	< 0.5µH
Limit frequency (- 3dB, Z_K = 120Ω)	f_G	> 22MHz	> 14Mhz	> 17Mhz
Terminal cross section			Multi-strand to 6 mm²	
Operating temperature			- 25°C ... + 60°C	
Degree of protection			IP 20	
Housing material			Thermoplastic; yellow, extinguishing degree V-O	
Dimensions DIN 43880			1TE	
Mounting EN 60715			on a 35mm DIN rail	
Ordering code	Base + Replaceable plug-in module	**704 002**	**704 006**	**704 010**
	Base 2GND + Replaceable plug-in module	**704 003**	**704 007**	**704 011**
	Replaceable plug-in module	**704 001**	**704 005**	**704 009**

Dimensional drawings



IM base

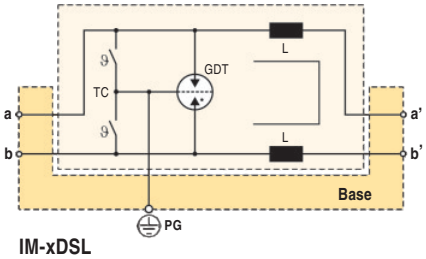


IM 2GND base

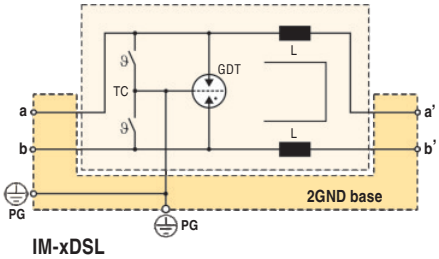
Connection diagram

Various options for the base unit exist including:

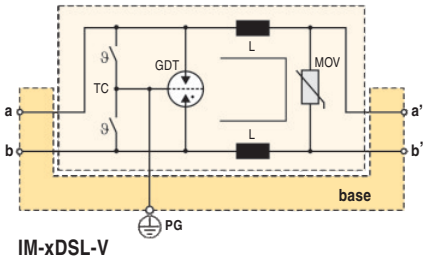
2 GND base: where a second ground terminal (in addition to the DIN rail ground strip) is provided for installations not utilizing DIN rail.



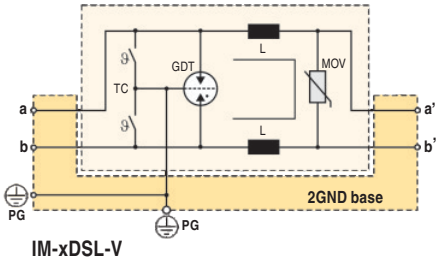
IM-xDSL



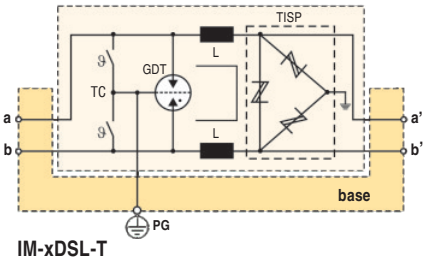
IM-xDSL



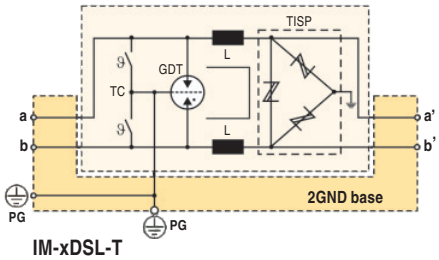
IM-xDSL-V



IM-xDSL-V



IM-xDSL-T



IM-xDSL-T

Legend:	
TC	*thermo-clip*
GDT	*gas discharge tube*
MOV	*varistor*
L	*coil*
TISP	*integrated circuit with thyristor protection*
PG	*protective grounding*

Accessory Part for IM-xDSL

Testing module IM TEST

A testing module IM TEST is intended for performing measurements on the IM bases.
A module enables performing of the measurements on both input and output sides.
It is equipped with five banana sockets with D = 2 mm. Red terminals are connected to the module's output, blue ones are connected to the module's input, whereas yellow one is connected to the grounding contact.

Type	**IMTest**
Ordering code	**127 145**

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Coarse Protection:	**Varistors**
Nom. Operating Voltage U_n:	**$12V_{DC}$, $24V_{DC}$ and $48V_{DC}$**
Max. Operating Voltage U_c:	**$15V_{DC}$, $28V_{DC}$ and $52V_{DC}$**
Series Inductivity:	**10 - 14µH**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**4A**
Enclosure:	**DIN 43880 12mm, DIN rail mount**
Terminals:	**Multi-strand to 4mm²**

The SMH-PS series has been developed to protect power supplies.

Coarse protection is provided by varistors while fine protection is provided using a high speed silicon stage.

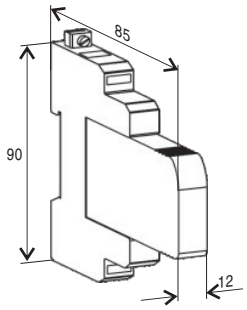
Internal thermal disconnectors are used to reduce the hazards of thermal runaway during fault conditions, or if mains incursion onto the low voltage data circuit, occurs.

If the module is unplugged out of the base, the connection lines remain enabled.

Technical characteristics

Type		SMH-PS 12V	SMH-PS 24V	SMH-PS 48V
Protection construction		Two parts: base + replaceable plug-in module		
Number of protected pairs		1 (2 conductors)		
Nominal operating voltage	U_n	$12V_{DC}$	$24V_{DC}$	$48V_{DC}$
Max. continuous operating voltage	U_c	$15V_{DC}$	$28V_{DC}$	$52V_{DC}$
Rated spark overvoltage	(1, 2 - PG)	90V - 110V	90V - 110V	90V - 110V
	(1, 2)	16V - 20V	30V - 36V	57V - 69V
Rated operating current at 25°C	I_L	4A	4A	4A
Nominal discharge current (8/20µs)	I_n	10kA	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)		< 32V	< 60V	< 135V
Response time of overvoltage protection	t_A	< 1ns	< 1ns	< 1ns
Thermal protection		Thermal disconnection		
Insulation resistance of the protection		≥ 15MΩ	≥ 28MΩ	≥ 52MΩ
Serial inductivity	L	10 - 14µH	10 - 14µH	10 - 14µH
Transverse capaticance	C	< 5nF	< 3nF	< 1.5nF
Terminal cross section		Multi-strand to 4 mm²		
Operating temperature		- 40°C ... + 80°C		
Degree of protection		IP 20		
Housing material		Thermoplastic; gray, extinguishing degree V-O		
Dimensions DIN 43880		12 mm		
Mounting EN 60715		on a 35mm DIN rail		
Ordering code	Base + Replaceable plug-in module	**708 120**	**708 121**	**708 122**
	Replaceable plug-in module	**708 125**	**708 126**	**708 127**

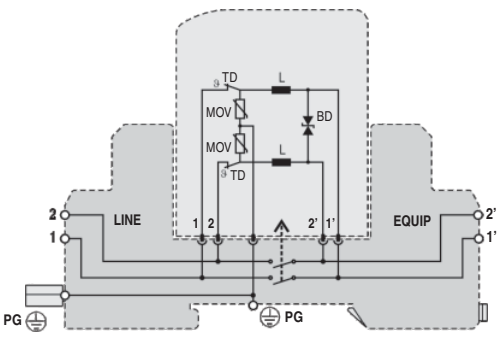
Dimensional drawings



Connection diagram

Legend:

TD	*thermal decoupler*
MOV	*varistor*
BD	*bi-directional TVS diode*
L	*coil*
PG	*protective grounding*



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module**
Coarse Protection:	**3 terminal GDT**
Nom. Operating Voltage U_n:	**12V_{DC} and 24V_{DC}**
Max. Operating Voltage U_c:	**15V_{DC} and 28V_{DC}**
Series Resistance:	**0.1Ω**
Freq:	**DC**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**10A**
Enclosure:	**DIN 43880 1TE, DIN rail mount**
Terminals:	**Multi-strand to 6mm²**

The VM-DC series has been developed to protect DC power supplies.

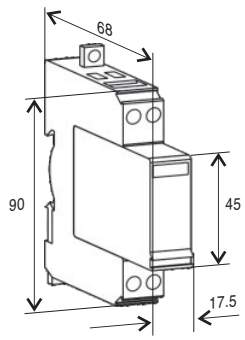
Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon stage.

Internal thermal disconnectors are used to reduce the hazards of thermal runaway during fault conditions, or if mains incursion onto the low voltage data circuit, occurs.

Technical characteristics

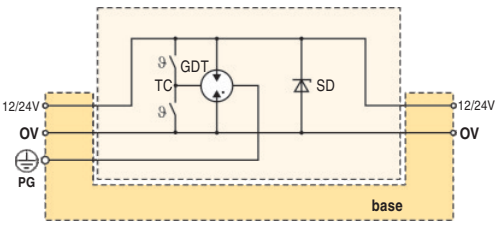
Type		VM-DC	
		12V	**24V**
Protection construction		Two parts: base + replaceable plug-in module	
Number of protected pairs		1 (2 conductors)	
Nominal operating voltage	U_n	12V_{DC}	24V_{DC}
Max. continuous operating voltage	U_c	15V_{DC}	28V_{DC}
Rated spark overvoltage	(0,12/24V - PG)	184V - 276V	184V - 276V
	(0 - 12/24V)	16V - 20V	30V - 36V
Rated operating current at 25°C	I_L	10A	10A
Nominal discharge current (8/20µs)	I_n	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA
Residual voltage at 5 kA (8/20µs)		< 32V (0.12V)	< 60V (0.24V)
Response time of overvoltage protection	t_A	< 1ns	< 1ns
Thermal protection		Thermo-clip	Thermo-clip
Insulation resistance of the protection		≥ 15MΩ	≥ 28MΩ
Serial resistance	R	< 0.1Ω	< 0.1Ω
Transverse capaticance	C	< 1nF	< 3nF
Terminal cross section		Multi-strand to 6 mm²	
Operating temperature		-40°C ... +80°C	
Degree of protection		IP 20	
Housing material		Thermoplastic; yellow, extinguishing degree V-O	
Dimensions DIN 43880		1TE	
Mounting EN 60715		on a 35mm DIN rail	
Ordering code	Base + Replaceable plug-in module	**703 502**	**703 504**
	Replaceable plug-in module	**703 501**	**703 503**

Dimensional drawings



Connection diagram

Legend:	
TC	*thermo clip*
GDT	*gas discharge tube*
SD	*signal-direction TVS diode*
PG	*protective grounding*



Category IEC / EN / VDE:	**Class I / Type 1 / B**
Design:	**Compact housing**
Location of use:	**Branch Sub-distribution Boards**
Protection modes:	**(+) - PE, (-) - PE, (+) - (-)**
Protective elements:	**MOV**
Surge discharge ratings:	**I_{imp} = 10kA**
Internal protection and safety:	**Separate thermal disconnector for each MOV**
Status indication:	**Mechanical flag + remote contacts (R)**
Enclosure:	**DIN 43880 4TE, DIN rail mount**

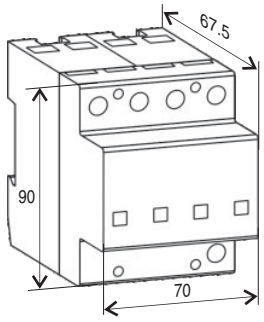
The DC PROTEC series has been designed to meet the unique requirements of protection of DC power systems found in telepower and railway applications.

DC-PROTEC 24/48 - provides both common and differential mode protection using high nominal discharge rating for extended operating life under DC conditions.

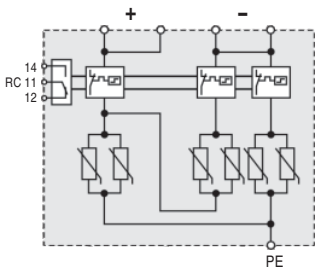
Technical characteristics

Type		DC PROTEC B(R) 10	
		24	**48**
In accordance with		IEC-61643-1	IEC-61643-1
Max. continuous operating voltage (DC)	U_C	30V	60V
Nominal discharge current (8/20)	I_n	20kA	20kA
Max. discharge current (8/20)	I_{max}	60kA	60kA
Impulse current (10/350)	I_{imp}	10kA	10kA
Protection level	U_p	< 0.6kV	< 0.6kV
Residual voltage at I_{imp}	U_{res}	< 0.3kV	< 0.3kV
Follow current	I_f	NO	NO
Response time	t_A	< 25ns	< 25ns
Thermal protection		YES	YES
Terminal screw torque		max. 4.5Nm	max. 4.5Nm
Short-circuit withstand current		25kA / 50Hz	25kA / 50Hz
Temperature range		- 40°C .... + 80°C	
Terminal cross section		35mm² (solid) / 25mm² (stranded)	
Mounting EN 60715		on a 35mm DIN rail	
Degree of protection		IP 20	
Housing material		Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		4TE	
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm²	
Remote terminal torque		0.25Nm	
Ordering code	Without remote contact	**510 598**	**510 600**
	With remote contact	**510 599**	**510 601**

Dimensional drawings



Connection diagram



Category IEC / EN / VDE:	**Class II / Type 2 / C**
Design:	**Compact housing**
Location of use:	**DC power systems**
Protection modes:	**(+) - PE, (-) - PE, (+) - (-)**
Protective element:	**MOV**
Surge discharge ratings:	**I_{max} = 40kA**
Internal protection and safety:	**Thermal disconnectors for MOVs**
Status indication:	**Mechanical flag + remote contacts (R)**
Enclosure:	**DIN 43880 2TE, DIN rail mount**

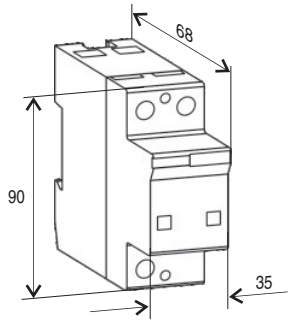
The DC PROTEC series has been designed to meet the unique requirements of protection of DC power systems found in telepower and railway applications.

DC-PROTEC 24/48 - provides both common and differential mode protection using high nominal discharge rating for extended operating life under DC conditions.

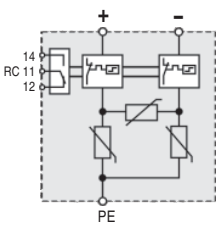
Technical characteristics

Type		DC PROTEC C(R) 40	
		24	**48**
In accordance with		IEC-61643-1	IEC-61643-1
Max. continuous operating voltage (DC)	U_C	30V	60V
Nominal discharge current (8/20)	I_n	20kA	20kA
Max. discharge current (8/20)	I_{max}	40kA	40kA
Protection level	U_p (+)- (-)	< 0.6kV	< 0.6kV
	(+), (-) - PE	< 1.5kV	< 1.5kV
Follow current	I_f	NO	NO
Response time	t_A	< 25ns	< 25ns
Thermal protection		YES	YES
Terminal screw torque		max. 4.5Nm	max. 4.5Nm
Short-circuit withstand current		25kA / 50Hz	25kA / 50Hz
Temperature range		- 40°C .... + 80°C	
Terminal cross section		35mm² (solid) / 25mm² (stranded)	
Mounting EN 60715		on a 35mm DIN rail	
Degree of protection		IP 20	
Housing material		Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		2TE	
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm²	
Remote terminal torque		0.25Nm	
Ordering code	Without remote contact	**510 564**	**510 566**
	With remote contact	**510 565**	**510 567**

Dimensional drawings



Connection diagram



Category IEC / EN / VDE:	**Class III / Type 3 / D**
Design:	**Replaceable plug-in module**
Location of use:	**DC and AC power systems**
Protection modes:	**L/N - PE**
Protective element:	**MOV + GDT**
Surge discharge ratings:	**I_{max} = 3kA ... 10kA**
Status indication:	**Remote contacts + LED**
Enclosure:	**DIN 43880 1TE, DIN rail mount**

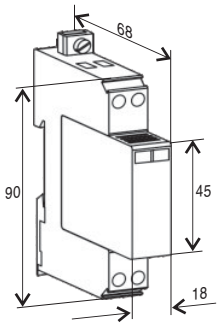
The PROTEC DMDR series has been designed to meet the unique requirements of protection of DC power systems found in telepower and railway applications.

PROTEC DMDR - provides both common and differential mode protection using high nominal discharge rating for extended operating life under DC conditions.

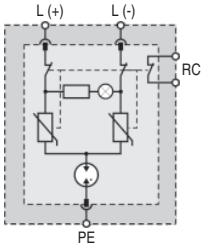
Technical characteristics

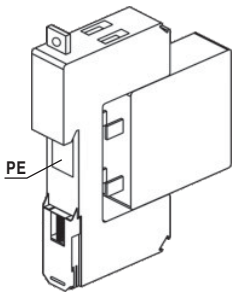
Type		PROTEC DMDR 20			
		24	**48**	**60**	**120**
In accordance with		IEC-61643-1			
Protection construction		Two parts: base + replaceable plug-in module			
Nominal operating voltage	U_n	$24V_{AC}$	$48V_{AC}$	$60V_{AC}$	$120V_{AC}$
Max. continuous operating voltage	U_c	$34V_{AC}/44V_{DC}$	$60V_{AC/DC}$	$75V_{AC/DC}$	$150V_{AC/DC}$
Combination wave (1.2/50, 8/20)	U_{OC}/I_{CW}	4kV/2kA	4kV/2kA	6kV/3kA	6kV/3kA
Nominal discharge current (8/20µs)	I_n	1.2kA	2.5kA	2.5kA	4kA
Max. discharge current (8/20µs)	I_{max}	3kA	6kA	6kA	10kA
Protection level	U_p (L-N)	< 180V	< 370V	< 400V	< 600V
	(L-PE/N-PE)	< 550V	< 650V	< 700V	< 850V
Response time of overvoltage protection	t_A (L-N)	< 25ns	< 25ns	< 25ns	< 25ns
	(L-PE/N-PE)	< 100ns	< 100ns	< 100ns	< 100ns
Thermal protection		YES	YES	YES	YES
Terminal cross section		Multi-strand to 6 mm^2			
Terminal screw torque		max. 2Nm			
Operating temperature		-40°C ... +80°C			
Degree of protection		IP 20			
Housing material		Thermoplastic; gray, extinguishing degree UL 94 V-0			
Dimensions DIN 43880		1TE			
Mounting EN 60715		on a 35mm DIN rail			
Ordering code		**515 051**	**515 053**	**515 054**	**515 055**

Dimensional drawings



Connection diagram





PROTEC C(R) 40

DC POWER SUPPLY PROTECTION

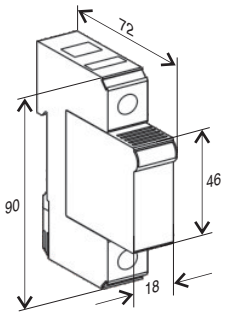
Category IEC / EN / VDE:	**Class II / Type 2 / C**
Design:	**Compact housing**
Location of use:	**Branch sub- distribution boards**
Protection modes:	**L/N - PE, L - PEN**
Protective element:	**MOV**
Surge discharge ratings:	**I_{max} = 40kA**
Internal protection and safety:	**Thermal disconnector for MOV**
Status indication:	**Mechanical flag + remote contacts (R)**
Enclosure:	**DIN 43880 1TE, DIN rail mount**

PROTEC C 40/75 provide differential-only protection against induced over-voltages. The C model's plug-in module / base design facilitates replacement of a failed module in situ without the need to remove system wiring.

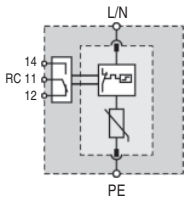
Technical characteristics

Type		**PROTEC C(R) 40 75**
In accordance with		IEC-61643-1
Max. continuous operating voltage (AC/DC)	U_C	75/100V
Nominal discharge current (8/20)	I_n	20kA
Max. discharge current (8/20)	I_{max}	40kA
Protection level	U_p	< 0.6kV
Follow current	I_f	NO
Response time	t_A	< 25ns
Thermal protection		YES
Terminal screw torque		max. 4.5Nm
Short-circuit withstand current		25kA / 50Hz
Temperature range		- 40°C .... + 80°C
Terminal cross section		35mm² (solid) / 25mm² (stranded)
Mounting EN 60715		on a35mm DIN rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		1TE
Remote contacts		YES
Contact ratings		AC: 250V/0.5A; 125V/3A
Terminal cross section		max. 1.5mm²
Remote terminal torque		0.25Nm
Ordering code	Without remote contact	**500 001**
	With remote contact	**500 011**
	Replaceable plug-in module	**500 216**

Dimensional drawings



Connection diagram



PROTEC CN(R) 40

DC POWER SUPPLY PROTECTION

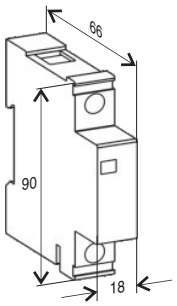
Category IEC / EN / VDE:	**Class II / Type 2 / C**
Design:	**Compact housing**
Location of use:	**Branch sub-distribution boards**
Protection modes:	**L/N - PE, L - PEN**
Protective element:	**MOV**
Surge discharge ratings:	**I_{max} = 40kA**
Internal protection and safety:	**Thermal disconnector for MOV**
Status indication:	**Mechanical flag + remote contacts (R)**
Enclosure:	**DIN 43880 1TE, DIN rail mount**

PROTEC CN 40/75 - provide differential-only protection against induced over-voltages. The CN enclosure provides a compact design.

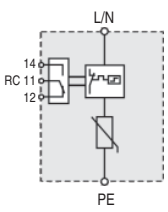
Technical characteristics

Type		PROTEC CN(R) 40 75
In accordance with		IEC-61643-1
Max. continuous operating voltage (AC/DC)	U_c	75/100V
Nominal discharge current (8/20)	I_n	20kA
Max. discharge current (8/20)	I_{max}	40kA
Protection level	U_p	< 0.6kV
Follow current	I_f	NO
Response time	t_A	< 25ns
Thermal protection		YES
Terminal screw torque		max. 3.5Nm
Short-circuit withstand current		25kA / 50Hz
Temperature range		- 40°C .... + 80°C
Terminal cross section		35mm² (solid) / 25mm² (stranded)
Mounting EN 60715		on a 35mm DIN rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		1TE
Remote contacts		YES
Contact ratings		AC: 250V/0.5A; 125V/3A
Terminal cross section		max. 1.5mm²
Remote terminal torque		0.25Nm
Ordering code	Without remote contact	**507 001**
	With remote contact	**507 011**

Dimensional drawings



Connection diagram



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**16 terminal compact module**
Mode of protection:	**Longitudinal, Transverse**
Number of protected pairs:	**2 (4 lines)**
Coarse Protection:	**2 x 3 terminal GDT,**
	2 x 2 terminal GDT
Nom. Operating Voltage U_n:	**5 V_{DC}**
Max. Operating Voltage U_c:	**6 V_{DC}**
Series Resistance:	**1.7 - 1.9Ω per line**
Freq:	**< 1.5MHz**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**500mA**
Enclosure:	**DIN 43880 2TE, DIN rail mount**
Terminals:	**Multi-strand to 2 x 2.5 mm^2**

The VM-RS series has been developed to protect 2 pair data transmission circuits using the RS 485, RS 422 and V11 protocol.

The circuit consists of two balanced pairs with equipotential equalization between them. Equipotential equalization is also provided between signal ground and protective ground to avoid equipment damage from ground potential rises during surge activity.

Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon stage which provides both common (longitudinal) mode protection from each line to protective ground, and differential (transverse) mode protection between each pair.

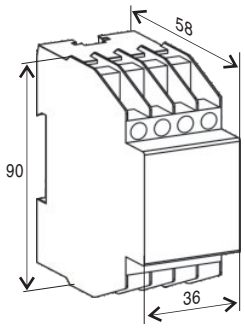
Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault.

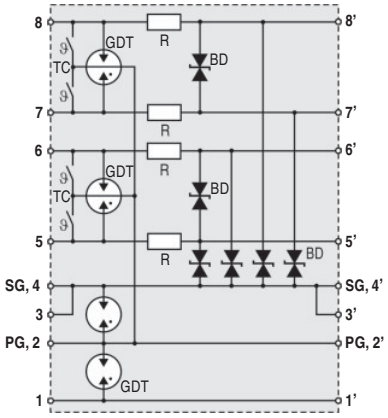
Technical characteristics

Type		VM-RS 485
Protection construction		Protective module
Number of protected pairs		2 (4 conductors)
Nominal operating voltage	U_n	$5V_{DC}$
Max. continuous operating voltage	U_c	$6V_{DC}$
Rated spark overvoltage	(5, 6, 7 and 8 - 4, SG)	6.5V - 8.5V
	(5-6 and 7-8)	6.5V - 8.5V
	(5, 6, 7 and 8 - 2, PG)	78V - 116V
Rated operating current at 25°C	I_L	500mA
Nominal discharge current (8/20µs)	I_n	20kA
Residual voltage at 5 kA (8/20µs)	(line-line)	20V
Response time of overvoltage protection	t_A	< 1ns (5, 6, 7, 8 - SG))
Thermal protection		Thermo-clip in lines 5, 6, 7and 8
Insulation resistance of the protection		6kΩ
Serial resistance	R	1.7 - 1.9Ω
Transverse capacitance	C	< 2nF
Limit frequency	f_G	> 1MHz
Terminal cross section		Multi-strand to 2 x 2.5mm^2
Operating temperature		-40°C ... +80°C
Degree of protection		IP 20
Housing material		Thermoplastic; gray, extinguishing degree V-O
Dimensions DIN 43880		2TE
Mounting EN 60715		on a 35mm DIN raill
Ordering code		**703 801**

Dimensional drawings

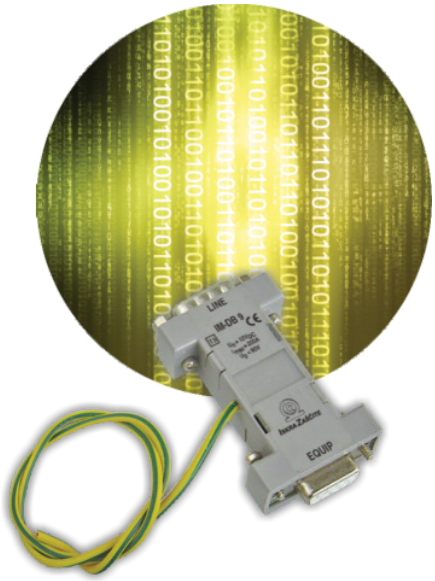


Connection diagram



Legend:	
TC	*thermo-clip*
GDT	*gas discharge tube*
R	*resistor*
BD	*bi-directional TVS diode*
PG	*protective grounding*
SG	*signal grounding*

IM-DB 9



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**In-line module**
Number of protected pairs:	**8 lines**
Nom. Operating Voltage U_n:	**$12V_{DC}$**
Max. Operating Voltage U_c:	**$15V_{DC}$**
Freq:	**< 1MHz**
Surge Discharge Ratings:	**I_n: 100A 8/20µs/line, I_{max}: 200A 8/20µs/line**
Series load current:	**500mA**
Enclosure:	**Plastic**
Termination:	**DB9 Male - DB9 Female**

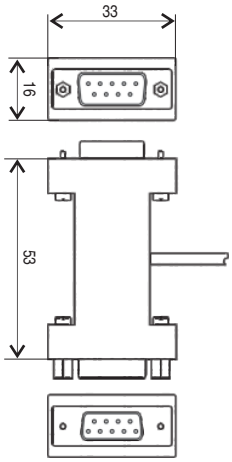
The IM-DB9 series has been developed to protect transmission circuits using the RS 232 protocol.

Protection is achieved via a DB9, in-line package, comprises a combination of MOV and fast silicon suppressor diodes. All eight lines are protected.

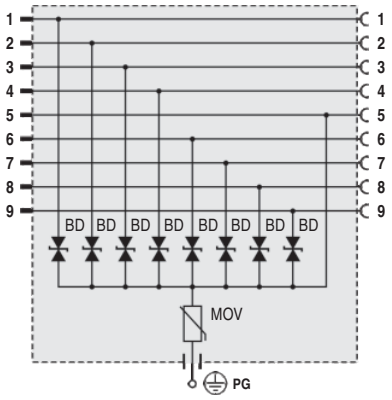
Technical characteristics

Type		IM-DB 9
Protection construction		Protective module
Nominal operating voltage	U_n	$12V_{DC}$
Max. continuous operating voltage	U_c	$15V_{DC}$
Nominal discharge current (8/20µs)	I_n	100A line - line
Max. discharge current (8/20µs)	I_{max}	200A line - line
Voltage protection level at I_n	U_p	≤ 30V line - line ≤ 200V line - PE
Voltage protection level at 1kV/µs	U_p	≤ 24V line - line ≤ 30V line - PE
Response time of overvoltage protection	t_A	≤ 1ns
Insulation resistance of the protection		15MΩ
Transverse capacitance	C	600pF line - line 700pF line - PE
Limit frequency	f_G	500kHz
Connector		9 pole M/F
Operating temperature		-40°C ... +80°C
Degree of protection		IP 20
Housing material		Thermoplastic; gray, extinguishing degree V-O
Ordering code		**127 526**

Dimensional drawings

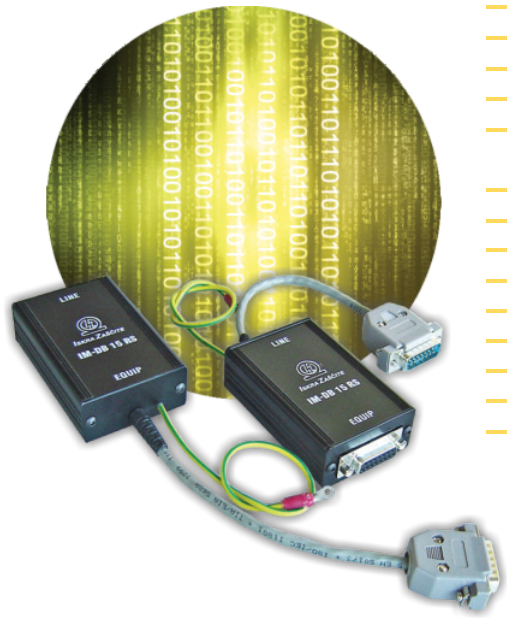


Connection diagram



Legend:

BD	*bi-directional TVS diode*
MOV	*varistor*
PG	*protective grounding*



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**In-line module**
Mode of protection:	**Longitudinal, Transverse**
Number of protected pairs:	**2 (4 lines)**
Coarse Protection:	**2 x 3 terminal GDT, 1 x 2 terminal GDT**
Nom. Operating Voltage U_n:	**$5V_{DC}$**
Max. Operating Voltage U_c:	**$6V_{DC}$**
Series Resistance:	**1.7 - 1.9Ω per line**
Freq:	**< 35MHz**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**500mA**
Enclosure:	**Extruded aluminium**
Termination:	**Db15 Male - DB15 Female**

The IM-DB15 series has been developed to protect 2 pair data transmission circuits using the RS 422, V.11 and X.12 protocols.

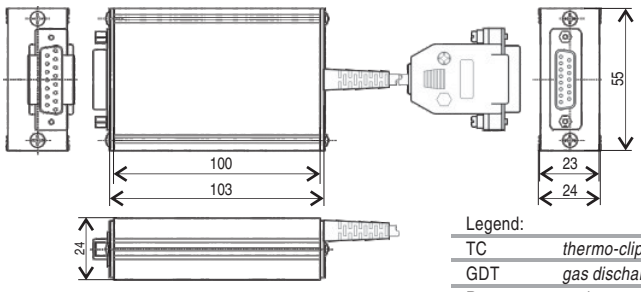
The DB15, in-line package, comprises a circuit of two balanced pairs with equipotential equalization between them. Equipotential equalization is also provided between signal ground and protective ground to avoid equipment damage from ground potential rises during surge activity.

Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon stage which provides both common (longitudinal) mode protection from each line to protective ground, and differential (transverse) mode protection between each pair. Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault.

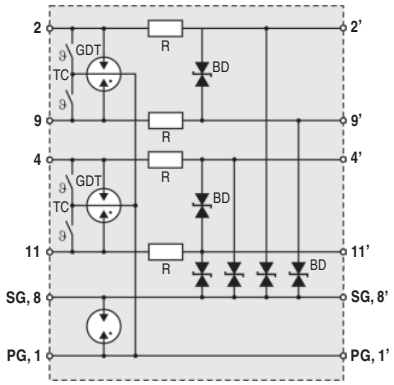
Technical characteristics

Type		IM-DB 15 RS	IM-DB 15 RS (F-LINE)
Protection construction		Protective module	
Nominal operating voltage	U_n	$5V_{DC}$	
Max. continuous operating voltage	U_c	$6V_{DC}$	
Rated spark overvoltage	(2, 9, 4, 11 - 8, SG) (2 - 9 and 4-11) (2, 9, 4, 11 - 1, PG)	6.5V - 8.5V 6.5V - 8.5V 78V - 116V	
Rated operating current at 25°C	I_L	500mA	
Nominal discharge current (8/20µs)	I_n	20kA	
Residual voltage at 5 kA (8/20µs)	(line-line)	< 20V	
Response time of overvoltage protection	t_A	< 1ns (2, 9, 4, 11 - 8, SG)	
Thermal protection		Thermo-clip in lines 2, 9, 4 and 11	
Insulation resistance of the protection		6kΩ	
Serial resistance	R	1.7 - 1.9Ω	
Transverse capacitance	C	< 30nF	
Limit frequency	f_G	35Mhz	
Connector		DB 15 (M-LINE)	DB 15 (F-LINE)
Operating temperature		-40°C ... +80°C	
Degree of protection		IP 20	
Housing material		Al	
Ordering code		**127 517**	**127 516**

Dimensional drawings



Connection diagram



Legend:

TC	*thermo-clip*
GDT	*gas discharge tube*
R	*resistor*
BD	*bi-directional TVS diode*
PG	*protective grounding*
SG	*signal grounding*

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Compact, ergonomic packaging**
Protection:	**All 4 pairs protected**
Nom. Operating Voltage U_n:	**± 5V_{DC}**
Max. Operating Voltage U_c:	**± 6V_{DC}**
Freq:	**< 100MHz, Cat 5 capable**
Surge Discharge Ratings I_n:	**300A 8/20µs per line**
Enclosure:	**UTB in-line patch**
Termination:	**RJ45, Cat. 5 connectors**

The LZ-NET series is intended to protect Local Area Networks (LAN) from over voltage surges and electrostatic discharges created by switching transients in buildings. LAN systems are particularly prone to such disturbances because of the often long cable lengths involved which behave like antennas to such atmospheric disturbances.

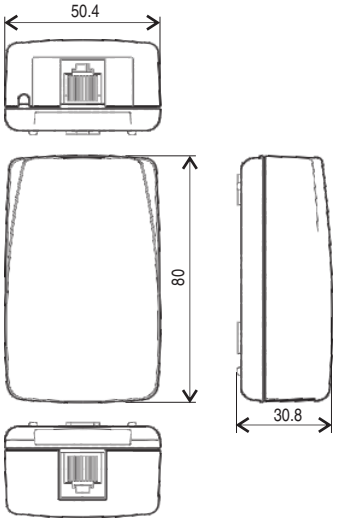
It provides protection to all 8 lines in the UTP, and is Cat 5 capable.

Ground potential equalization between signal and protective (network or PC chassis) ground is provided.

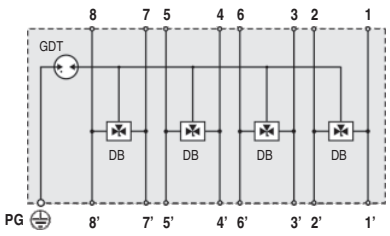
Technical characteristics

Type		LZ-NET	LZ-NET PoE	LZ-NET STP
Protection construction		Protective module	Protective module	Protective module
Nominal operating voltage	U_n	5V_{DC}	48V_{DC}	5V_{DC}
Max. continuous operating voltage	U_c	6V_{DC}	58V_{DC}	6V_{DC}
Nominal discharge current (8/20µs)	I_n	300A line - line 300A line - PG	60A line - line 60A line - PG	300A line - line 300A line - PG
Voltage protection level at I_n	U_p	35V line - line 350V line - PG	150V line - line 550V line - PG	35V line - line 350V line - PG
Limit frequency	f_G	< 100MHz	< 100MHz	< 100MHz
Response time of overvoltage protection	t_A	< 1ns	< 1ns	< 1ns
Connection		Input/Output: RJ45 sockets, All 4 line pairs protected	Input/Output: RJ45 sockets, all 4 line pairs protected	Input/Output: RJ45S sockets, all 4 line pairs protected
Operating temperature		-40°C ... +80°C		
Degree of protection		IP 20		
Housing material		Thermoplastic, gray, extinguishing degree V-0		
Ordering code		**706 001**	**706 002**	**706 011**

Dimensional drawings



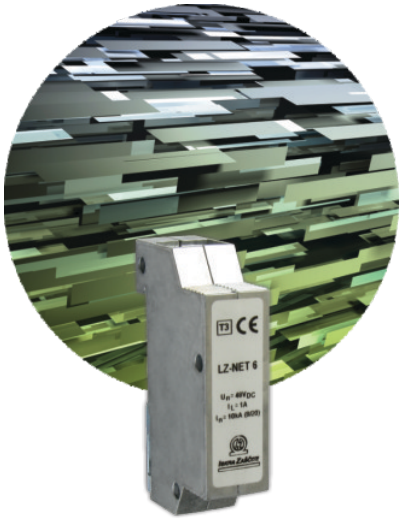
Connection diagram



Legend:

GDT	*gas discharge tube*
DB	*diode block*
PG	*protective grounding*

LZ-NET 6



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Compact packaging**
Protection:	**All 4 pairs protected**
Nom. Operating Voltage U_n:	**± 48V_{DC}**
Max. Operating Voltage U_C:	**± 48V_{DC}**
Freq:	**< 250MHz, Cat 6 capable**
Surge Discharge Ratings I_n:	**250A 8/20µs per line**
Enclosure:	**UTB in-line patch**
Termination:	**RJ45, shielded**

The LZ-NET 6 series is intended to protect Local Area Networks (LAN) from over voltage surges and electrostatic discharges created by switching transients in buildings. LAN systems are particularly prone to such disturbances because of the often long cable lengths involved which behave like antennas to such atmospheric disturbances.

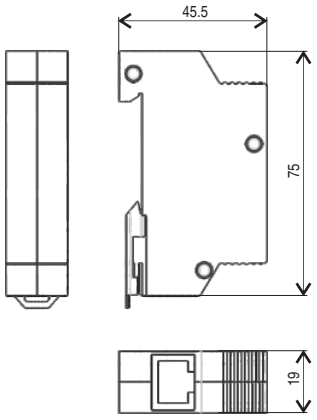
It provides protection to all 8 lines in the UTP, STP and is **Cat 6 capable**.

Ground potential equalization between signal and protective (network or PC chassis) ground is provided.

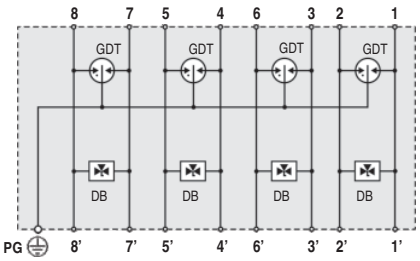
Technical characteristics

Type		LZ-NET 6
Protection construction		Protective module
Nominal operating voltage	U_n	48V_{DC}
Max. continuous operating voltage	U_c	48V_{DC}
Nominal operating current	I_L	1A
Nominal discharge current (8/20µs)	I_n	150A line - line
Total nominal discharge current (8/20µs)	I_n	10kA lines - PG
Voltage protection level at I_n	U_p	150V line - line 550V line - PG
Limit frequency	f_G	< 250MHz (Class E)
Response time of overvoltage protection	t_A	< 1ns
Connection		Input/Output: RJ45 sockets, all 4 line pairs protected
Operating temperature		-40°C ... +80°C
Degree of protection		IP 20
Housing material		Metal
Ordering code		**706 301**

Dimensional drawings



Connection diagram



Legend:

GDT	*gas discharge tube*
DB	*diode block*
PG	*protective grounding*

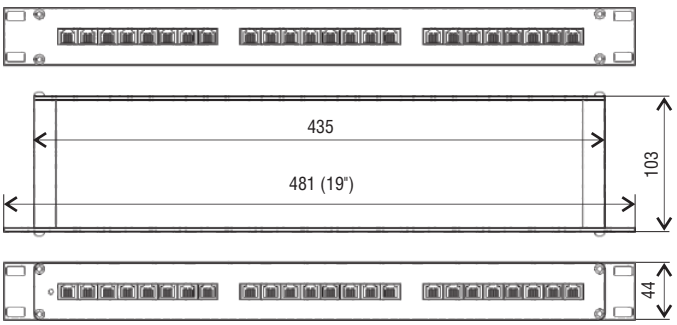
IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**19" rack patch panel up to 24 way**
Protection:	**All 4 pairs protected**
Nom. Operating Voltage U_n:	**± $5V_{DC}$**
Max. Operating Voltage U_c:	**± $6V_{DC}$**
Freq:	**< 100MHz, Cat 5 capable**
Surge Discharge Ratings:	**I_n: 300A 8/20µs per line**
Enclosure:	**19" rack, shielded enclosure, in-line patch**
Termination:	**RJ45, Cat. 5 connectors**
Options:	**8, 16, 24 way. Replaceable 8 way module**

The LZ-NET 19 series is intended to protect Local Area Networks (LAN) from over voltage surges and electrostatic discharges created by switching transients in buildings. LAN systems are particularly prone to such disturbances because of the often long cable lengths involved which behave like antennas to such atmospheric disturbances.
It is designed to fit a 19" rack mount and can provide 8, 16 or 24 way patching to UTP lines.

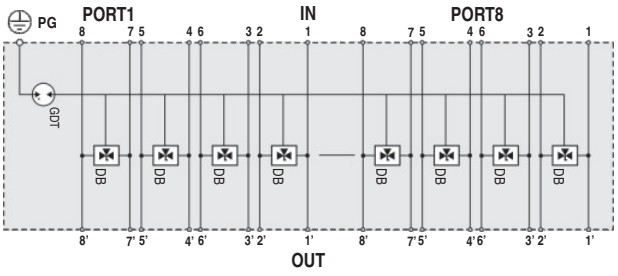
Technical characteristics

Type		LZ-xx NET 19	LZ-xx NET 19 PoE
Protection construction		Protective module	
Number of protected ports		8, 16 or 24	
Nominal operating voltage	U_n	$5V_{DC}$	$48V_{DC}$
Max. continuous operating voltage	U_c	$6V_{DC}$	$58V_{DC}$
Nominal discharge current (8/20µs)	I_n	300A line - line 300A line - PG	60A line - line 60A line - PG
Voltage protection level at I_n	U_p	35V line - line 550V line - PG	150V line - line 550V line - PG
Limit frequency	f_G	< 100MHz	< 100MHz
Response time of overvoltage protection	t_A	< 1ns	< 1ns
Connection		Input/Output: RJ 45 sockets, all 4 line pairs protected	
Operating temperature		-40°C ... +80°C	-40°C ... +80°C
Degree of protection		IP 20	IP 20
Housing material		Al	Al
Ordering code			
LZ 8 NET 19 (NET Protector for 8 UTP lines)		**706 110**	**706 130**
LZ 16 NET 19 (NET Protector for 16 UTP lines)		**706 111**	**706 131**
LZ 24 NET 19 (NET Protector for 24 UTP lines)		**706 112**	**706 132**
LZ 8 NET 19M (Repleceament Surge Module for LZ xx NET 19)		**706 113**	**706 133**

Dimensional drawings



Connection diagram



Legend:

GDT	*gas discharge tube*
DB	*diode block*
PG	*protective grounding*

IEC category / EN type:	**III (IEC 60643-1) and C1/C2/C3 (IEC 60643-21)**
Design:	**Compact, ergonomic packaging**
Protection:	**Power and Data port**
Data port:	**Nom. Operating Voltage U_n: ± $5V_{DC}$**
	Max. Operating Voltage U_c: ± $5V_{DC}$
Power port:	**Nom. Operating Voltage U_n: $230V_{AC}$**
	Max. Operating Voltage U_c: $275V_{AC}$
Freq:	**< 100MHz, Cat 5 capable**
Surge Discharge Ratings:	**Data Port I_n: 300A 8/20µs per line**
	Power Port I_n: 3kA 8/20µs L-N / L-PE
Enclosure:	**UTB in-line patch, AC power outlet**
Termination:	**Data: RJ45, Cat. 5 connectors**
	Power: DIN 49 440-CE(7) III, DIN 49 441-CEE(7) IV

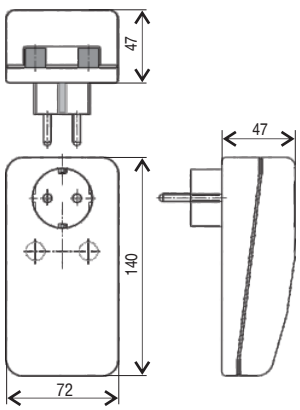
The ZE 200-NET series is intended to protect Local Area Networks (LAN) from over voltage surges and electrostatic discharges created by switching transients in buildings. LAN systems are particularly prone to such disturbances because of the often long cable lengths involved which behave like antennas to such atmospheric disturbances.

It provides protection to all 8 lines in the UTP as well as protection to a 230Vac power outlet. Equipotential equalization is provided between the LAN signal port and the AC power port.

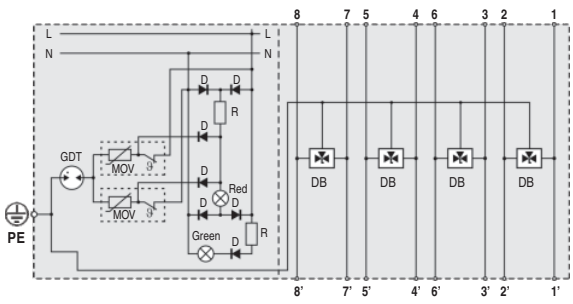
Technical characteristics

Type		ZE 200-NET	
		Power part	**Data part**
Protection construction		Protective module	
Nominal operating voltage	U_n	230V / 50Hz	$5V_{DC}$
Max. continuous operating voltage	U_c	275V / 50Hz	$6V_{DC}$
Nominal discharge current (8/20µs)	I_n	3kA (L(N) - PE, L - N) 10kA (L+N - PE)	300A line - line 300A line - PE
Pulse discharge voltage (1.2/20µs)	U_{oc}	6kV (L(N) - PE, L - N) 10kV (L+N - PE)	/ /
Voltage protection level at I_n	U_p	< 1000V (L - N) < 1500V (L(N) - PE)	35V line - line 350V line - PE
Forefuse		16A gL - (needed if not present in the network)	/
Limit frequency	f_G	/	100MHz
Response time of overvoltage protection	t_A	< 25ns (L - N) < 100ns (L(N) - PE)	< 1ns /
Connection		DIN 49 440-CE(7)III, DIN 49 441-CEE(7)IV Grounding contact	Input/Output: RJ 45 sockets, all 4 line pairs protected
Supervising device: Supply present Error		Green light Red light	/
Operating temperature		-40°C ... +80°C	
Degree of protection		IP 20	
Housing material		Thermoplastic, gray, extinguishing degree V-0	
Ordering code		**121 257**	

Dimensional drawings



Connection diagram

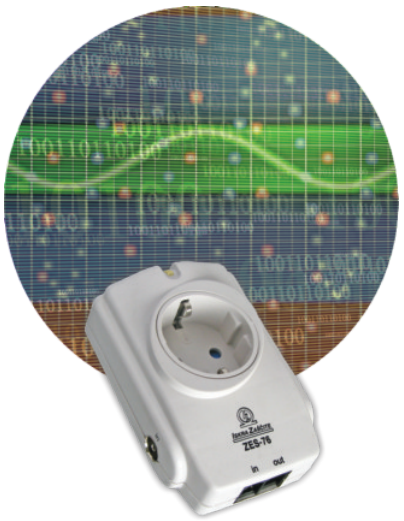


Legend:

GDT	*gas discharge tube*
R	*resistor*
DB	*diode block*
D	*diode*
MOV	*varistor*

ZES-76 TEL-TV

COMBINED PLUG-IN SURGE PROTECTION



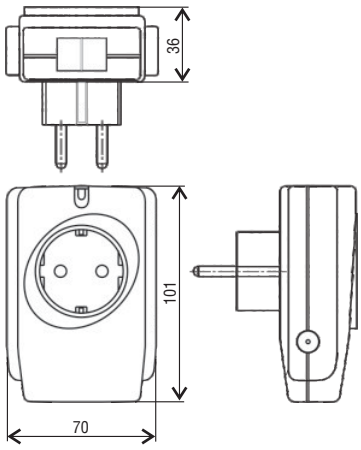
IEC category / EN type:	**III (IEC 60643-1) and C1/C2/C3 (IEC 60643-21)**
Design:	**Compact, ergonomic packaging**
Protection:	**Power, telecommunication and TV**
Telecommunication port:	**Max. Operating Voltage U_C: 170V_{DC}**
TV port:	**Max. Operating Voltage U_C: 70V_{DC}**
Power port:	**Nom. Operating Voltage U_n: 230V_{AC}**
	Max. Operating Voltage U_C: 250V_{AC}
Surge Discharge Ratings:	**Tel. Port I_n: 2.5kA 8/20µs per line**
	Coax. Port I_n: 5kA 8/20µs per line
	Power Port I_n: U_{OC}: 3kV
Enclosure:	**UTB in-line patch, AC power outlet**
Termination:	**Tel.: RJ11 input / RJ11 output**
	Coax.: IEC connector
	Power: DIN 49 440-CEE(7) III, DIN 49 441-CEE(7) IV

The adapter ZES-76 TEL-TV is intended for the protection of multimedia devices (e.g. printers, modems, TV sets, Hi-fi's, DVDs etc). The protection is functionally divided into power supply protection (230V), telephone line protection and TV protection. Furthermore, there is also an overload protection fitted. The adapter protects electronic devices against surges caused by lightning strikes, switching operations at larger electrical consumers, induction and other sources of overvoltage.

Technical characteristics

Type		ZES-76 TEL-TV Power part	Tel. Part	Coax. Part
Protection construction			Protective module	
Nominal operating voltage	U_n	230V / 50Hz	110V_{DC}	50V_{DC}
Max. continuous operating voltage	U_c	250V / 50Hz	170V_{DC}	70V_{DC}
Nominal discharge current (8/20µs)	I_n	/	2.5kA	5kA
Pulse discharge voltage (1.2/20µs)	U_{oc}	3kV	/	/
Voltage protection level at I_n	U_p	< 1000V (L - N)	700V	700V
Forefuse (needed if not present in the network)		16A gL	/	/
Limit frequency	f_G	/	30MHz	860MHz
Response time of overvoltage protection	t_A	< 25ns (L - N)	< 100ns	< 100ns
Connection		DIN 49 440-CE(7)III DIN 49 441-CEE(7)IV Grounding contact	Input/Output: RJ 11 sockets,	IEC connector
Supervising device: Protection status		Green light		
Operating temperature			-40°C ... +80°C	
Degree of protection			IP 20	
Housing material			Thermoplastic, extinguishing degree V-0	
Ordering code			**121 368**	

Dimensional drawings



ZES-7 TEL-TV

COMBINED PLUG-IN SURGE PROTECTION

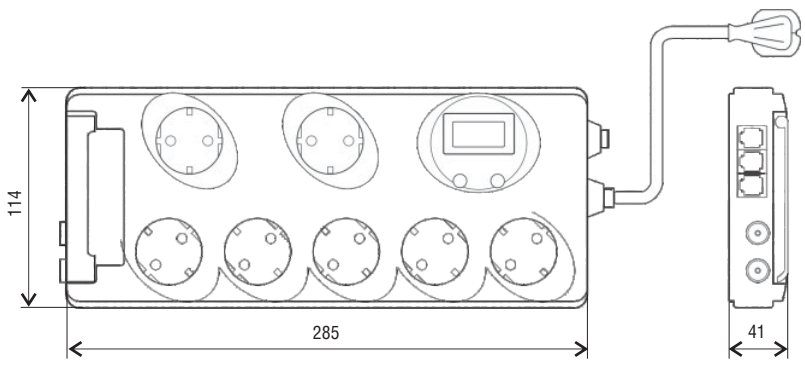
IEC category / EN type:	**III (IEC 60643-1) and C1/C2/C3 (IEC 60643-21)**
Design:	**Compact, ergonomic packaging, extension cord, 7 power socket**
Protection:	**Power, telecommunication and TV**
Telecommunication port:	**Max. Operating Voltage U_C: 170V_{DC}**
TV port:	**Max. Operating Voltage U_C: 70V_{DC}**
Power port:	**Nom. Operating Voltage U_n: 230V_{AC}**
	Max. Operating Voltage U_C: 250V_{AC}
Surge Discharge Ratings:	**Tel. Port I_n: 2.5kA 8/20µs per line**
	Coax. Port I_n: 5kA 8/20µs per line
	Power Port I_n: U_{OC}: 3kV
Enclosure:	**UTB in-line patch, AC power outlet**
Termination:	**Tel.: RJ11 input / RJ11 output**
	Coax.: IEC connector
	Power: DIN 49 440-CEE(7) III, DIN 49 441-CEE(7) IV

The combined plug-in surge protection ZES-7 TEL-TV is intended for the protection of multimedia devices (e.g. printers, modems, TV sets, Hi-fi's, DVDs etc). The protection is functionally divided into power supply protection (230V), telephone line protection and TV protection. Furthermore, there is also an overload protection fitted. The ZES-7 TEL-TV protects electronic devices against surges caused by lightning strikes, switching operations at larger electrical consumers, induction and other sources of overvoltage.

Technical characteristics

Type		ZES-7 TEL-TV Power part	Tel. Part	Coax. Part
Protection construction			Protective module	
Nominal operating voltage	U_n	230V / 50Hz	110V_{DC}	50V_{DC}
Max. continuous operating voltage	U_C	250V / 50Hz	170V_{DC}	70V_{DC}
Nominal discharge current (8/20µs)	I_n	/	2.5kA	5kA
Pulse discharge voltage (1.2/20µs)	U_{OC}	3kV	/	/
Voltage protection level at I_n	U_p	< 1000V (L - N)	700V	700V
Limit frequency	f_G	/	30MHz	/
Response time of overvoltage protection	t_A	< 25ns (L - N)	< 100ns	860MHz
Connection		DIN 49 440-CE(7)III DIN 49 441-CEE(7)IV Grounding contact	Input/Output: RJ 11 sockets,	< 100ns IEC connector
Supervising device: Supply present		Green light		
Protection status		Yellow light		
Operating temperature			-40°C ... +80°C	
Degree of protection			IP 20	
Housing material			Thermoplastic, extinguishing degree V-0	
Ordering code			**121 369**	

Dimensional drawings



ZES 1M+5S

COMBINED PLUG-IN SURGE PROTECTION

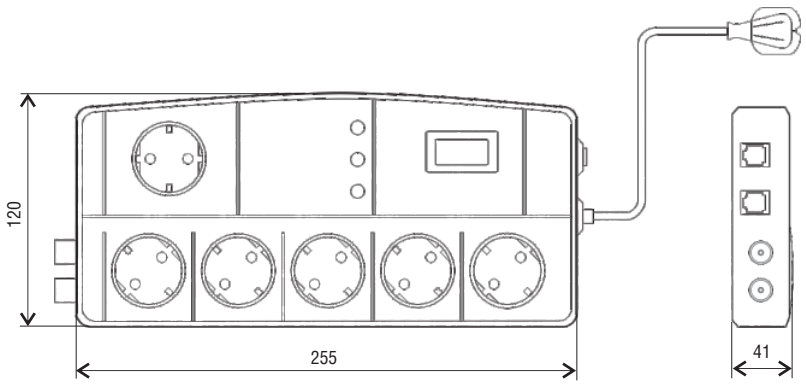
IEC category / EN type:	**III (IEC 60643-1) and C1/C2/C3 (IEC 60643-21)**
Design:	**Compact, ergonomic packaging, extension cord, 6 power socket**
Protection:	**Power, telecommunication and TV**
Telecommunication port:	**Max. Operating Voltage U_C: 170V_{DC}**
TV port:	**Max. Operating Voltage U_C: 70V_{DC}**
Power port:	**Nom. Operating Voltage U_n: 230V_{AC}**
	Max. Operating Voltage U_C: 250V_{AC}
Surge Discharge Ratings:	**Tel. Port I_n: 2.5kA 8/20µs per line**
	Coax. Port I_n: 5kA 8/20µs per line
	Power Port I_n: U_{OC}: 3kV
Enclosure:	**UTB in-line patch, AC power outlet**
Termination:	**Tel.: RJ11 input / RJ11 output**
	Coax.: IEC connector
	Power: DIN 49 440-CEE(7) III, DIN 49 441-CEE(7) IV

The combined plug-in surge protection ZES-1M+5S is intended for the protection of multimedia devices (e.g. printers, modems, TV sets, Hi-fi's, DVDs etc). The protection is functionally divided into power supply protection (230V), telephone line protection and TV protection. Furthermore, there is also an overload protection fitted. The ZES-1M+5S protects electronic devices against surges caused by lightning strikes, switching operations at larger electrical consumers, induction and other sources of overvoltage. Master-slave function is included.

Technical characteristics

Type		ZES 1M+5S Power part	ZES 1M+5S Tel. Part	ZES 1M+5S Coax. Part
Protection construction			Protective module	
Nominal operating voltage	U_n	230V / 50Hz	110V_{DC}	50V_{DC}
Max. continuous operating voltage	U_c	250V / 50Hz	170V_{DC}	70V_{DC}
Nominal discharge current (8/20µs)	I_n	/	2.5kA	5kA
Pulse discharge voltage (1.2/20µs)	U_{oc}	3kV	/	/
Voltage protection level at I_n	U_p	< 1000V (L - N)	700V	700V
Limit frequency	f_G	/	30MHz	860MHz
Response time of overvoltage protection	t_A	< 25ns (L - N)	< 100ns	< 100ns
Connection		DIN 49 440-CE(7)III DIN 49 441-CEE(7)IV Grounding contact	Input/Output: RJ 11 sockets,	IEC connector
Supervising device: Supply present		Green light		
Protection status		Yellow light		
Operating temperature			-40°C ... +80°C	
Degree of protection			IP 20	
Housing material			Thermoplastic, extinguishing degree V-0	
Ordering code			**121 370**	

Dimensional drawings



ZES 1M+4S TEL-NET USB Hub

COMBINED PLUG-IN SURGE PROTECTION

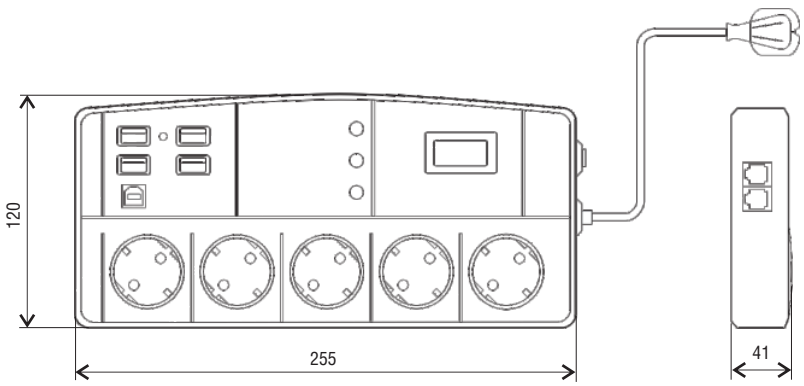
IEC category / EN type:	**III (IEC 60643-1) and C1/C2/C3 (IEC 60643-21)**
Design:	**Compact, ergonomic packaging, extension cord, 5 power socket**
Protection:	**Power, telephone/Ethernet Cat5 protection**
Data port:	**Max. Operating Voltage U_C: 170 V_{DC}**
Power port:	**Nom. Operating Voltage U_n: 230V_{AC}**
	Max. Operating Voltage U_C: 250V_{AC}
Surge Discharge Ratings:	**Data Port I_n: 2.5kA 8/20µs per line**
	Power Port I_n: U_{OC}: 3kV
Enclosure:	**UTB in-line patch, AC power outlet**
Termination:	**Data: RJ45 input / RJ45 output**
	Power: DIN 49 440-CEE(7) III, DIN 49 441-CEE(7) IV

The combined plug-in surge protection ZES-1M+4S is intended for the protection of multimedia devices (e.g. printers, modems, TV sets, Hi-fi's, DVDs etc). The protection is functionally divided into power supply protection (230V) and telephone/Ethernet Cat5 protection. Furthermore, there is also an overload protection fitted. The ZES-1M+4S protects electronic devices against surges caused by lightning strikes, switching operations at larger electrical consumers, induction and other sources of overvoltage. 4 Port passive USB Hub and master-slave function are included.

Technical characteristics

Type		ZES-1M+4S TEL-TV USB Hub	
		Power part	**Data part**
Protection construction		Protective module	
Nominal operating voltage	U_n	230V / 50Hz	110V_{DC}
Max. continuous operating voltage	U_C	250V / 50Hz	170V_{DC}
Nominal discharge current (8/20µs)	I_n	/	2.5kA
Pulse discharge voltage (1.2/20µs)	U_{OC}	3kV	/
Voltage protection level at I_n	U_p	< 1000V (L - N)	700V
Limit frequency	f_G	/	100MHz
Response time of overvoltage protection	t_A	< 25ns	< 100ns
Connection		DIN 49 440-CE(7)III, DIN 49 441-CEE(7)IV Grounding contact	Input/Output: RJ 45 sockets, all 3 pairs protected
Supervising device: Supply present Protection status		Green light Yellow light	/
Operating temperature		-40°C ... +80°C	
Degree of protection		IP 20	
Housing material		Thermoplastic, extinguishing degree V-0	
Ordering code		**121 380**	

Dimensional drawings



ZES 6

PLUG-IN SURGE PROTECTION

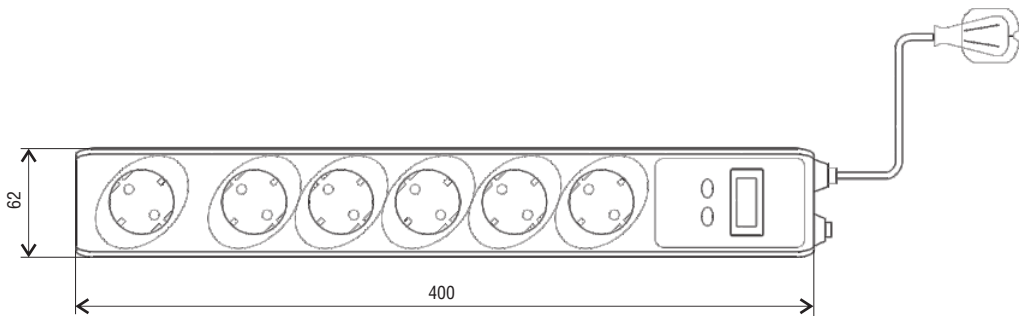
IEC category / EN type:	**III (IEC 60643-1)**
Design:	**Compact, ergonomic packaging, extension cord, 5 power socket**
Protection:	**Nom. Operating Voltage U_n: 230V_{AC}** **Max. Operating Voltage U_C: 250V_{AC}**
Surge Discharge Ratings:	**U_{OC}: 3kV**
Enclosure:	**AC power outlet**
Termination:	**Power: DIN 49 440-CEE(7) III, DIN 49 441-CEE(7) IV**

The plug-in surge protection ZES-6 is intended for the protection of household appliances. There is also an overload protection fitted. The ZES-6 protects electronic devices against surges caused by lightning strikes, switching operations at larger electrical consumers, induction and other sources of overvoltage.

Technical characteristics

Type		**ZES 6 Power part**
Protection construction		Protective module
Nominal operating voltage	U_n	230V / 50Hz
Max. continuous operating voltage	U_c	250V / 50Hz
Pulse discharge voltage (1.2/20µs)	U_{oc}	3kV
Voltage protection level at I_n	U_p	< 1000V (L - N)
Limit frequency	f_G	/
Response time of overvoltage protection	t_A	< 25ns
Connection		DIN 49 440-CE(7)III, DIN 49 441-CEE(7)IV Grounding contact
Supervising device: Supply present		Green light
Protection status		Yellow light
Operating temperature		-40°C ... +80°C
Degree of protection		IP 20
Housing material		Thermoplastic, extinguishing degree V-0
Ordering code		**121 374**

Dimensional drawings



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Impedance matched**
Nom. Operating Voltage U_n:	**±5, ±12VDC**
Max. Operating Voltage U_c:	**±6, ±14VDC**
Freq:	**< 100MHz**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**100mA**
Enclosure:	**Shielded enclosure, in-line installation**
Termination:	**BNC connectors**

The ZV-BNC series is intended to protect Arcnet computer networks and CCTV coaxial video signals.

Both coarse and fine protection is provided in a shielded, impedance matched, compact in-line enclosure.

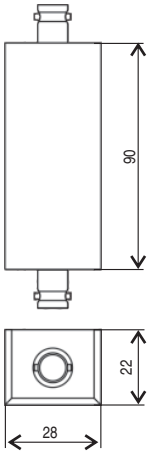
Protection is provided core-shield, and shield-protective ground.

The design ensures minimum of capacitance loading thereby ensuring a high operating bandwidth while providing efficient clamping against transient voltages.

Technical characteristics

Type		**ZV-BNC ± 5V**	**ZV-BNC ± 12V**
Protection construction		Protective module	
Nominal operating voltage	U_n	± $5V_{DC}$	± $12V_{DC}$
Max. operating voltage	U_c	± $6V_{DC}$	± $14V_{DC}$
Rated spark overvoltage	(wire-shield) (shield-PG)	13.5V - 16.5V 72V - 108V	30V - 36V 72V - 108V
Rated operating current at 25°C	I_L	100mA	100mA
Nominal discharge current (8/20µs)	I_n	10kA	10kA
Residual voltage at 5kA (8/20µs)		< 35V (wire-shield)	< 65V (wire-shield)
Response time of overvoltage protection	(wire-shield) (shield-PG)	< 10ns < 100ns	< 10ns < 100ns
Insulation resistance of the protection	(wire-shield) (shield-PG)	≥ 10MΩ ≥ 1GΩ	≥ 28MΩ ≥ 1GΩ
Serial resistance	R	9 - 11Ω	9 - 11Ω
Transverse capacitance	(wire-shield) (shield-PG)	30pF 1pF	30pF 1pF
Limit frequency	f_G	100MHz	100MHz
Transmission rate		16Mbit/s	16Mbit/s
Operating temperature		- 40°C ... + 80°C	
Degree of protection		IP 20	
Casing material		Metal	
Connection		BNC connector	
Ordering code		**705 001**	**705 002**

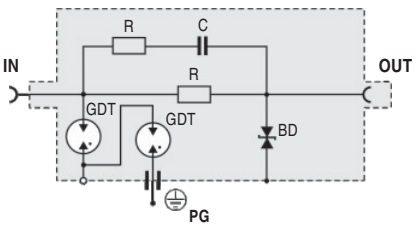
Dimensional drawings

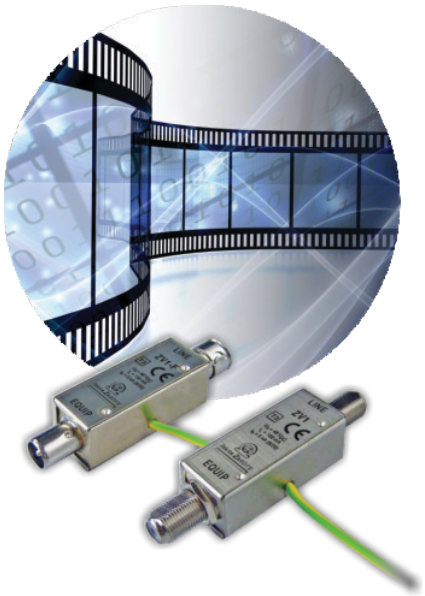


Connection diagram

Legend:

GDT	*gas discharge tube*
R	*resistor*
C	*capacitor*
D	*diode*
BD	*bi-directional TVS diode*
PG	*protective grounding*





IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Impedance matched**
Nom. Operating Voltage U_n:	**48VDC**
Max. Operating Voltage U_c:	**60VDC**
Freq:	**40 - 860MHz**
Surge Discharge Ratings:	**I_n: 5kA 8/20µs, I_{max}: 10kA 8/20µs**
Series load current:	**100mA**
Enclosure:	**Shielded enclosure, in-line installation**
Termination:	**IEC; F connectors**

The aerial adapters ZV1 (ZV1-F) are intended for the protection of TV sets, aerial amplifiers and cable television CATV.

It should be connected to the aerial input of the TV set, with the coaxial cable from the aerial plugged into the other side. It should be grounded to the protective earth conductor of the housing installation.

In the case of an individual aerial system with an individual aerial amplifier it is recommended to install an additional aerial adapter which should be connected in the same way as for the TV set.

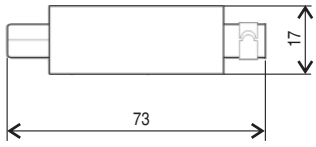
The aerial adapter is not suitable for outdoor installation or installation in very damp places.

Technical characteristics

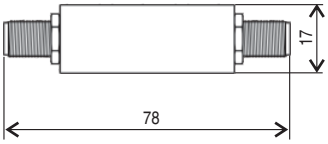
Type		ZV-1	ZV1-F
Protection construction		Protective module	
Nominal operating voltage	U_n	$48V_{DC}$	$48V_{DC}$
Max. operating voltage	U_c	$60V_{DC}$	$60V_{DC}$
Rated spark overvoltage	(wire-shield)	90V - 110V	90V - 110V
Rated operating current at 25°C	I_L	100mA	100mA
Nominal discharge current (8/20µs)	I_n	5kA	5kA
Residual voltage at 5kA (8/20µs)		< 500V	< 500V
Response time of overvoltage protection	(wire-shield)	< 25ns	< 25ns
Insulation resistance of the protection	(wire-shield)	≥ 6MΩ	≥ 6MΩ
Serial resistance	R	< 0.1 Ω	< 0.1 Ω
Limit frequency	f_G	40 - 860MHz	40 - 860MHz
Operating temperature		- 40°C ... + 80°C	
Degree of protection		IP 20	
Casing material		Metal	
Connection		IEC	F
Ordering code		**125 090**	**125 210**

Dimensional drawings

ZV1-F

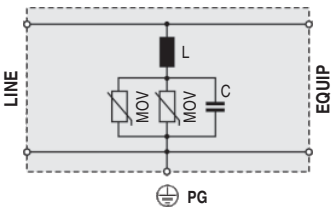


Zv1

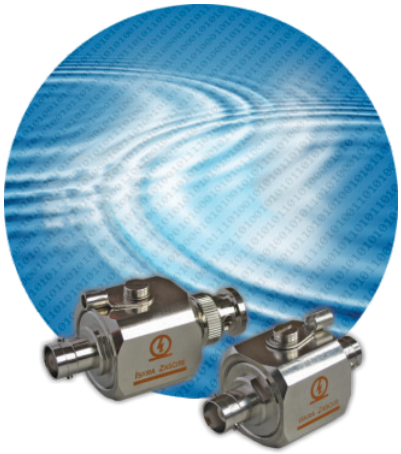


Connection diagram

Legend:	
MOV	*varistor*
L	*coil*
C	*capacitor*
PG	*protective grounding*



CCP-BNC Series



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**In-line. Impedance matched**
Max. Operating Voltage U_C:	**70, 180, 280V**
Max. Peak Power:	**40, 125, 300W respectively**
Freq:	**DC 2.6GHz**
Characteristic Impedance:	**50Ω**
Insertion loss:	**< 0.4dB**
Return loss:	**> 20dB**
Surge Discharge Ratings:	**I_N:10kA 8/20µs, I_{MAX}: 20kA 8/20µs**
Enclosure:	**Shielded enclosure, in-line installation**
Termination:	**BNC - Type. M-F and F-F available**

The CCP-BNC series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 2.4 GHz.

It is designed as an in-line unit allowing ease of installation. The careful design, low capacitance gas discharge arresters and high quality BNC-type termination connectors, ensures a minimum of insertion loss throughout the frequency band.

Transfer power is 40W to 300W continuous (depending on CCP voltage).

The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

- IEC 61643-21:2000

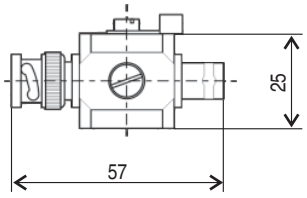
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

Technical characteristics

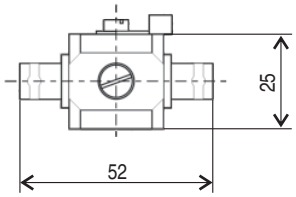
Type		CCP70 -BNC-FF	CCP180 -BNC-FF	CCP280 -BNC-FF	CCP70 -BNC-MF	CCP180 -BNC-MF	CCP280 -BNC-MF
Max. Continuous operating voltage	U_C	70V	180V	280V	70V	180V	280V
Max. peak power		40W	125W	300W	40W	125W	300W
Impedance		50Ω					
Frequency range		0 - 2600 MHz					
Insertion losses		< 0.4dB					
Return losses		> 20dB					
Nom. discharge current (8/20µs)	I_n	10kA					
Max. discharge current (8/20µs)	I_{max}	20kA					
Residual voltage (1kV/µs)		< 600V	< 700V	< 900V	< 600V	< 700V	< 900V
Insulation		> 10GΩ					
Weight		106g	106g	106g	114g	114g	114g
Operation temperature		- 40°C ... + 80°C					
Style of connector		BNC female / female			BNC male / female		
Ordering code		**800 729**	**800 730**	**800 731**	**800 732**	**800 733**	**800 734**

Dimensional drawings

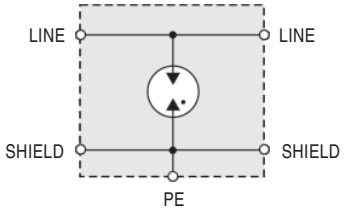
CCP-BNC-MF



CCP-BNC-FF

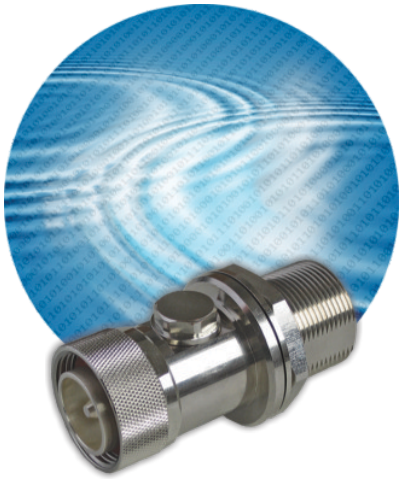


Connection diagram



CCP-7/16 Series

COAXIAL/RF PROTECTION



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design	**Bulkhead, impedance matched**
Max. Operating Voltage U_C:	**70, 180, 280V**
Max. Peak Power:	**40, 125, 300W respectively**
Freq:	**DC 2.5GHz**
Characteristic Impedance:	**50Ω**
Insertion loss:	**< 0.2dB**
Return loss:	**> 20dB**
Surge Discharge Ratings:	**I_N: 10kA 8/20µs, I_{MAX}: 20kA 8/20µs**
Enclosure:	**Shielded enclosure, bulkhead installation**
Termination:	**7/16-Type M-F**

The CCP-7/16 series of coaxial surge protectors is intended to protect base station RF antenna systems and is suitable for frequencies from DC to 2.5 GHz.

It is designed for bulkhead or in-line installation. The careful design, low capacitance gas discharge arresters and high quality 7/16-type termination connectors ensure a minimum of insertion loss throughout the frequency band.

Transfer power is 40W to 300W continuous (depending on CCP voltage).

The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

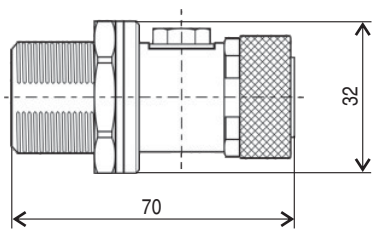
- IEC 61643-21:2000

GDT is replaceable. The unit should be solidly mounted to the coaxial feed-through bulkhead which should in turn present a low impedance path to ground for direct or partial lightning currents.

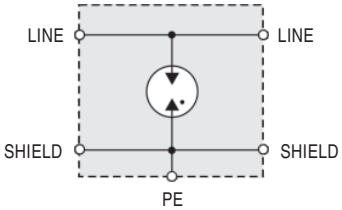
Technical characteristics

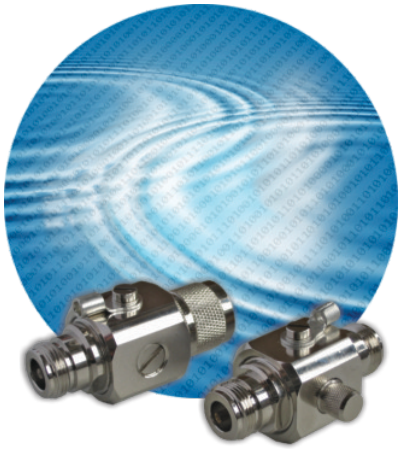
Type		CCP70 -7/16-MF	CCP180 -7/16-MF	CCP280 -7/16-MF
Max. Continuous operating voltage	U_C	70V	180V	280V
Max. peak power		40W	125W	300W
Impedance			50Ω	
Frequency range			0 - 2500MHz	
Insertion losses			< 0.2dB	
Return losses			> 20dB	
Nom. discharge current (8/20µs)	I_n		10kA	
Max. discharge current (8/20µs)	I_{max}		20kA	
Residual voltage (1kV/µs)		< 600V	< 700V	< 900V
Insulation			> 10GΩ	
Weight			214g	
Operation temperature			- 40°C ... + 80°C	
Style of connector			7/16 male / female	
Ordering code		**800 720**	**800 721**	**800 722**

Dimensional drawings



Connection diagram





IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**In-line. Impedance matched**
Max. Operating Voltage U_C:	**70, 180, 280V**
Max. Peak Power:	**40, 125, 300W respectively**
Freq:	**DC 2.6GHz**
Characteristic Impedance:	**50Ω**
Insertion loss:	**< 0.4dB**
Return loss:	**> 20dB**
Surge Discharge Ratings:	**I_N: 10kA 8/20µs, I_{MAX}: 20kA 8/20µs**
Enclosure:	**Shielded enclosure, in-line installation**
Termination:	**N - Type. M-F and F-F available**

The CCP-N series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 2.4 GHz.

It is designed as an in-line unit allowing ease of installation. The careful design, low capacitance gas discharge arresters and high quality N-type termination connectors, ensures a minimum of insertion loss throughout the frequency band.

Transfer power is 40W to 300W continuous (depending on CCP voltage).

The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

- IEC 61643-21:2000

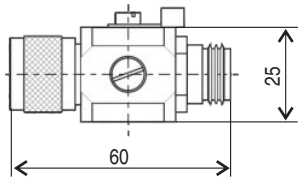
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

Technical characteristics

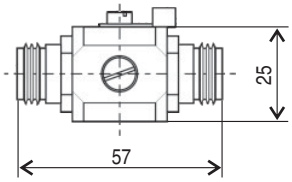
Type		CCP70 -N-FF	CCP180 -N-FF	CCP280 -N-FF	CCP70 -N-MF	CCP180 -N-MF	CCP280 -N-MF
Max. Continuous operating voltage	U_C	70V	180V	280V	70V	180V	280V
Max. peak power		40W	125W	300W	40W	125 W	300 W
Impedance		50Ω					
Frequency range		0 - 2600MHz					
Insertion losses		< 0.4dB					
Return losses		> 20dB					
Nom. discharge current (8/20µs)	I_n	10kA					
Max. discharge current (8/20µs)	I_{max}	20kA					
Residual voltage (1kV/µs)		< 600V	< 700V	< 900V	< 600V	< 700V	< 900V
Insulation		> 10GΩ					
Weight		138g	138g	138g	142g	142g	142g
Operation temperature		- 40°C ... + 80°C					
Style of connector		N female / female			N male / female		
Ordering code		**800 723**	**800 724**	**800 725**	**800 726**	**800 727**	**800 728**

Dimensional drawings

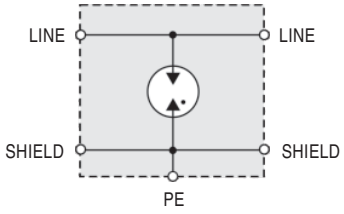
CCP-N-MF



CCP-N-FF



Connection diagram



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**In-line. Impedance matched**
Max. Operating Voltage U_C:	**180V**
Max. Peak Power:	**125W**
Freq:	**DC - 6.0GHz**
Characteristic Impedance:	**50Ω**
Insertion loss:	**< 0.4dB**
Return loss:	**> 20dB**
Surge Discharge Ratings:	**I_N: 10kA 8/20µs, I_{MAX}: 20kA 8/20µs**
Enclosure:	**Shielded enclosure, in-line installation**
Termination:	**N - Type. M-F and F-F available**

The CCP-N-6G series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to **6.0GHz**.

It is designed as an in-line unit allowing ease of installation. The careful design, low capacitance gas discharge arresters and high quality N-type termination connectors, ensures a minimum of insertion loss throughout the frequency band.

Transfer power is 125W continuous.

The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

- IEC 61643-21:2000

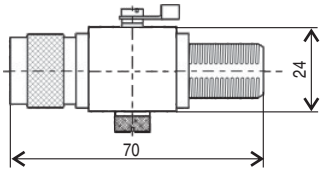
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

Technical characteristics

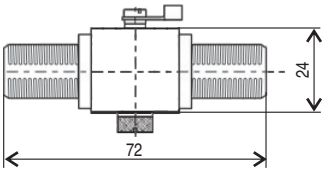
Type		CCP180 -N-FF	CCP180 -N-MF
Max. Continuous operating voltage	U_C	180V	180V
Max. peak power		125W	125 W
Impedance		50Ω	
Frequency range		0 - 6.0GHz	
Insertion losses		< 0.4dB	
Return losses		> 20dB	
Nom. discharge current (8/20µs)	I_n	10kA	
Max. discharge current (8/20µs)	I_{max}	20kA	
Residual voltage (1kV/µs)		< 700V	< 700V
Insulation		> 10GΩ	
Weight		132g	130g
Operation temperature		- 40°C ... + 80°C	
Style of connector		N female / female	N male / female
Ordering code		**800 763**	**800 764**

Dimensional drawings

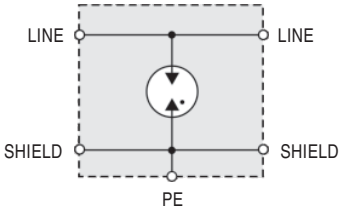
CCP-N-6G-MF



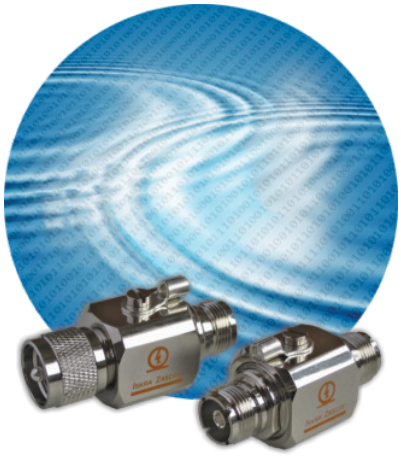
CCP-N-6G-FF



Connection diagram



CCP-UHF Series



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**In-line. Impedance matched**
Max. Operating Voltage U_C:	**70, 180, 280V**
Max. Peak Power:	**40, 125, 300W respectively**
Freq:	**DC 600MHz**
Characteristic Impedance:	**50Ω**
Insertion loss:	**< 0.4dB**
Return loss:	**> 20dB**
Surge Discharge Ratings:	**I_N: 10kA 8/20µs, I_{MAX}: 20kA 8/20µs**
Enclosure:	**Shielded enclosure, in-line installation**
Termination:	**UHF - Type. M-F and F-F available**

The CCP-UHF series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 600 MHz.

It is designed as an in-line unit allowing ease of installation. The careful design, low capacitance gas discharge arresters and high quality UHF-type termination connectors, ensures a minimum of insertion loss throughout the frequency band.

Transfer power is 40W to 300W continuous (depending on CCP voltage) .

The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

- IEC 61643-21:2000

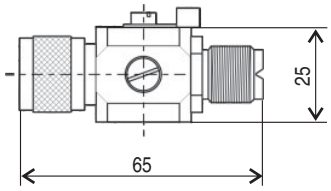
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

Technical characteristics

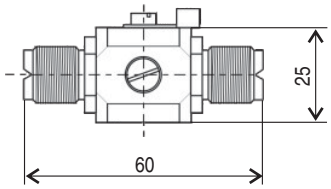
Type		CCP70 -UHF-FF	CCP180 -UHF-FF	CCP280 -UHF-FF	CCP70 -UHF-MF	CCP180 -UHF-MF	CCP280 -UHF-MF
Max. Continuous operating voltage	U_C	70V	180V	280V	70V	180V	280V
Max. peak power		40W	125W	300W	40W	125W	300W
Impedance		50Ω					
Frequency range		0 - 600MHz					
Insertion losses		< 0.4dB					
Return losses		> 20dB					
Nom. discharge current (8/20µs)	I_n	10kA					
Max. discharge current (8/20µs)	I_{max}	20kA					
Residual voltage (1kV/µs)		< 600V	< 700V	< 900V	< 600V	< 700V	< 900V
Insulation		> 10GΩ					
Weight		104g	104g	104g	104g	104g	104g
Operation temperature		- 40°C ... + 80°C					
Style of connector		UHF female / female			UHF male / female		
Ordering code		**800 735**	**800 736**	**800 737**	**800 738**	**800 739**	**800 740**

Dimensional drawings

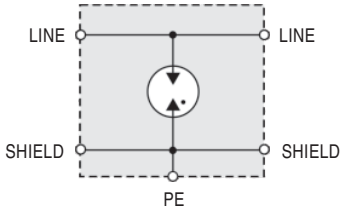
CCP-UHF-MF



CCP-UHF-FF

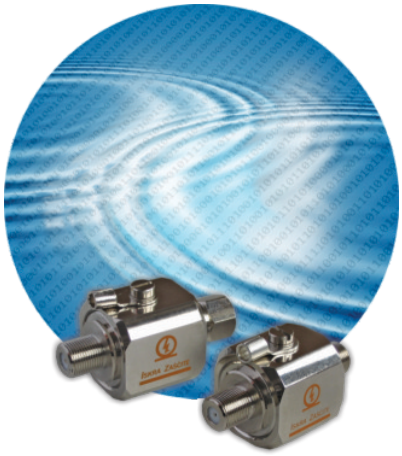


Connection diagram



CCP-F Series

COAXIAL/RF PROTECTION



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**In-line. Impedance matched**
Max. Operating Voltage U_C:	**70, 180V**
Max. Peak Power:	**40, 125W respectively**
Freq:	**DC 2.0GHz**
Characteristic Impedance:	**75Ω**
Insertion loss:	**< 0.4dB**
Return loss:	**> 20dB**
Surge Discharge Ratings:	**I_N: 10kA 8/20µs, I_{MAX}: 20kA 8/20µs**
Enclosure:	**Shielded enclosure, in-line installation**
Termination:	**F - Type. M-F and F-F available**

The CCP-F series of coaxial surge protectors is intended to protect RF antenna systems terminating in F-type connectors and is suitable for frequencies from DC to 1.6 GHz. It is eminently suitable for the protection of USA CCTV and CATV systems.

It is designed as an in-line unit allowing ease of installation. The careful design, low capacitance gas discharge arresters and high quality F-type termination connectors, ensures a minimum of insertion loss throughout the frequency band.

Transfer power is 40 W to 125 W continuous (depending on CCP voltage).

The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

- IEC 61643-21:2000

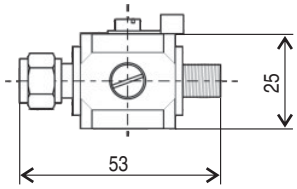
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

Technical characteristics

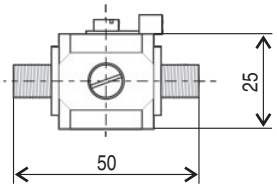
Type		CCP70 -F75-FF	CCP180 -F75-FF	CCP70 -F75-MF	CCP180 -F75-MF
Max. continuous operating voltage	U_C	70V	180V	70V	180V
Max. peak power		40W	125W	40W	125W
Impedance			75Ω		
Frequency range			0 - 2000MHz		
Insertion losses			< 0.4dB		
Return losses			> 20dB		
Nom. discharge current (8/20µs)	I_n		10kA		
Max. discharge current (8/20µs)	I_{max}		20kA		
Residual voltage (1kV/µs)		< 600V	< 700V	< 600V	< 700V
Insulation			> 10GΩ		
Weight		80g	80g	84g	84g
Operation temperature			- 40°C ... + 80°C		
Style of connector		F female / female		F male / female	
Ordering code		**800 741**	**800 742**	**800 743**	**800 744**

Dimensional drawings

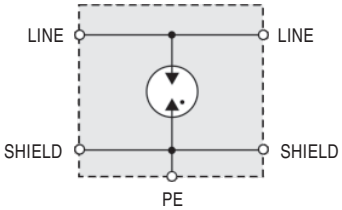
CCP-F-MF

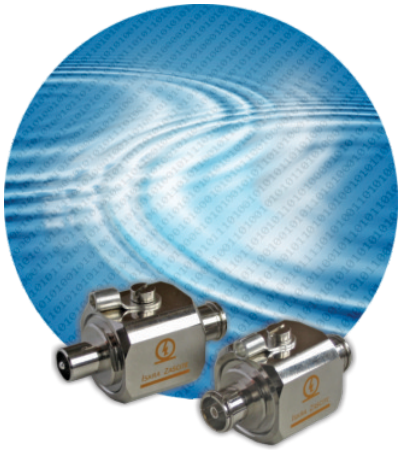


CCP-F-FF



Connection diagram





IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**In-line. Impedance matched**
Max. Operating Voltage U_C:	**70, 180V**
Max. Peak Power:	**40, 125W respectively**
Freq:	**DC 2.0GHz**
Characteristic Impedance:	**75Ω**
Insertion loss:	**< 0.4dB**
Return loss:	**> 20dB**
Surge Discharge Ratings:	**I_N: 10kA 8/20µs, I_{MAX}: 20kA 8/20µs**
Enclosure:	**Shielded enclosure, in-line installation**
Termination:	**TV - Type. M-F and F-F available**

The CCP-TV series of coaxial surge protectors is intended to protect RF antenna systems terminating in TV-type connectors and is suitable for frequencies from DC to 1.6 GHz. It is eminently suitable for European CCTV and CATV systems.

It is designed as an in-line unit allowing ease of installation. The careful design, low capacitance gas discharge arresters and high quality TV-type termination connectors, ensures a minimum of insertion loss throughout the frequency band.

Transfer power is 40W to 125W continuous (depending on CCP voltage).

The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

- IEC 61643-21:2000

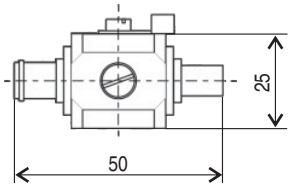
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

Technical characteristics

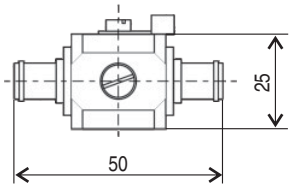
Type		CCP70 -TV75-FF	CCP180 -TV75-FF	CCP70 -TV75-MF	CCP180 -TV75-MF
Max. continuous operating voltage	U_C	70V	180V	70V	180V
Max. peak power		40W	125W	40W	125W
Impedance		75Ω			
Frequency range		0 - 2000MHz			
Insertion losses		< 0.4dB			
Return losses		> 20dB			
Nom. discharge current (8/20µs)	I_n	10kA			
Max. discharge current (8/20µs)	I_{max}	20kA			
Residual voltage (1kV/µs)		< 600V	< 700V	< 600V	< 700V
Insulation		> 10GΩ			
Weight		80g		82g	
Operation temperature		- 40°C ... + 80°C			
Style of connector		TV female / female		TV male / female	
Ordering code		**800 745**	**800 746**	**800 747**	**800 748**

Dimensional drawings

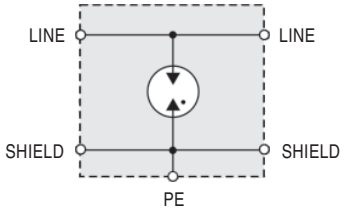
CCP-TV-MF



CCP-TV-FF



Connection diagram



CCP-L/4-7/16 Series

COAXIAL/RF PROTECTION

IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design	**Bulkhead, impedance matched**
Max. Peak Power:	**500W**
Freq:	**865 - 965MHz, 1700 - 1950MHz**
Characteristic Impedance:	**50Ω**
Insertion loss:	**< 0.2dB**
Return loss:	**> 20dB**
Surge Discharge Ratings:	**I_N: 15kA 8/20µs, I_{MAX}: 30kA 8/20µs**
Enclosure:	**Shielded enclosure, bulkhead installation**
Termination:	**L/4-7/16-Type M-F and F-F available**

The CCP-L/4-7/16 series of coaxial surge protectors is intended to protect base station RF antenna systems and is suitable for frequencies from DC to 865 - 965 Mhz, 1700 - 1950MHz.

It is designed for bulkhead or in-line installation. The careful design, low intermodulation and high quality 7/16-type termination connectors ensure a minimum of insertion loss throughout the frequency band.

Transfer power is 500W.

The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

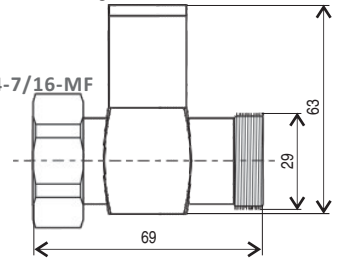
- IEC 61643-21:2000

Technical characteristics

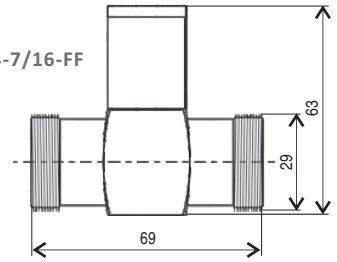
Type		CCP-L/4 -7/16-MF	CCP-L/4 -7/16-FF
Max. Continuous operating voltage	U_C	0V	0V
Max. peak power		500W	500W
Impedance		50Ω	
Frequency range		865 - 965, 1700 - 1950MHz	
Insertion losses		< 0.2dB	
Return losses		> 20dB	
Nom. discharge current (8/20µs)	I_n	15kA	
Max. discharge current (8/20µs)	I_{max}	30kA	
Voltage protection level	U_p	< 100V	
Insulation		> 10GΩ	
Weight		320g	312g
Operation temperature		- 40°C ... + 80°C	
Style of connector		L/4-7/16 male / female	L/N-7/16 female / female
Ordering code		**800 755**	**800 756**

Dimensional drawings

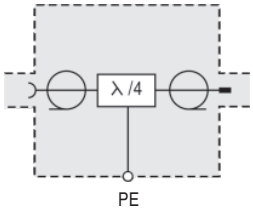
CCP-L/4-7/16-MF



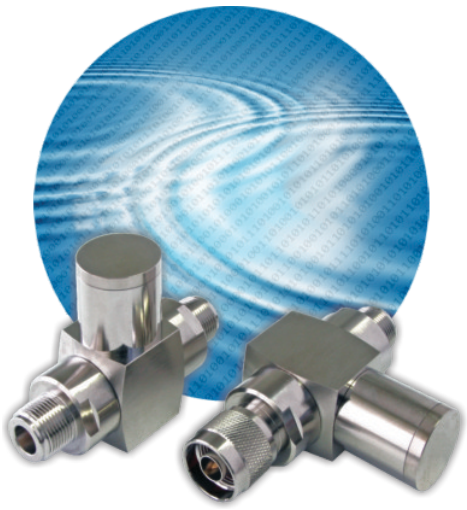
CCP-L/4-7/16-FF



Connection diagram



CCP-L/4-N Series



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design	**Bulkhead, impedance matched**
Max. Peak Power:	**500W**
Freq:	**865 - 965MHz, 1700 - 1950MHz**
Characteristic Impedance:	**50Ω**
Insertion loss:	**< 0.2dB**
Return loss:	**> 20dB**
Surge Discharge Ratings:	**I_N: 15kA 8/20µs, I_{MAX}: 30kA 8/20µs**
Enclosure:	**Shielded enclosure, bulkhead installation**
Termination:	**L/4-N-Type M-F and F-F available**

The CCP-L/4-N series of coaxial surge protectors is intended to protect base station RF antenna systems and is suitable for frequencies from DC to 865 - 965 Mhz, 1700 - 1950MHz.

It is designed for bulkhead or in-line installation. The careful design, low intermodulation and high quality 7/16-type termination connectors ensure a minimum of insertion loss throughout the frequency band.

Transfer power is 500W.

The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

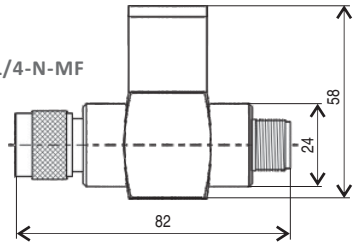
- IEC 61643-21:2000

Technical characteristics

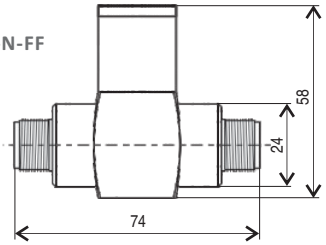
Type		CCP-L/4 -N-MF	CCP-L/4 -N-FF
Max. Continuous operating voltage	U_C	0V	0V
Max. peak power		500W	500W
Impedance		50Ω	
Frequency range		865 - 965, 1700 - 1950MHz	
Insertion losses		< 0.2dB	
Return losses		> 20dB	
Nom. discharge current (8/20µs)	I_n	15kA	
Max. discharge current (8/20µs)	I_{max}	30kA	
Voltage protection level	U_p	< 100V	
Insulation		> 10GΩ	
Weight		282g	266g
Operation temperature		- 40°C ... + 80°C	
Style of connector		L/4-N male / female	L/4-N female / female
Ordering code		**800 757**	**800 758**

Dimensional drawings

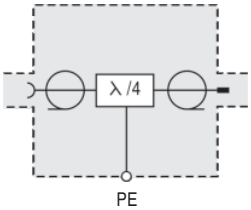
CCP-L/4-N-MF



CCP-L/4-N-FF



Connection diagram



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**Replaceable plug-in module, inherently safe design**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Nom. Operating Voltage U_n:	**15, 30V_{DC}**
Max. Operating Voltage U_c:	**18, 33V_{DC} respectively**
Series Resistance:	**0.1 - 0.4Ω per line**
Freq:	**< 3 Mhz**
Surge Discharge Ratings:	**I_n: 10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**500mA**
Enclosure:	**DIN 43880 1TE, DIN rail mount**
Terminals:	**Multi-strand to 6mm²**

The IM-Ex series is intended to provide protection to low voltage signal and data circuits located in potentially explosive environments.

It is intended for use on inherently safe circuits in accordance with ATEX directive. The protection module should be located as close to the end-user equipment being protected, as possible.

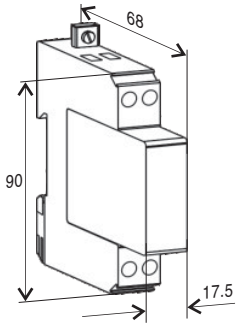
The circuit consists of a multi-stage protector providing both common (longitudinal) mode and differential (transverse) mode protection.

Coarse protection is provided using a three terminal gas discharge tube while fine protection is provided using a high speed bi-directional silicon stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

Technical characteristics

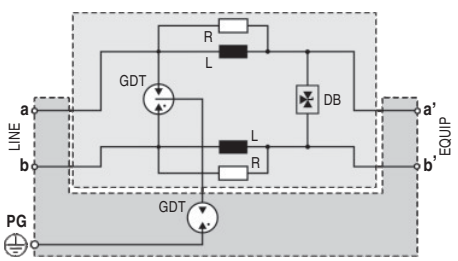
Type		IM-15Ex	IM-30Ex
Explosion protected		II 1G EEx ia II CT4	
IEC Type Examination Certificate No.		Baseefa 04 ATEX0209X	
Number of protected pairs		1(2) conductors	
Nominal operating voltage	U_n	15V_{DC}	30V_{DC}
Max. operating voltage	U_c	18V_{DC}	33V_{DC}
Rated spark overvoltage	(a/b-PG)	458 - 662V	458 - 662V
	(a-b)	20 - 25V	36 - 44V
Rated operating current at 25°C	I_L	500mA	500mA
Nominal discharge current (8/20µs)	I_n	10kA	10kA
Max. discharge current (8/20µs)	I_{max}	20kA	20kA
Residual voltage at 5kA (8/20µs)	(a-b)	34V	59V
Response time of the protection	t_A	< 1ns	< 1ns
Insulation resistance of the protection		≥ 18MΩ	≥ 33MΩ
Serial resistance	R	0.1 -0.4Ω	0.1 -0.4Ω
Transverse capacitance	C	< 10pF	< 10pF
Cross section of connecting wire		max. 6 mm²	
Ambient temperature	T_a	P_i ≤ 1Ω (- 30°C ≤ Ta ≤ 80°C) P_i ≤ 1.2Ω (- 30°C ≤ Ta ≤ 60°C) P_i ≤ 1.3Ω (- 30°C ≤ Ta ≤ 40°C)	
Degree of protection		IP 20	
Housing material		Thermoplastic; gray,extinguishing degree UL 94 V-O	
Mounting		on a 35mm DIN rail	
Ordering code		**704 102**	**704 104**

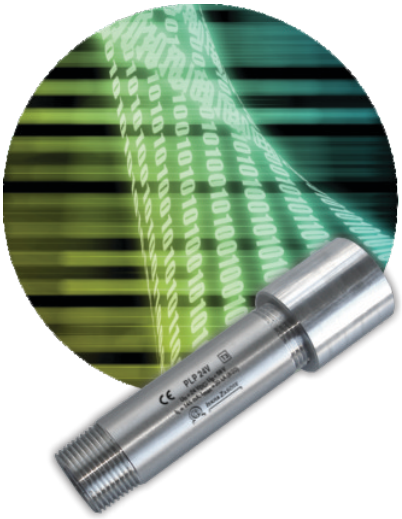
Dimensional drawings



Connection diagram

Legend:	
GDT	*gas discharge tube*
R	*resistor*
DB	*diode block*
L	*coil*
PG	*protective grounding*





IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**in-line, ¾" conduit fitting**
Mode of protection:	**Longitudinal, Transverse**
Coarse Protection:	**3 terminal GDT**
Nom. Operating Voltage U_n:	**24 V_{DC}**
Max. Operating Voltage U_c:	**28 V_{DC}**
Series Resistance:	**< 3 Ω per line**
Freq:	**< 3 MHz (see specification sheet)**
Surge Discharge Ratings:	**I_n:10kA 8/20µs, I_{max}: 20kA 8/20µs**
Series load current:	**145 mA**
Enclosure:	**¾" stainless steel fitting conduit**
Terminals:	**Multi-strand to 2.5 mm²**

The PLP-24V series of low voltage protective devices is intended for the protection of data circuits such as 4-20mA current loops, in industrial environments.

The ¾-inch pipe fitting makes this device ideal for applications such as the protection of field mount sensors, transducers and RTUs. The unit can be configured in-line with the cable with the cable conduit and sensor terminals, or in a "T" configuration.

The circuit consists of a multi-stage protector providing both common (longitudinal) mode and differential (transverse) mode protection.

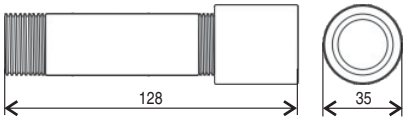
Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon avalanche diode or metal oxide varistor stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault.

Technical characteristics

Type		PLP 24V
Protection construction		Protective module
Number of protected pairs		1 (2 conductors)
Nominal operating voltage	U_n	24V_{DC}
Max. continuous operating voltage	U_c	28V_{DC}
Rated spark overvoltage	(a/b-PG)	90V - 110V
	(a-b)	36V - 44V
Rated operating current at 25°C	I_L	145 mA
Nominal discharge current (8/20µs)	I_n	10 kA
Max. discharge current (8/20µs)	I_{max}	20 kA
Residual voltage at 5 kA (8/20µs)	U_{res} (line-line)	< 59V
Response time of overvoltage protection	t_A	< 1 ns
Insulation resistance of the protection		≥ 28MΩ
Serial resistance	R	< 5Ω
Transverse capacitance	C	< 3 nF
Terminal cross section		2.5 mm²
Operating temperature		-40°C ... +80°C
Degree of protection		IP 55
Housing material		Stainless stell
Mounting		on pipe 3/4 inch
Ordering code		**127 515**

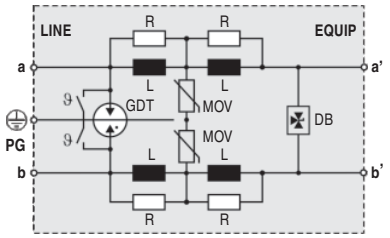
Dimensional drawings



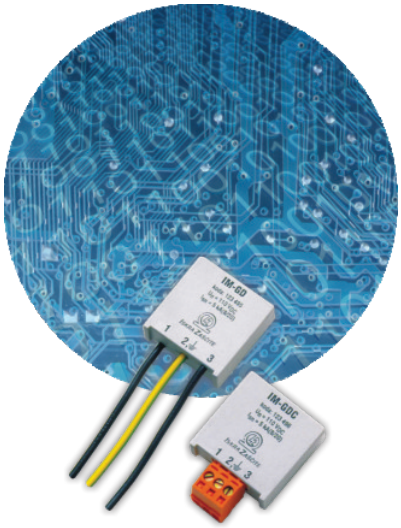
Connection diagram

Legend:

GDT	*gas discharge tube*
DB	*diode block*
MOV	*varistor*
R	*resistor*
L	*coil*
PG	*protective grounding*



IM-GD Series



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**OEM PCB module**
Mode of protection:	**Transverse, Differential**
Number of protected lines:	**1 pair (2 lines)**
Nom. Operating Voltage U_n:	**110V_{DC}**
Max. Operating Voltage U_C:	**120V_{DC}**
Surge Discharge Ratings:	**I_n: 5kA 8/20µs, I_{max}: 10kA 8/20µs**
Series load current:	**6A**
Enclosure:	**PCB hybrid**
Terminals:	**Flying leads or screw terminals**

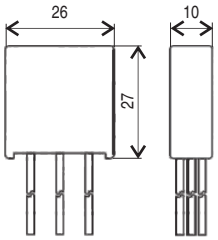
The IM-GD series is intended as a generic protector for data circuits.
It provides coarse protection via a three terminal gas discharge tube.
An internal thermal disconnector provides protection during mains incursion.

Technical characteristics

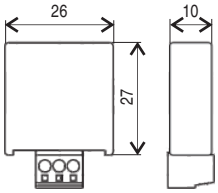
Type		IM-GD	IM-GDC
Protection construction		Protective module	
Number of protected pairs		1 (2 conductors)	
Nominal operating voltage	U_n	110V_{DC}	110V_{DC}
Max. continuous operating voltage	U_C	120V_{DC}	120V_{DC}
Rated spark overvoltage	(a/b-PG)	184V - 312V	184V - 312V
	(a-b)	184V - 624V	184V - 624V
Rated operating current at 25°C	I_L	6A	6A
Nominal discharge current (8/20µs)	I_n	5kA	5kA
Residual voltage at 5kA (8/20µs)		< 700V	< 700V
Response time of overvoltage protection	t_A	< 100ns	< 100ns
Thermal protection		Thermo-clip	Thermo-clip
Insulation resistance of the protection		≥ 1GΩ	≥ 1GΩ
Transverse capacitance	C	< 1pF	< 1pF
Terminal cross section		0.5mm^2	1.5mm^2
Ground conductor terminal cross section		0.75mm^2	1.5mm^2
Length of connecting conductors		150mm	150mm
Operating temperature		-40°C ... +80°C	-40°C ... +80°C
Degree of protection		IP 20	
Housing material		Thermoplastic; gray, extinguishing degree V-O	
Ordering code		**123 495**	**123 496**

Dimensional drawings

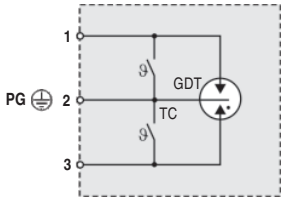
IM-GD



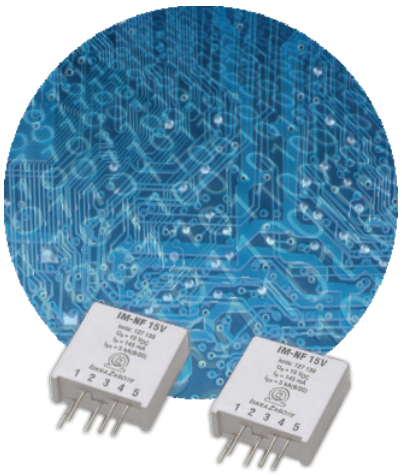
IM-GDC



Connection diagram



Legend:	
TC	*thermo-clip*
GDT	*gas discharge tube*
PG	*protective grounding*



IEC category / EN type:	**C1/C2/C3 (IEC 60643-21)**
Design:	**OEM PCB module**
Mode of protection:	**Transverse**
Number of protected lines:	**1**
Nom. Operating Voltage U_n:	**5, 15, 24V_{DC}**
Max. Operating Voltage U_c:	**6, 18, 28V_{DC}**
Series Elements typical:	**18Ω / 47µH**
Freq:	**< 0.6 - 1.4MHz (ref. Specification sheet)**
Surge Discharge Ratings:	**I_n: 5kA 8/20µs, I_{max}: 10kA 8/20µs**
Series load current:	**145mA**
Enclosure:	**PCB hybrid**
Terminals:	**PCB pins**

The IM-NF series is designed as a hybrid, PCB mount, protector against the effects of induced voltages onto data, signal and communication circuits. It is used by OEM as a component in their final product assembly.

It consists of a multi-stage protector with coarse protection being provided by a two terminal gas discharge tube while fine protection is provided using a high speed silicon stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

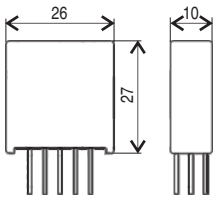
Over current protection is provided by a PTC element, which provides a level of protection against short circuit or mains incursion. Internal thermal disconnectors are also employed to reduce the hazards of thermal runaway during fault conditions.

An inline inductor is incorporated and can be used to achieve better coordination with other on-board protection components.

Technical characteristics

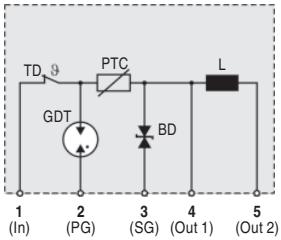
Type		IM-NF 5V	IM-NF 15V	IM-NF 24V
Protection construction			Protective module	
Number of protected pairs			1 (2 conductors)	
Nominal operating voltage	U_n	5 V_{DC}	15 V_{DC}	24 V_{DC}
Max. continuous operating voltage	U_c	6 V_{DC}	18 V_{DC}	28 V_{DC}
Rated spark overvoltage		6.5 - 8V	20 - 24V	30 - 36V
Rated operating current at 25°C	I_L	145mA	145mA	145mA
Nominal discharge current (8/20µs)	I_n	5kA	5kA	5kA
Residual voltage at 5kA (8/20µs)		< 20V	< 45V	< 65V
Response time of overvoltage protection	t_A	< 1ns	< 1ns	< 1ns
Thermal protection			Thermal disconnection	
Insulation resistance of the protection		≤ 6 kΩ	≤ 18 MΩ	≤ 28 MΩ
Serial capacitance	R	15 - 18Ω	15 - 18Ω	15 - 18Ω
Serial inductance	L	47mH	47mH	47mH
Transverse capacitance	C	< 10nF	< 4nF	< 3nF
Operating temperature			-40°C ... +80°C	
Degree of protection			IP 20	
Housing material			Thermoplastic; gray, extinguishing degree V-O	
Mounting			on a printed circuit	
Ordering code		**127 138**	**127 139**	**127 141**

Dimensional drawings



Connection diagram

Legend:	
TD	*thermal decoupler*
GDT	*gas discharge tube*
L	*coil*
PTC	*varistor with a positive temperature coeficient*
BD	*bi-directional TVS diode*
SG	*signal grounding*



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	VMO 24V	27
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	SMH-SG 5V - 60V	24
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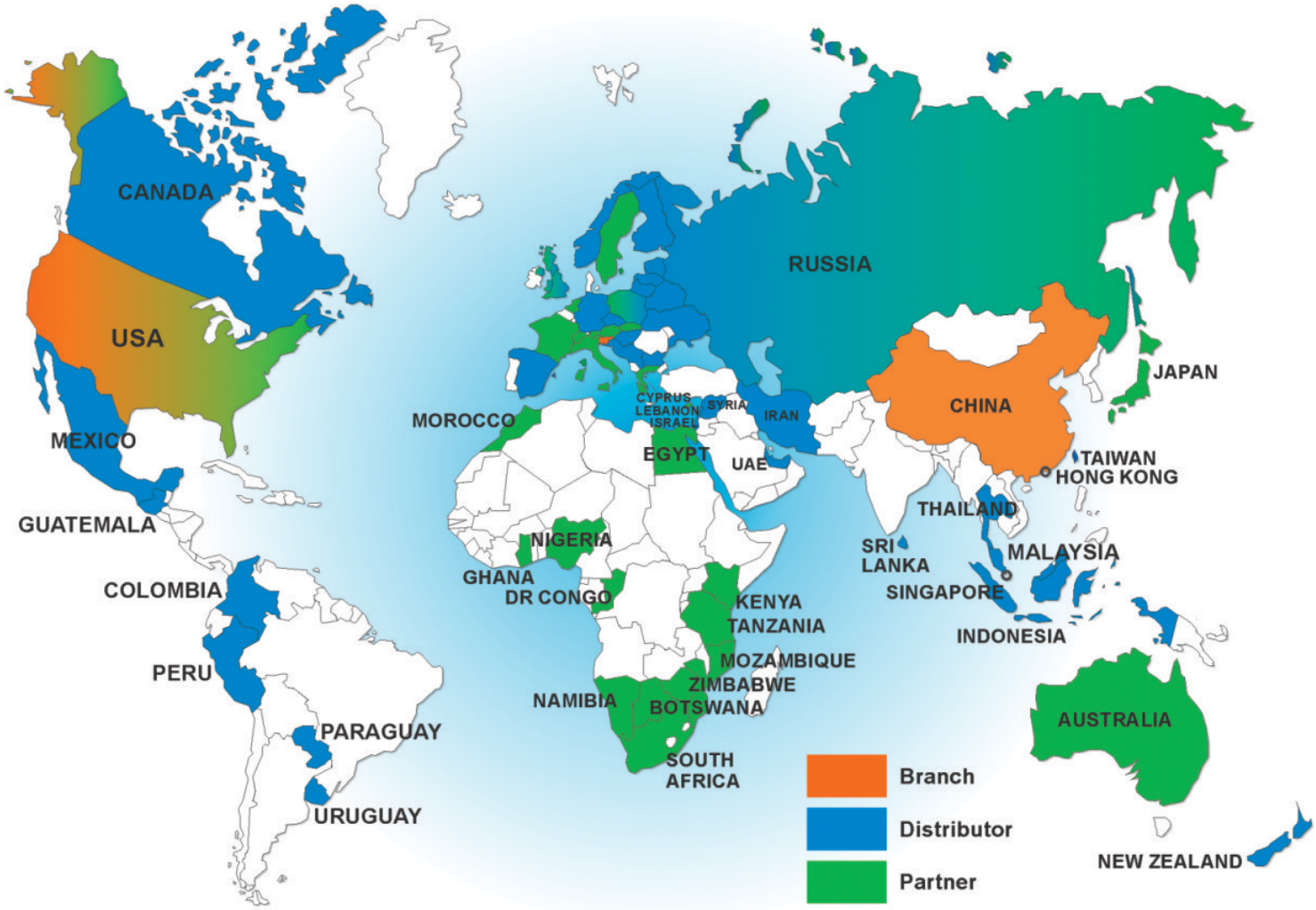

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