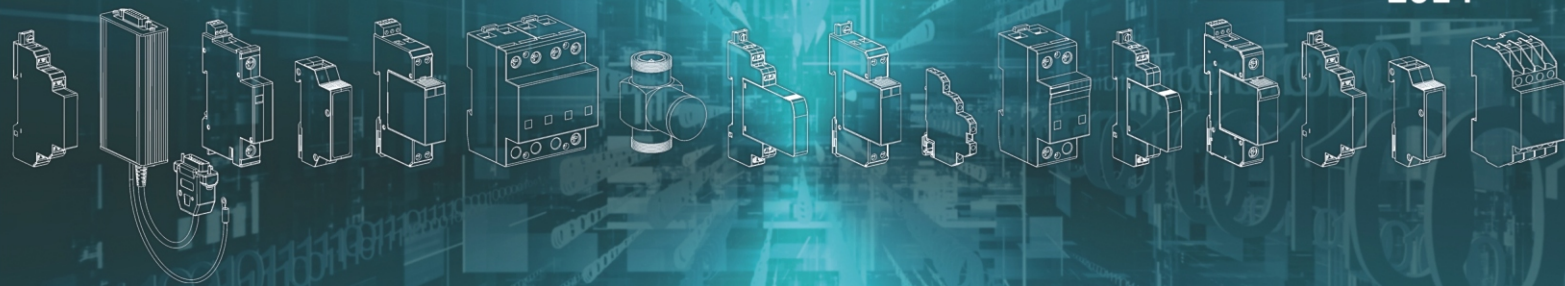


Surge Protection

for Signalling Networks

2014



ISKRA ZAŠČITE

BE ON THE SAFE SIDE



Dr. Otmar Zorn

PRESIDENT'S FOREWORD

Dear Reader,

We are pleased to introduce our 2014 Catalogue for Surge protective devices intended for use in signalling networks. This edition includes updated product information and upgraded section with typical applications.

ISKRA ZAŠČITE is a leading designer and manufacturer of surge protection products with a strong customer-oriented culture fostered throughout the company. We believe a comprehensive understanding of our customers' needs and of the industry in which they operate is crucial to our ability to develop effective products and solutions.

Our success in bring you the best products we can, is driven by our people and their commitment to excellence. These attributes are encouraged in all aspects of our operations - from our qualified research and development engineers many of whom hold higher degrees, to our dedicated manufacturing staff and continuing education programs which ensure skill-sets keep pace with our newer process control capabilities and automated test equipment.

As a leader in our industry, we believe we share responsibilities beyond those we owe to our customers and partners (to ensure our dealing adhere to the highest standards of business integrity) and beyond those we owe to our employees (to ensure a safe and pleasant working environment), but we also owe an obligation to care for our environment and to minimize the impact we have upon it.

We are proud of the many ways in which we work to safeguard this. Our products are RoHS compliant, our manufacturing facility is currently ISO 9001 certified and we are now in the advanced stage of moving towards ISO 14001. We also believe that we owe an obligation to give back to our industry as a whole. This we do through such activities as educational seminars and participation in standardization committees.

With our strong customer focus, stringent quality measures, compliance to relevant safety and performance standards, comprehensive testing and manufacturing facilities and good relations with suppliers, we are reassured that ISKRA ZAŠČITE and its products are well placed to face the demands of our evolving electrical industry with its growing sensitivity to overvoltages surges and transients.

Ljubljana, Slovenia, EU, 2014

President and Owner

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Recommended selection table for Surge Protective Devices (SPDs)

Recommended selection table for SPDs for the use in (zone) interfaces according to IEC 62305-1 and IEC 61000-4-5, based on correlation between standards IEC 61643-11 and IEC 61643-21.

Lightning protection zones	Test class of SPD in acc. to IEC 61643-11	Category of SPD in acc. to IEC 61643-21
0/1	Test class 1	D1
1/2	Test class 2	C2
2/3	Test class 3	C1

Typical components used in SPDs

Voltage-limiting and current limiting devices

Voltage-clamping devices



- Varistor (MOV)

A varistor is a bipolar, non-linear resistor with symmetrical voltage-current characteristics, where the resistance decreases with increasing characteristic curve.



- Transient Voltage Suppression (TVS) diode

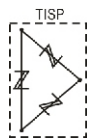
A TVS diode is clamping device that limit voltage spikes by the low impedance avalanche breakdown of the P/N junction. TVS diode contains a P/N junction similar to a Zener diode but with a larger cross section, which is proportional to its surge power rating. TVS diode has a very short response time, making it suitable for limiting fast rising transient voltages.

Voltage-switching devices



- Gas discharge tube (GDT)

A GDT is an arrangement of electrodes in a gas within an insulating, temperature-resistant ceramic or glass cylinder. Because of their switching characteristic and rugged construction, GDTs exceed other component in current carrying capability.



- Thyristor surge suppressor (TSS) Fixed voltage types

A Thyristor surge suppressor is voltage-switching device where above a certain breakdown current, the NPNP structure regenerates and switches to a low voltage condition. The multiple PN junctions of the TSS reduce the overall capacitance.

Current limiting devices


















- Positive temperature coefficient resistor (PTC resistor)

PTC resistors are ceramic components whose electrical resistance rapidly increases when a certain temperature is exceeded. An overcurrent condition causes the devices to increase their resistance, thus reducing current flow.

1. IEC 61643-21:2009 (VDE 0845-3-1)	Low voltage surge protective devices - Part 21: Surge protective devices connected to telecommunications and signaling networks - Performance requirements and testing methods;
2. IEC 61643-22:2004	Low-Voltage Surge Protective Devices - Part 22: Surge protection devices connected to telecommunications and signaling networks - Selection and application principles;
3. IEC/EN 61643-11:2011 (VDE 0675-6-11)	Surge protective devices connected to low voltage power distribution systems - Requirements and test methods;
4. IEC 61643-12:2008 (VDE 0675-6-12)	Surge protective devices connected to low voltage power distribution systems - Selection and application principles;
5. IEC 60364-5-53:2001 (VDE 0100-534)	Electrical installation of buildings - Part 5-53: Selection and erection of electrical equipment - isolation, switching and control;
6. IEC PAS 60099-7:2004	Surge arresters - Part 7: Glossary of terms and definitions from IEC publications 60099-1, 60099-4, 60099-6, 61643-11, 61643-12, 61643-21, 61643-311, 61643-321, 61643-331 and 61643-341;
7. IEC 61000-4-5:2005 (VDE 0847-4-5)	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test;
8. IEC 62305-1:2010 (VDE 0185-305-1)	Protection against lightning - Part 1: General principles;
9. IEC 62305-2:2010 (VDE 0185-305-2)	Protection against lightning - Part 2: Risk management;
10. IEC 62305-3:2010 (VDE 0185-305-3)	Protection against lightning - Part 3: Physical damage to structures and life hazard;
11. IEC 62305-4:2010 (VDE 0185-305-4)	Protection against lightning - Part 4: Electrical and electronic systems within structures;
12. ITU-T K.20:2008	Protection against interferences: Resistibility of telecommunication switching equipment to overvoltages and overcurrent;
13. ITU-T K.21:2008	Protection against interferences: Resistibility of subscriber's terminal to overvoltages and overcurrent;
14. ITU-T K.44:2011	Protection against interferences: Resistibility test for telecommunication equipment exposed to overvoltages and overcurrent - Basic Recommendation;
15. IEC 60099-1:1999 (VDE 0675-1)	Surge arresters - Part 1: Non-linear resistor type gapped surge arresters for a.c. systems
16. IEC 60099-4:2009 (VDE 0675-4)	Surge arresters - Part 4: Metal-oxide surge arresters without gaps for a.c. systems
17. IEC 60099-5:2000 (VDE 0675-5)	Surge arresters - Part 5: Selection and application recommendations;
18. IEC 60038:2009 (VDE 0175-1)	IEC standard voltages
19. UL 497B	Protectors for data communication and fire-alarm circuits
20. IEC 62497-2:2010	Railway applications - Insulation coordination - Part 2: Overvoltages and related protection
21. EN 50526-1:2012	Railway applications - Fixed installations - D.C. surge arresters and voltage limiting devices - Part 1: Surge arresters
22. EN 50123-5:2003	Railway applications - Fixed installations - D.C. switchgear - Part 5: Surge arresters and low-voltage limiters for specific use in d.c. systems
23. EN 50122-1:1998	Railway applications - Fixed installations - Part 1: Protective provisions relating to electrical safety and earthing
24. IEC 60364-7-712:2002	Electrical installations of buildings - Part 7-712 : Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
25. HD 60364-7-712:2005	Electrical installations of buildings - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
26. EN 61173:2001	Overvoltage protection for photovoltaic (PV) power generating systems - guide32. SIST EN 61400-1:2006 /A1:2011 Wind turbines - Part 1: Design requirements (IEC 61400-1:2005/A1:2010)
27. IEC TR 61400-24:2010	Wind turbine generator systems - part 24: Lightning protection
28. EN 50539-12:2013	Low-voltage surge protective devices - Surge protective devices for specific application including d.c. - Part 12: Selection and application principles - SPDs connected to photovoltaic installations
29. EN 50539-11:2012	Low-voltage surge protective devices - Surge protective devices for specific application including d.c. - Part 11: Requirements and tests for SPDs in photovoltaic applications
30. IEEE 802.3at	Power over Ethernet enhancements


















QUICK PRODUCT SELECTION

Product Group	Description	Product Name	Product Photo	Page	Connection/Signal
Data/Signal Lines	<ul style="list-style-type: none"> Modular universal single-pair data SPD for shielded cables Coarse and fine protection 	SMH-SH		16	<ul style="list-style-type: none"> - 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
	<ul style="list-style-type: none"> Modular universal single-pair data SPD with remote contacts (RC) Coarse and fine protection 	SMH-RC		18	<ul style="list-style-type: none"> - 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
	<ul style="list-style-type: none"> Modular 2-pair SPD for exposed lines Coarse and fine protection limp= 5kA/per pair 	SMI2		20	<ul style="list-style-type: none"> - 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
	<ul style="list-style-type: none"> Modular universal single-pair data SPD Coarse and fine protection Overcurrent protection 	SMH-TC		22	<ul style="list-style-type: none"> - 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
	<ul style="list-style-type: none"> Modular universal 2-pair data SPD Coarse and fine protection Overcurrent protection 	SMH2-TC		24	<ul style="list-style-type: none"> - 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
	<ul style="list-style-type: none"> Universal compact single-pair data SPD Coarse and fine protection 	NMH-TC		26	<ul style="list-style-type: none"> - 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
	<ul style="list-style-type: none"> Universal compact 2-pair data SPD Coarse and fine protection 	NMH2-TC		28	<ul style="list-style-type: none"> - 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
	<ul style="list-style-type: none"> Modular single-pair data SPD with overcurrent protection Coarse and fine protection Available various options for the base unit 	IM-TD		30	<ul style="list-style-type: none"> - 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
	<ul style="list-style-type: none"> Modular universal single-pair SPD Coarse and fine protection Available various options for the base unit 	IMH-TC		32	<ul style="list-style-type: none"> - 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
	<ul style="list-style-type: none"> Modular single-pair data SPD with separated signal ground (RS232) Coarse and fine protection Insulation resistance to earth 	SMH-SG		34	<ul style="list-style-type: none"> - Analog telephone line - RS 232, RS 485 - Thermal probe PT 100
	<ul style="list-style-type: none"> Modular single-pair SPD with insulation resistance to earth Coarse and fine protection 	VMS-TC		36	<ul style="list-style-type: none"> - Analog telephone line - RS 485 - Thermal probe PT 100
	<ul style="list-style-type: none"> Modular single-pair SPD with lightning impulse current limp= 5kA per pair Coarse and fine protection 	VMO		38	<ul style="list-style-type: none"> - 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
	<ul style="list-style-type: none"> Modular single-pair SPD with coarse protection only Coordination elements 	SMH-TDR		40	<ul style="list-style-type: none"> - Analog telephone line
	<ul style="list-style-type: none"> Modular 2-pair SPD with coarse protection only Coordination elements 	SMH2-TDR		42	<ul style="list-style-type: none"> - Analog telephone line
<ul style="list-style-type: none"> Modular single-pair SPD with coarse protection only Coordination elements 	VM-TDR		44	<ul style="list-style-type: none"> - Analog telephone 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)	I_{imp} (10/350) (kA)	Frequency up to MHz	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	2.5	30	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	2.5	30	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	20	30	10	30	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	2.5	30	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	5	30	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	2.5	35	Compact 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	0.8	10	20	5	3	Compact 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	0.145, 1	10	20	2.5	10	Modular 1TE
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	2.5	35	Modular 1TE
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	2.5	30	Modular 12mm
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	10	20	2.5	10	Modular 1TE
5, 12, 15, 24, 30, 48, 60, 110	6, 15, 18, 28, 33, 52, 64, 170	1	20	30	5	10	Modular 1TE
110	170	0.3	10	20	2.5	16	Modular 12mm
110	170	0.3	10	20	5	16	Modular 12mm
110	170	0.3	10	20	2.5	16	Modular 1TE


QUICK PRODUCT SELECTION

Product Group	Description	Product Name	Product Photo	Page	Connection/Signal
Data/Signal Lines	<ul style="list-style-type: none"> Modular 2-pair SPD Fine protection with suppressor diode only 	SMH2-DF		46	- 20 mA current loop
	<ul style="list-style-type: none"> Compact single-pair SPD Fine protection (MOV) only 	IM-VF		48	- 20 mA current loop
	<ul style="list-style-type: none"> Compact single-pair SPD Fine protection (suppressor diode) only 	IM-DF		50	- 20 mA current loop
	<ul style="list-style-type: none"> Modular single-pair SPD with increased sparkover voltage Coarse and fine protection Overcurrent protection 	SMH-20K SMH-20D		52	- Analog telephone line - 20 mA current loop - Thermal probe PT 100
	<ul style="list-style-type: none"> Modular 2-pair SPD with increased sparkover voltage Coarse and fine protection Overcurrent protection 	SMH2-20K SMH2-20D		54	- Analog telephone line - 20 mA current loop - Thermal probe PT 100
	<ul style="list-style-type: none"> Modular SPD for DC power supply and data line in one (CAN bus) Coarse and fine protection Overcurrent protection 	SMH-TC+PS		56	- DC power system + data line - CAN bus
	<ul style="list-style-type: none"> Universal single-pair SPD PCB assembly Coarse and fine protection Overcurrent protection 	LZ-SMH		58	- 20 mA current loop - Analog telephone line - RS 232, RS 422, V.11, RS 485 - Thermal probe PT 100, TTL
xDSL Technologies	<ul style="list-style-type: none"> Modular single-pair SPD for xDSL transmission Coarse and Fine Protection 	IM-xDSL		62	- Analog telephone line - xDSL (VDSL class 1 only)
Explosive environments (Ex)	<ul style="list-style-type: none"> Modular single-pair SPD for explosive environments (Ex) Coarse and fine protection Insulation resistance to earth 	IM-15Ex IM-30Ex		66	- Hazardous Areas 
DC Power Systems	<ul style="list-style-type: none"> SPD for DC power systems Class I / Type 1 / B I_{imp} = 10kA Differential and common mode of protection 	DC PROTEC B(R) 10		70	- DC power systems
	<ul style="list-style-type: none"> SPD for DC power systems Class II / Type 2 / C I_{max} = 40kA Differential and common mode of protection 	DC PROTEC C(R) 40		72	- DC power systems
	<ul style="list-style-type: none"> Modular single-pole SPD Class II/Type 2/C Mechanical flag + remote contacts (RC) 	PROTEC C(R) 40		74	- DC power systems
	<ul style="list-style-type: none"> Compact single-pole SPD Class II/Type 2/C Mechanical flag + remote contacts (RC) 	PROTEC CN(R) 40		76	- DC power systems
	<ul style="list-style-type: none"> Modular SPD for DC and AC power systems Class III / Type 3 / D U_{oc} up to 6kV Remote contacts + LED status indication 	PROTEC DMDR 20		78	- DC power systems
	<ul style="list-style-type: none"> Modular single-pair SPD with rated load current I_L = 10A Coarse and fine protection 	VM-DC		80	- DC power systems
	<ul style="list-style-type: none"> Modular single-pair SPD with low residual voltage Coarse and fine protection I_L = 4A 	SMH-PS		82	- DC power systems

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)	I_{imp} (10/350) (kA)	Frequency up to MHz	Housing IP 20 Dimensions DIN 43880
12, 24	15, 28	1	0.5, 0.25	/	/	1.4	Modular 12mm
24	31	10	0.5	1	/	0.5	Compact 6mm
5, 12, 24, 60	6, 15, 28, 64	10	0.5, 0.5, 0.25, 0.1	/	/	1.4	Compact 6mm
230 24, 60	320 28, 64	5 0.145	10 10	20 20	2.5 2.5	10 10	Modular 12mm
230 24, 60	320 28, 64	5 0.145	10 10	20 20	5 5	10 10	Modular 12mm
24	28	1	10	20	2.5	30	Modular 12mm
12, 24	15, 28	1	10	20	2.5	30	/
120	170	0.2	10	20	2.5	22	Modular 1TE
15 30	18 33	0.5 0.5	10 10	20 20	/ /	3 3	Modular 1TE
24, 48	30, 60	/	20	60	10	/	Compact 4TE
24, 48	30, 60	/	20	40	/	/	Compact 2TE
/	75/100V _{AC/DC}	/	20	40	/	/	Modular 1TE
/	75/100V _{AC/DC}	/	20	40	/	/	Compact 1TE
24, 48, 60, 120	34/44, 60, 75, 150V _{AC/DC}	/	1.2, 2.5, 2.5, 4	3, 6, 6, 10	/	/	Modular 1TE
12, 24	15, 28	10	10	20	2.5	/	Modular 1TE
12, 24, 48	15, 28, 52	4	10	20	/	/	Modular 12mm

QUICK PRODUCT SELECTION

Product Group	Description	Product Name	Product Photo	Page	Connection/Signal
Local Area Networks (LAN)	<ul style="list-style-type: none"> • LAN protector (1 way) • All 4 pairs protected • Frequency < 250MHz, Cat 6 capable • Termination: RJ45, shielded 	LZ-NET 6		86	- LAN (up to Cat 6)
	<ul style="list-style-type: none"> • LAN protector (1 way) • All 4 pairs protected • Frequency < 100MHz, Cat 5 capable • Termination: RJ45, Cat 5 connectors 	LZ-NET LZ-NET PoE LZ-NET STP		88	- LAN (up to Cat 5)
	<ul style="list-style-type: none"> • LAN protector • 19" rack patch panel up to 24 ports • All 4 pairs protected • Frequency < 100MHz, Cat 5 capable • Termination: RJ45, Cat 5 connectors 	LZ-24NET 19 LZ-24NET 19 PoE		90	- LAN (up to Cat 5)
	<ul style="list-style-type: none"> • Combined POWER/LAN Protector • All 4 pairs in the UTB protected • Frequency < 100MHz, Cat 5 capable • Termination: RJ45, Cat 5 connectors 	ZE 200 NET		92	- LAN (up to Cat 5)
Data Protocols	<ul style="list-style-type: none"> • Compact 4-wire (2-line) data SPD designed for RS 485 • Coarse and fine protection 	VM-RS 485		96	- RS 422 - V.11 - RS 485
	<ul style="list-style-type: none"> • SPD for 9-pin D-SUB connector • All pins protected • RS 232 • Fine protection only 	IM-DB 9		98	- RS 232
	<ul style="list-style-type: none"> • SPD for 15-pin D-SUB connector • Coarse and fine protection • RS 422 	IM-DB 15 RS		100	- RS 422 - V.11 - X.21
Line Fitting	<ul style="list-style-type: none"> • Single-pair SPD for 3/4" pipe installations • Coarse and fine protection • $t_A < 1ns$ 	PLP-24V		104	- 20mA current loop
Terminal Connection	<ul style="list-style-type: none"> • OEM PCB module • Single-pair SPD • Coarse protection only • Flying leads or screw terminals 	IM-GD		106	- Analog telephone line - xDSL (VDSL class 1 only) - EIB
PCB Mounting	<ul style="list-style-type: none"> • OEM PCB module • Single-pair SPD • Coarse and fine protection • PCB hybrid • PCB pins 	IM-NF		108	- 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)	I_{imp} (10/350) (kA)	Frequency up to MHz	Housing Dimensions IP
48	50	1	0.15 (line-line) 10 (lines-PG)	/	1	250	Compact 19mm 20
5 48 5	6 58 6	/	0.3 (line-line) 0.06 (line-line) 0.3 (line-line)	/	/	100	Compact 20
5 48	6 48	/	0.3 (line-line) 0.06 (line-line)	/	/	100	Compact 20
5 230V/50Hz	6 275V/50Hz	/	0.3 (line-line) 3 (L(N)-PE, L-N) 10 (L+N-PE)	/	/	100	Compact 20
5	6	0.5	20	/	2.5	1	Compact 20
12	15	/	0.1 (line-line)	0.2 (line-line)	/	1	Compact 20
5	6	0.5	20	/	/	35	Compact 20
24	28	0.145	10	20	/	3	55
110	170	6	5	10	/	30	20
5, 15, 24	6, 18, 28	0.145	5	10	/	1.4	20






QUICK PRODUCT SELECTION

Product Group	Description	Product Name	Product Photo	Page	Connection/Signal
Coaxial/RF Systems	<ul style="list-style-type: none"> • Coaxial BNC protector for analog video surveillance systems • Coarse and fine protection • Indirect shield earthing 	ZV-BNC		112	- Arcnet - Analog video
	<ul style="list-style-type: none"> • Coaxial protector for TV and cable TV • Direct shield earthing 	ZV-1 ZV1-F		114	- TV - Cable TV
	<ul style="list-style-type: none"> • Coaxial protector • For RF antenna systems • Frequency 2.6GHz • GDT 	CCP-BNC		116	- Analog video
	<ul style="list-style-type: none"> • Coaxial protector • For base station RF antenna systems • Frequency 2.5GHz • GDT 	CCP-7/16		118	- GSM, UMTS, LTE - GPS - Radio systems
	<ul style="list-style-type: none"> • Coaxial protector • For RF antenna systems • Frequency 2.6GHz • GDT 	CCP-N		120	- GSM, UMTS, LTE - GPS - Radio systems
	<ul style="list-style-type: none"> • Coaxial protector • For RF antenna systems • Frequency 6.0GHz • GDT 	CCP-N-6G		122	- GSM, UMTS, LTE - GPS - Radio systems
	<ul style="list-style-type: none"> • Coaxial protector • For RF antenna systems • Frequency 6.0GHz • GDT 	CCP-TNC-6G		124	- GSM, UMTS, LTE - GPS - Radio systems
	<ul style="list-style-type: none"> • Coaxial protector • For RF antenna systems • Frequency 600MHz • GDT 	CCP-UHF		126	- Radio systems
	<ul style="list-style-type: none"> • Coaxial protector • For RF antenna systems (CCTV and CATV systems) • Frequency 2.0GHz • GDT 	CCP-F		128	- Cable TV
	<ul style="list-style-type: none"> • Coaxial protector • For RF antenna systems (CCTV and CATV systems) • Frequency 2.0GHz • GDT 	CCP-TV		130	- TV
	<ul style="list-style-type: none"> • Coaxial protector • For RF antenna systems • Frequency 865-965MHz, 1.7-1.95GHz 	CCP-L/4-7/16		132	- GSM, UMTS, LTE
<ul style="list-style-type: none"> • Coaxial protector • For RF antenna systems • Frequency 865-965MHz, 1.7-1.95GHz 	CCP-L/4-N		134	- GSM, UMTS, LTE	

TECHNICAL CHARACTERISTICS

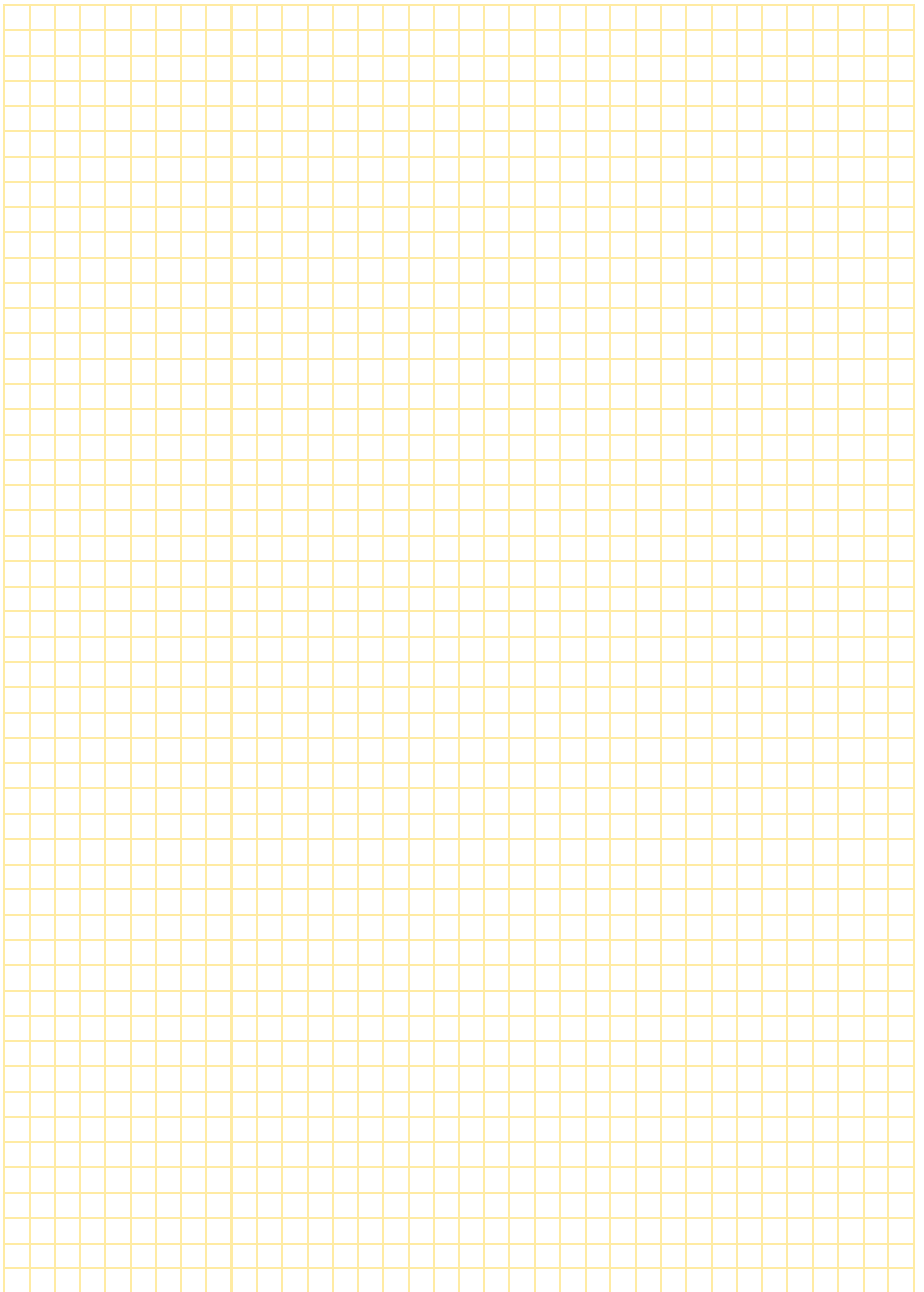
U_n (V _{DC})	U_c (V _{DC})	Max. peak power (W)	I_L at 25°C (A)	I_n (8/20) (kA)	I_{max} (8/20) (kA)	Frequency up to	Termination
10, 24	12, 28	/	0.1	10	20	100MHz	BNC - Type M-F and F-F
48 48	66 60	/ /	0.1 0.1	5 5	10 10	40 - 860MHz	IEC TV F
/	70, 180, 280	40, 125, 300	/	10	20	2.6GHz	BNC - Type M-F and F-F
/	70, 180, 280	40, 125, 300	/	10	20	2.5GHz	7/16 - Type M-F
/	70, 180, 280	40, 125, 300	/	10	20	2.6GHz	N - Type M-F and F-F
/	180	125	/	10	20	6GHz	N - Type M-F and F-F
/	180	125	/	10	20	6GHz	TNC - Type M-F and F-F
/	70, 180, 280	40, 125, 300	/	10	20	600MHz	UHF - Type M-F and F-F
/	70, 180	40, 125	/	10	20	2GHz	F - Type M-F and F-F
/	70, 180	40, 125	/	10	20	2GHz	TV - Type M-F and F-F
/	0	500	/	15	30	865 -1950MHz	L/4-7/16 - Type M-F and F-F
/	0	500	/	15	30	850 -1950MHz	L/4-N - Type M-F and F-F

QUICK PRODUCT SELECTION

Product Group	Description	Product Name	Product Photo	Page	Connection/Signal
Combined Plug-in SPDs	<ul style="list-style-type: none"> • Combined POWER/TEL/TV protector • Coax protected • Tel. protected • Termination: RJ11, IEC TV connector • Compact, ergonomic packaging 	ZES-76 TEL-TV		138	- TV, telephone line
	<ul style="list-style-type: none"> • Combined POWER/TEL/TV protector • Coax protected • Tel. protected • Termination: RJ11, IEC TV connector • Compact, ergonomic packaging 	ZES-7 TEL-TV		139	- TV, telephone line
	<ul style="list-style-type: none"> • Combined POWER/TEL/TV protector • Coax protected • Tel. protected • Termination: RJ11, IEC TV connector • Master-slave function • Compact, ergonomic packaging 	ZES 1M+5S		140	- TV, telephone line
	<ul style="list-style-type: none"> • Combined POWER/TEL/LAN protector • Freq. < 100MHz, Cat 5 capable • Termination: RJ45, Cat 5 connectors • Master-slave function (USB, Hub) • Compact, ergonomic packaging 	ZES 1M+4S TEL-NET USB Hub		141	- LAN (up to Cat 5)
	<ul style="list-style-type: none"> • POWER protector • Uoc = 3kV • Compact, ergonomic packaging 	ZES 6		142	

TECHNICAL CHARACTERISTICS

U_n (V _{DC})	U_c (V _{DC})	I_n (8/20) (kA)	U_{oc} (kV)	Frequency up to MHz	Housing IP 20
110 (tel.); 50 (coax.) 230V / 50Hz	170 (tel.); 70 (coax.) 275V / 50Hz	2.5 (tel.); 5 (coax)	3	30 (tel.)	Compact
110 (tel.); 50 (coax.) 230V / 50Hz	170 (tel.); 70 (coax.) 275V / 50Hz	2.5 (tel.); 5 (coax.)	3	30 (tel.)	Compact
110 (tel.); 50 (coax.)	170 (tel.); 70 (coax.)	2.5 (tel.); 5 (coax.)	3	30 (tel.)	Compact
110 230V/50Hz	170 275V/50Hz	2.5	3	100 (tel.)	Compact
230V/50Hz	275V/50Hz	/	3	/	Compact



Universal Modular and Compact SPD for Data/Signal Lines



Category IEC / EN:	D1/C1/C2/C3
Location of use:	Data, signal and communication circuits
Protective elements:	MOV, GDT, diode, PTC resistor
Available voltages:	5, 12, 15, 24, 30, 48, 60, 110V_{DC}
Surge discharge ratings:	I_n up to 20kA, I_{max} up to 30kA, I_{imp} up to 10kA
Complies with:	IEC/EN 61643-21

SMH-SH xxx
SMH-RC xxx
SMI2 xxx
SMH-TC xxx
SMH2-TC xxx
NMH-TC xxx
NMH2-TC xxx
IM-TD xxx
IMH-TC xxx
SMH-SG xxx
VMS-TC xxx
VMO xxx
SMH-TDR xxx
SMH2-TDR xxx
VM-TDR xxx
SMH2-DF xx
IM-VF xx
IM-DF xx
SMH-20K xxx
SMH2-20X xxx
SMH-TC+PS xx
LZ-SMH xx

SMH products are universal data surge protective devices contain both coarse and fine overvoltage stages and provide longitudinal and a transverse surge protection.

SMH-RC products have additional remote contacts. If the unit fails, the contacts change state.

SMH-SH series is equipped with additional protection for cable shield.

SMI2 series was designed to have greater withstand surge level (I_{imp}=10kA).

SMH2 series is universal data surge protective device designed to protect 2 independent symmetrical data lines.

SMH-SH Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60V, 110V_{DC}
- **Frequency range:** 30MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Series load current:** 1A
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



The SMH-SH series of surge 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 data

Type	SMH-SH							
	5V	12V	15V	24V	30V	48V	60V	110 V
Electrical characteristics								
Number of protected pairs	1 (2 conductors)							
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated load current at 25°C I_L	1A							
Nominal discharge current (8/20µs) I_n	10kA							
Max. discharge current (8/20µs) I_{max}	20kA							
Impulse current (10/350µs) I_{imp}	2.5kA							
Residual voltage at 5kA (8/20µs) U_{res} (line-line)	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Rated spark overvoltage (SH-PG)	184 - 276V							
Response time of overvoltage protection t_A (SH-PG)	100ns							
	< 1ns							
Insulation resistance of the protection R_{iso} (SH-PG)	> 1GΩ/100V							
	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance R	1.6 - 2.0Ω							
Transverse capacitance C (SH-PG)	5pF							
	50pF							
Limit frequency f_G	30MHz							
Mechanical characteristics								
Temperature range	- 40°C ... + 80°C							
Terminal cross section	Stranded to 4 mm ²							
Terminal screw torque	0.5Nm							
Degree of protection IEC/EN 60529	IP 20							
Housing material	Thermoplastic; grey, extinguishing degree V-0							
Mounting IEC/EN 60715	35mm DIN rail							

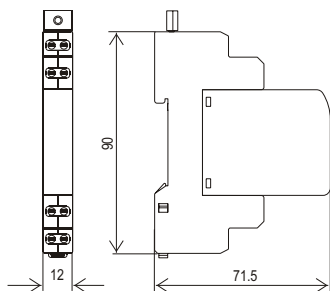
Ordering information

U_n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code SMH-SH xxx	7082.01	7082.02	7082.03	7082.04	7082.05	7082.06	7082.07	7082.08
Ordering code Module SMH-SH xxx	7082.11	7082.12	7082.13	7082.14	7082.15	7082.16	7082.17	7082.18

Dimensions, Internal configuration, Weight and Packaging

SMH-SH Series

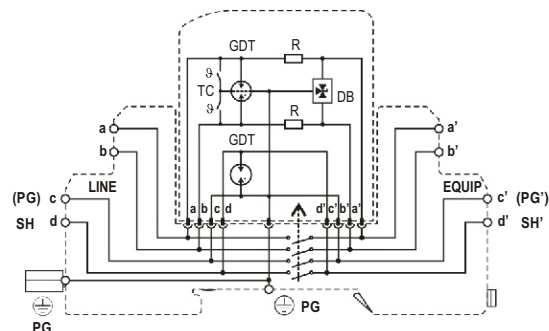
Dimensions



Legend:

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

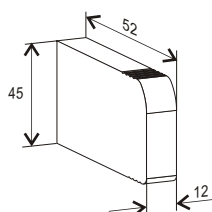
Internal configuration



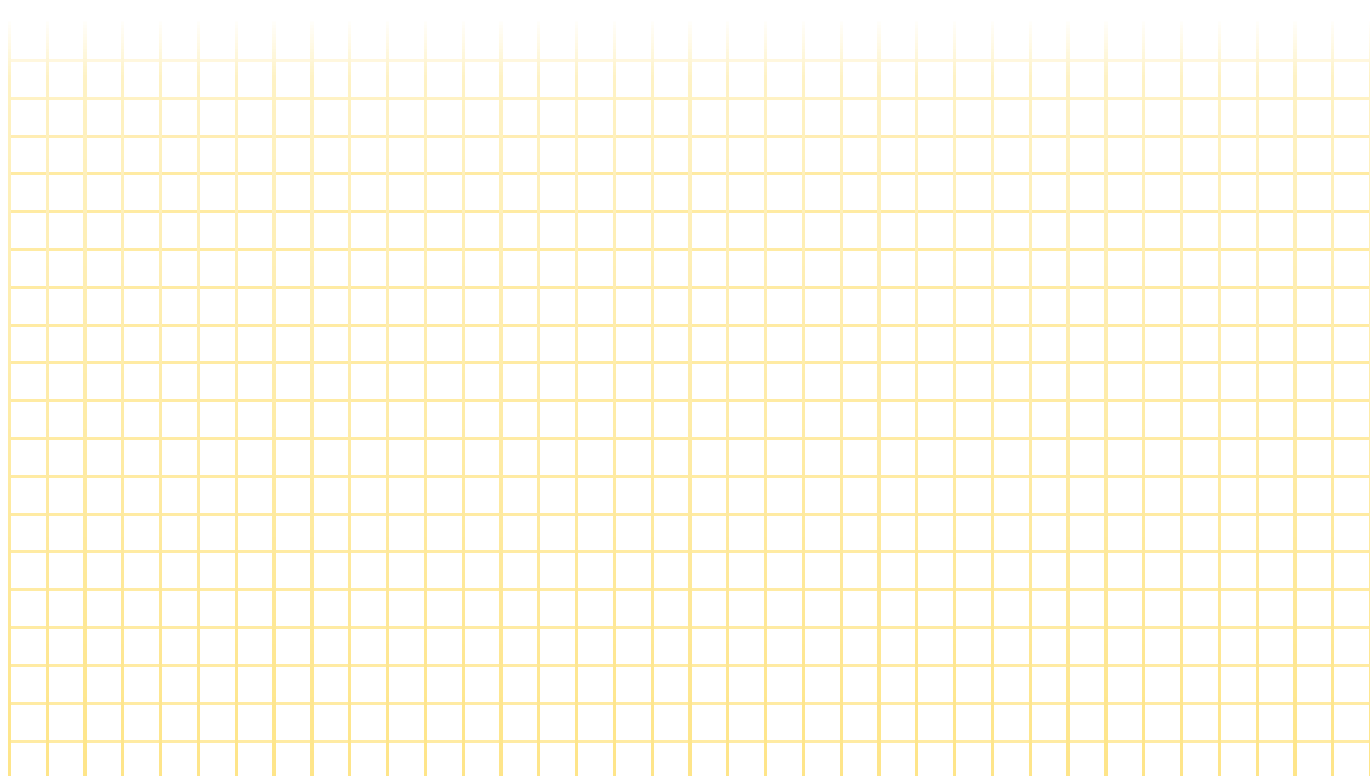
SMH-SH xxx	5V	12V	15V	24V	30V	48V	60V	110V
Dimensions DIN 43880					2/3TE			
Weight per unit	60g							
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity	15 pcs.							

Module SMH-SH Series

Dimensions



Module SMH-SH xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit	26g							
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity	15 pcs.							



SMH-RC Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60, 110V_{DC}
- **Frequency range:** 30MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Series load current:** 1A
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



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 thermoclip is included in the primary protection stage to divert the power frequency current to the 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 data

Type	SMH-RC							
	5V	12V	15V	24V	30V	48V	60V	110 V
Electrical characteristics								
Number of protected pairs	1 (2 conductors)							
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated load current at 25°C I_L	1A							
Nominal discharge current (8/20μs) I_n	10kA							
Max. discharge current (8/20μs) I_{max}	20kA							
Impulse current (10/350μs) I_{imp}	2.5kA							
Residual voltage at 5kA (8/20μs) U_{res}	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
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
Response time of overvoltage protection t_A	< 1ns							
Thermal protection	YES							
Insulation resistance of the protection R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance R	1.6 - 2.0Ω							
Transverse capacitance C	50pF							
Limit frequency f_G	30MHz							
Mechanical characteristics								
Temperature range	- 40°C ... + 80°C							
Terminal cross section	Stranded to 4 mm ²							
Terminal screw torque	0.5Nm							
Degree of protection IEC/EN 60529	IP 20							
Housing material	Thermoplastic; grey, extinguishing degree V-0							
Mounting IEC/EN 60715	35mm DIN rail							

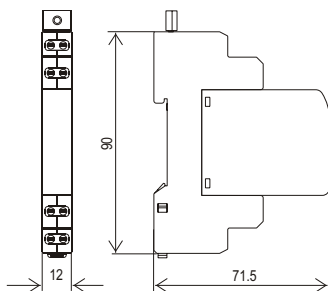
Ordering information

U _n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code SMH-RC xxx	7082.21	7082.22	7082.23	7082.24	7082.25	7082.26	7082.27	7082.28
Ordering code Module SMH-RC xxx	7082.31	7082.32	7082.33	7082.34	7082.35	7082.36	7082.37	7082.38

Dimensions, Internal configuration, Weight and Packaging

SMH-RC Series

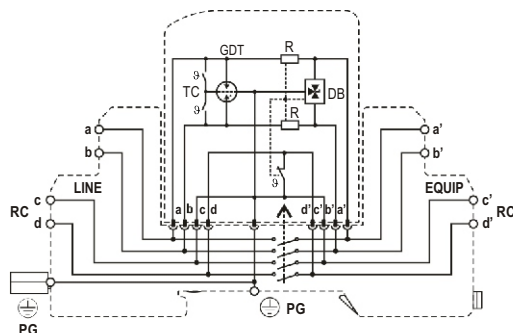
Dimensions



Legend:

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

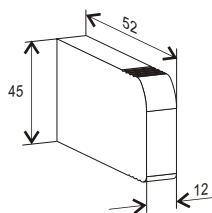
Internal configuration



SMH-RC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Dimensions DIN 43880					2/3TE			
Weight per unit					58g			
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity					15 pcs.			

Module SMH-RC Series

Dimensions



Module SMH-RC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit					24g			
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity					15 pcs.			

SMI2 Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60, 110V_{DC}
- **Frequency range:** 30MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, **I_{imp} : 10kA**
- **Series load current:** 1A
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



The SMI2 series provides the same electrical performance as the SMH2-TC series but with a greater surge withstand level or **I_{imp} 10kA**, (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 the 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 data

Type	SMI2								
	5V	12V	15V	24V	30V	48V	60V	110 V	
Electrical characteristics									
Number of protected pairs	2 (4 conductors)								
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V	
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V	
Rated load current at 25°C I_L	1A								
Nominal discharge current (8/20µs) I_n	20kA								
Max. discharge current (8/20µs) I_{max}	30kA								
Impulse current (10/350µs) I_{imp}	10kA								
Residual voltage at 5kA (8/20µs) U_{res}	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V	
Rated spark overvoltage	(a/b-PG), (c/d-PG)	7 - 10V	16 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
	(a-b), (c-d)	7 - 10V	16 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
Response time of overvoltage protection t_A	< 1ns								
Thermal protection	YES								
Insulation resistance of the protection R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ	
Serial resistance R	1.6 - 2.0Ω								
Transverse capacitance C	50pF								
Limit frequency f_G	30Mhz								
Mechanical characteristics									
Temperature range	- 40°C ... + 80°C								
Terminal cross section	Stranded to 4 mm ²								
Terminal screw torque	0.5Nm								
Degree of protection IEC/EN 60529	IP 20								
Housing material	Thermoplastic; grey, extinguishing degree V-0								
Mounting IEC/EN 60715	35mm DIN rail								

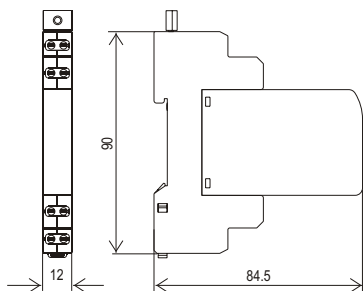
Ordering information

U_n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code SMI2 xxx	7083.01	7083.02	7083.03	7083.04	7083.05	7083.06	7083.07	7083.08
Ordering code Module SMI2 xxx	7083.11	7083.12	7083.13	7083.14	7083.15	7083.16	7083.17	7083.18

Dimensions, Internal configuration, Weight and Packaging

SMI2 Series

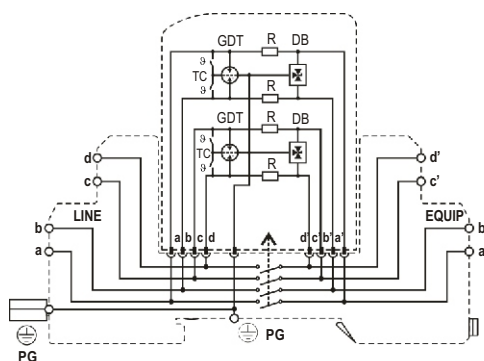
Dimensions



Legend:

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

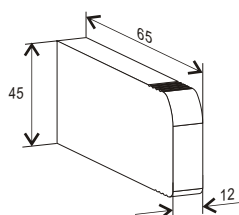
Internal configuration



SMI2 xxx	5V	12V	15V	24V	30V	48V	60V	110V
Dimensions DIN 43880					2/3TE			
Weight per unit					70g			
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity					15 pcs.			

Module SMI2 Series

Dimensions



Module SMI2 xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit					30g			
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity					15 pcs.			

SMH-TC Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60, 110V_{DC}
- **Frequency range:** 30MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Series load current:** 1A
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



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 incident surge. To protect against the hazards of electric shock and fire which often results when power frequency contact occurs 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 data

Type	SMH-TC							
	5V	12V	15V	24V	30V	48V	60V	110 V
Electrical characteristics								
Number of protected pairs	1 (2 conductors)							
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated load current at 25°C I_L	1A							
Nominal discharge current (8/20µs) I_n	10kA							
Max. discharge current (8/20µs) I_{max}	20kA							
Impulse current (10/350µs) I_{imp}	2.5kA							
Residual voltage at 5kA (8/20µs) U_{res}	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Rated spark overvoltage (a/b-PG) (a-b)	7 - 10V	17 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
	7 - 10V	17 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
Response time of overvoltage protection t_A	< 1ns							
Thermal protection	YES							
Insulation resistance of the protection R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance R	1.6 - 2.0Ω							
Transverse capacitance C	50pF							
Limit frequency f_G	30MHz							
Mechanical characteristics								
Temperature range	- 40°C ... + 80°C							
Terminal cross section	Stranded to 4 mm ²							
Terminal screw torque	0.5Nm							
Degree of protection IEC/EN 60529	IP 20							
Housing material	Thermoplastic; grey, extinguishing degree V-0							
Mounting IEC/EN 60715	35mm DIN rail							

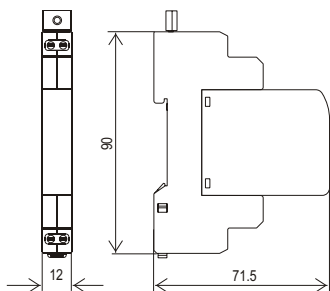
Ordering information

U_n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code SMH-TC xxx	7080.62	7080.63	7080.64	7080.65	7080.66	7080.67	7080.68	7080.61
Ordering code Module SMH-TC xxx	7080.52	7080.53	7080.54	7080.55	7080.56	7080.57	7080.58	7080.51

Dimensions, Internal configuration, Weight and Packaging

SMH-TC Series

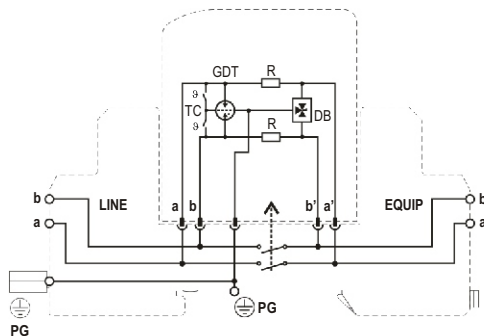
Dimensions



Legend:

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

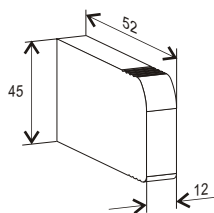
Internal configuration



SMH-TC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Dimensions DIN 43880					2/3TE			
Weight per unit					52g			
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity					15 pcs.			

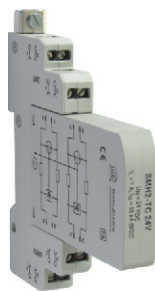
Module SMH-TC Series

Dimensions



Module SMH-TC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit					24g			
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity					15 pcs.			

SMH2-TC Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60, 110V_{DC}
- **Frequency range:** 30MHz
- **Surge Discharge Ratings:** I_n: 10kA, I_{max}: 20kA, I_{imp}: 5kA
- **Series load current:** 1A
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



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 data

Type	SMH2-TC							
	5V	12V	15V	24V	30V	48V	60V	110 V
Electrical characteristics								
Number of protected pairs	2 (4 conductors)							
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated load current at 25°C I_L	1A							
Nominal discharge current (8/20µs) I_n	10kA							
Max. discharge current (8/20µs) I_{max}	20kA							
Impulse current (10/350µs) I_{imp}	5kA							
Residual voltage at 5kA (8/20µs) U_{res}	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Rated spark overvoltage (a/b-PG), (c/d-PG)	7 - 10V	17 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V	184 - 264V
	(a-b), (c-d)	7 - 10V	17 - 21V	21 - 25V	31 - 37V	36 - 44V	57 - 69V	68 - 84V
Response time of overvoltage protection t_A	< 1ns							
Thermal protection	YES							
Insulation resistance of the protection R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance R	1.6 - 2.0Ω							
Transverse capacitance C	50pF							
Limit frequency f_G	30MHz							
Mechanical characteristics								
Temperature range	- 40°C ... + 80°C							
Terminal cross section	Stranded to 4 mm ²							
Terminal screw torque	0.5Nm							
Degree of protection IEC/EN 60529	IP 20							
Housing material	Thermoplastic; grey, extinguishing degree V-0							
Mounting IEC/EN 60715	35mm DIN rail							

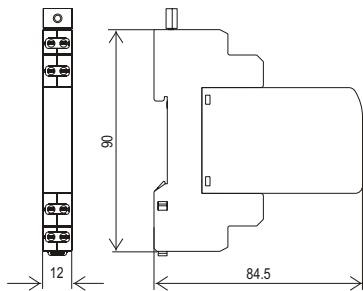
Ordering information

U _n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code SMH2-TC xxx	7080.12	7080.13	7080.14	7080.15	7080.16	7080.17	7080.18	7080.11
Ordering code Module SMH2-TC xxx	7080.02	7080.03	7080.04	7080.05	7080.06	7080.07	7080.08	7080.01

Dimensions, Internal configuration, Weight and Packaging

SMH2-TC Series

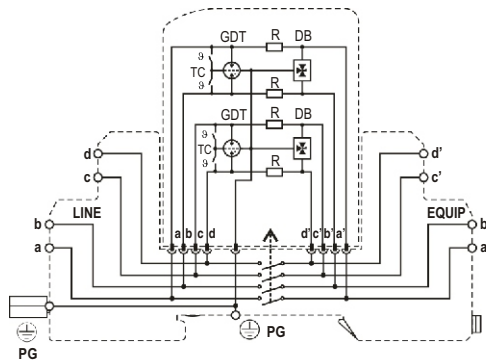
Dimensions



Legend:

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

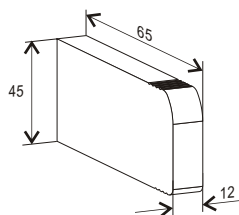
Internal configuration



SMH2-TC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Dimensions DIN 43880					2/3TE			
Weight per unit					66g			
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity					15 pcs.			

Module SMH2-TC Series

Dimensions



Module SMH2-TC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit					30g			
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity					15 pcs.			

NMH-TC Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60, 110V_{DC}
- **Frequency range:** up to 35MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Series load current:** 1A
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Compact design
- **Complies with:** IEC/EN 61643-21



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 incident surge. To protect against the hazards of electric shock and fire which often results when power frequency contact occurs 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 the ground.

Technical data

Type	NMH-TC							
	5V	12V	15V	24V	30V	48V	60V	110 V
Electrical characteristics								
Number of protected pairs	1 (2 conductors)							
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated load current at 25°C I_L	1A							
Nominal discharge current (8/20µs) I_n	10kA							
Max. discharge current (8/20µs) I_{max}	20kA							
Impulse current (10/350µs) I_{imp}	2.5kA							
Residual voltage at 5kA (8/20µs) U_{res}	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Rated spark overvoltage (a/b-PG)	7 - 10V	16 - 21V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 86V	184 - 264V
	(a-b)	7 - 10V	16 - 21V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 86V
Response time of overvoltage protection t_A	< 1ns							
Thermal protection	YES							
Insulation resistance of the protection R_{iso}	≥ 6kΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance R	cca. 1.0Ω							
Transverse capacitance C	30pF							
Limit frequency f_G	35MHz							
Mechanical characteristics								
Temperature range	- 40°C ... + 80°C							
Terminal cross section	Stranded to 4 mm ²							
Terminal screw torque	0.5Nm							
Degree of protection IEC/EN 60529	IP 20							
Housing material	Thermoplastic; grey, extinguishing degree V-0							
Mounting IEC/EN 60715	35mm DIN rail							

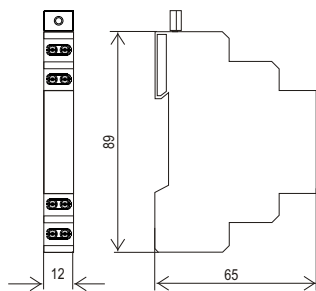
Ordering information

U _n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code NMH-TC xxx	7070.02	7070.03	7070.04	7070.05	7070.06	7070.07	7070.08	7070.01

Dimensions, Internal configuration, Weight and Packaging

NMH-TC Series

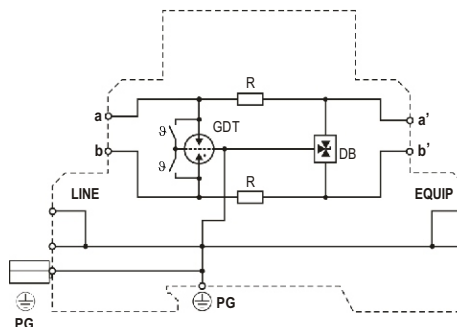
Dimensions



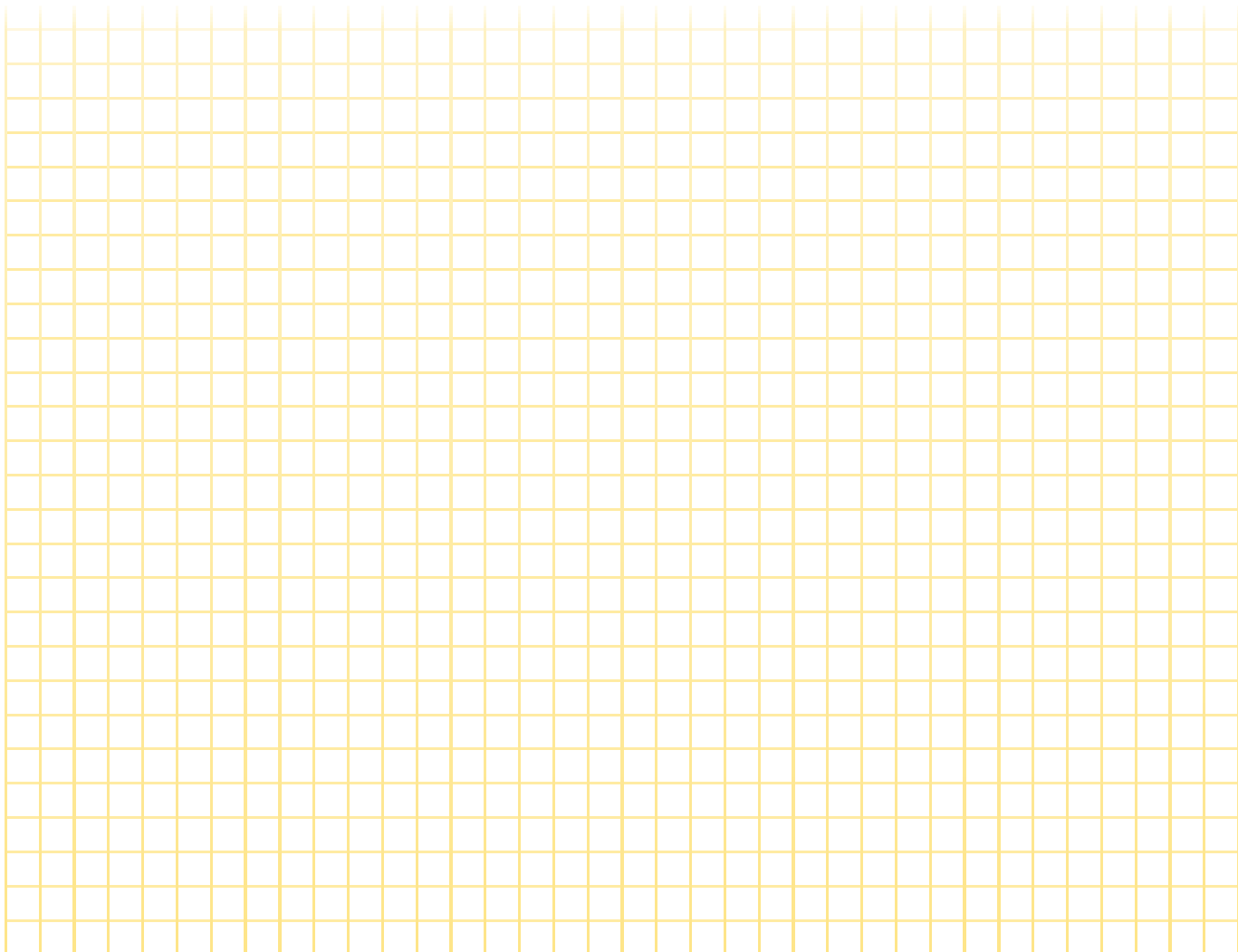
Legend:

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

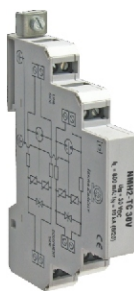
Internal configuration



NMH-TC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Dimensions DIN 43880					2/3TE			
Weight per unit	54g							
Packaging dimensions (single unit)					70 x 16 x 110mm			
Min. packaging quantity	15 pcs.							



NMH2-TC Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60, 110V_{DC}
- **Frequency range:** up to 5MHz
- **Surge Discharge Ratings:** I_n: 10kA, I_{max}: 20kA, I_{imp}: 5kA
- **Series load current:** 0.8A
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Compact design
- **Complies with:** IEC/EN 61643-21



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 data

Type	NMH2-TC								
	5V	12V	15V	24V	30V	48V	60V	110 V	
Electrical characteristics									
Number of protected pairs	2 (4 conductors)								
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V	
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V	
Rated load current at 25°C I_L	0.8A								
Nominal discharge current (8/20µs) I_n	10kA								
Max. discharge current (8/20µs) I_{max}	20kA								
Impulse current (10/350µs) I_{imp}	5kA								
Residual voltage at 5kA (8/20µs) U_{res} (line-line)	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V	
Rated spark overvoltage (a/b-PG), (c/d-PG)	7 - 10V	16 - 21V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 86V	184 - 264V	
Rated spark overvoltage (a-b), (c-d)	7 - 10V	16 - 21V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 86V	184 - 264V	
Response time of overvoltage protection t_A	< 1ns								
Thermal protection	YES								
Insulation resistance of the protection R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ	
Serial resistance R	0.5Ω								
Transverse capacitance C	500pF								
Limit frequency f_G	3MHz								
Mechanical characteristics									
Temperature range	- 40°C ... + 80°C								
Terminal cross section	Stranded to 4 mm ²								
Terminal screw torque	0.5Nm								
Degree of protection IEC/EN 60529	IP 20								
Housing material	Thermoplastic; grey, extinguishing degree V-0								
Mounting IEC/EN 60715	35mm DIN rail								

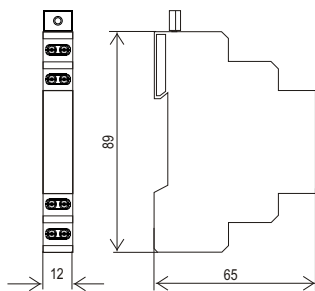
Ordering information

U _n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code NMH2-TC xxx	7072.02	7072.03	7072.04	7072.05	7072.06	7072.07	7072.08	7072.01

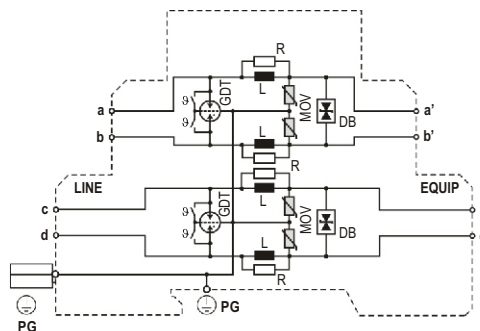
Dimensions, Internal configuration, Weight and Packaging

NMH2-TC Series

Dimensions



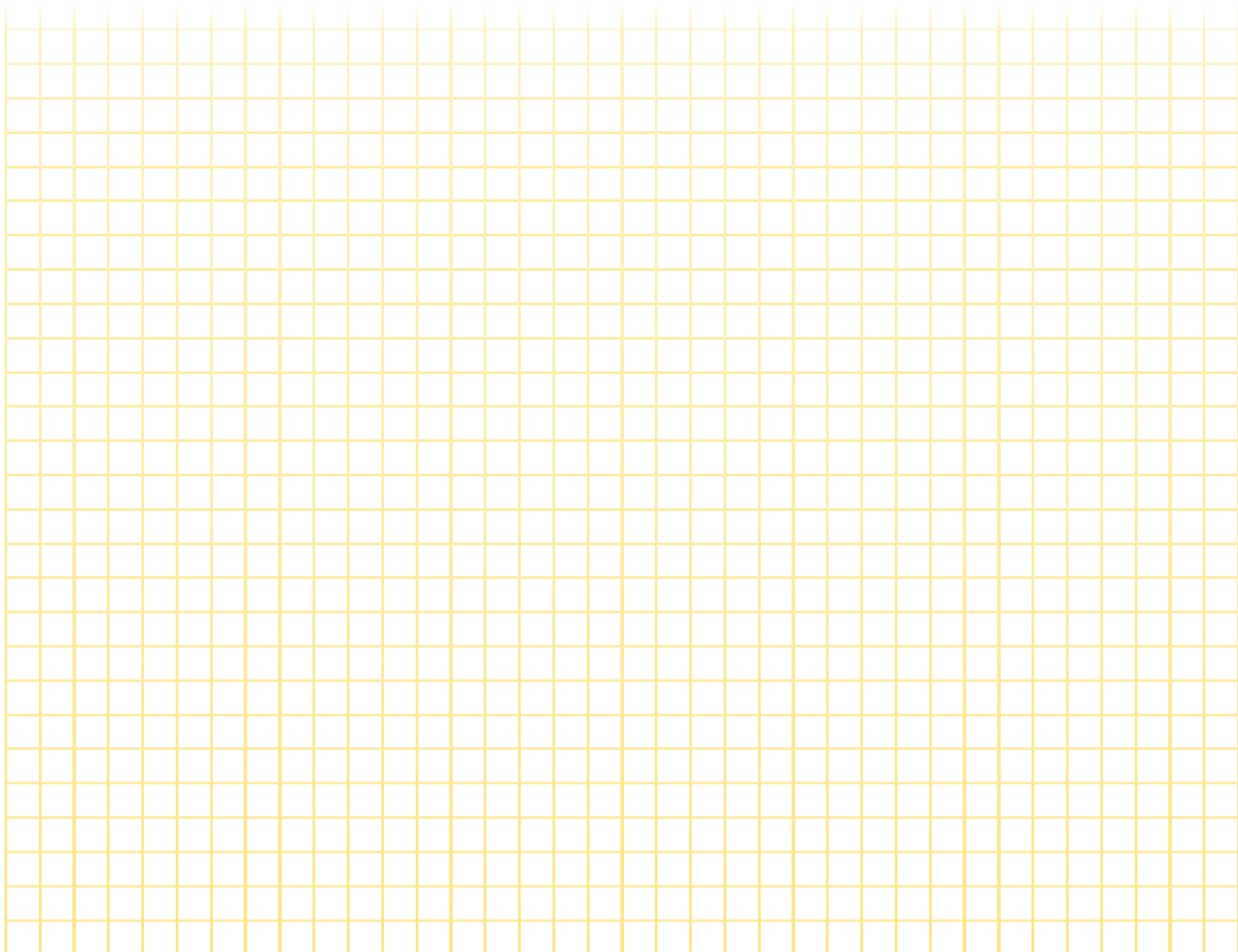
Internal configuration



Legend:

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

NMH2-TC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Dimensions DIN 43880					2/3TE			
Weight per unit					64g			
Packaging dimensions (single unit)					70 x 16 x 110mm			
Min. packaging quantity					15 pcs.			



IM-TD Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60, 110V_{DC}
- **Frequency range:** 0.6 - 10MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Series load current:** 145mA (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:** Stranded to 6 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



The IM-TD series of surge 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.

Overcurrent 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 data

Type	IM-TD							
	5V	12V	15V	24V	30V	48V	60V	110 V
Electrical characteristics								
Number of protected pairs	1 (2 conductors)							
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated load current at 25°C I_L	145mA	145mA	145mA	145mA	145mA	145mA	145mA	1A
Nominal discharge current (8/20µs) I_n	10kA							
Max. discharge current (8/20µs) I_{max}	20kA							
Impulse current (10/350µs) I_{imp}	2.5kA							
Residual voltage at 5kA (8/20µs) U_{res}	< 20V	< 39V	< 45V	< 65V	< 77V	< 135V	< 150V	< 450V
Rated spark overvoltage (a/b-PG)	6.5 - 9V	16 - 20V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
	6.5 - 9V	16 - 20V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Response time of overvoltage protection t_A	< 1ns							
Thermal protection (a, b)	YES (thermal disconnection in lines a and b)							
Overcurrent protection	PTC resistors at I ≥ 0.3A							
Insulation resistance of the protection R_{iso}	≥ 6kΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance R	9-11Ω							
Transverse capacitance C	7.0nF	4.4nF	3.3nF	2.9nF	2.1nF	1.2nF	1.0nF	90pF
Limit frequency f_G	0.6MHz	0.9MHz	1.1MHz	1.4MHz	1.8MHz	2.2MHz	3.0MHz	10MHz
Mechanical characteristics								
Temperature range	- 40°C ... + 80°C							
Terminal cross section	Stranded to 6 mm ²							
Terminal screw torque	2.0Nm							
Degree of protection IEC/EN 60529	IP 20							
Housing material	Thermoplastic; yellow, extinguishing degree V-0							
Mounting IEC/EN 60715	35mm DIN rail							

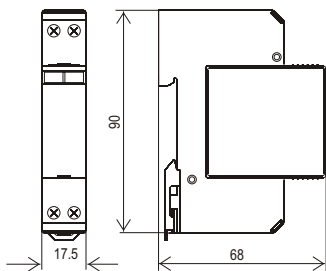
Ordering information

U _n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code IM-TD xxx	700.010	700.016	700.022	700.028	700.034	700.040	700.046	700.003
Ordering code IM-TD xxx (base S-GDT)	700.011	700.017	700.023	700.029	700.035	700.041	700.047	700.004
Ordering code IM-TD xxx (base RC)	700.012	700.018	700.024	700.030	700.036	700.042	700.048	700.005
Ordering code IM-TD xxx (base 2GND)	700.013	700.019	700.025	700.031	700.037	700.043	700.049	700.006
Ordering code Module IM-TD xxx	700.009	700.015	700.021	700.027	700.033	700.039	700.045	700.002

Dimensions, Internal configuration, Weight and Packaging

IM-TD Series

Dimensions



- Legend:
- TD thermal decoupler
 - GDT gas discharge tube
 - MOV varistor
 - PTC positive temperature coefficient resistor
 - R resistor
 - BD bi-directional TVS diode
 - SG signal grounding
 - PG protective grounding

Various options for the base:



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

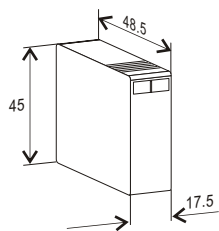
S-GDT base: where a coaxial shield is used and equipotential ground equalization is required.

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

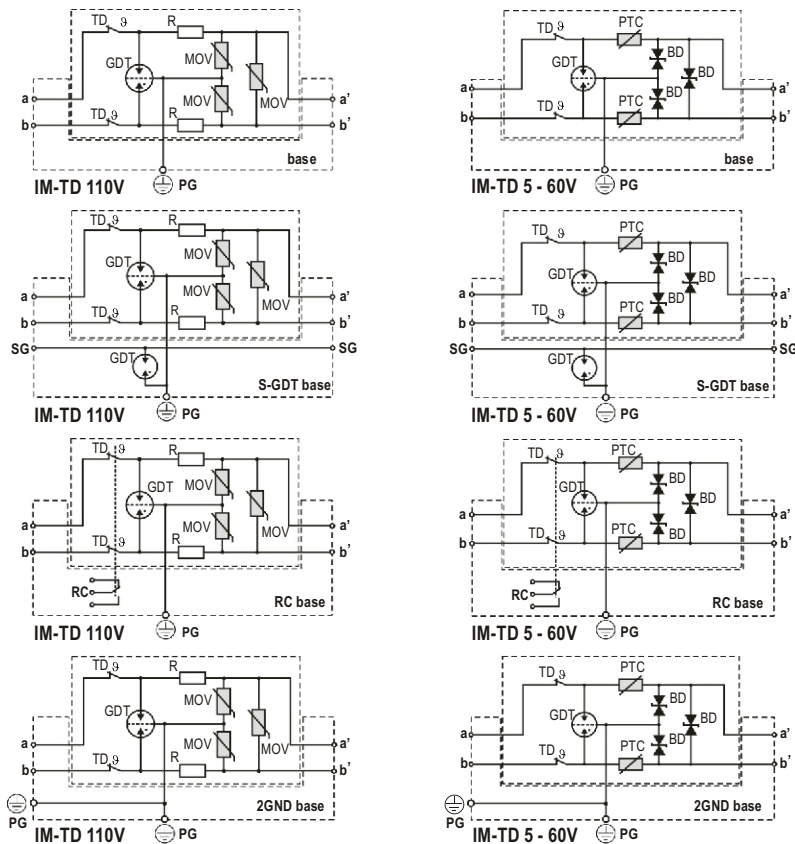
2 GND base: where a second ground terminal (in addition to the DIN rail ground strip) is provided for installations not utilizing DIN rail.

Module IM-TD Series

Dimensions



Internal configuration



IM-TD xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit								88g
IM-TD xxx SGDT								
Weight per unit								96g
IM-TD xxx RC								
Weight per unit								92g
IM-TD xxx 2GND								
Weight per unit								96g
Dimensions DIN 43880								1TE
Packaging dimensions (single unit)								78 x 23 x 108mm
Min. packaging quantity								12 pcs.

Module IM-TD xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit								32g
Packaging dimensions (single unit)								61 x 49 x 21mm
Min. packaging quantity								24 pcs.

Accessory Part for IM-TD

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.

Module IMTEST	
Weight per unit	26g
Packaging dimensions (single unit)	61 x 49 x 21mm
Min. packaging quantity	24 pcs.

Ordering code IMTEST	127 145
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IMH-TC Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60, 110V_{DC}
- **Frequency range:** up to 35MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Series load current:** 1A
- **Enclosure:** DIN 43880 1TE, DIN rail mount
- **Terminals:** Stranded to 6 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



The IMH-TC series of surge 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 data

Type	IMH-TC							
	5V	12V	15V	24V	30V	48V	60V	110 V
Electrical characteristics								
Number of protected pairs	1 (2 conductors)							
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated load current at 25°C I_L	1A							
Nominal discharge current (8/20μs) I_n	10kA							
Max. discharge current (8/20μs) I_{max}	20kA							
Impulse current (10/350μs) I_{imp}	2.5kA							
Residual voltage at 5kA (8/20μs) U_{res}	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
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
Response time of overvoltage protection t_A	< 1ns							
Thermal protection	YES							
Insulation resistance of the protection R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance R	cca. 1.0Ω							
Transverse capacitance C	30pF							
Limit frequency f_G	35MHz							
Mechanical characteristics								
Temperature range	- 40°C ... + 80°C							
Terminal cross section	Stranded to 6 mm ²							
Terminal screw torque	2.0Nm							
Degree of protection IEC/EN 60529	IP 20							
Housing material	Thermoplastic; yellow, extinguishing degree V-0							
Mounting IEC/EN 60715	35mm DIN rail							

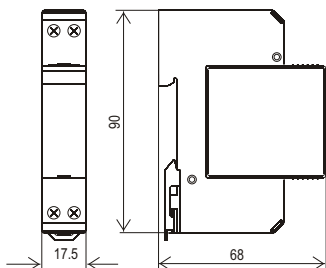
Ordering information

U _n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code IMH-TC xxx	701.007	701.012	701.017	701.022	701.027	701.032	701.037	701.002
Ordering code IMH-TC xxx (base S-GDT)	701.008	701.013	701.018	701.023	701.028	701.033	701.038	701.003
Ordering code IMH-TC xxx (base 2GND)	701.009	701.014	701.019	701.034	701.029	701.034	701.039	701.004
Ordering code Module IMH-TC xxx	701.006	701.011	701.016	701.021	701.026	701.031	701.036	701.001

Dimensions, Internal configuration, Weight and Packaging

IMH-TC Series

Dimensions



- Legend:
- TC thermo-clip
 - GDT gas discharge tube
 - MOV varistor
 - R resistor
 - DB diode block
 - SG signal grounding
 - PG protective grounding

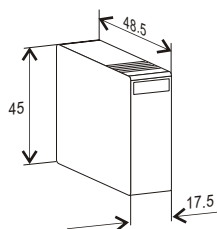
Various options for the base:



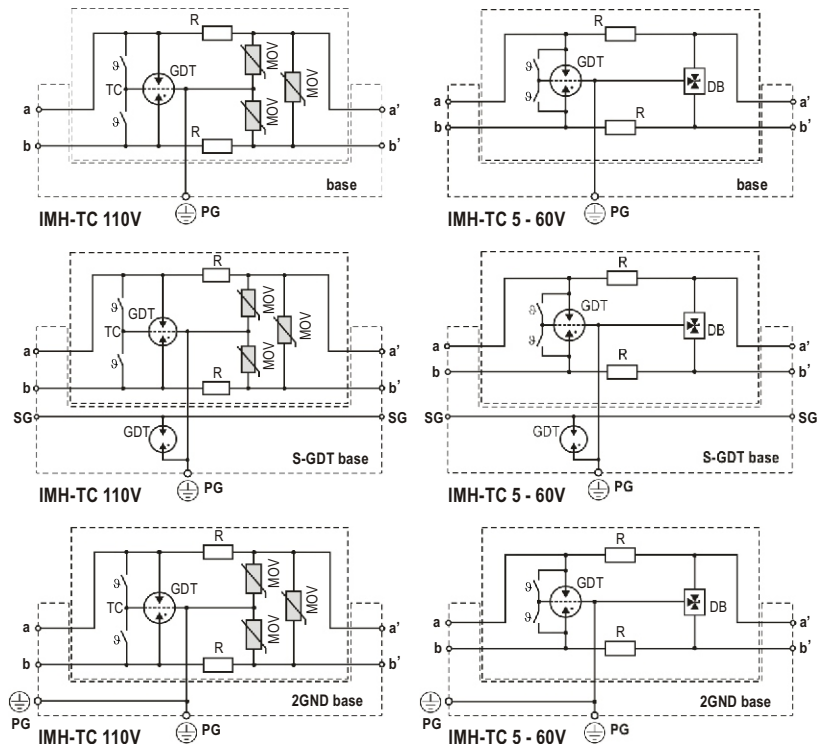
S-GDT base: where a coaxial shield is used and equipotential ground equalization is required.
2GND base: where a second ground terminal (in addition to the DIN rail ground strip) is provided for installations not utilizing DIN rail.

Module IMH-TC Series

Dimensions



Internal configuration



IMH-TC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit	84g							
IMH-TC xxx SGDT								
Weight per unit	94g							
IMH-TC xxx 2GND								
Weight per unit	92g							
Dimensions DIN 43880	1TE							
Packaging dimensions (single unit)	78 x 23 x 108mm							
Min. packaging quantity	12 pcs.							

Module IMH-TC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit	28g							
Packaging dimensions (single unit)	61 x 49 x 21mm							
Min. packaging quantity	24 pcs.							

Accessory Part for IMH-TC

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.

Module IMTEST	
Weight per unit	26g
Packaging dimensions (single unit)	61 x 49 x 21mm
Min. packaging quantity	24 pcs.

Ordering code IMTEST	127 145
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SMH-SG Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60, 110V_{DC}
- **Frequency range:** 30MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Series load current:** 1A
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



The SMH-SG series of surge 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 data

Type	SMH-SG								
	5V	12V	15V	24V	30V	48V	60V	110 V	
Electrical characteristics									
Number of protected pairs	1 (2 conductors)								
Nominal operating voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V	110V
Max. continuous operating voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated load current at 25°C	I_L	1A							
Nominal discharge current (8/20µs)	I_n	10kA							
Max. discharge current (8/20µs)	I_{max}	20kA							
Impulse current (10/350µs)	I_{imp}	2.5kA							
Residual voltage at 5kA (8/20µs)	U_{res} (line-line)	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Rated spark overvoltage	(SG-PG)	280-420V							
	(a-b), (a, b-SG)	7 - 10V	15 - 19V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Response time of overvoltage protection	t_A (a, b-SG)	< 1ns							
	(SG-PG)	100ns							
Insulation resistance of the protection	R_{iso} (a-b)	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
	(SG-PG)	> 1GΩ/100V							
Serial resistance	R	1.6 - 2.0Ω							
Transverse capacitance	C (a, b-SG)	50pF							
	(SG-PG)	5pF							
Limit frequency	f_g	30MHz							
Mechanical characteristics									
Temperature range	- 40°C ... + 80°C								
Terminal cross section	Stranded to 4 mm ²								
Terminal screw torque	0.5Nm								
Degree of protection IEC/EN 60529	IP 20								
Housing material	Thermoplastic; grey, extinguishing degree V-0								
Mounting IEC/EN 60715	35mm DIN rail								

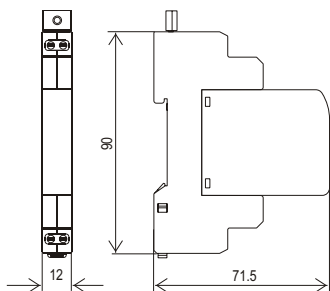
Ordering information

U_n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code SMH-SG xxx	7081.42	7081.43	7081.44	7081.45	7081.46	7081.47	7081.48	7081.41
Ordering code Module SMH-SG xxx	7081.32	7081.33	7081.34	7081.35	7081.36	7081.37	7081.38	7081.31

Dimensions, Internal configuration, Weight and Packaging

SMH-SG Series

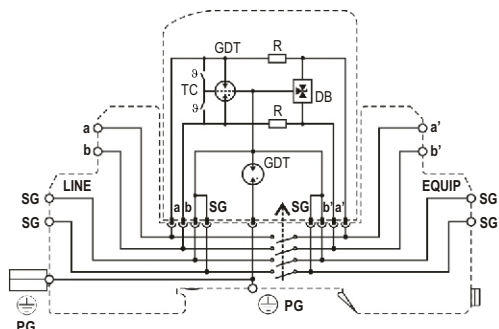
Dimensions



Legend:

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

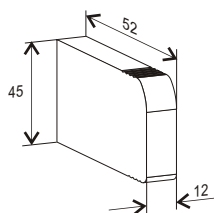
Internal configuration



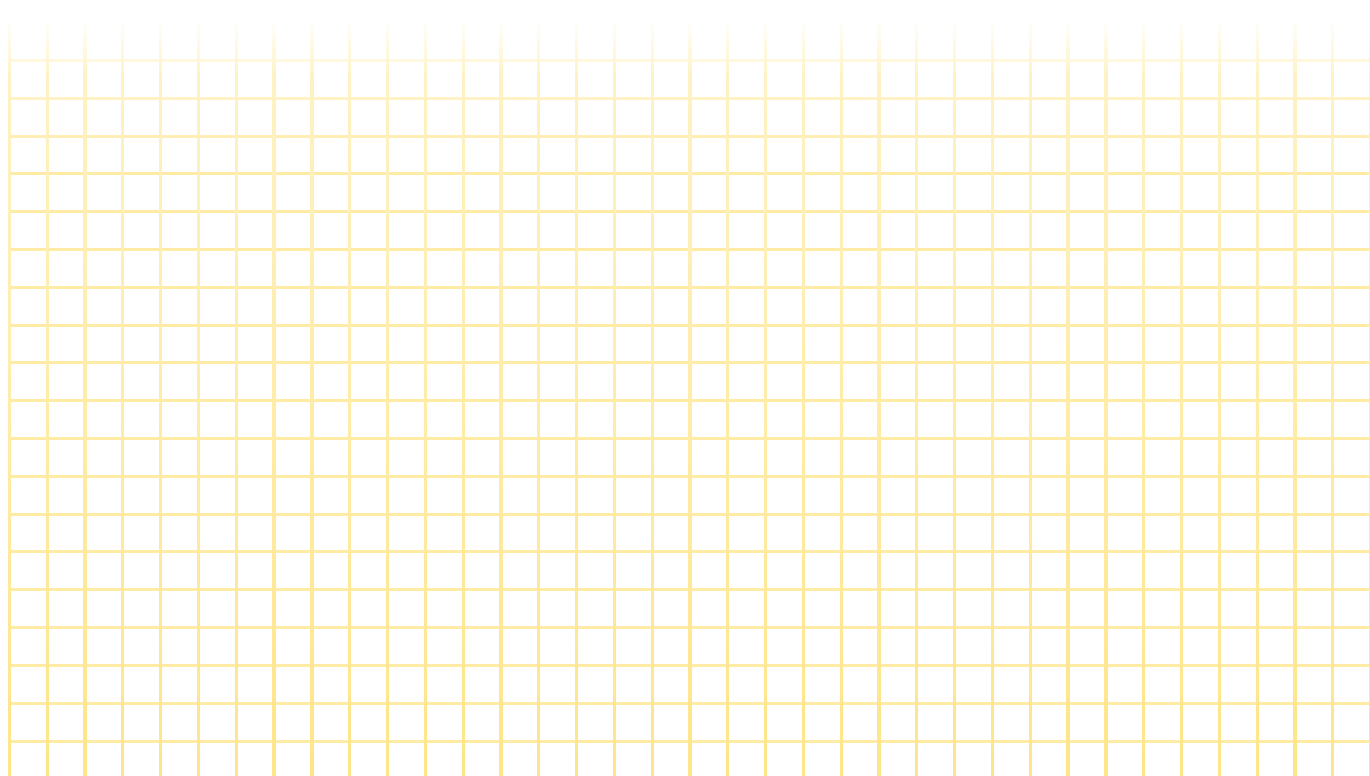
SMH-SG xxx	5V	12V	15V	24V	30V	48V	60V	110V
Dimensions DIN 43880					2/3TE			
Weight per unit					60g			
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity					15 pcs.			

Module SMH-SG Series

Dimensions



Module SMH-SG xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit					26g			
Packaging dimensions (single unit)					87 x 15 x 102mm			
Min. packaging quantity					15 pcs.			



VMS-TC Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Available voltages:** 5, 12, 15, 24, 30, 48, 60, 110V_{DC}
- **Frequency range:** 0.6 - 10MHz
- **Surge Discharge Ratings:** I_n: 10kA, I_{max}: 20kA, I_{imp}: 2.5kA
- **Series load current:** 1A
- **Enclosure:** DIN 43880 1TE, DIN rail mount
- **Terminals:** Stranded to 6 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



The VMS-TC series of surge 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 data

Type	VMS-TC								
	5V	12V	15V	24V	30V	48V	60V	110 V	
Electrical characteristics									
Number of protected pairs	1 (2 conductors)								
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V	
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V	
Rated load current at 25°C I_L	1A								
Nominal discharge current (8/20µs) I_n	10kA								
Max. discharge current (8/20µs) I_{max}	20kA								
Impulse current (10/350µs) I_{imp}	2.5kA								
Residual voltage at 5kA (8/20µs) U_{res} (line-line)	< 20V	< 39V	< 45V	< 65V	< 77V	< 135V	< 150V	< 450V	
Rated spark overvoltage (a/b-PG)	280-500V								
	(a-b)	6.5 - 9V	16 - 20V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Response time of overvoltage protection t_A (a-b)	< 1ns								
	(a/b-PG)	100ns							
Insulation resistance of the protection R_{iso} (a-b)	≥ 6KΩ								
	(a/b-PG)	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ	
Serial resistance R	cca. 1.0Ω								
Transverse capacitance C (a-b)	5nF								
	(a/b-PG)	3nF	2.2nF	1.9nF	1.4nF	0.82nF	0.7nF	90pF	
Limit frequency f_G	8pF								
	0.6MHz	0.9MHz	1.1MHz	1.4MHz	1.8MHz	2.2MHz	3.0MHz	10MHz	
Mechanical characteristics									
Temperature range	- 40°C ... + 80°C								
Terminal cross section	Stranded to 6 mm ²								
Terminal screw torque	2.0Nm								
Degree of protection IEC/EN 60529	IP 20								
Housing material	Thermoplastic; yellow, extinguishing degree V-0								
Mounting IEC/EN 60715	35mm DIN rail								

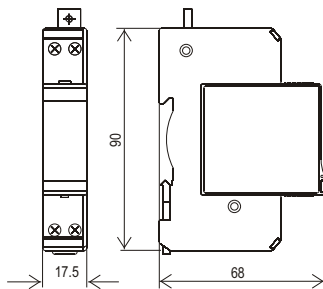
Ordering information

U _n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code VMS-TC xxx	7020.05	7020.08	7020.11	7020.14	7020.17	7020.20	7020.23	7020.02
Ordering code Module VMS-TC xxx	7020.04	7020.07	7020.10	7020.13	7020.16	7020.19	7020.22	7020.01

Dimensions, Internal configuration, Weight and Packaging

VMS-TC Series

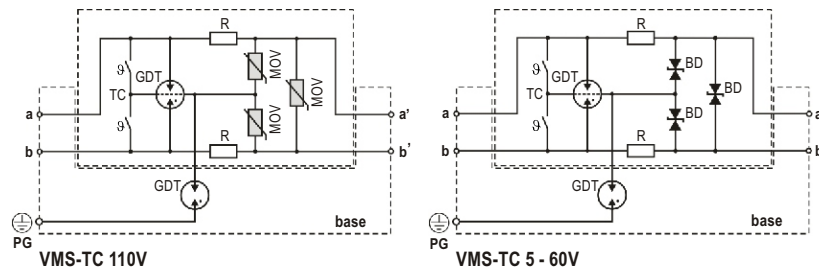
Dimensions



Legend:

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

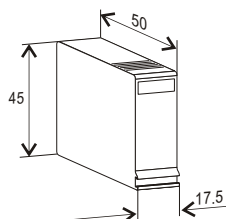
Internal configuration



VMS-TC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Dimensions DIN 43880	1TE							
Weight per unit	92g							
Packaging dimensions (single unit)	78 x 23 x 108mm							
Min. packaging quantity	12 pcs.							

Module VMS-TC Series

Dimensions



Module VMS-TC xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit	30g							
Packaging dimensions (single unit)	61 x 49 x 21mm							
Min. packaging quantity	12 pcs.							

Accessory Part for VMS-TC

Testing module VM TEST is intended for performing measurements on the VMS-TC and 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.



Module VMTEST	
Weight per unit	26g
Packaging dimensions (single unit)	61 x 49 x 21mm
Min. packaging quantity	24 pcs.

Ordering code VMTEST	127 144
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VMO Series



- **Category IEC/EN:** D1/C1/C2/C3
- **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, 110V_{DC}
- **Frequency range:** 0.6 - 10MHz
- **Surge Discharge Ratings:** I_n: 20kA, I_{max}: 30kA, I_{imp}: 5kA
- **Series load current:** 1A
- **Enclosure:** DIN 43880 1TE, DIN rail mount
- **Terminals:** Stranded to 6 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



The VMO series of surge 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 data

Type	VMO							
	5V	12V	15V	24V	30V	48V	60V	110 V
Electrical characteristics								
Number of protected pairs	1 (2 conductors)							
Nominal operating voltage (DC) U_n	5V	12V	15V	24V	30V	48V	60V	110V
Max. continuous operating voltage (DC) U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated load current at 25°C I_L	1A							
Nominal discharge current (8/20μs) I_n	20kA							
Max. discharge current (8/20μs) I_{max}	30kA							
Impulse current (10/350μs) I_{imp}	5kA							
Residual voltage at 5kA (8/20μs) U_{res}	< 20V	< 39V	< 45V	< 65V	< 77V	< 135V	< 150V	< 450V
Rated spark overvoltage (a/b-PG)	6.5 - 9V	16 - 20V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
	6.5 - 9V	16 - 20V	20 - 24V	30 - 36V	35 - 43V	55 - 68V	67 - 85V	184 - 264V
Response time of overvoltage protection t_A	< 1ns							< 25ns
Insulation resistance of the protection R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance R	cca. 2Ω							
Transverse capacitance C	7.0nF	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
Mechanical characteristics								
Temperature range	- 40°C ... + 80°C							
Terminal cross section	Stranded to 6 mm ²							
Terminal screw torque	2.0Nm							
Degree of protection IEC/EN 60529	IP 20							
Housing material	Thermoplastic; yellow, extinguishing degree V-0							
Mounting IEC/EN 60715	35mm DIN rail							

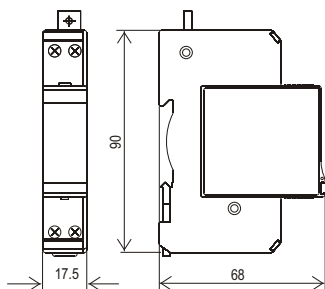
Ordering information

U _n	5V	12V	15V	24V	30V	48V	60V	110 V
Ordering code VMO xxx	7025.05	7025.08	7025.11	7025.14	7025.17	7025.20	7025.23	7025.02
Ordering code Module VMO xxx	7025.04	7025.07	7025.10	7025.13	7025.16	7025.19	7025.22	7025.01

Dimensions, Internal configuration, Weight and Packaging

VMO Series

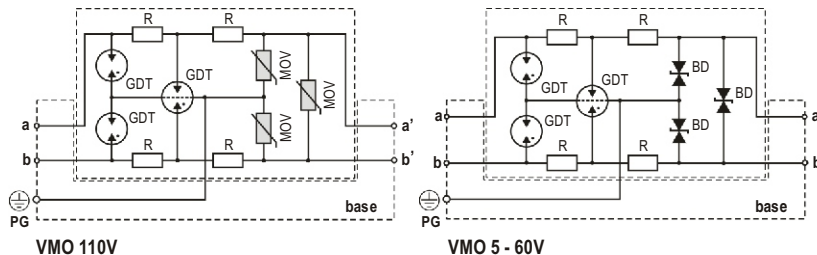
Dimensions



Legend:

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

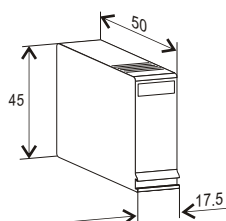
Internal configuration



VMO xxx	5V	12V	15V	24V	30V	48V	60V	110V
Dimensions DIN 43880	1TE							
Weight per unit	96g							
Packaging dimensions (single unit)	78 x 23 x 108mm							
Min. packaging quantity	15 pcs.							

Module VMO Series

Dimensions



Module VMO xxx	5V	12V	15V	24V	30V	48V	60V	110V
Weight per unit	34g							
Packaging dimensions (single unit)	78 x 23 x 108mm							
Min. packaging quantity	15 pcs.							

Accessory Part for VMO

Testing module VM TEST is intended for performing measurements on the VMS-TC and 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.



Module VMTEST	
Weight per unit	26g
Packaging dimensions (single unit)	61 x 49 x 21mm
Min. packaging quantity	24 pcs.

Ordering code VMTEST	127 144
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SMH-TDR



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Nominal operating voltage:** U_n : 110V_{DC}
- **Max. operating voltage:** U_c : 170V_{DC}
- **Serial resistance:** 9 - 11 Ω
- **Frequency range:** 16MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Series load current:** 300mA
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design



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 occurs 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 data

Type	SMH-TDR 110 V	
Electrical characteristics		
Number of protected pairs		1 (2 conductors)
Nominal operating voltage (DC)	U_n	110V
Max. continuous operating voltage (DC)	U_c	170V
Rated load current at 25°C	I_L	300mA
Nominal discharge current (8/20 μ s)	I_n	10kA
Max. discharge current (8/20 μ s)	I_{max}	20kA
Impulse current (10/350 μ s)	I_{imp}	2.5kA
Residual voltage at 5kA (8/20 μ s)	U_{res}	< 500V
Rated spark overvoltage	(a/b-PG)	184 - 276V
	(a-b)	184 - 550V
Response time of overvoltage protection	t_A	< 100ns
Thermal protection		YES
Insulation resistance of the protection	R_{iso}	\geq 1G Ω
Serial resistance	R	9-11 Ω
Transverse capacitance	C	10pF
Limit frequency	f_G	16MHz
Mechanical characteristics		
Temperature range		- 40°C ... + 80°C
Terminal cross section		Stranded to 4 mm ²
Terminal screw torque		0.5Nm
Degree of protection IEC/EN 60529		IP 20
Housing material		Thermoplastic; grey, extinguishing degree V-0
Mounting IEC/EN 60715		35mm DIN rail

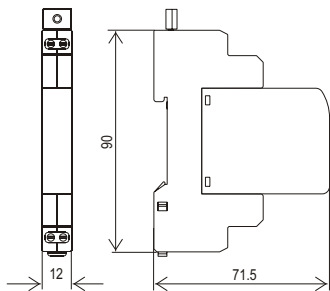
Ordering information

U_n	110 V
Ordering code SMH-TDR xxx	7081.50
Ordering code Module SMH-TDR xxx	7081.52

Dimensions, Internal configuration, Weight and Packaging

SMH-TDR

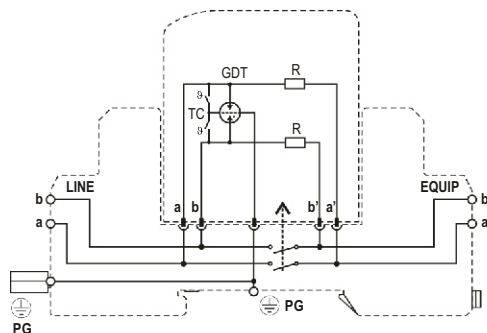
Dimensions



Legend:

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

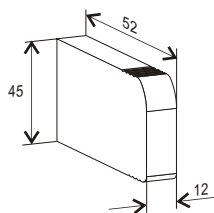
Internal configuration



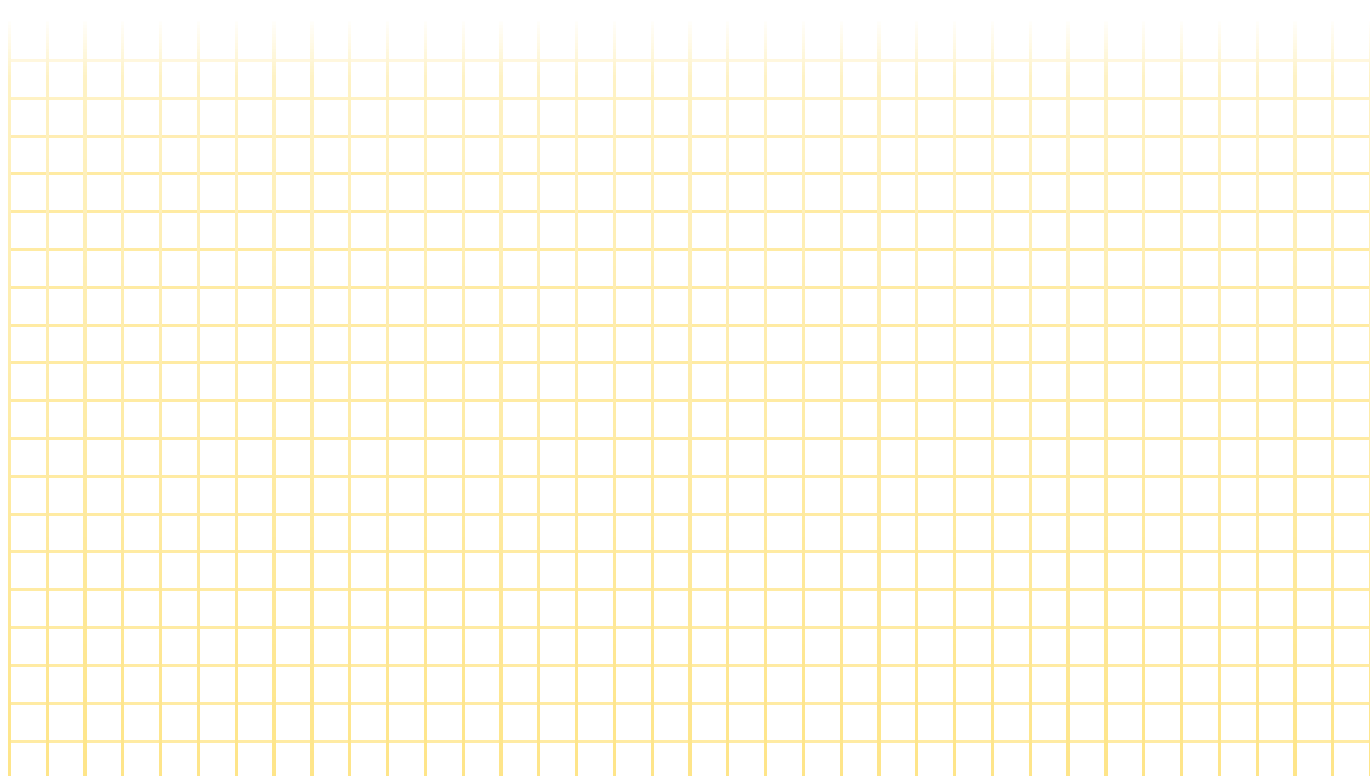
SMH-TDR xxx	110V
Dimensions DIN 43880	2/3TE
Weight per unit	52g
Packaging dimensions (single unit)	87 x 15 x 24mm
Min. packaging quantity	15 pcs.

Module SMH-TDR

Dimensions



Module SMH-TDR xxx	110V
Weight per unit	24g
Packaging dimensions (single unit)	87 x 15 x 24mm
Min. packaging quantity	15 pcs.



SMH2-TDR



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Nominal operating voltage:** U_n : 110V_{DC}
- **Max. operating voltage:** U_c : 170V_{DC}
- **Serial resistance:** 9 - 11Ω
- **Frequency range:** 16MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 5kA
- **Series load current:** 300mA
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design



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 occurs 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 data

Type		SMH2-TDR 110 V
Electrical characteristics		
Number of protected pairs		2 (4 conductors)
Nominal operating voltage (DC)	U_n	110V
Max. continuous operating voltage (DC)	U_c	170V
Rated load current at 25°C	I_L	300mA
Nominal discharge current (8/20μs)	I_n	10kA
Max. discharge current (8/20μs)	I_{max}	20kA
Impulse current (10/350μs)	I_{imp}	5kA
Residual voltage at 5kA (8/20μs)	U_{res}	< 500V
Rated spark overvoltage	(a/b-PG)	184 - 276V
	(a-b)	184 - 550V
Response time of overvoltage protection	t_A	< 100ns
Thermal protection		YES
Insulation resistance of the protection	R_{iso}	≥ 1GΩ
Serial resistance	R	9-11Ω
Transverse capacitance	C	10pF
Limit frequency	f_G	16MHz
Mechanical characteristics		
Temperature range		- 40°C ... + 80°C
Terminal cross section		Stranded to 4 mm ²
Terminal screw torque		0.5Nm
Degree of protection IEC/EN 60529		IP 20
Housing material		Thermoplastic; grey, extinguishing degree V-0
Mounting IEC/EN 60715		35mm DIN rail

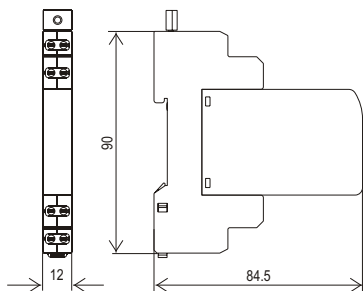
Ordering information

U_n	110 V
Ordering code SMH2-TDR xxx	7081.51
Ordering code Module SMH2-TDR xxx	7081.53

Dimensions, Internal configuration, Weight and Packaging

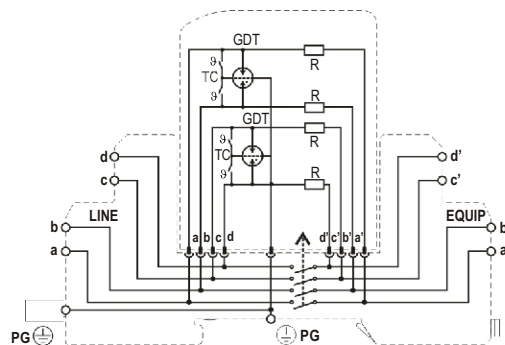
SMH2-TDR

Dimensions



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

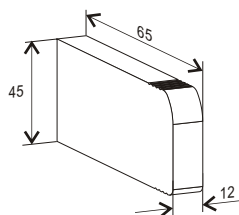
Internal configuration



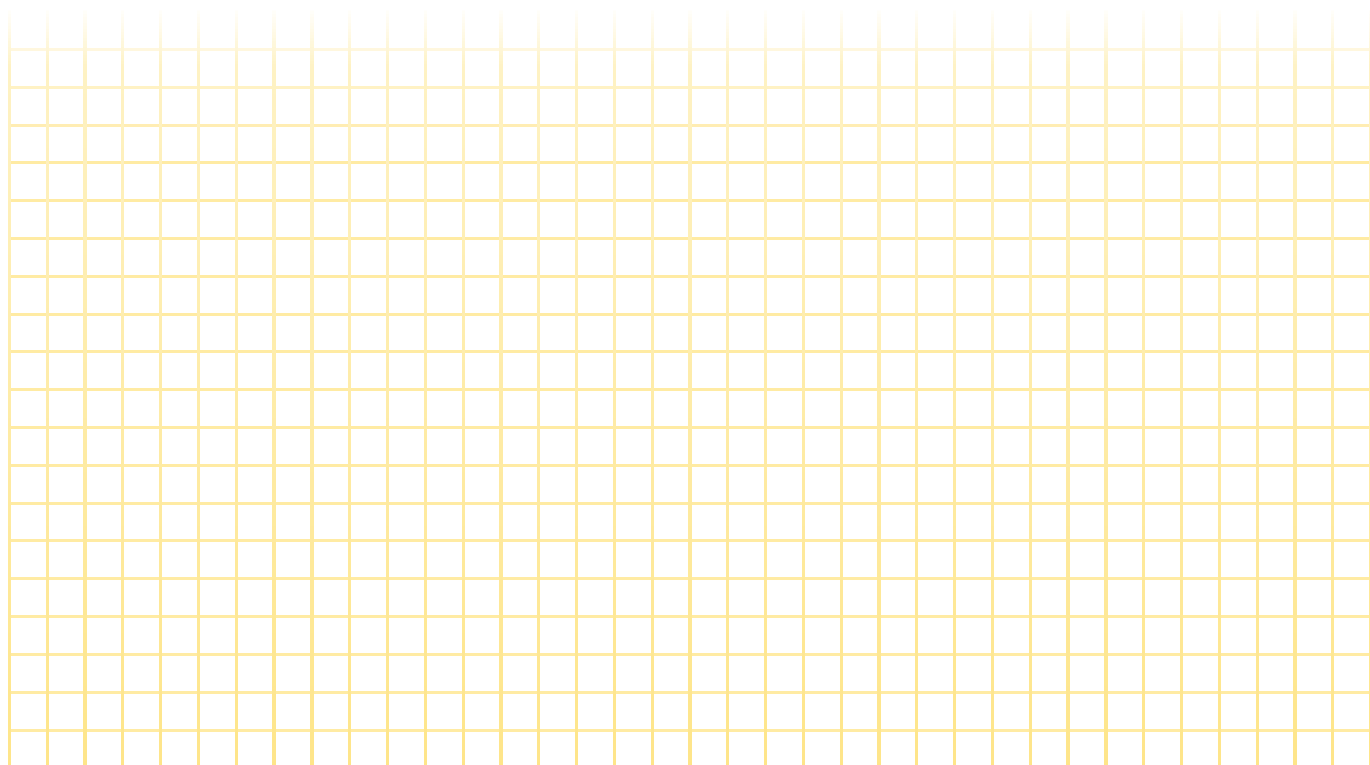
SMH2-TDR xxx	110V
Dimensions DIN 43880	2/3TE
Weight per unit	66g
Packaging dimensions (single unit)	87 x 15 x 102mm
Min. packaging quantity	15 pcs.

Module SMH2-TDR

Dimensions



Module SMH2-TDR xxx	110V
Weight per unit	28g
Packaging dimensions (single unit)	87 x 15 x 102mm
Min. packaging quantity	15 pcs.



VM-TDR



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Nominal operating voltage:** U_n : 110V_{DC}
- **Max. operating voltage:** U_c : 170V_{DC}
- **Serial resistance:** 9 - 11 Ω
- **Frequency range:** 16MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Series load current:** 300mA
- **Enclosure:** DIN 43880 1TE, DIN rail mount
- **Terminals:** Stranded to 6 mm²
- **Housing:** Modular design



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 data

Type		VM-TDR 110 V
Electrical characteristics		
Number of protected pairs		1 (2 conductors)
Nominal operating voltage (DC)	U_n	110V
Max. continuous operating voltage (DC)	U_c	170V
Rated load current at 25°C	I_L	300mA
Nominal discharge current (8/20 μ s)	I_n	10kA
Max. discharge current (8/20 μ s)	I_{max}	20kA
Impulse current (10/350 μ s)	I_{imp}	2.5kA
Residual voltage at 5kA (8/20 μ s)	U_{res}	< 500V
Rated spark overvoltage	(a/b-PG)	184 - 276V
	(a-b)	184 - 550V
Response time of overvoltage protection	t_A	< 100ns
Thermal protection		YES (thermal disconnection in lines a and b)
Insulation resistance of the protection	R_{iso}	\geq 1G Ω
Serial resistance	R	9-11 Ω
Transverse capacitance	C	10pF
Limit frequency	f_G	16MHz
Mechanical characteristics		
Temperature range		-40°C ... + 80°C
Terminal cross section		Stranded to 6 mm ²
Terminal screw torque		2.0Nm
Degree of protection IEC/EN 60529		IP 20
Housing material		Thermoplastic; yellow, extinguishing degree V-0
Mounting IEC/EN 60715		35mm DIN rail

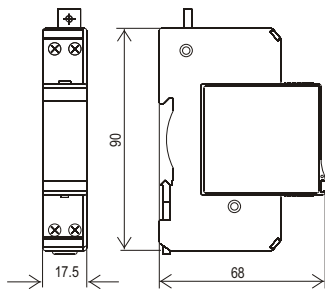
Ordering information

U_n	110 V
Ordering code VM-TDR xxx	7030.52
Ordering code Module VM-TDR xxx	7030.51

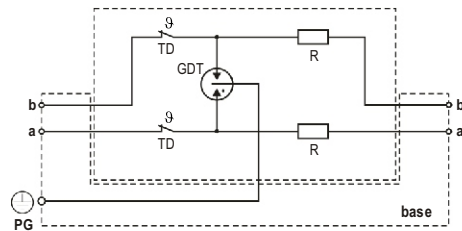
Dimensions, Internal configuration, Weight and Packaging

VM-TDR

Dimensions



Internal configuration



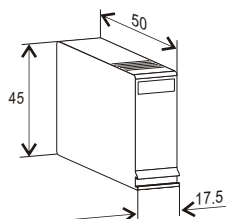
Legend:

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

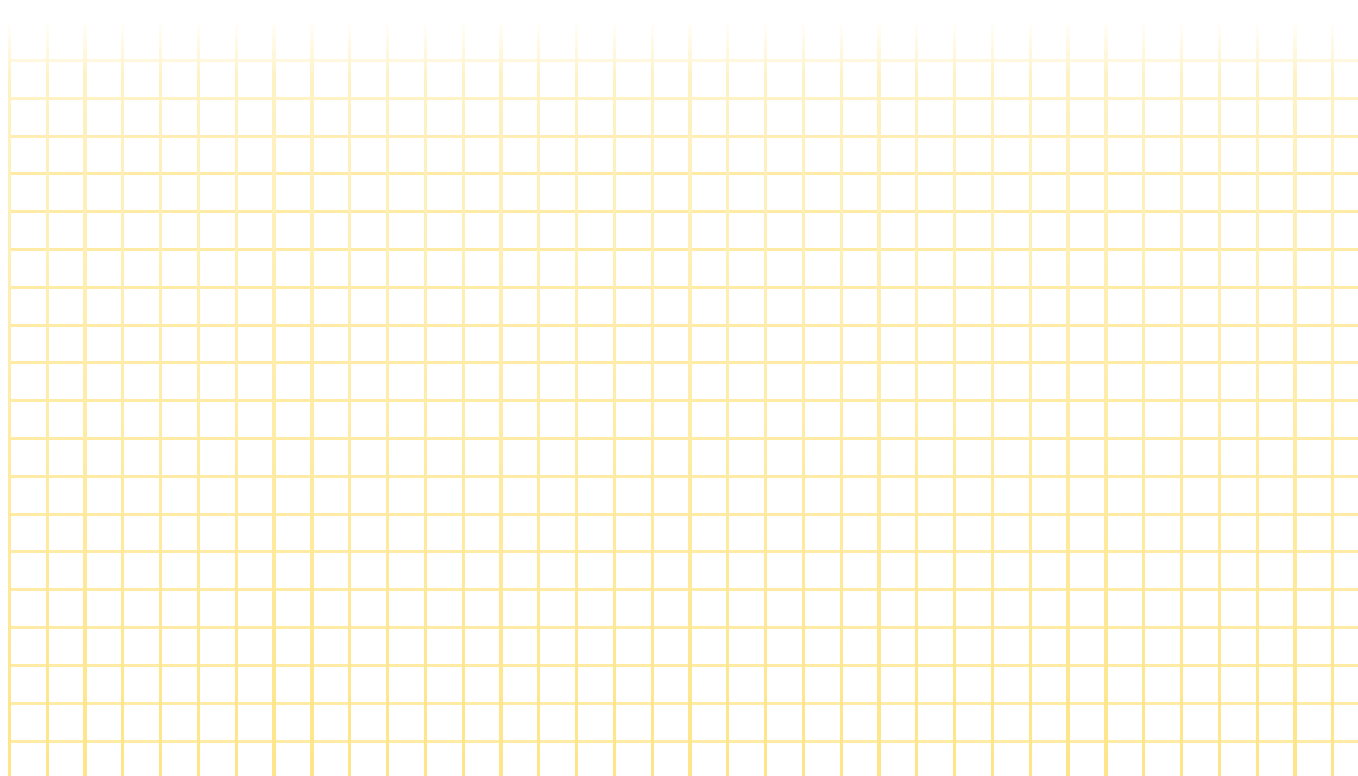
VM-TDR xxx	110V
Dimensions DIN 43880	1TE
Weight per unit	94g
Packaging dimensions (single unit)	78 x 23 x 108mm
Min. packaging quantity	12 pcs.

Module VM-TDR

Dimensions



Module VM-TDR xxx	110V
Weight per unit	32g
Packaging dimensions (single unit)	61 x 49 x 21mm
Min. packaging quantity	24 pcs.



SMH2-DF Series



- **Category IEC/EN:** C1/C3
- **Fine Protection:** Bi-directional TVS diode
- **Nominal operating voltage:** U_n : 12, 24V_{DC}
- **Max. operating voltage:** U_c : 15, 28V_{DC}
- **Frequency range:** up to 1.4MHz
- **Surge Discharge Ratings:** I_n : 250A, 500A
- **Series load current:** 10A
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



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 facilitates 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 data

Type	SMH2-DF		
	12V		24V
Electrical characteristics			
Number of protected pairs	2 (4 conductors)		
Nominal operating voltage (DC)	U_n	12V	24V
Max. continuous operating voltage (DC)	U_c	15V	28V
Rated load current at 25°C	I_L	10A	
Nominal discharge current (8/20μs)	I_n	500A	250A
Residual voltage at I_n (8/20μs)	U_{res}	< 48V	< 70V
Rated spark overvoltage	(a/b-PG)	18 - 21V	30 - 37V
	(a-b)	36 - 42V	60 - 74V
Response time of overvoltage protection	t_A	1ns	
Insulation resistance of the protection	R_{iso}	≥ 15MΩ	≥ 28MΩ
Serial resistance	R	< 0.1Ω	
Transverse capacitance	C	50pF	
Limit frequency	f_G	0.9MHz	1.4MHz
Mechanical characteristics			
Temperature range	- 40°C ... + 80°C		
Terminal cross section	Stranded to 4 mm ²		
Terminal screw torque	0.5Nm		
Degree of protection IEC/EN 60529	IP 20		
Housing material	Thermoplastic; grey, extinguishing degree V-0		
Mounting IEC/EN 60715	35mm DIN rail		

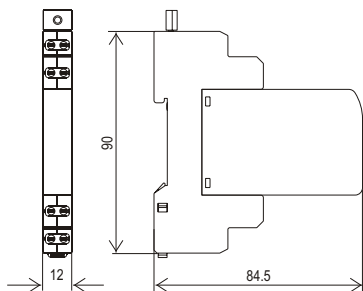
Ordering information

U_n	12V	24V
Ordering code SMH2-DF xx	7082.58	7082.59

Dimensions, Internal configuration, Weight and Packaging

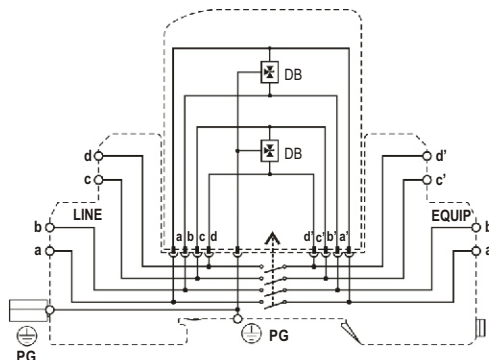
SMH2-DF Series

Dimensions

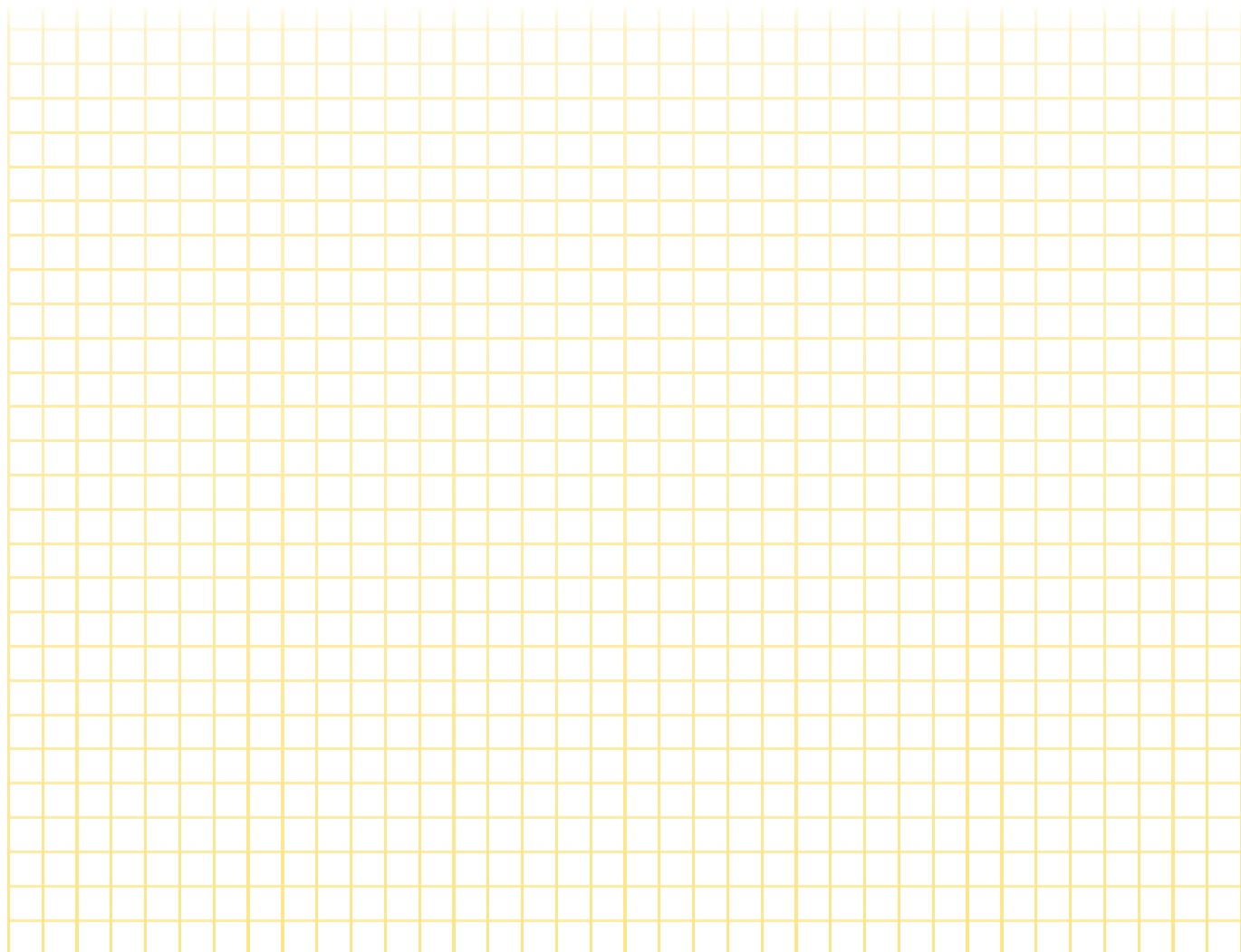


Legend:
 DB diode block
 PG protective grounding

Internal configuration



SMH2-DF xx	12V	24V
Dimensions DIN 43880		2/3TE
Weight per unit		64g
Packaging dimensions (single unit)	87 x 15 x 102mm	
Min. packaging quantity	15 pcs.	



IM-VF Series



- **Category IEC/EN:** C1/C3
- **Fine Protection:** MOV
- **Nominal operating voltage:** U_n : 15, 30V_{DC}
- **Max. operating voltage:** U_c : 22, 38V_{DC}
- **Frequency range:** 0.5MHz
- **Surge Discharge Ratings:** I_n : 500A
- **Series load current:** 10A
- **Enclosure:** DIN 43880 1/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Compact design
- **Complies with:** IEC/EN 61643-21



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 data

Type		15V	IM-VF	30V
Electrical characteristics				
Number of protected pairs			1 conductor	
Nominal operating voltage (DC)	U_n	15V		30V
Max. continuous operating voltage (DC)	U_c	22V		38V
Rated load current at 25°C	I_L		10A	
Nominal discharge current (8/20μs)	I_n		500A	
Residual voltage at I_n (8/20μs)	U_{res}	< 48V		< 70V
Rated spark overvoltage		24 - 30V		42 - 52V
Response time of overvoltage protection	t_A		25ns	
Insulation resistance of the protection	R_{iso}	≥ 1.5MΩ		≥ 3.0MΩ
Serial resistance	R		< 0.1Ω	
Transverse capacitance	C	< 10nF		< 6.0nF
Limit frequency	f_G		0.5MHz	
Mechanical characteristics				
Temperature range			- 40°C ... + 80°C	
Terminal cross section			Stranded to 4 mm ²	
Terminal screw torque			0.5Nm	
Degree of protection IEC/EN 60529			IP 20	
Housing material			Thermoplastic; beige, extinguishing degree V-0	
Mounting IEC/EN 60715			35mm DIN rail	

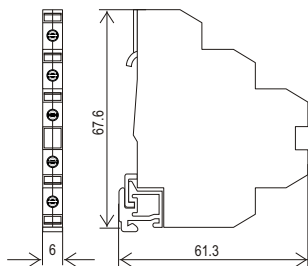
Ordering information

U_n	15V	30V
Ordering code IM-VF xx	704 550	704 551

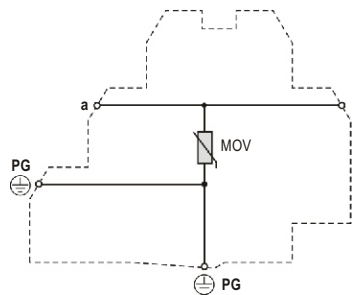
Dimensions, Internal configuration, Weight and Packaging

IM-VF Series

Dimensions

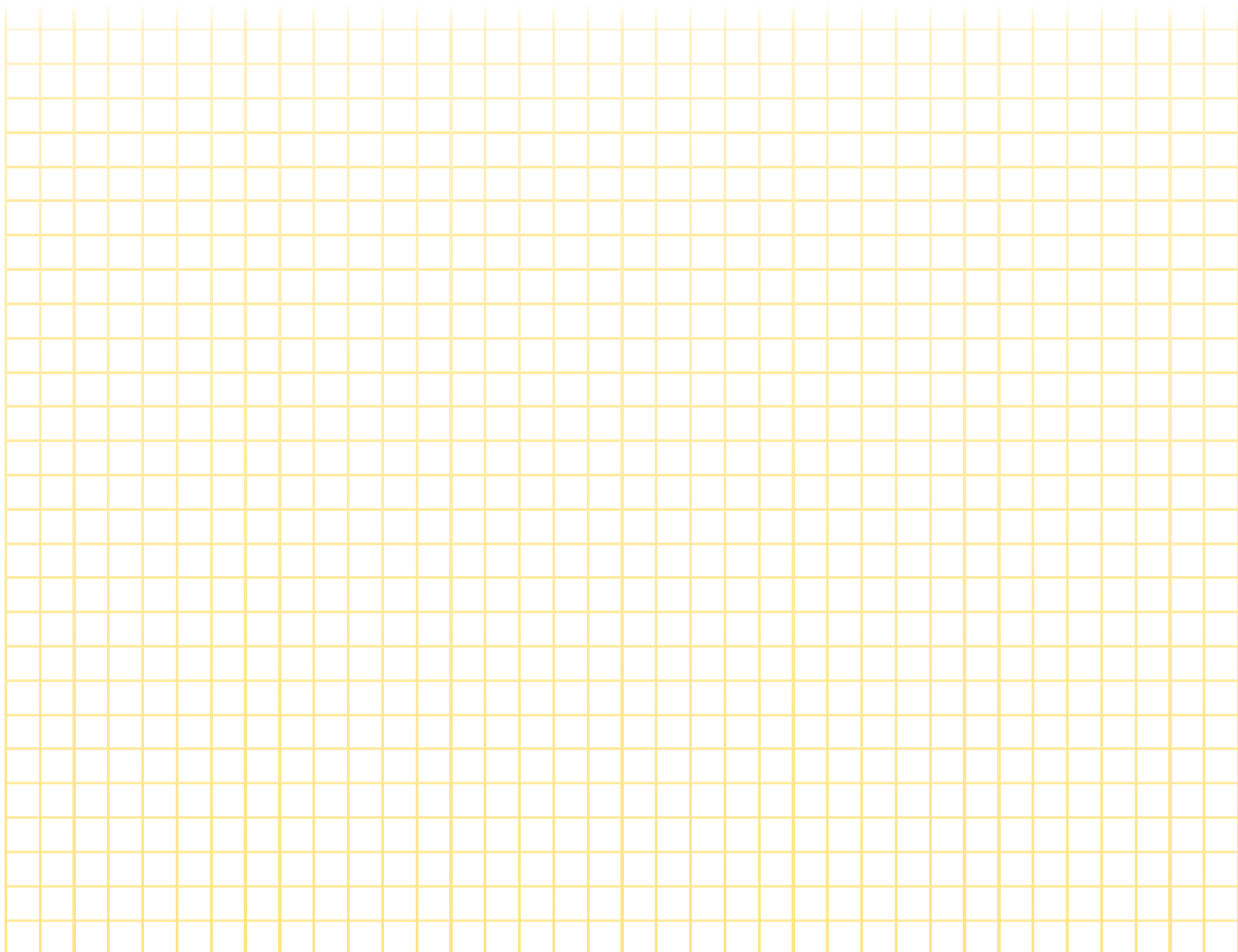


Internal configuration



Legend:
 MOV varistor
 PG protective grounding

IM-VF xx	15V	30V
Dimensions DIN 43880	1/3TE	
Weight per unit	28g	
Packaging dimensions (pvc)	90 x 150mm	
Min. packaging quantity	40 pcs.	



IM-DF Series



- **Category IEC/EN:** C1/C2/C3 (see Technical data)
- **Fine Protection:** Bi-directional TVS diode
- **Nominal operating voltage:** U_n : 5, 12, 24, 60V_{DC}
- **Max. operating voltage:** U_c : 7, 15, 28, 64V_{DC}
- **Frequency range:** up to 1.4MHz
- **Surge Discharge Ratings:** I_n : 100, 250, 500A
- **Series load current:** 10A
- **Enclosure:** DIN 43880 1/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Compact design
- **Complies with:** IEC/EN 61643-21



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 data

Type	IM-DF			
	5V	12V	24V	60V
Category IEC/EN	C1/C2/C3	C1/C3	C1/C3	C3
Electrical characteristics				
Number of protected pairs	1 (2 conductors)			
Nominal operating voltage (DC) U_n	5V	12V	24V	60V
Max. continuous operating voltage (DC) U_c	6V	15V	28V	64V
Rated load current at 25°C I_L	10A			
Nominal discharge current (8/20µs) I_n	500A	500A	250A	100A
Residual voltage at I_n (8/20µs) U_{res}	< 20V	< 39V	< 65V	< 150V
Rated spark overvoltage (a/b-PG)	8 - 10V	15 - 19V	30 - 36V	67 - 85V
	(a-b) 16 - 20V	30 - 38V	60 - 72V	134 - 170V
Response time of overvoltage protection t_A	< 1ns			
Insulation resistance of the protection R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 28MΩ	≥ 64MΩ
Serial resistance R	< 0.1Ω			
Transverse capacitance C	< 7.0nF	< 3.0nF	< 1.0nF	< 0.5nF
Limit frequency f_G	0.6MHz	0.9MHz	1.4MHz	3MHz
Mechanical characteristics				
Temperature range	- 40°C ... + 80°C			
Terminal cross section	Stranded to 4 mm ²			
Terminal screw torque	0.5Nm			
Degree of protection IEC/EN 60529	IP 20			
Housing material	Thermoplastic; beige, extinguishing degree V-0			
Mounting IEC/EN 60715	35mm DIN rail			

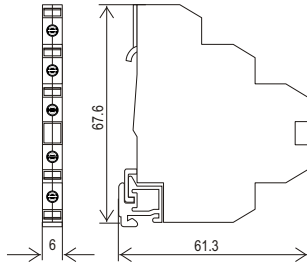
Ordering information

U_n	5V	12V	24V	60V
Ordering code IM-DF xx	7045.08	7045.02	7045.04	7045.06

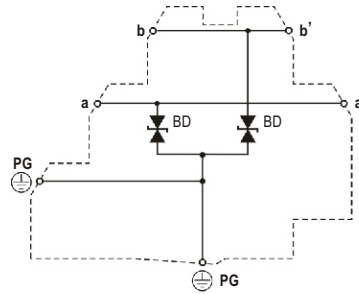
Dimensions, Internal configuration, Weight and Packaging

IM-DF Series

Dimensions



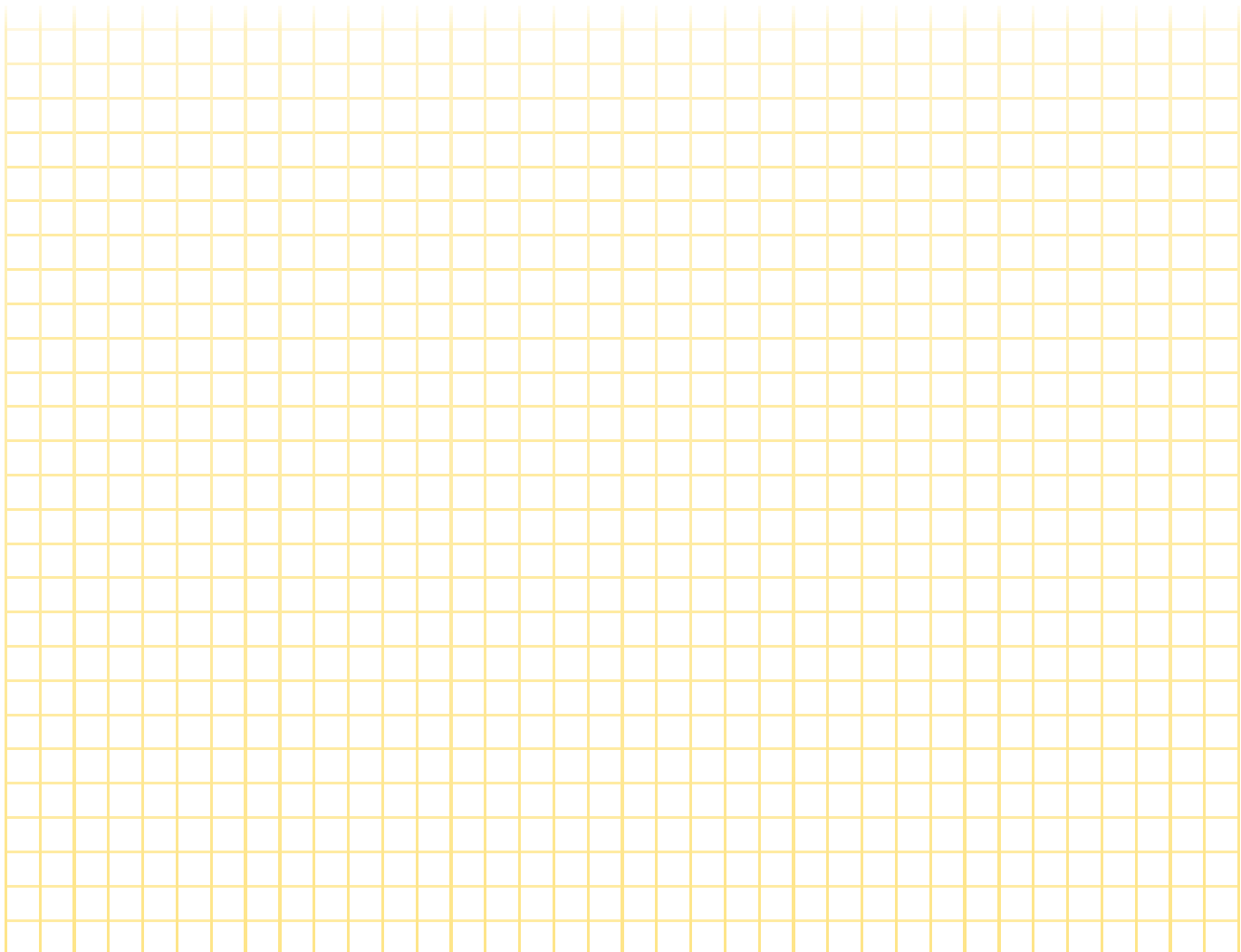
Internal configuration



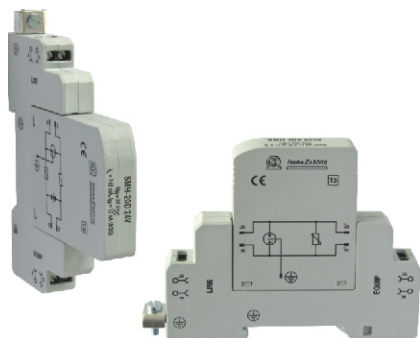
Legend:

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

IM-DF xx	5V	12V	24V	60V
Dimensions DIN 43880			1/3TE	
Weight per unit			26g	
Packaging dimensions (pvc)			90 x 150mm	
Min. packaging quantity			40 pcs.	



SMH-20 Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Coarse Protection:** 3 terminal GDT
- **Nominal operating voltage:** U_n : 230, 24, 60V_{DC}
- **Max. operating voltage:** U_c : 320, 28, 64V_{DC}
- **Frequency range:** 1.4 - 10MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **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:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



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.

Overcurrent 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 data

Type	SMH-20K 230V	SMH-20D 24V	SMH-20D 48V
Electrical characteristics			
Number of protected pairs	1 (2 conductors)		
Nominal operating voltage (DC)	U_n	230V	24V
Max. continuous operating voltage (DC)	U_c	320V	28V
Rated load current at 25°C	I_L	5A	145mA
Nominal discharge current (8/20μs)	I_n	10kA	10kA
Max. discharge current (8/20μs)	I_{max}	20kA	20kA
Impulse current (10/350μs)	I_{imp}	2.5kA	2.5kA
Residual voltage at 5kA (8/20μs)	U_{res} (line-line)	< 450V	< 65V
Rated spark overvoltage	(a/b-PG)	350 - 504V	350 - 504V
	(a-b)	351 - 429V	30 - 36V
Response time of overvoltage protection	t_A	< 25ns	< 1ns
Overcurrent protection	/	PTC resistors at I > 0.3A	PTC resistors at I > 0.3A
Insulation resistance of the protection	R_{iso}	≥ 320MΩ	≥ 28MΩ
Serial resistance	R	< 0.1Ω	< 9 - 11Ω
Transverse capacitance	C	< 1nF	< 3nF
Limit frequency	f_G	10MHz	1.4MHz
Mechanical characteristics			
Temperature range	-40°C ... +80°C	-25°C ... +50°C	-25°C ... +50°C
Terminal cross section	Stranded to 4 mm ²		
Terminal screw torque	0.5Nm		
Degree of protection IEC/EN 60529	IP 20		
Housing material	Thermoplastic; grey, extinguishing degree V-0		
Mounting IEC/EN 60715	35mm DIN rail		

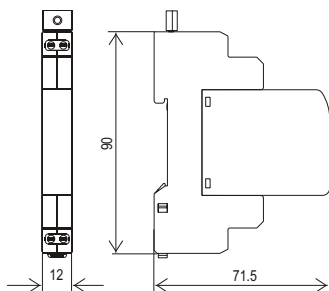
Ordering information

U_n	230V	24V	48V
Ordering code SMH-20x xxx	7081.54	7081.55	7081.56
Ordering code Module SMH-20x xxx	7081.57	7081.58	7081.59

Dimensions, Internal configuration, Weight and Packaging

SMH-20 Series

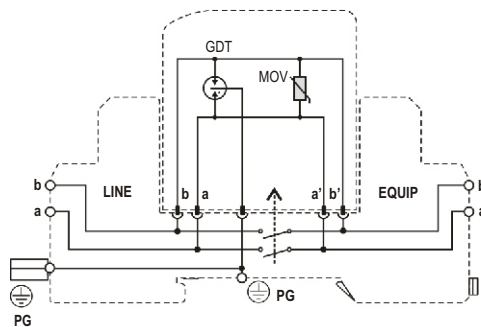
Dimensions



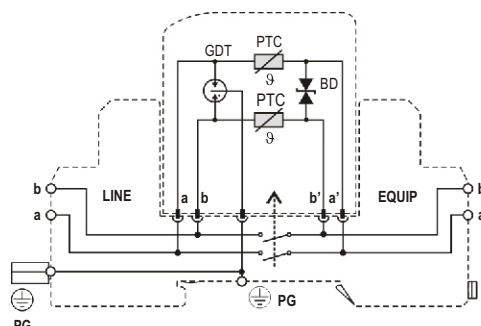
Legend:

- PTC *positive temperature coefficient resistor*
- GDT *gas discharge tube*
- BD *bi-directional TVS diode*
- MOV *varistor*
- PG *protective grounding*

Internal configuration



SMH-20K

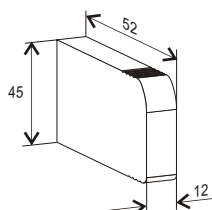


SMH-20D

SMH-20x xxx	230V	24V	48V
Dimensions DIN 43880		2/3TE	
Weight per unit		52g	
Packaging dimensions (single unit)		87 x 15 x 102mm	
Min. packaging quantity		15 pcs.	

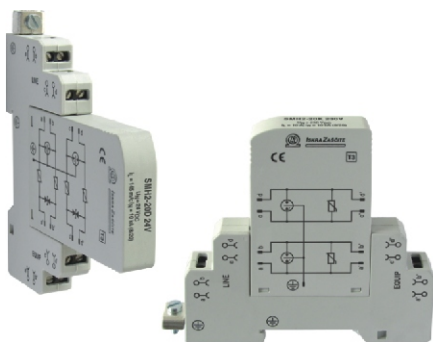
Module SMH-20 Series

Dimensions



Module SMH-20x xxx	230V	24V	48V
Weight per unit		24g	
Packaging dimensions (single unit)		87 x 15 x 102mm	
Min. packaging quantity		15 pcs.	

SMH2-20 Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Coarse Protection:** 3 terminal GDT
- **Nominal operating voltage:** U_n : 230, 24, 60V_{DC}
- **Max. operating voltage:** U_c : 320, 28, 64V_{DC}
- **Frequency range:** up to 10MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 5kA
- **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:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



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.

Overcurrent 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 data

Type		SMH2-20K 230V	SMH2-20D 24V	SMH2-20D 48V
Electrical characteristics				
Number of protected pairs		2 (4 conductors)		
Nominal operating voltage (DC)	U_n	230V	24V	60V
Max. continuous operating voltage (DC)	U_c	320V	28V	64V
Rated load 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
Impulse current (10/350μs)	I_{imp}	5kA	5kA	5kA
Residual voltage at 5kA (8/20μs)	U_{res} (line-line)	< 450V	< 65V	< 135V
Rated spark overvoltage	(a/b-PG)	350 - 504V	350 - 504V	350 - 504V
	(a-b)	351 - 429V	30 - 36V	67 - 85V
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	R_{iso}	≥ 320MΩ	≥ 28MΩ	≥ 64MΩ
Serial resistance	R	< 0.1Ω	< 9 - 11Ω	< 9 - 11Ω
Transverse capacitance	C	< 1nF	< 3nF	< 1.2nF
Limit frequency	f_G	10MHz	1.4MHz	2.2MHz
Mechanical characteristics				
Temperature range		- 40°C ... + 80°C	- 25°C ... + 50°C	- 25°C ... + 50°C
Terminal cross section		Stranded to 4 mm ²		
Terminal screw torque		0.5Nm		
Degree of protection IEC/EN 60529		IP 20		
Housing material		Thermoplastic; grey, extinguishing degree V-0		
Mounting IEC/EN 60715		35mm DIN rail		

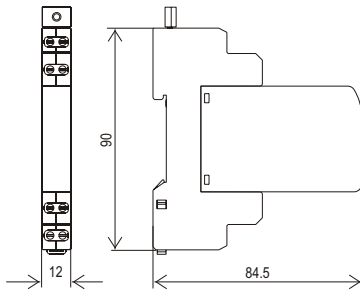
Ordering information

U_n	230V	24V	48V
Ordering code SMH2-20x xxx	7081.60	7081.61	7081.62
Ordering code Module SMH2-20x xxx	7081.63	7081.64	7081.65

Dimensions, Internal configuration, Weight and Packaging

SMH2-20 Series

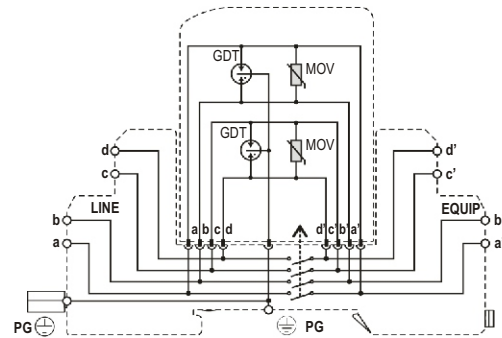
Dimensions



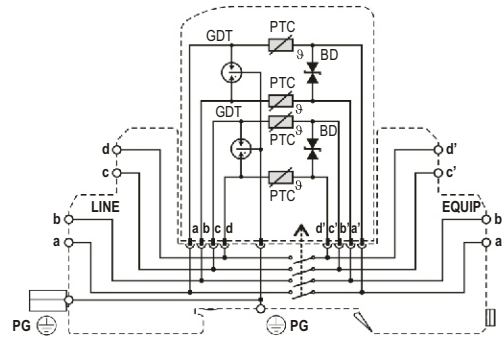
Legend:

- PTC *positive temperature coefficient resistor*
- GDT *gas discharge tube*
- BD *bi-directional TVS diode*
- MOV *varistor*
- PG *protective grounding*

Internal configuration



SMH2-20K

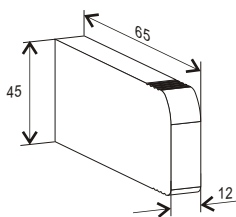


SMH2-20D

SMH2-20x xxx	230V	24V	48V
Dimensions DIN 43880		2/3TE	
Weight per unit		66g	
Packaging dimensions (single unit)		87 x 15 x 102mm	
Min. packaging quantity		15 pcs.	

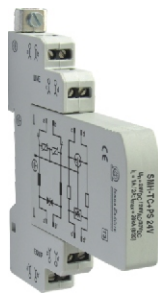
Module SMH2-20 Series

Dimensions



Module SMH2-20x xxx	230V	24V	48V
Weight per unit		28g	
Packaging dimensions (single unit)		87 x 15 x 102mm	
Min. packaging quantity		15 pcs.	

SMH-TC+PS



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse protection:** 3 terminal GDT (data line), MOVs (PS line)
- **Available voltages:** 24V_{DC}
- **Frequency range:** 30MHz
- **Surge Discharge Ratings:** I_n: 10kA, I_{max}: 20kA, I_{imp}: 2.5kA
- **Series load current:** 1A (data line), 3A (PS line)
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



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 overvoltage 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 30MHz.

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

Technical data

Type	SMH-TC+PS 24V	
	Data line	Power supply line
Electrical characteristics		
Number of protected pairs	2 (1 data line + 1 power supply line)	
Nominal operating voltage (DC)	U_n 24V	24V _{AC} /30V _{DC}
Max. continuous operating voltage (DC)	U_c 28V	28V _{AC} /40V _{DC}
Rated load current at 25°C	I_L 1A	3A
Nominal discharge current (8/20μs)	I_n	10kA
Max. discharge current (8/20μs)	I_{max}	20kA
Impulse current (10/350μs)	I_{imp}	2.5kA
Residual voltage at 5kA (8/20μs)	U_{res}	< 70V
Rated spark overvoltage	(a/b-PG), (c/d-PG)	31 - 37V
	(a-b), (c-d)	31 - 37V
Response time of overvoltage protection	t_A	< 1ns
Insulation resistance of the protection	R_{iso} (a-b)	≥ 28MΩ
Serial resistance	R	1.6 - 2.0Ω
Serial inductivity	L	/
Transverse capacitance	C	50pF
Limit frequency	f_G	30MHz
Mechanical characteristics		
Temperature range	- 40°C ... + 80°C	
Terminal cross section	Stranded to 4 mm ²	
Terminal screw torque	0.5Nm	
Degree of protection IEC/EN 60529	IP 20	
Housing material	Thermoplastic; grey, extinguishing degree V-0	
Mounting IEC/EN 60715	35mm DIN rail	

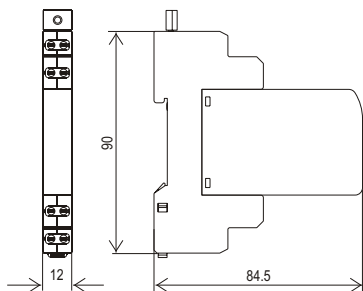
Ordering information

U_n	24V
Ordering code SMH-TC+PS 24V	7081.81
Ordering code Module SMH-TC+PS 24V	7081.82

Dimensions, Internal configuration, Weight and Packaging

SMH-TC+PS

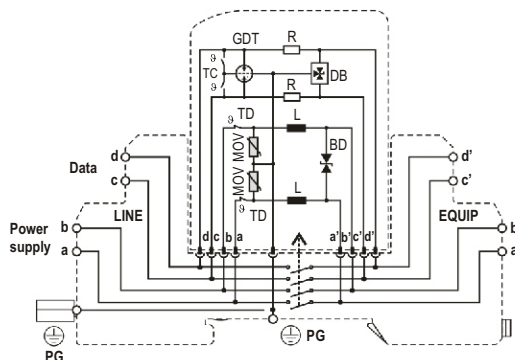
Dimensions



Legend:

- TC thermo-clip
- GDT gas discharge tube
- R resistor
- DB diode block
- TD thermal disconnection
- MOV varistor
- BD bi-directional TVS diode
- L inductor
- PG protective grounding

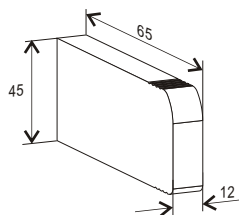
Internal configuration



SMH-TC+PS xx	24V
Dimensions DIN 43880	2/3TE
Weight per unit	72g
Packaging dimensions (single unit)	87 x 15 x 102mm
Min. packaging quantity	15 pcs.

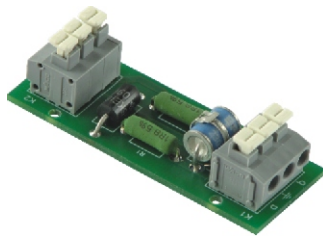
Module SMH-TC+PS

Dimensions



Module SMH-TC+PS xx	24V
Weight per unit	34g
Packaging dimensions (single unit)	87 x 15 x 102mm
Min. packaging quantity	15 pcs.

LZ-SMH Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse protection:** 3 terminal GDT
- **Available voltages:** 12, 24V, 110V_{DC}
- **Frequency range:** 30MHz
- **Surge Discharge Ratings:** I_n: 10kA, I_{max}: 20kA, I_{imp}: 2.5kA
- **Series load current:** 1A
- **Terminals:** Stranded to 1.5 mm²
- **Design:** PCB assembly
- **Complies with:** IEC/EN 61643-21



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 occurs 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 the ground.

Technical data

Type		12V	LZ-SMH 24V	110V
Electrical characteristics				
Number of protected pairs			1 (2 conductors)	
Nominal operating voltage (DC)	U_n	12V	24V	110V
Max. continuous operating voltage (DC)	U_c	15V	28V	170V
Rated load current at 25°C	I_L		1A	
Nominal discharge current (8/20µs)	I_n		10kA	
Max. discharge current (8/20µs)	I_{max}		20kA	
Impulse current (10/350µs)	I_{imp}		2.5kA	
Residual voltage at 5kA (8/20µs)	U_{res}	< 48V	< 70V	< 450V
Rated spark overvoltage	(a/b-PG)	17 - 21V	31 - 37V	184 - 265V
	(a-b)	17 - 21V	31 - 37V	184 - 265V
Response time of overvoltage protection	t_A		< 1ns	
Thermal protection			YES	
Insulation resistance of the protection	R_{iso} (a-b)	> 15MΩ	> 28MΩ	> 170MΩ
Serial resistance	R		1.6 - 2.0Ω	
Transverse capacitance	C		50pF	
Limit frequency	f_G		30MHz	
Mechanical characteristics				
Temperature range			- 40°C ... + 80°C	
Terminal cross section			Stranded to 1.5 mm ²	

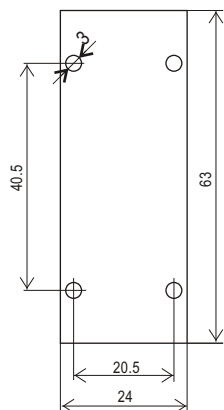
Ordering information

U _n	12V	24V	110V
Ordering code LZ-SMH xxx	127 555	127 556	127 574

Dimensions, Internal configuration, Weight and Packaging

LZ-SMH Series

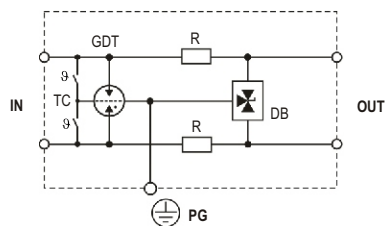
Dimensions



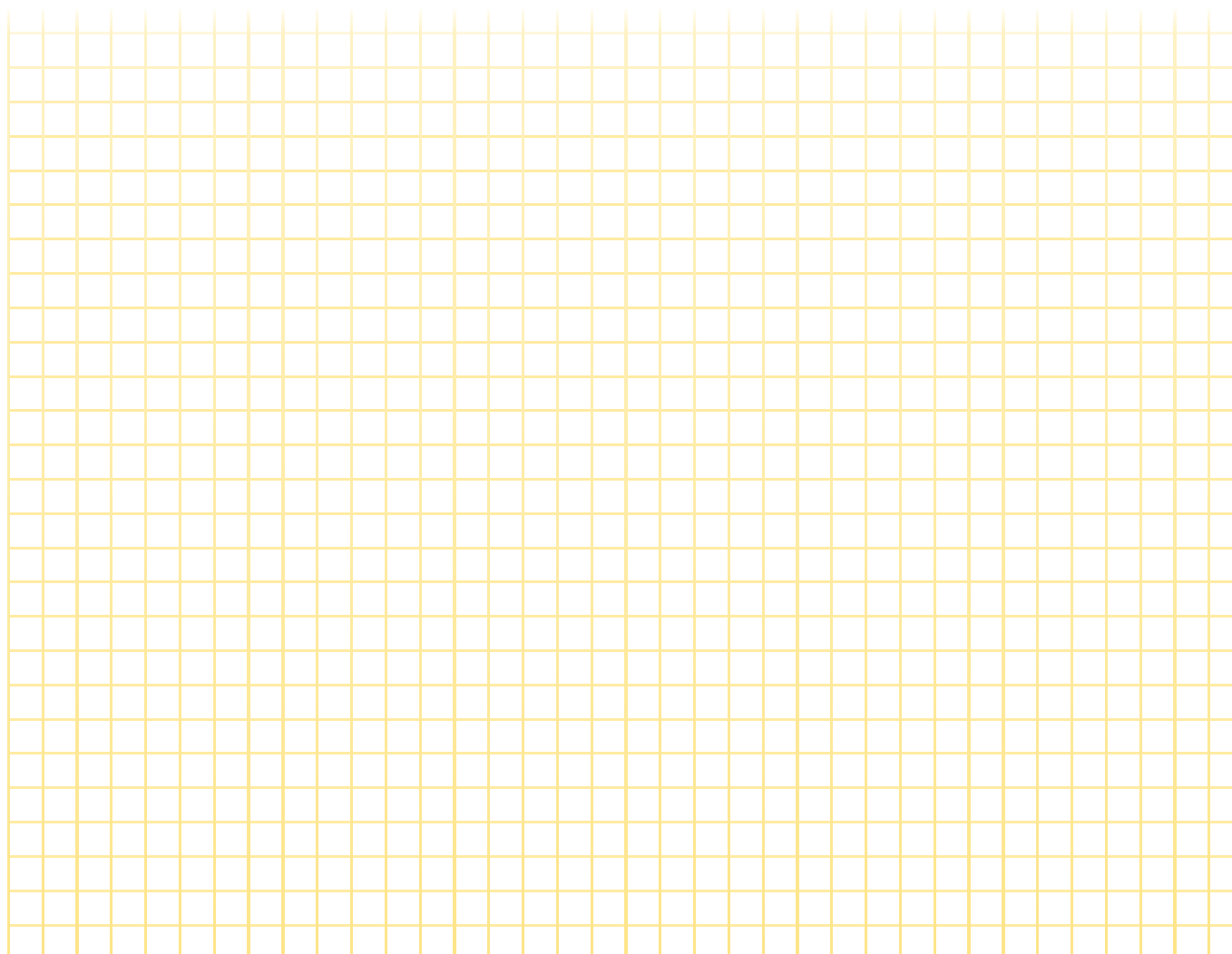
Legend:

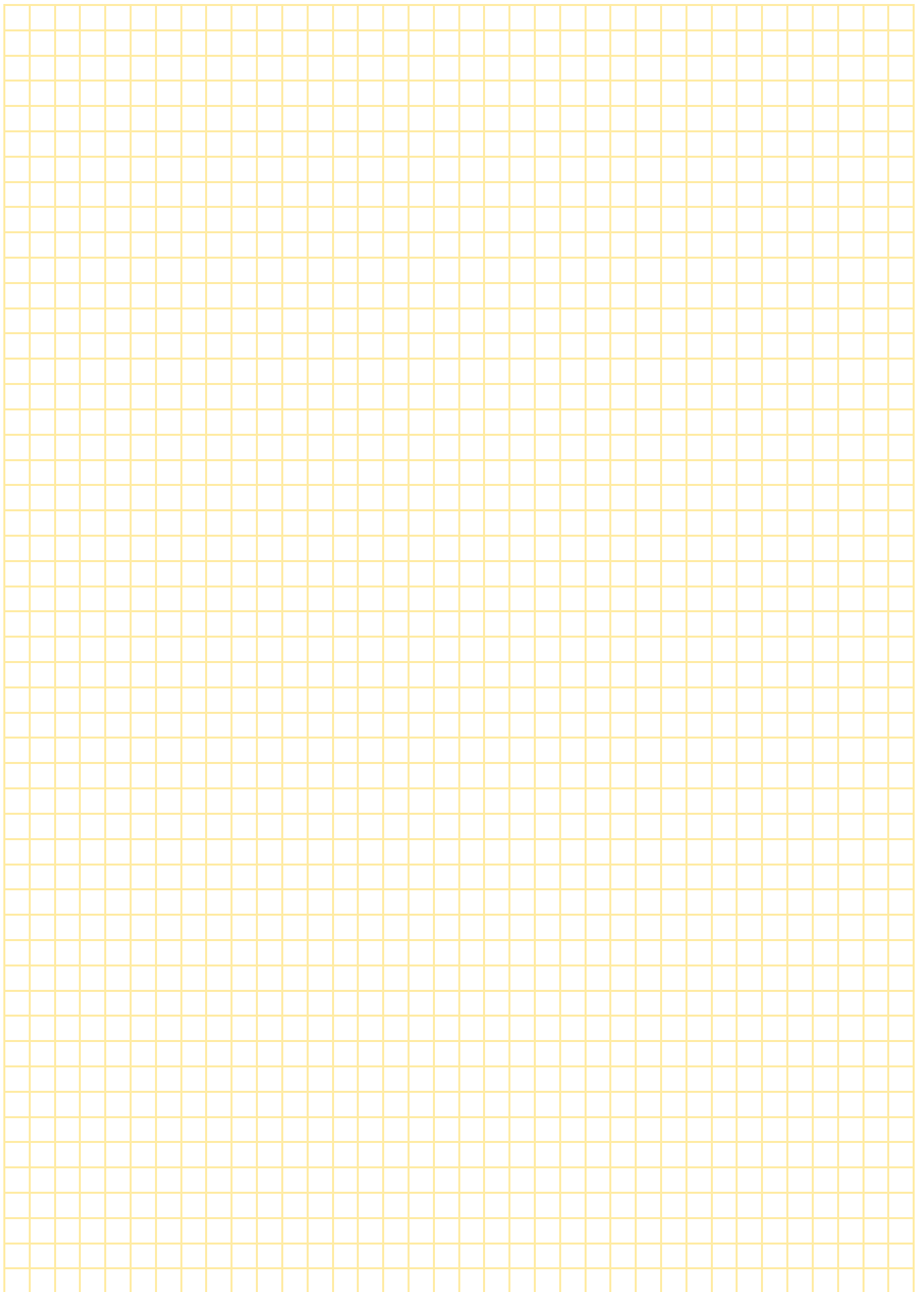
- TC *thermo-clip*
- GDT *gas discharge tube*
- R *resistor*
- DB *diode block*
- PG *protective grounding*

Internal configuration



LZ-SMH xxx	12V	24V	110V
Weight per unit		30g	
Packaging dimensions (single unit)		25 x 65 x 25mm	
Min. packaging quantity		30 pcs.	





Modular SPD for xDSL Technologies



Category IEC / EN:	D1/C1/C2/C3
Location of use:	xDSL transmission
Protective elements:	MOV, GDT, thyristor
Available voltages:	120V_{DC}
Surge discharge ratings:	I_n = 10kA, I_{max} = 20kA, I_{imp} = 2.5kA
Complies with:	IEC/EN 61643-21

IM-xDSL-x

IM-xDSL series products were designed to protect ADSL and VDSL transmissions. It can be also used to protect POTS, ISDN, SHDSL and HDSL protocols.

Products are available in three different versions offering different protection level and frequency range.

IM-xDSL Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Coarse Protection:** 3 terminal GDT
- **Nominal operating voltage:** U_n : 120V_{DC}
- **Max. operating voltage:** U_c : 170V_{DC}
- **Frequency range:** 14 - 22MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Series elements typical:** 0.3Ω/50μH
- **Enclosure:** DIN 43880 1TE, DIN rail mount
- **Terminals:** Stranded to 6 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



The IM-xDSL series has been developed to protect ADSL and VDSL class I 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 thyristor protection 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 data

Type	IM-xDSL	IM-xDSL-V	IM-xDSL-T	
Electrical characteristics				
Number of protected pairs		1 (2 conductors)		
Nominal operating voltage (DC)	U_n	120V		
Max. continuous operating voltage (DC)	U_c	170V		
Rated load current at 25°C	I_L	200mA		
Nominal discharge current (8/20μs)	I_n	10kA		
Max. discharge current (8/20μs)	I_{max}	20kA		
Impulse current (10/350μs)	I_{imp}	2.5kA		
Residual voltage at 5 kA (8/20μs)	U_{res}	< 700V	< 500V	< 350V
Rated spark overvoltage	(a/b-PG)	184 - 276V	184 - 276V	184 - 260V
	(a-b)	184 - 550V	184 - 264V	184 - 260V
Response time of overvoltage protection	t_A	< 100ns	< 25ns	< 1ns
Thermal protection		YES		
Insulation resistance of the protection	R_{iso}	170MΩ		
Serial resistance	R	approx. 0.3Ω		
Serial inductance	L	approx. 50μH		
Inductance in the loop		< 0.5μH		
Limit frequency (- 3dB, $Z_K = 120\Omega$)	f_G	> 22MHz	> 14MHz	> 17MHz
Mechanical characteristics				
Temperature range		- 25°C ... + 60°C		
Terminal cross section		Stranded to 6 mm ²		
Terminal screw torque		2.0Nm		
Degree of protection IEC/EN 60529		IP 20		
Housing material		Thermoplastic; yellow, extinguishing degree V-0		
Mounting IEC/EN 60715		35mm DIN rail		

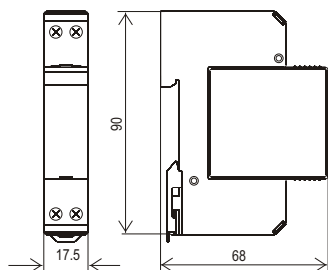
Ordering information

	IM-xDSL	IM-xDSL-V	IM-xDSL-T
Ordering code IM-xDSL	7040.02	7040.06	7040.10
Ordering code IM-xDSL (base 2GND)	7040.03	7040.07	7040.11
Ordering code Module IM-xDSL	7040.01	7040.05	7040.09

Dimensions, Internal configuration, Weight and Packaging

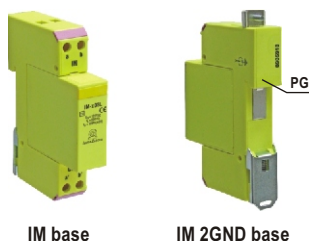
IM-xDSL Series

Dimensions



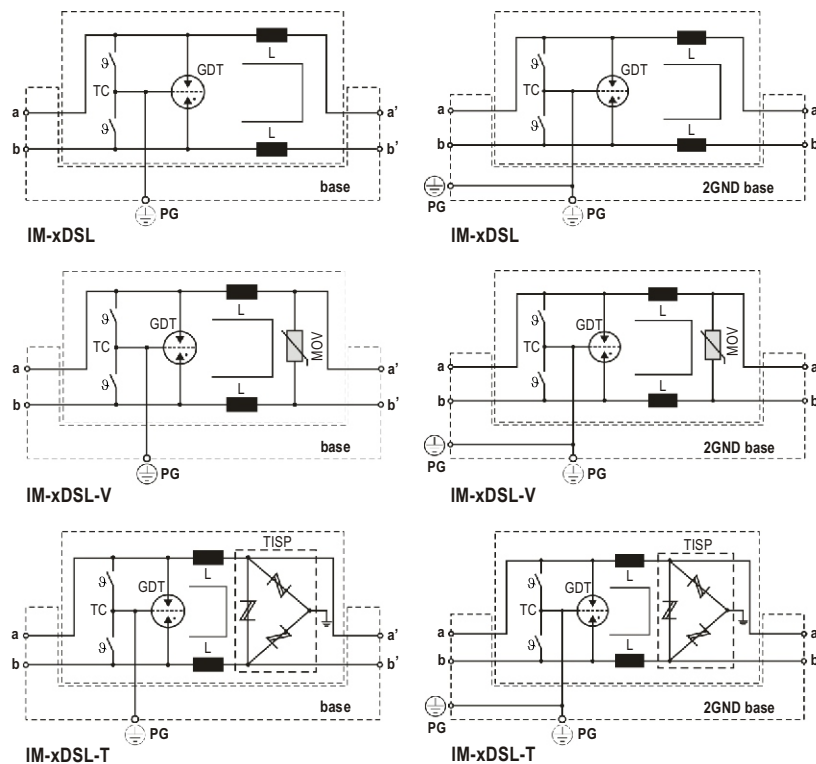
- Legend:
- TC thermo-clip
 - GDT gas discharge tube
 - MOV varistor
 - L inductor
 - TISP integrated circuit with thyristor protection
 - PG protective grounding

Various options for the base:



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

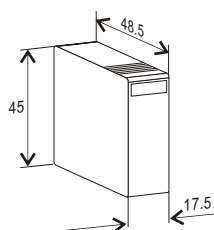
Internal configuration



IM-xDSL	IM-xDSL	IM-xDSL-V	IM-xDSL-T
Weight per unit		84g	
IM-xDSL 2GND			
Weight per unit		92g	
Dimensions DIN 43880		1TE	
Packaging dimensions (single unit)		78 x 23 x 108mm	
Min. packaging quantity		12 pcs.	

Module IM-xDSL Series

Dimensions



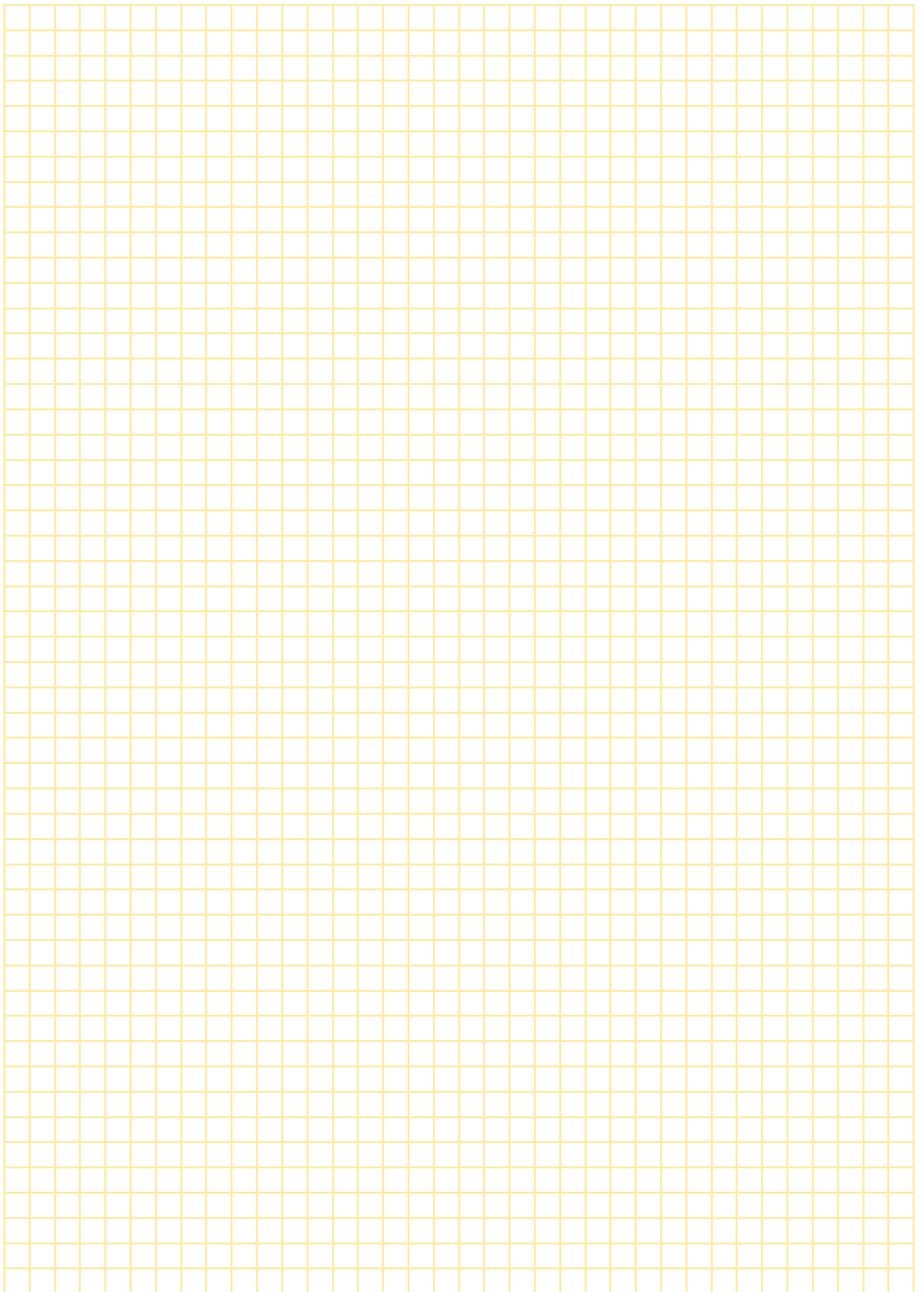
Module IM-xDSL	IM-xDSL	IM-xDSL-V	IM-xDSL-T
Weight per unit		28g	
Packaging dimensions (single unit)		61 x 49 x 21mm	
Min. packaging quantity		24 pcs.	

Accessory Part for IM-xDSL

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.

Module IMTEST	IMTEST
Weight per unit	26g
Packaging dimensions (single unit)	61 x 49 x 21mm
Min. packaging quantity	24 pcs.

Ordering code IMTEST	127 145
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Modular SPD for Explosive Environments (Ex)



Category IEC / EN:	C1/C2/C3
Location of use:	Hazardous areas
Protective elements:	GDT, diode
Available voltages:	15, 30VDC
Surge discharge ratings:	$I_n = 10\text{kA}$, $I_{max} = 20\text{kA}$
Complies with:	IEC/EN 61643-21 ⚡ II 1 G Ex ia IIC T4 Ga Baseefa 04 ATEX 0209X



IM-xxEx

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.



IM-Ex Series



- **Category IEC/EN:** C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Nominal operating voltage:** U_n : 15, 30V_{DC}
- **Max. operating voltage:** U_c : 18, 33V_{DC}
- **Frequency range:** 3MHz
- **Serial Resistance:** 0.1 - 0.4Ω per line
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA
- **Series load current:** 500mA
- **Enclosure:** DIN 43880 1TE, DIN rail mount
- **Terminals:** Stranded to 6 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



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 data

Type	IM-xxEx		
	15		30
Electrical characteristics			
Explosion protected	II 1G Ex ia IIC T4 Ga		
IEC Type Examination Certificate No.	Baseefa 04 ATEX0209X		
Number of protected pairs	1 (2 conductors)		
Nominal operating voltage (DC) U_n	15V		30V
Max. continuous operating voltage (DC) U_c	18V		33V
Rated load current at 25°C I_L		500mA	
Nominal discharge current (8/20µs) I_n		10kA	
Max. discharge current (8/20µs) I_{max}		20kA	
Residual voltage at 5 kA (8/20µs) U_{res}	34V		59V
Rated spark overvoltage	(a/b-PG)	458 - 662V	458 - 662V
	(a-b)	20 - 25V	36 - 44V
Response time of overvoltage protection t_A		< 1ns	
Insulation resistance of the protection R_{iso}	≥ 18MΩ		≥ 33MΩ
Serial resistance R		0.1 - 0.4Ω	
Transverse capacitance C		10pF	
Limit frequency f_G		3MHz	
Mechanical characteristics			
Ambient temperature	$P_i \leq 1\Omega$ (- 30°C ≤ Ta ≤ 80°C) $P_i \leq 1.2\Omega$ (- 30°C ≤ Ta ≤ 60°C) $P_i \leq 1.3\Omega$ (- 30°C ≤ Ta ≤ 40°C)		
Terminal cross section	Stranded to 6 mm ²		
Terminal screw torque	2.0Nm		
Degree of protection IEC/EN 60529	IP 20		
Housing material	Thermoplastic; grey, extinguishing degree V-0		
Mounting IEC/EN 60715	35mm DIN rail		

Ordering information

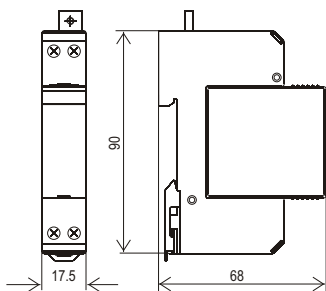
U_n	15V	30V
Ordering code IM-xxEx	704 102	704 104
Ordering code Module IM-xxEx	704 101	704 103



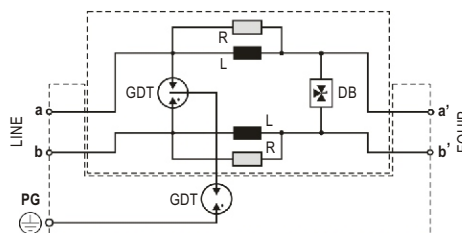
Dimensions, Internal configuration, Weight and Packaging

IM-Ex Series

Dimensions



Internal configuration



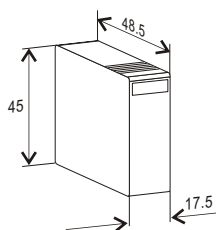
Legend:

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

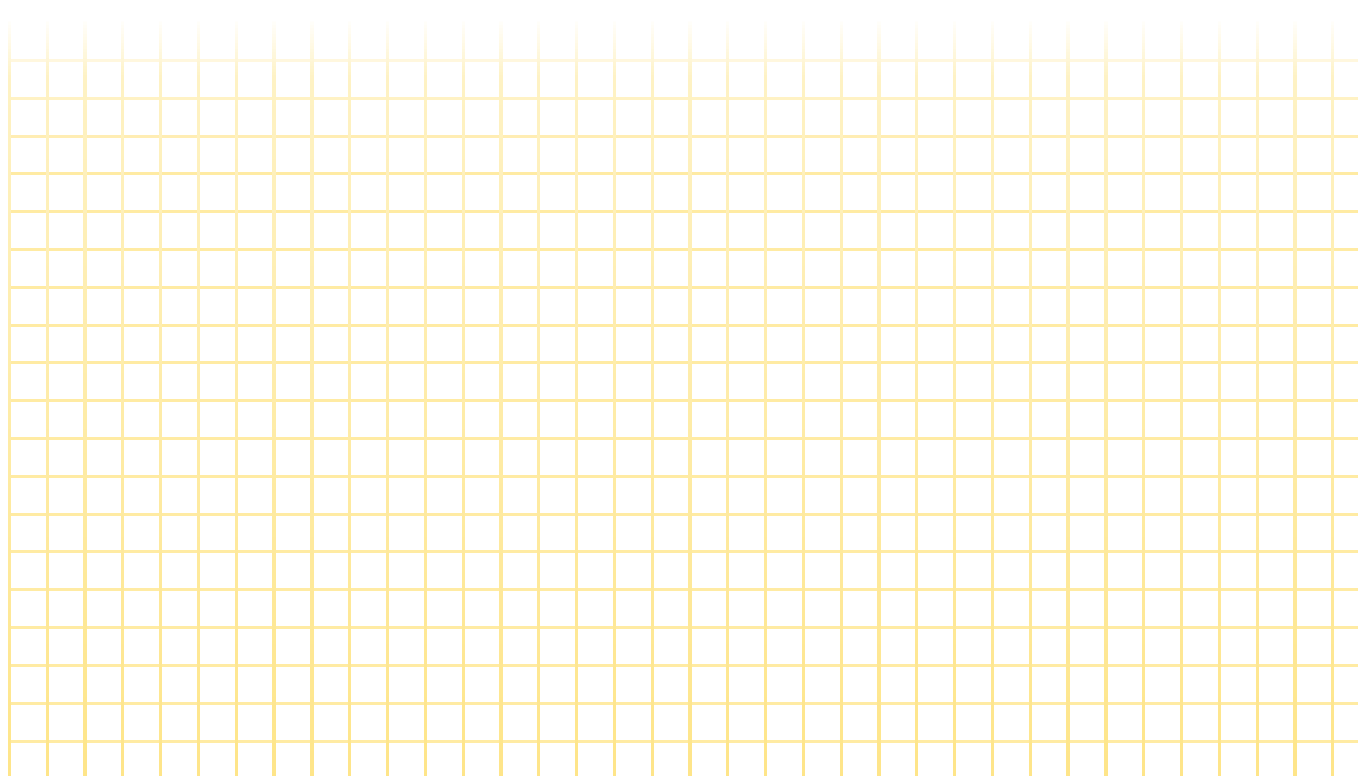
IM-xxEx	15	30
Dimensions DIN 43880	1TE	
Weight per unit	96g	
Packaging dimensions (single unit)	78 x 23 x 108mm	
Min. packaging quantity	12 pcs.	

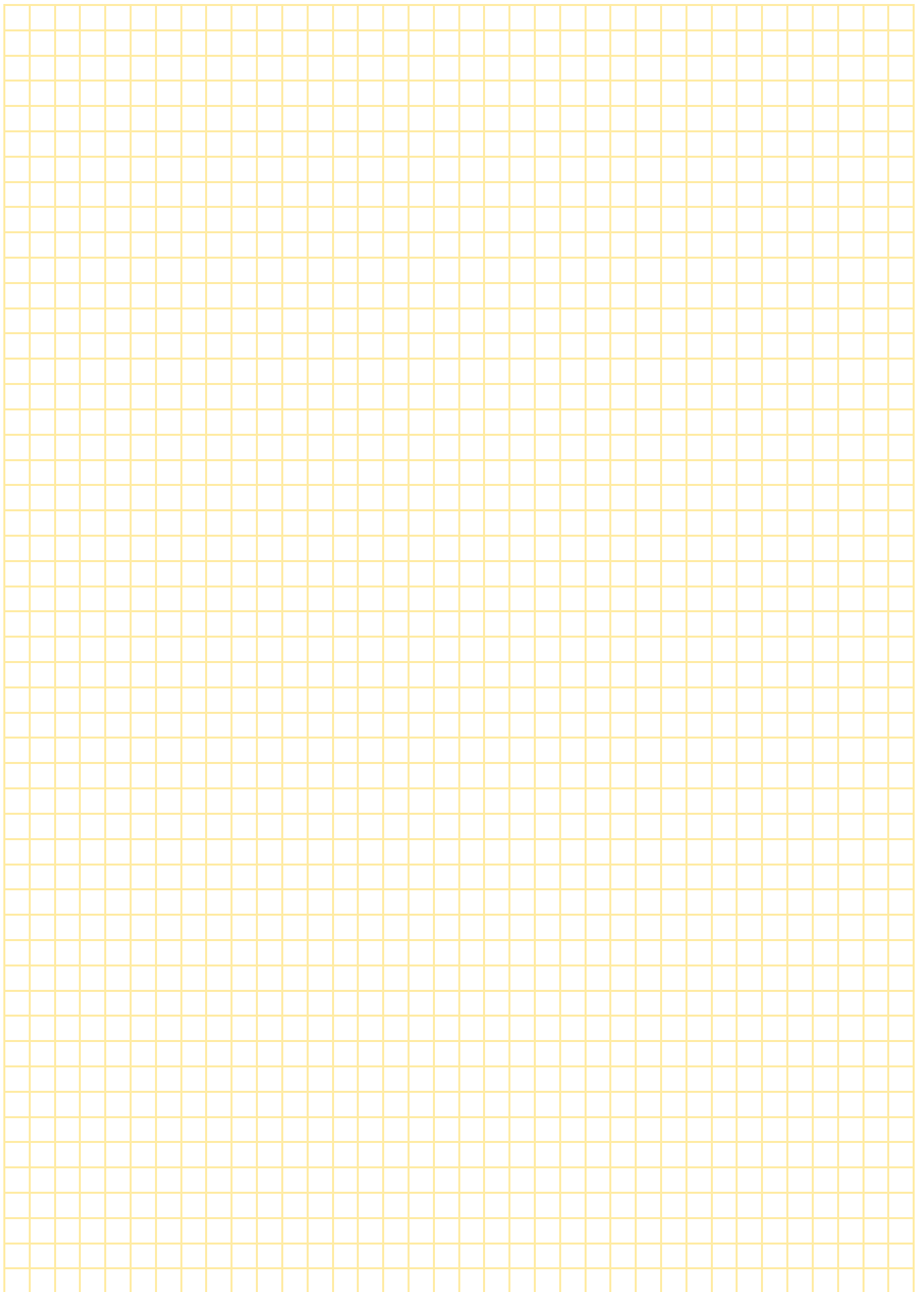
Module IM-Ex Series

Dimensions



Module IM-xxEx	15	30
Weight per unit	32g	
Packaging dimensions (single unit)	61 x 49 x 21mm	
Min. packaging quantity	24 pcs.	





Modular and Compact SPD for DC Power Systems



Category IEC / EN / VDE:	Class I, II, III / Type 1, 2, 3 / B, C, D (IEC/EN 61643-11)
Category IEC / EN:	D1/C1/C2/C3 (IEC/EN 61643-21)
Location of use:	Sub-distribution boards, DC power systems
Protective elements:	MOV, GDT, diode
Surge discharge ratings:	I_{max} up to 60kA, I_{imp} up to 10kA
Internal protection and safety:	Separate thermal disconnecter for each MOV
Complies with:	IEC/EN 61643-11, 61643-21

DC PROTEC B(R) 10/xx
DC PROTEC C(R) 40/xx
PROTEC C(R) 40/75
PROTEC CN(R) 40/75
PROTEC DMDR 20/xxx
VM-DC xx
SMH-PS xx

SPDs for DC power systems have been designed to meet the unique requirements of protection used for telecommunication and railway applications. It provides both, common and differential protection modes. Internal thermal disconnectors are used to eliminate the hazard of thermal runaway fault conditions.

DC PROTEC B(R) 10 Series



- **Category IEC/EN/VDE:** Class I / Type 1 / B
- **Location of use:** Sub-distribution boards
- **Protection modes:** (+) → PE, (-) → PE, (+) → (-)
- **Protective element:** MOV
- **Surge discharge rating:** I_n : 20kA, I_{max} : 60kA, I_{imp} : 10kA
- **Enclosure:** DIN 43880 4TE, DIN rail mount
- **Terminals:** Solid 35 mm²/stranded 25 mm²
- **Housing:** Compact design
- **Complies with:** IEC/EN 61643-11



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

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

Technical data

Type	DC PROTEC B(R) 10/xx		
	24	48	
Electrical characteristics			
Nominal operating voltage (DC)	U_n	24V	48V
Max. continuous operating voltage (DC)	U_c	30V	60V
Nominal discharge current (8/20 μ s)	I_n		20kA
Max. discharge current (8/20 μ s)	I_{max}		60kA
Impulse current (10/350 μ s)	I_{imp}		10kA
Protection level	U_p		< 0.6kV
Residual voltage at I_{imp}	U_{res}		< 0.3kV
Follow current	I_{fi}		NO
Response time	t_A		< 25ns
Thermal protection			YES
Short-circuit withstand current	I_{SCCR}		25kA / 50Hz
Mechanical characteristics			
Temperature range			- 40°C + 80°C
Terminal screw torque			max. 3.0Nm
Terminal cross section			35mm ² (solid) / 25mm ² (stranded)
Degree of protection IEC/EN 60529			IP 20
Housing material			Thermoplastic; grey, extinguishing degree UL 94 V-0
Mounting IEC/EN 60715			35mm DIN rail
Indication of disconnector operation			red flag
Remote contacts (RC)			YES
Contact ratings			AC: 250V/0.5A; 125V/3A
Terminal cross section			max. 1.5mm ²
Remote terminal torque			0.25Nm

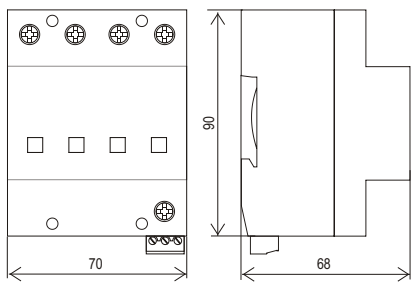
Ordering information

U_n	24V	48V
Ordering code DC PROTEC B 10/xx	510 598	510 600
Ordering code DC PROTEC BR 10/xx (with remote contacts)	510 599	510 601

Dimensions, Internal configuration, Weight and Packaging

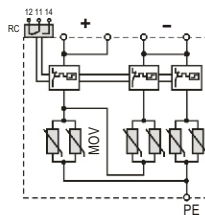
DC PROTEC B(R) 10 Series

Dimensions

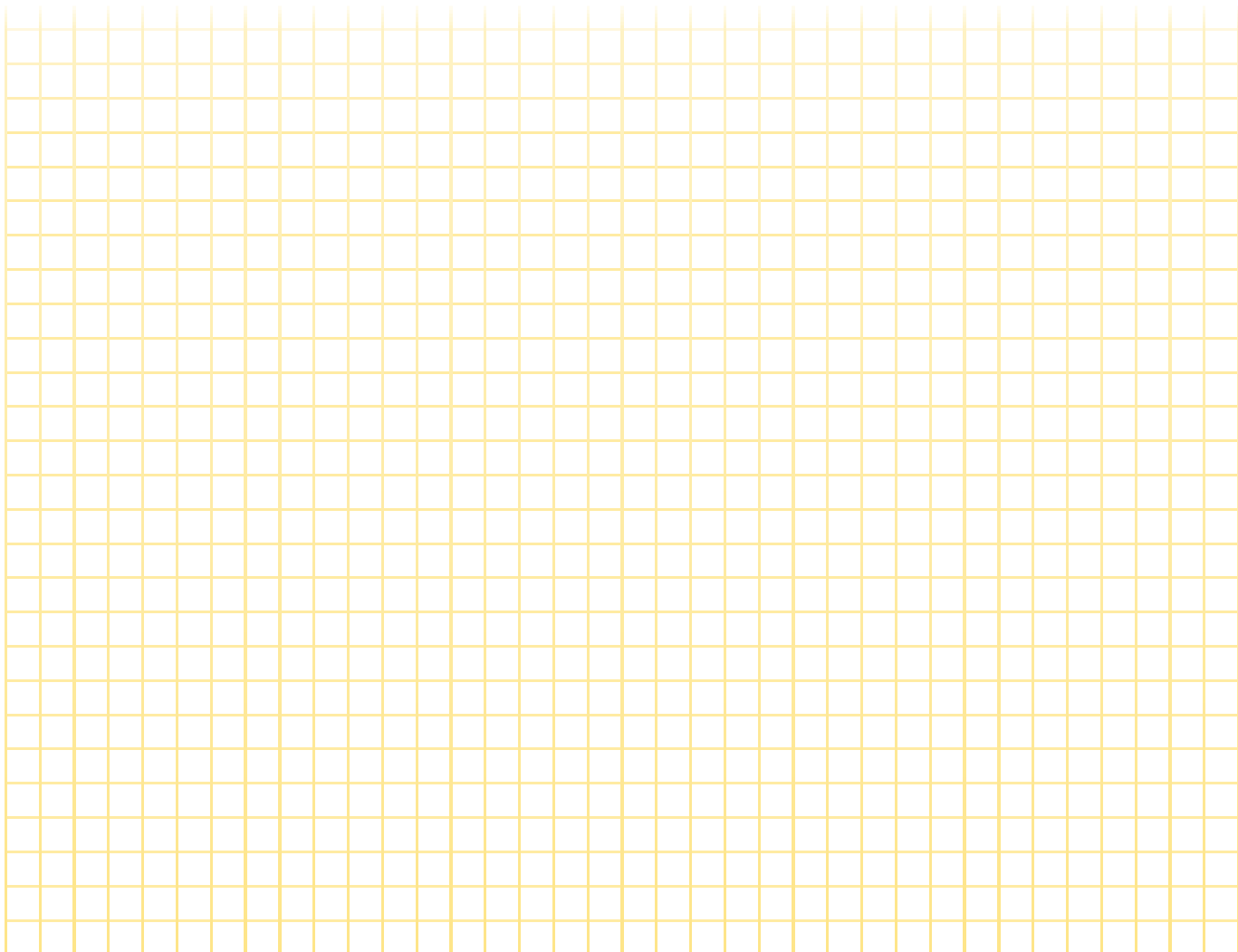


Legend:
MOV varistor

Internal configuration



DC PROTEC B 10/xx	24	48
Dimensions DIN 43880		4TE
Weight per unit	327g	332g
DC PROTEC BR 10/xx	24	48
Dimensions DIN 43880		4TE
Weight per unit	251g	288g
Packaging dimensions (single unit)	78 x 71 x 106mm	
Min. packaging quantity	3 pcs.	



DC PROTEC C(R) 40 Series



- **Category IEC/EN/VDE:** Class II / Type 2 / C
- **Location of use:** DC power systems
- **Protection modes:** (+) → PE, (-) → PE, (+) → (-)
- **Protective element:** MOV
- **Surge discharge rating:** I_n : 20kA, I_{max} = 40kA
- **Enclosure:** DIN 43880 2TE, DIN rail mount
- **Terminals:** Solid 35 mm²/stranded 25 mm²
- **Housing:** Compact design
- **Complies with:** IEC/EN 61643-11



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

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

Technical data

Type	DC PROTEC C(R) 40/xx		
	24	48	
Electrical characteristics			
Nominal operating voltage (DC)	U_n	24V	48V
Max. continuous operating voltage (DC)	U_c	30V	60V
Nominal discharge current (8/20 μ s)	I_n		20kA
Max. discharge current (8/20 μ s)	I_{max}		40kA
Protection level	U_p (+) → (-) (+), (-) → PE		< 0.6kV
			< 1.5kV
Follow current	I_{fi}		NO
Response time	t_A		< 25ns
Thermal protection			YES
Short-circuit withstand current	I_{SCCR}		25kA / 50Hz
Mechanical characteristics			
Temperature range			- 40°C + 80°C
Terminal screw torque			max. 3.0Nm
Terminal cross section			35mm ² (solid) / 25mm ² (stranded)
Degree of protection IEC/EN 60529			IP 20
Housing material			Thermoplastic; grey, extinguishing degree UL 94 V-0
Mounting IEC/EN 60715			35mm DIN rail
Indication of disconnector operation			red flag
Remote contacts (RC)			YES
Contact ratings			AC: 250V/0.5A; 125V/3A
Terminal cross section			max. 1.5mm ²
Remote terminal torque			0.25Nm

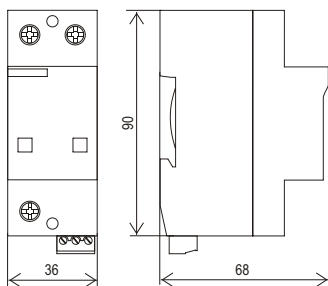
Ordering information

U_n	24V	48V
Ordering code DC PROTEC C 40/xx	510 564	510 566
Ordering code DC PROTEC CR 40/xx (with remote contacts)	510 565	510 567

Dimensions, Internal configuration, Weight and Packaging

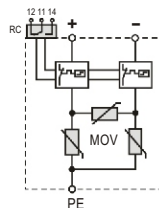
DC PROTEC C(R) 40 Series

Dimensions

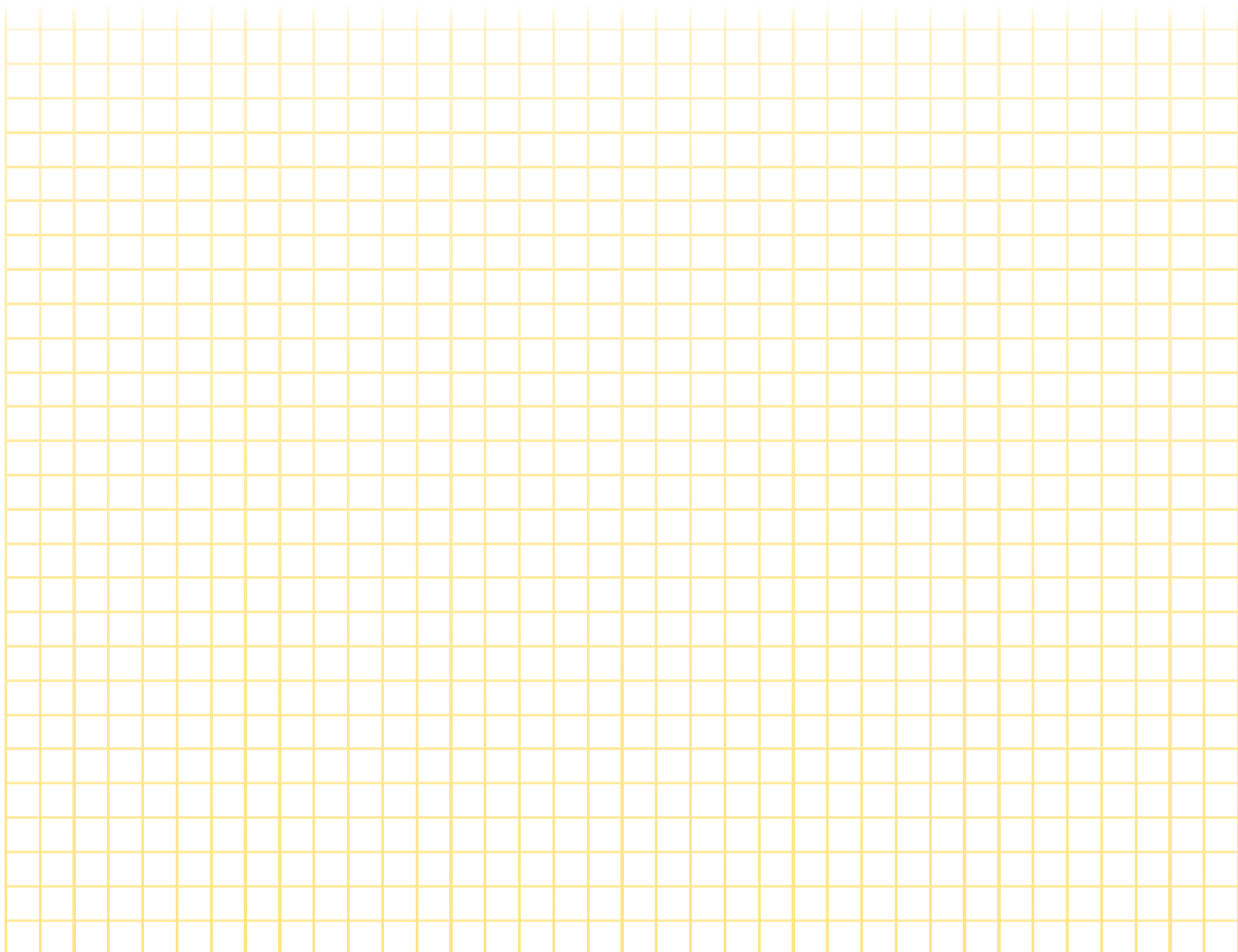


Legend:
MOV varistor

Internal configuration



DC PROTEC C 40/xx	24	48
Dimensions DIN 43880		4TE
Weight per unit	204g	204g
DC PROTEC CR 40/xx	24	48
Dimensions DIN 43880		4TE
Weight per unit	208g	208g
Packaging dimensions (single unit)	39 x 74 x 106mm	
Min. packaging quantity	7 pcs.	



PROTEC C(R) 40



- **Category IEC/EN/VDE:** Class II / Type 2 / C
- **Location of use:** Sub-distribution boards
- **Protection modes:** L/N- PE, L-PEN
- **Protective element:** MOV
- **Surge discharge rating:** $I_n = 20\text{kA}$, $I_{max} = 40\text{kA}$
- **Housing:** Compact design
- **Enclosure:** DIN 43880 1TE, DIN rail mount
- **Terminals:** Solid 35 mm²/stranded 25 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-11



PROTEC 40/75 provides differential-only protection against induced overvoltages. Plug-in module / base design facilitates replacement of a failed module in situ without the need to remove system wiring.

Technical data

Type		PROTEC C(R) 40/75
Electrical characteristics		
Max. continuous operating voltage (AC/DC)	U_c	75/100V
Nominal discharge current (8/20 μ s)	I_n	20kA
Max. discharge current (8/20 μ s)	I_{max}	40kA
Protection level	U_p	< 0.6kV
Residual voltage at 5kA (8/20 μ s)	U_{res}	< 0.4kV
Follow current	I_{fj}	NO
Response time	t_A	< 25ns
Thermal protection		YES
Short-circuit withstand current	I_{SCCR}	25kA / 50Hz
Mechanical characteristics		
Temperature range		- 40°C + 80°C
Terminal screw torque		max. 3.0Nm
Terminal cross section		35mm ² (solid) / 25mm ² (stranded)
Degree of protection IEC/EN 60529		IP 20
Housing material		Thermoplastic; grey, extinguishing degree UL 94 V-0
Mounting IEC/EN 60715		35mm DIN rail
Indication of disconnecter operation		red flag
Remote contacts (RC)		YES
Contact ratings		AC: 250V/0.5A; 125V/3A
Terminal cross section		max. 1.5mm ²
Remote terminal torque		0.25Nm

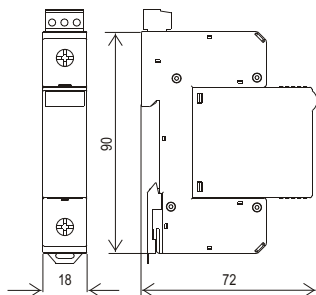
Ordering information

U_c	75V
Ordering code PROTEC C 40/75	50.0001
Ordering code PROTEC CR 40/75 (with remote contacts)	50.0011
Ordering code Module PROTEC C(R) 40/75	50.0216

Dimensions, Internal configuration, Weight and Packaging

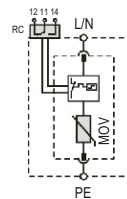
PROTEC C(R) 40

Dimensions



Legend:
MOV varistor

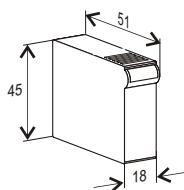
Internal configuration



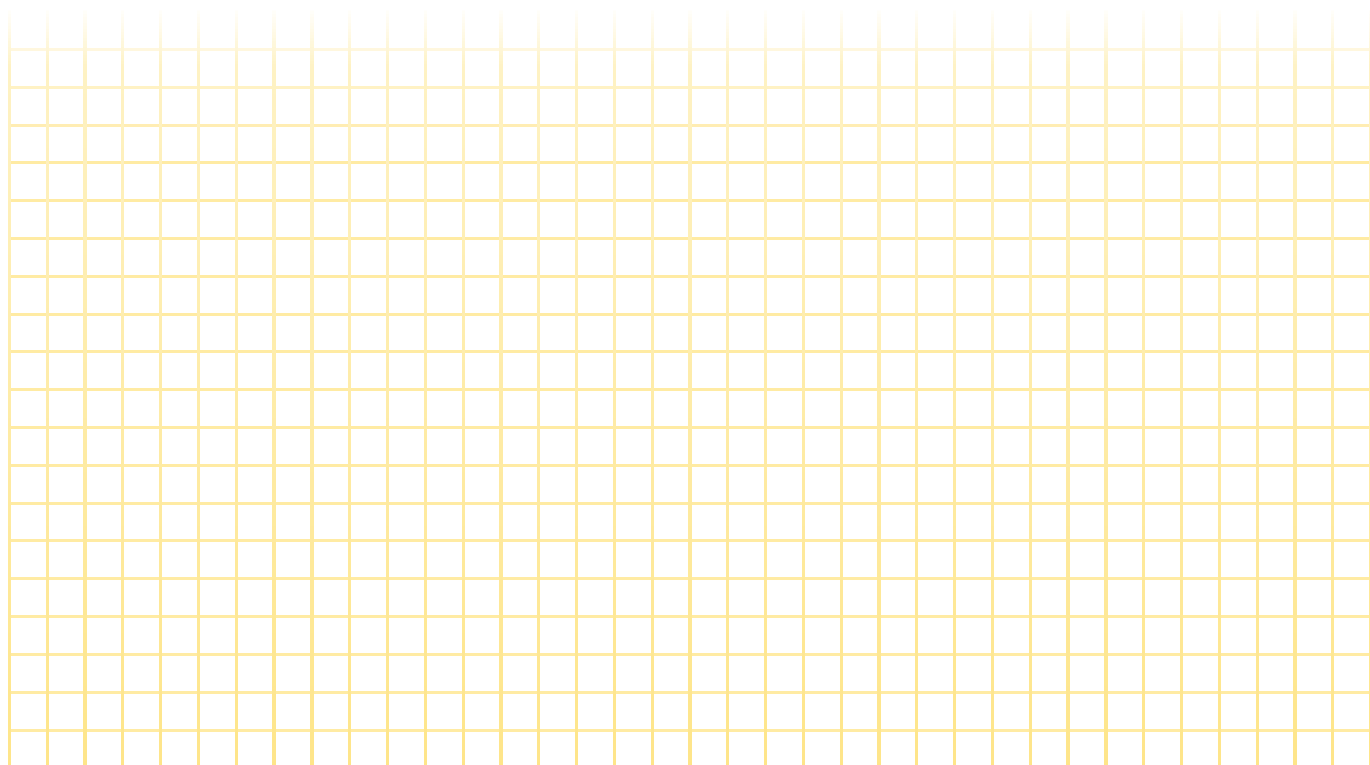
PROTEC C 40/xx	75
Dimensions DIN 43880	1TE
Weight per unit	112g
PROTEC CR 40/xx	75
Dimensions DIN 43880	1TE
Weight per unit	117g
Packaging dimensions (single unit)	78 x 23 x 108mm
Min. packaging quantity	12 pcs.

Module PROTEC C(R) 40

Dimensions



Module PROTEC C(R) 40/xx	75
Weight per unit	40g
Packaging dimensions	78 x 23 x 108mm
Min. packaging quantity	12 pcs.



PROTEC CN(R) 40



- **Category IEC/EN/VDE:** Class II / Type 2 / C
- **Location of use:** Sub-distribution boards
- **Protection modes:** L/N- PE, L-PEN
- **Protective element:** MOV
- **Surge discharge rating:** $I_n = 20\text{kA}$, $I_{max} = 40\text{kA}$
- **Housing:** Compact design
- **Enclosure:** DIN 43880 1TE, DIN rail mount
- **Terminals:** Solid 35 mm²/stranded 25 mm²
- **Housing:** Compact design
- **Complies with:** IEC/EN 61643-11



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

Technical data

Type		PROTEC CN(R) 40/75
Electrical characteristics		
Max. continuous operating voltage (AC/DC)	U_c	75/100V
Nominal discharge current (8/20 μ s)	I_n	20kA
Max. discharge current (8/20 μ s)	I_{max}	40kA
Protection level	U_p	< 0.6kV
Residual voltage at 5kA (8/20 μ s)	U_{res}	< 0.4kV
Follow current	I_{fi}	NO
Response time	t_A	< 25ns
Thermal protection		YES
Short-circuit withstand current	I_{SCCR}	25kA / 50Hz
Mechanical characteristics		
Temperature range		- 40°C + 80°C
Terminal screw torque		max. 3.0Nm
Terminal cross section		35mm ² (solid) / 25mm ² (stranded)
Degree of protection IEC/EN 60529		IP 20
Housing material		Thermoplastic; grey, extinguishing degree UL 94 V-0
Mounting IEC/EN 60715		35mm DIN rail
Indication of disconnecter operation		red flag
Remote contacts		YES
Contact ratings		AC: 250V/0.5A; 125V/3A
Terminal cross section		max. 1.5mm ²
Remote terminal torque		0.25Nm

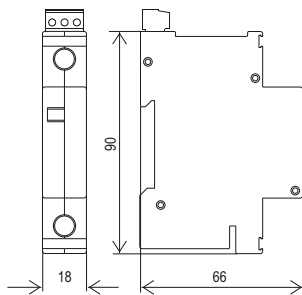
Ordering information

U_c	75V
Ordering code PROTEC CN 40/75	507.001
Ordering code PROTEC CNR 40/75 (with remote contacts)	507.011

Dimensions, Internal configuration, Weight and Packaging

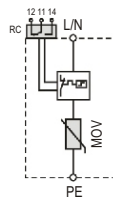
PROTEC CN(R) 40

Dimensions

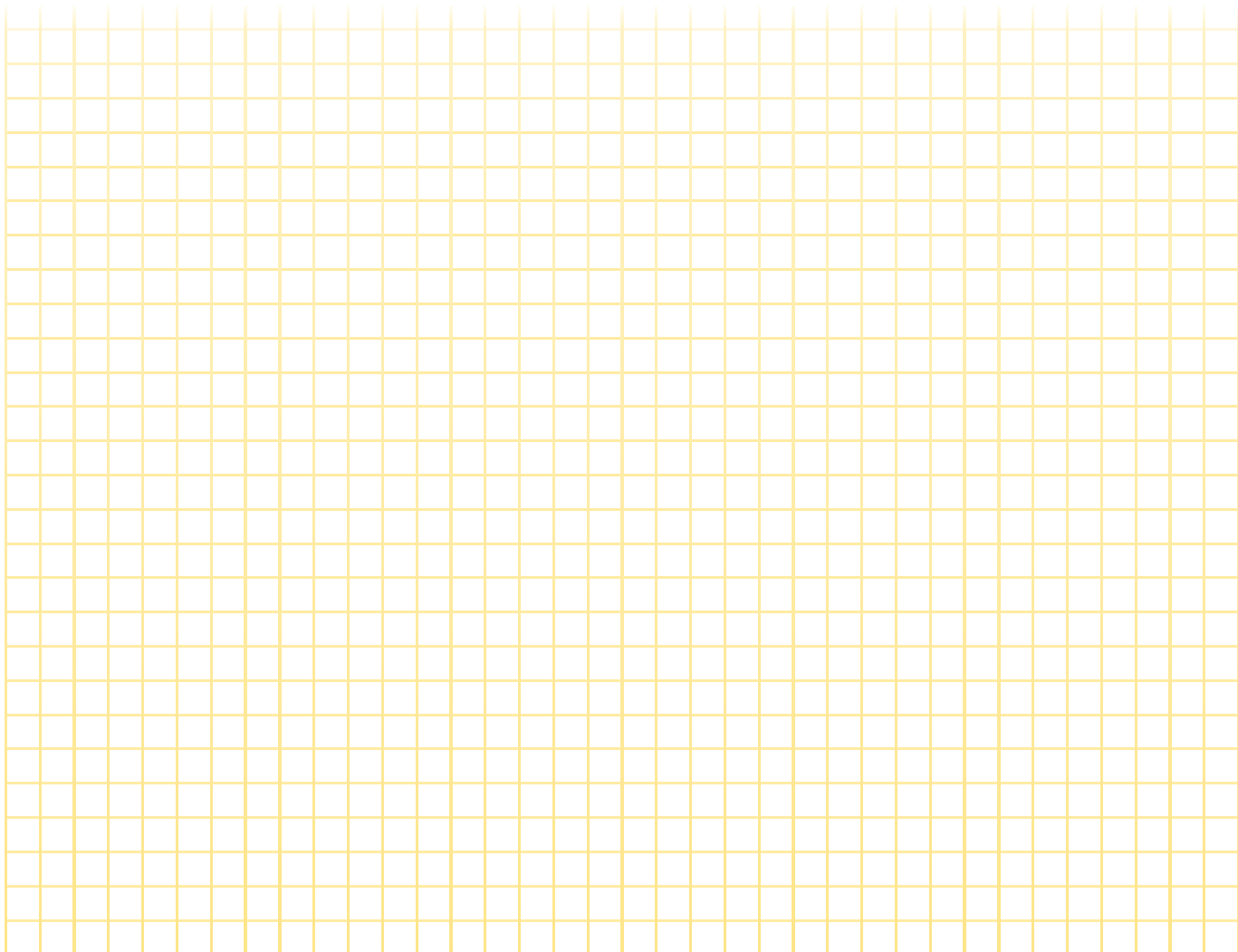


Legend:
MOV varistor

Internal configuration



PROTEC CN 40/xx	75
Dimensions DIN 43880	1TE
Weight per unit	127g
PROTEC CNR 40/xx	75
Dimensions DIN 43880	1TE
Weight per unit	132g
Packaging dimensions (single unit)	78 x 23 x 108mm
Min. packaging quantity	12 pcs.



PROTEC DMDR 20 Series



- **Category IEC/EN/VDE:** Class III / Type 3 / D
- **Coarse Protection:** 3 terminal GDT
- **Location of use:** DC power systems
- **Protection modes:** L/N - PE
- **Protective element:** MOV + GDT
- **Surge discharge ratings:** I_{max} up to 10kA
- **Status indication:** remote contacts + LED
- **Enclosure:** DIN 43880 1TE, DIN rail mount
- **Terminals:** Stranded to 6 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-11



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 data

Type		24	PROTEC DMDR 20/xxx 48	60	120
Electrical characteristics					
Nominal operating voltage (AC)	U_n	24V	48V	60V	120V
Max. continuous operating voltage (AC/DC)	U_c	34V/44V	60V	75V	150V
Open circuit voltage of the combination wave generator	U_{oc}	4kV	4kV	6kV	6kV
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		
	(L-PE/N-PE)		< 100ns		
Thermal protection			YES		
Mechanical characteristics					
Temperature range		-40°C ... +80°C			
Terminal screw torque		max. 2Nm			
Terminal cross section		Stranded to 6 mm ²			
Degree of protection IEC/EN 60529		IP 20			
Housing material		Thermoplastic; grey, extinguishing degree UL 94 V-0			
Mounting IEC/EN 60715		35mm DIN rail			

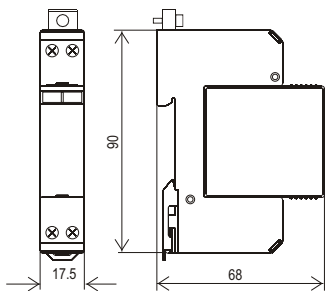
Ordering information

U _n	24V	48V	60V	120V
Ordering code PROTEC DMDR 20/xxx	515 051	515 053	515 054	515 055
Ordering code Module PROTEC DMDR 20/xxx	515 086	515 087	515 088	515 089

Dimensions, Internal configuration, Weight and Packaging

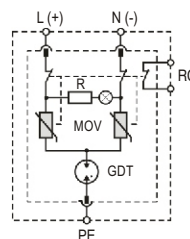
PROTEC DMDR 20 Series

Dimensions



Legend:
 MOV *varistor*
 GDT *gas discharge tube*
 R *resistor*

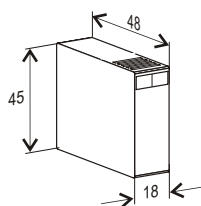
Internal configuration



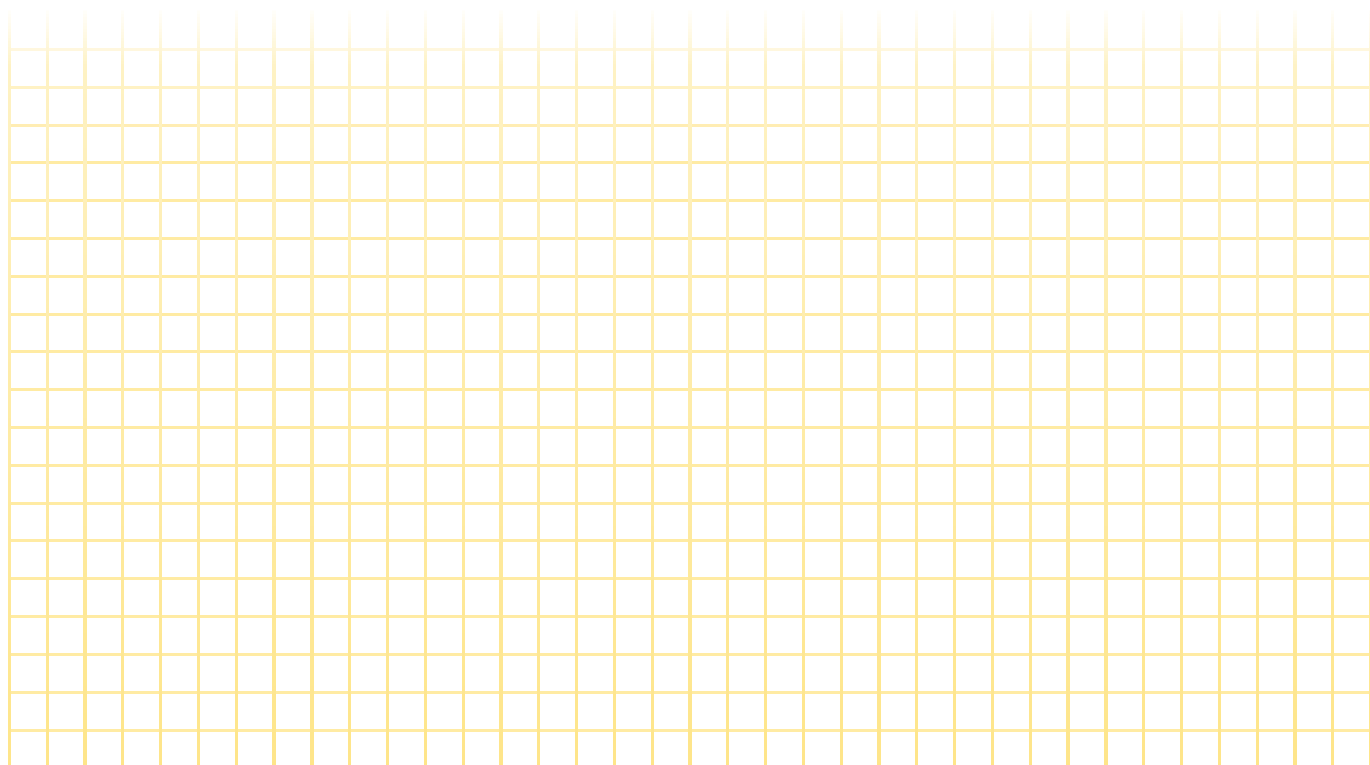
PROTEC DMDR 20/xxx	24	48	60	120
Dimensions DIN 43880	1TE			
Weight per unit	96g	96g	96g	96g
Packaging dimensions (single unit)	78 x 23 x 108mm			
Min. packaging quantity	12 pcs.			

Module PROTEC DMDR 20 Series

Dimensions



Module PROTEC DMDR 20/xxx	24	48	60	120
Weight per unit	32g	32g	32g	32g
Packaging dimensions	61 x 49 x 21mm			
Min. packaging quantity	24 pcs.			



VM-DC Series



- **Category IEC/EN:** D1/C1/C2/C3
- **Coarse Protection:** 3 terminal GDT
- **Location of use:** DC power systems
- **Nominal operating voltage:** U_n : 12 and 24V_{DC}
- **Max. operating voltage:** U_c : 15 and 28V_{DC}
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
- **Serial resistance:** 0.1Ω
- **Enclosure:** DIN 43880 1TE, DIN rail mount
- **Terminals:** Stranded to 6 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



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.

Technical data

Type		12V	VM-DC xx	24V
Electrical characteristics				
Number of protected pairs			1 (2 conductors)	
Nominal operating voltage (DC)	U_n	12V _{DC}		24V _{DC}
Max. continuous operating voltage (DC)	U_c	15V _{DC}		28V _{DC}
Rated operating current at 25°C	I_L		10A	
Nominal discharge current (8/20μs)	I_n		10kA	
Max. discharge current (8/20μs)	I_{max}		20kA	
Impulse current (10/350μs)	I_{imp}		2.5kA	
Residual voltage at 5 kA (8/20μs)	U_{res}	184V - 276V		184V - 276V
Rated spark overvoltage	(0,12/24V - PG)	16V - 20V		30V - 36V
	(0 - 12/24V)	< 32V (0.12V)		< 60V (0.24V)
Response time of overvoltage protection	t_A		< 1ns	
Thermal protection			YES	
Insulation resistance of the protection	R_{iso}	≥ 15MΩ		≥ 28MΩ
Serial resistance	R		< 0.1Ω	
Transverse capacitance	C	< 1nF		< 3nF
Mechanical characteristics				
Temperature range			-40°C ... +80°C	
Terminal cross section			Stranded to 6 mm ²	
Terminal screw torque			max. 2Nm	
Degree of protection IEC/EN 60529			IP 20	
Housing material			Thermoplastic; yellow, extinguishing degree V-O	
Mounting IEC/EN 60715			35mm DIN rail	

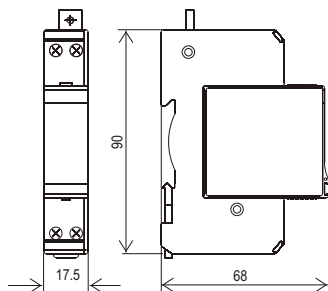
Ordering information

U_n	12V	24V
Ordering code VM-DC xx	7035.02	7035.04
Ordering code Module VM-DC xx	7035.01	7035.03

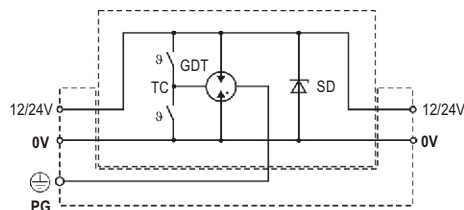
Dimensions, Internal configuration, Weight and Packaging

VM-DC Series

Dimensions



Internal configuration



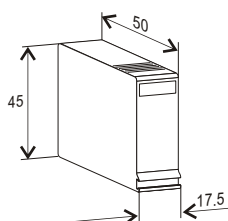
Legend:

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

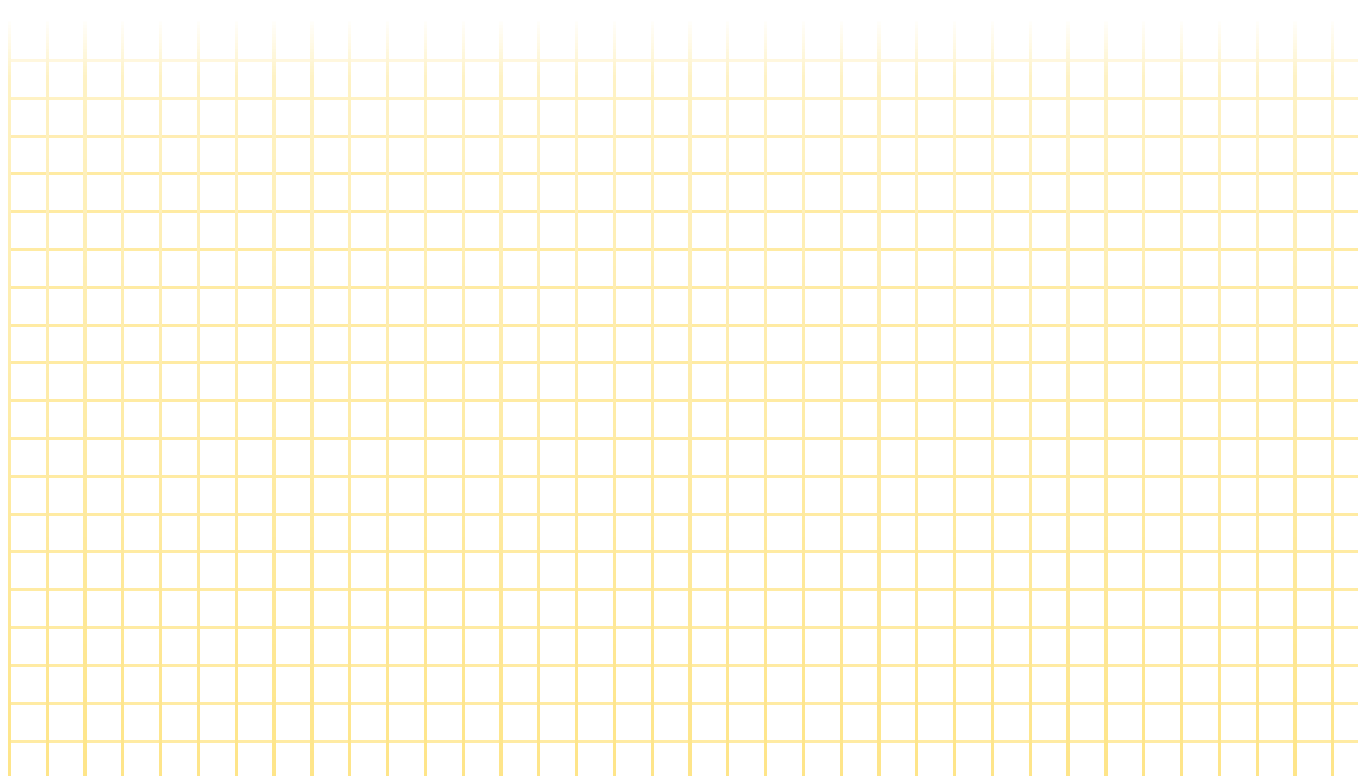
VM-DC xx	12V	24V
Dimensions DIN 43880	1TE	
Weight per unit	90g	90g
Packaging dimensions (single unit)	78 x 23 x 108mm	
Min. packaging quantity	12 pcs.	

Module VM-DC Series

Dimensions



Module VM-DC xx	12V	24V
Weight per unit	24g	24g
Packaging dimensions (single unit)	61 x 49 x 21mm	
Min. packaging quantity	24 pcs.	



SMH-PS Series



- **Category IEC/EN:** C1/C2/C3
- **Coarse Protection:** MOVs
- **Location of use:** DC power systems
- **Nominal operating voltage:** U_n : 12, 24 and 48V_{DC}
- **Max. operating voltage:** U_c : 15, 18 and 52V_{DC}
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA
- **Serial inductivity:** 10 - 14μH
- **Series load current:** 4A
- **Enclosure:** DIN 43880 2/3TE, DIN rail mount
- **Terminals:** Stranded to 4 mm²
- **Housing:** Modular design
- **Complies with:** IEC/EN 61643-21



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 data

Type		12V	SMH-PS xx 24V	48V
Electrical characteristics				
Number of protected pairs			1 (2 conductors)	
Nominal operating voltage (DC)	U_n	12V	24V	48V
Max. continuous operating voltage (DC)	U_c	15V	28V	52V
Rated operating current at 25°C	I_L		4A	
Nominal discharge current (8/20μs)	I_n		10kA	
Max. discharge current (8/20μs)	I_{max}		20kA	
Residual voltage at 5 kA (8/20μs)	U_{res}	< 32V	< 60V	< 135V
Rated spark overvoltage	(1, 2 - PG)	90V - 110V	90V - 110V	90V - 110V
	(1, 2)	16V - 20V	30V - 36V	57V - 69V
Response time of overvoltage protection	t_A		< 1ns	
Thermal protection			Thermal disconnection	
Insulation resistance of the protection	R_{iso}	≥ 15MΩ	≥ 28MΩ	≥ 52MΩ
Serial inductivity	L		10 - 14μH	
Transverse capacitance	C	< 5nF	< 3nF	< 1.5nF
Mechanical characteristics				
Temperature range			- 40°C ... + 80°C	
Terminal cross section			Stranded to 4 mm ²	
Terminal screw torque			0.5Nm	
Degree of protection IEC/EN 60529			IP 20	
Housing material			Thermoplastic; grey, extinguishing degree V-0	
Mounting IEC/EN 60715			35mm DIN rail	

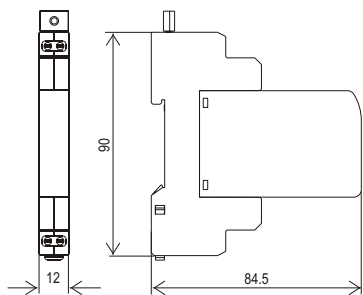
Ordering information

U_n	12V	24V	48V
Ordering code SMH-PS xx	7081.20	7081.21	7081.22
Ordering code Module SMH-PS xx	7081.25	7081.26	7081.27

Dimensions, Internal configuration, Weight and Packaging

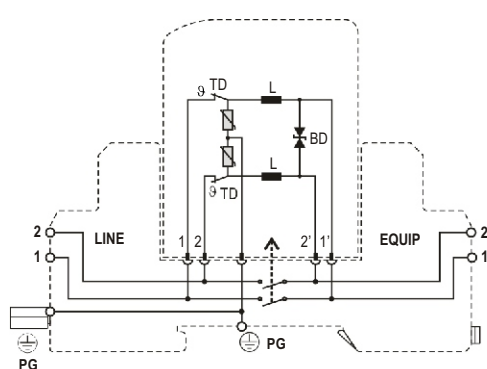
SMH-PS Series

Dimensions



- Legend:
 GDT gas discharge tube
 DB diode block
 PG protective grounding
 L inductor

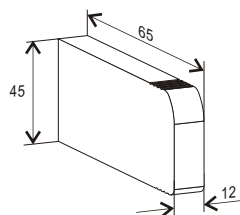
Internal configuration



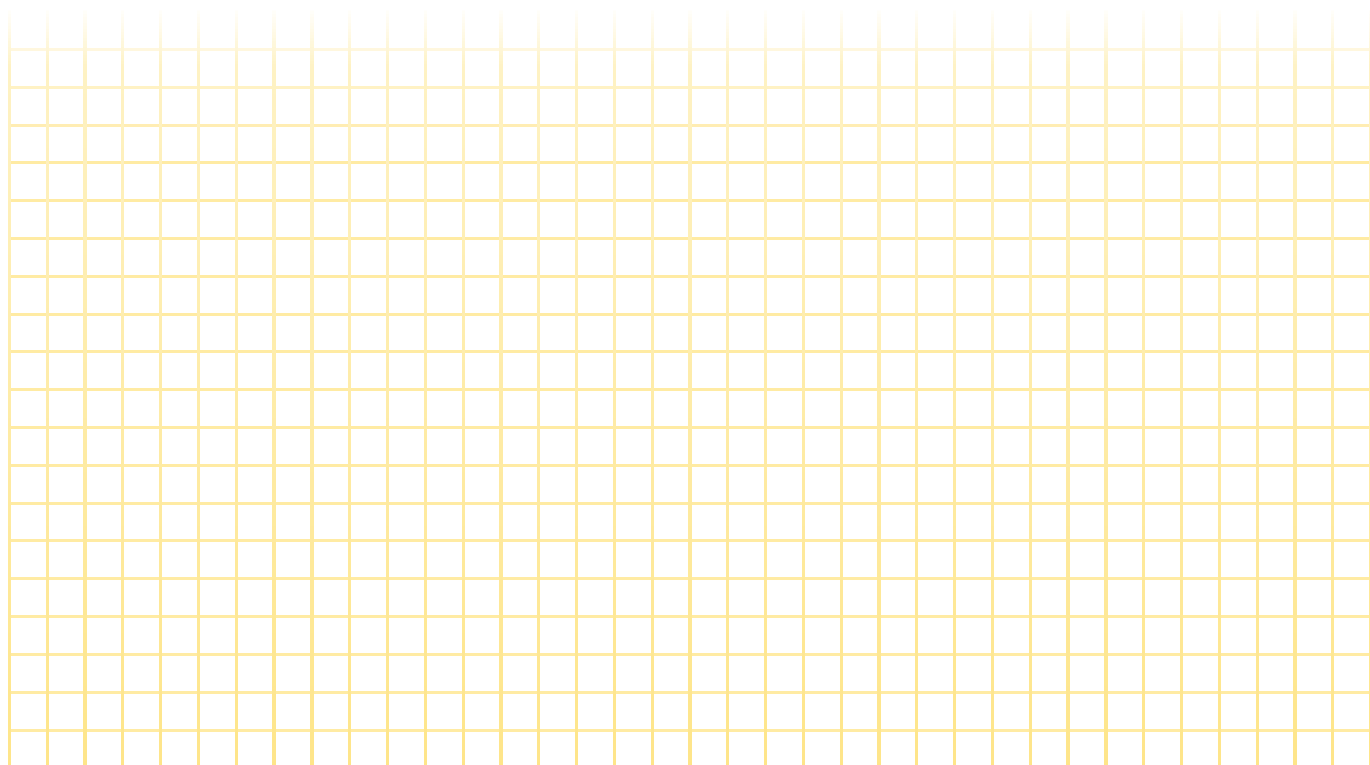
SMH-PS xx	12V	24V	48V
Dimensions DIN 43880		2/3TE	
Weight per unit	64g	64g	64g
Packaging dimensions (single unit)	87 x 15 x 102mm		
Min. packaging quantity	15 pcs.		

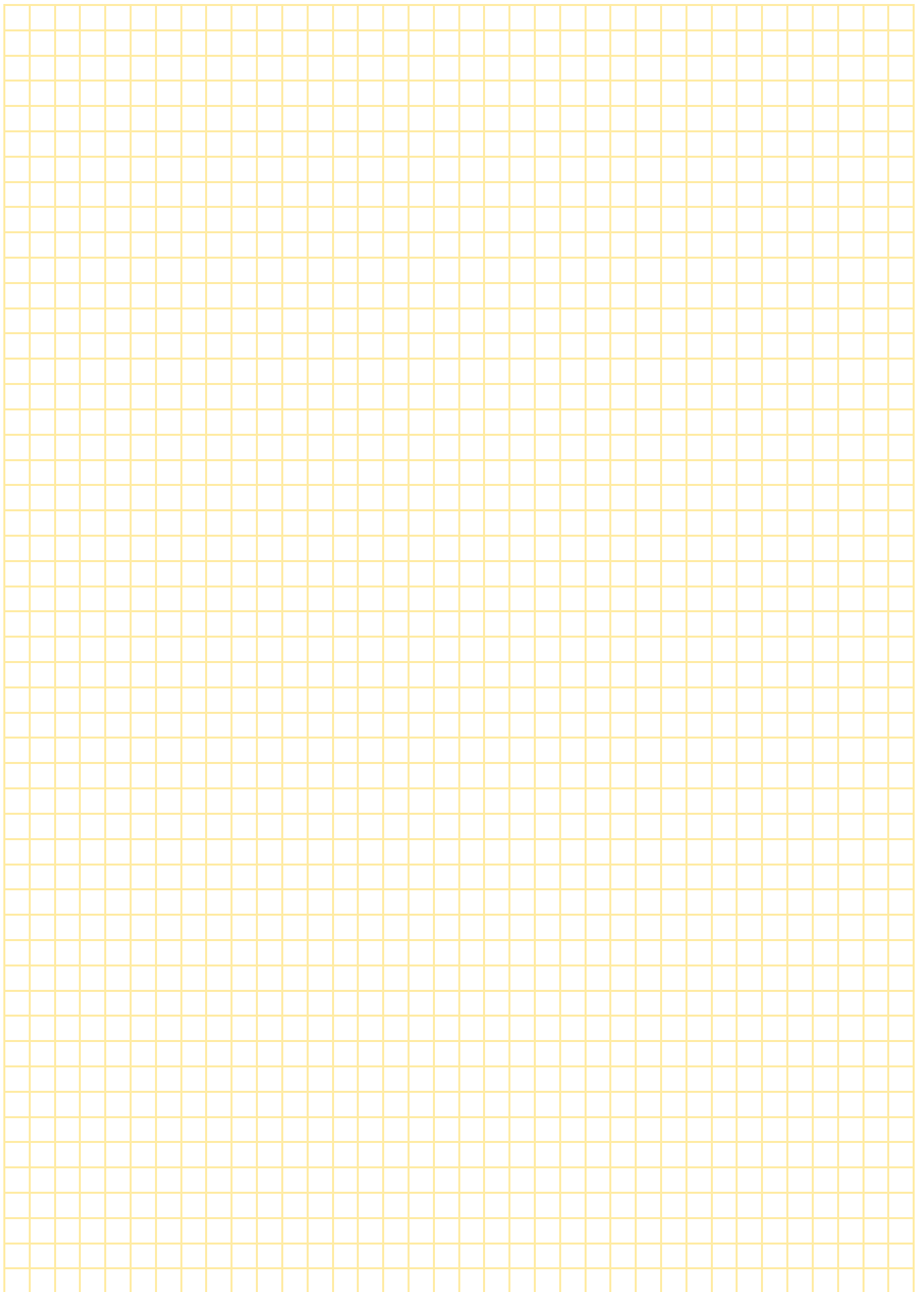
Module SMH-PS Series

Dimensions

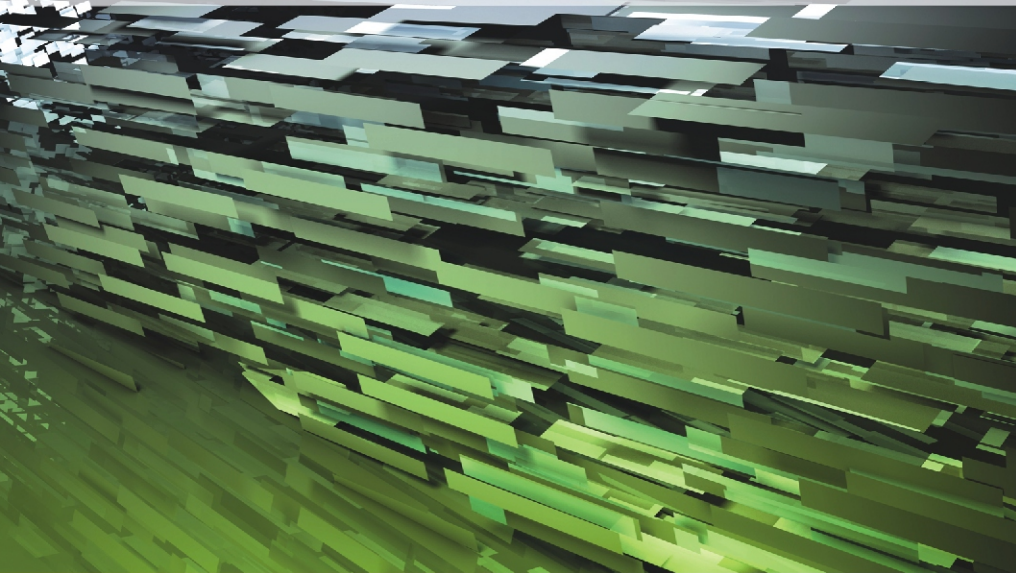


Module SMH-PS xx	12V	24V	48V
Weight per unit	36g	36g	36g
Packaging dimensions (single unit)	87 x 15 x 102mm		
Min. packaging quantity	15 pcs.		





SPD for Local Area Networks (LAN)



Category IEC / EN / VDE:	Class III / Type 3 / D (IEC/EN 61643-11)
Category IEC / EN:	D1/C1/C2/C3 (IEC/EN 61643-21)
Location of use:	Local area networks (LAN)
Protective elements:	GDT, diode
Surge discharge ratings:	I_n up to 10kA
Frequency:	up to 250MHz, Cat 6 capable
Complies with:	IEC/EN 61643-11, IEC/EN 61643-21

LZ-NET 6
LZ-NET-xxx
LZ-24NET xx
ZE 200 NET

The NET series is intended to protect Local Area Networks (LAN) from overvoltage surges and electrostatic discharges created by switching transients in buildings. LAN systems are particularly prone to such disturbances because of long cable lengths.

LZ-NET series is designed to protect Cat 5 Local Area Networks. There are available in standard, PoE and STP versions.

LZ-NET 6 is designed to protect Cat 6 Local Area Networks. It is suitable for protection of 1Gbit/s lines and fully compatible with current PoE standards.

LZ-xxNET 19 series is designed to protect Cat 5 Local Area Networks. It is available in 8, 16 and 24 line versions.

ZE 200-NET is combined protective device designed to protect Cat 5 Local Area Networks as well as the AC power port.



LZ-NET 6



- **Category IEC / EN:** D1/C1/C2/C3
- **Protection:** All 4 pairs protected
- **Nominal operating voltage:** U_n : 48V_{DC}
- **Max. operating voltage:** U_c : 50V_{DC}
- **Frequency range:** 250MHz, up to Cat 6, PoE compatible
- **Surge Discharge Ratings:** I_n : 10kA, I_{imp} : 1kA
- **Enclosure:** UTB in-line patch, DIN rail mount
- **Housing:** Compact design
- **Termination:** RJ45, shielded
- **Complies with:** IEC/EN 61643-21



The LZ-NET 6 series is intended to protect Local Area Networks (LAN) from overvoltage 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 4 lines in the UTP, STP and is **Cat 6 capable**. Ground potential equalization between signal and protective (network or PC chassis) ground is provided. Product is designed to fulfil all versions of PoE applications compatible with standards IEEE 802.3af and IEEE 802.3at.

Technical data

Type		LZ-NET 6
Electrical characteristics		
Number of protected pairs		4
Nominal operating voltage (DC)	U_n	48V
Max. continuous operating voltage (DC)	U_c	50V
Rated load current at 25°C	I_L	1A
Nominal discharge current (8/20µs)	I_n (line-line)	150A
	(Lines-PG)	10kA
Impulse current (10/350µs)	I_{imp}	1kA
Voltage protection level at I_n	U_p (line-line)	150V
	(line-PG)	550V
Response time of overvoltage protection	t_A	< 1ns
Limit frequency	f_G	250MHz (Class E)
Mechanical characteristics		
Connection		Input/Output: RJ45 sockets
Temperature range		-40°C ... +80°C
Degree of protection IEC/EN 60529		IP 20
Housing material		Metal
Mounting IEC/EN 60715		35mm DIN rail

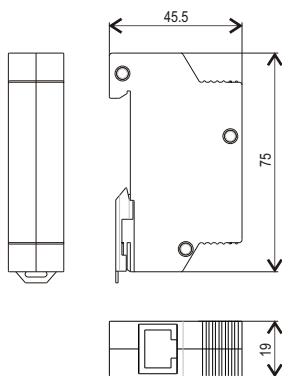
Ordering information

Ordering code LZ-NET 6	706 301
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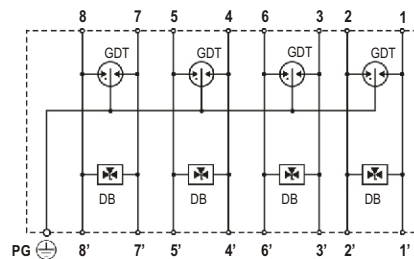
Dimensions, Internal configuration, Weight and Packaging

LZ-NET 6

Dimensions



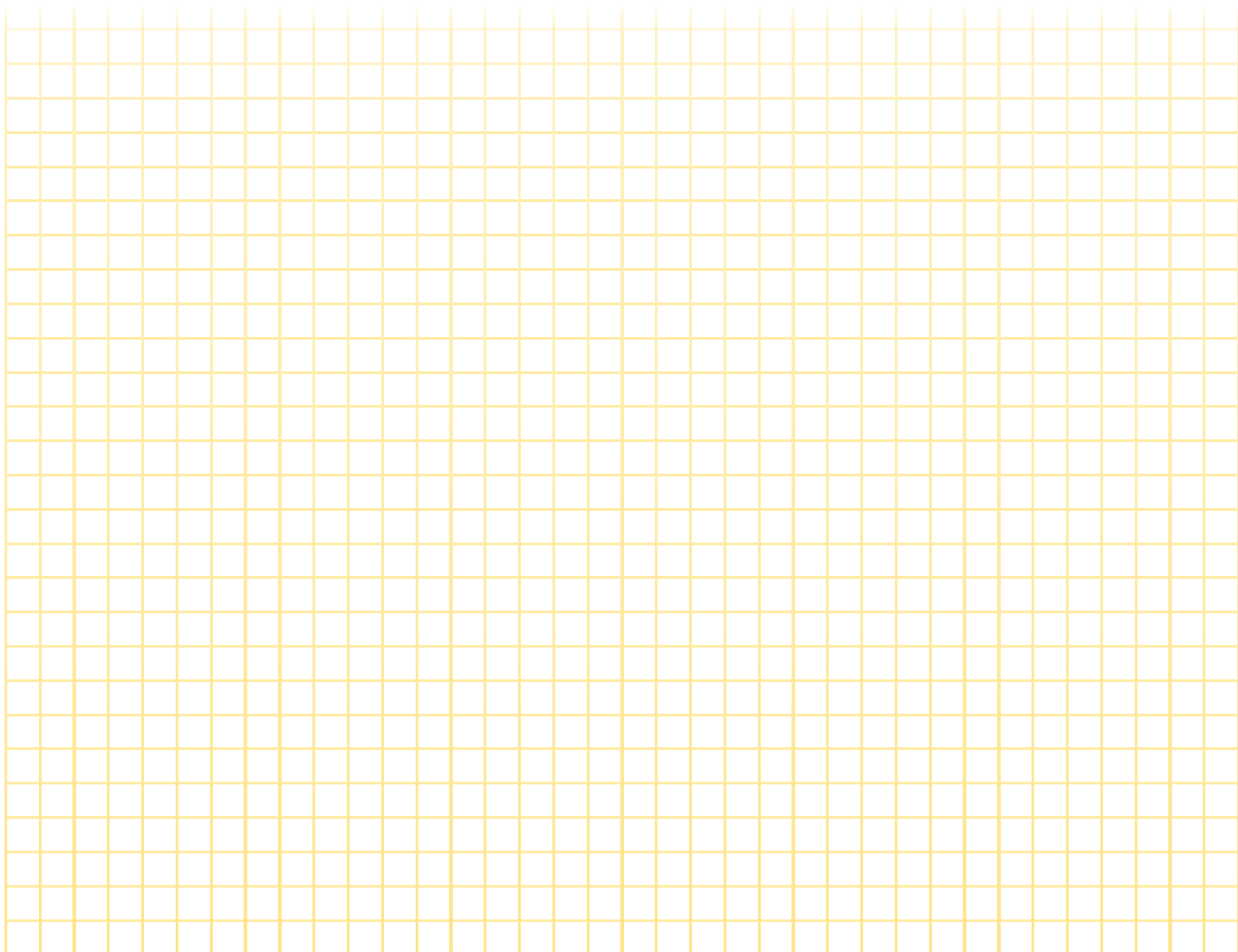
Internal configuration



Legend:

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

LZ-NET 6	
Dimensions DIN 43880	19mm
Weight per unit	120g
Packaging dimensions (single unit)	78 x 23 x 108mm
Min. packaging quantity	12 pcs.



LZ-NET Series



- **Category IEC / EN:** C1/C2/C3 (see Technical data)
- **Protection:** All 4 pairs protected
- **Nominal operating voltage:** U_n : 5, 48V_{DC}
- **Max. operating voltage:** U_c : 6, 58V_{DC}
- **Frequency range:** < 100MHz, Cat 5 capable
- **Surge Discharge Rating:** I_n up to 300A per line
- **Enclosure:** UTB in-line patch
- **Housing:** Compact design
- **Termination:** RJ45, Cat 5 connectors
- **Complies with:** IEC/EN 61643-21



The LZ-NET series is intended to protect Local Area Networks (LAN) from overvoltage 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 4 lines in the UTP, and is Cat 5 capable. Ground potential equalization between signal and protective (network or PC chassis) ground is provided. PoE version (LZ-NET PoE) is designed to fulfil all versions of PoE applications compatible with standards IEEE 802.3af and IEEE 802.3at.

Technical data

Type	LZ-NET	LZ-NET PoE	LZ-NET STP
IEC/EN category	C1/C2/C3	C1/C3	C1/C2/C3
Electrical characteristics			
Number of protected pairs		4	
Nominal operating voltage (DC) U_n	5V	48V	5V
Max. continuous operating voltage (DC) U_c	6V	58V	6V
Nominal discharge current (8/20 μ s) I_n	(line-line)	300A	300A
	(lines-PG)	1kA	1kA
Voltage protection level at I_n U_p	(line-line)	35V	35V
	(line-PG)	350V	350V
Response time of overvoltage protection t_A		< 1ns	
Limit frequency f_G		< 100MHz	
Mechanical characteristics			
Connection		Input/Output: RJ45 sockets	
Temperature range		-40°C ... +80°C	
Degree of protection IEC/EN 60529		IP 20	
Housing material		Thermoplastic; grey, extinguishing degree V-0	

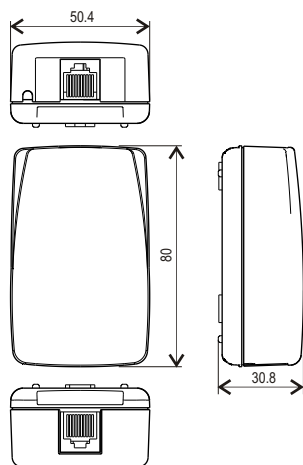
Ordering information

	LZ-NET	LZ-NET PoE	LZ-NET STP
Ordering code LZ-NET xxx	7060.01	7060.02	7060.11

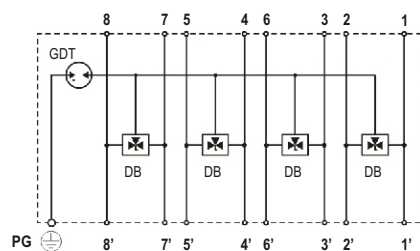
Dimensions, Internal configuration, Weight and Packaging

LZ-NET Series

Dimensions

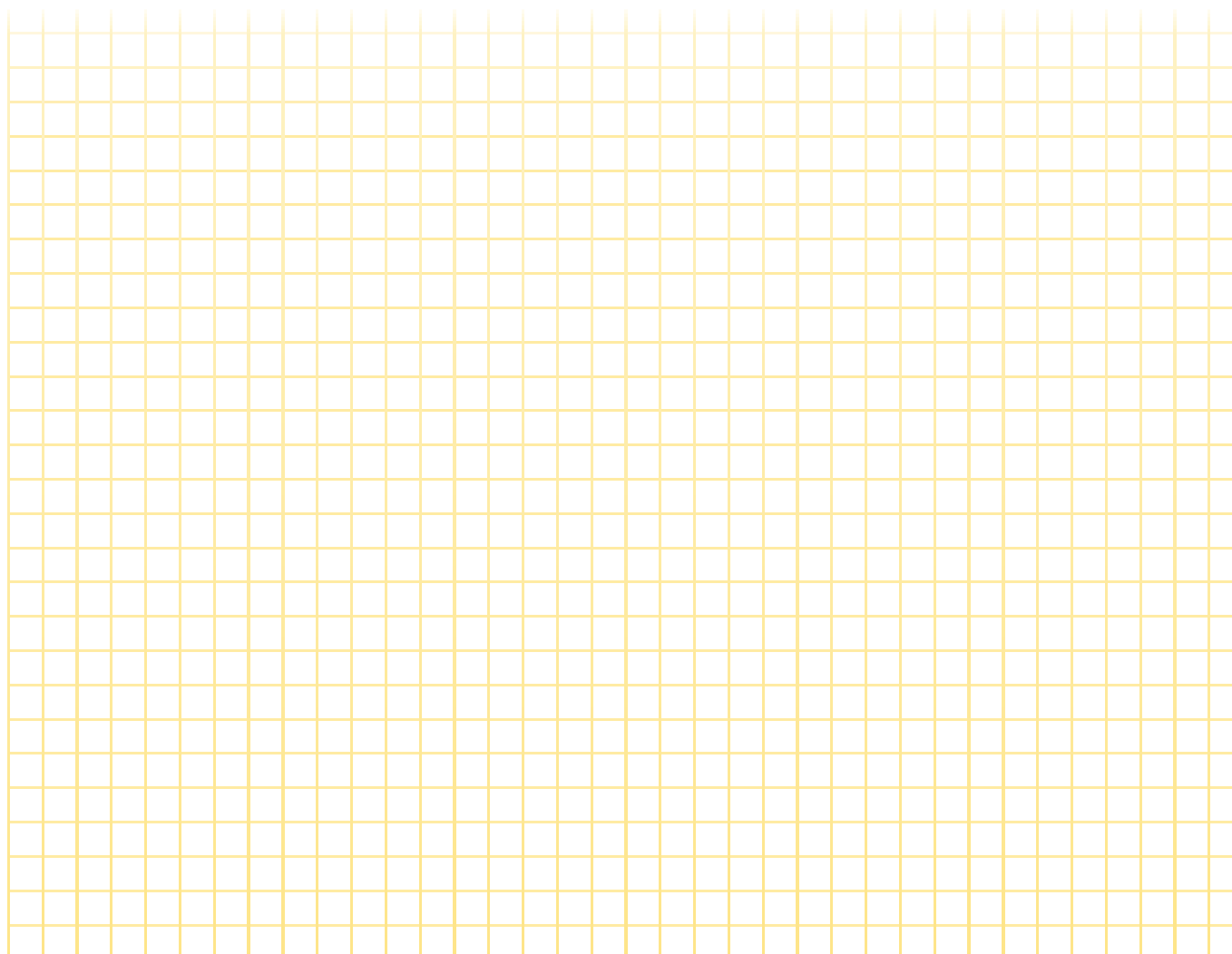


Internal configuration



LZ-NET	PoE	STP
Weight per unit	56g	56g
Packaging dimensions (single unit)	55 x 50 x 106mm	
Min. packaging quantity	12 pcs.	

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



LZ-xx NET 19 Series



- **Category IEC / EN:** C1/C2/C3 (see Technical data)
- **Protection:** All 4 pairs protected
- **Nominal operating voltage:** U_n : 5, 48V_{DC}
- **Max. operating voltage:** U_c : 6, 58V_{DC}
- **Frequency range:** < 100MHz, Cat 5 capable
- **Surge Discharge Rating:** I_n up to 300A per line
- **Enclosure:** 19" rack, shielded, in-line patch
- **Termination:** RJ45, Cat 5 connectors
- **Options:** 8, 16, 24 ports; replaceable 8 ports module
- **Complies with:** IEC/EN 61643-21



The LZ-NET 19 series is intended to protect Local Area Networks (LAN) from overvoltage 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 ports patching to UTP lines.

PoE version (LZ-xx NET 19 PoE) is designed to fulfil all versions of PoE applications compatible with standards IEEE 802.3af and IEEE 802.3at.

Technical data

Type	LZ-xx NET 19	LZ-xx NET 19 PoE
IEC/EN category	C1/C2/C3	C1/C3
Electrical characteristics		
Number of protected ports	8, 16 or 24	
Nominal operating voltage (DC) U_n	5V	48V
Max. continuous operating voltage (DC) U_c	6V	58V
Nominal discharge current (8/20 μ s) I_n (line-line)	300A	60A
	(lines-PG) 1kA	250A
Voltage protection level at I_n U_p (line-line)	35V	150V
	(line-PG) 350V	350V
Response time of overvoltage protection t_A	< 1ns	
Limit frequency f_G	< 100MHz	
Mechanical characteristics		
Connection	Input/Output: RJ45 sockets	
Temperature range	- 40°C ... + 80°C	
Degree of protection IEC/EN 60529	IP 20	
Housing material	Al	
Mounting	19" rack	

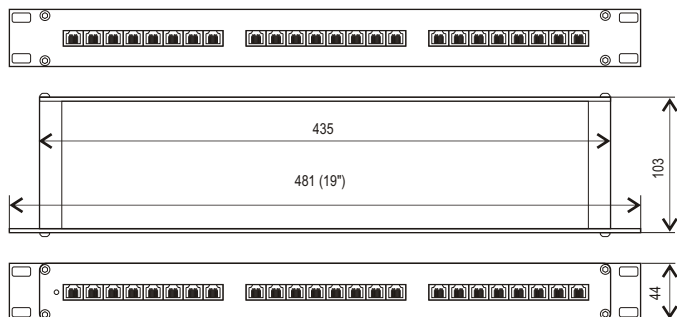
Ordering information

	LZ-xx NET 19	LZ-xx NET 19 PoE
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 (Replacement surge module for LZ xx NET 19)	706 113	706 133

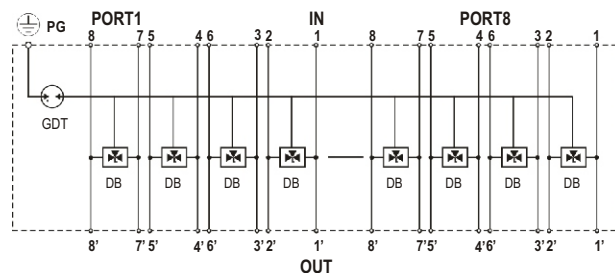
Dimensions, Internal configuration, Weight and Packaging

LZ-xx NET 19 Series

Dimensions



Internal configuration



Legend:

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

LZ xx NET 19	8	16	24
Weight per unit	1.060g	1.160g	1.240g
Packaging dimensions (single unit)	483 x 108 x 45mm		
Min. packaging quantity	1 pc.		

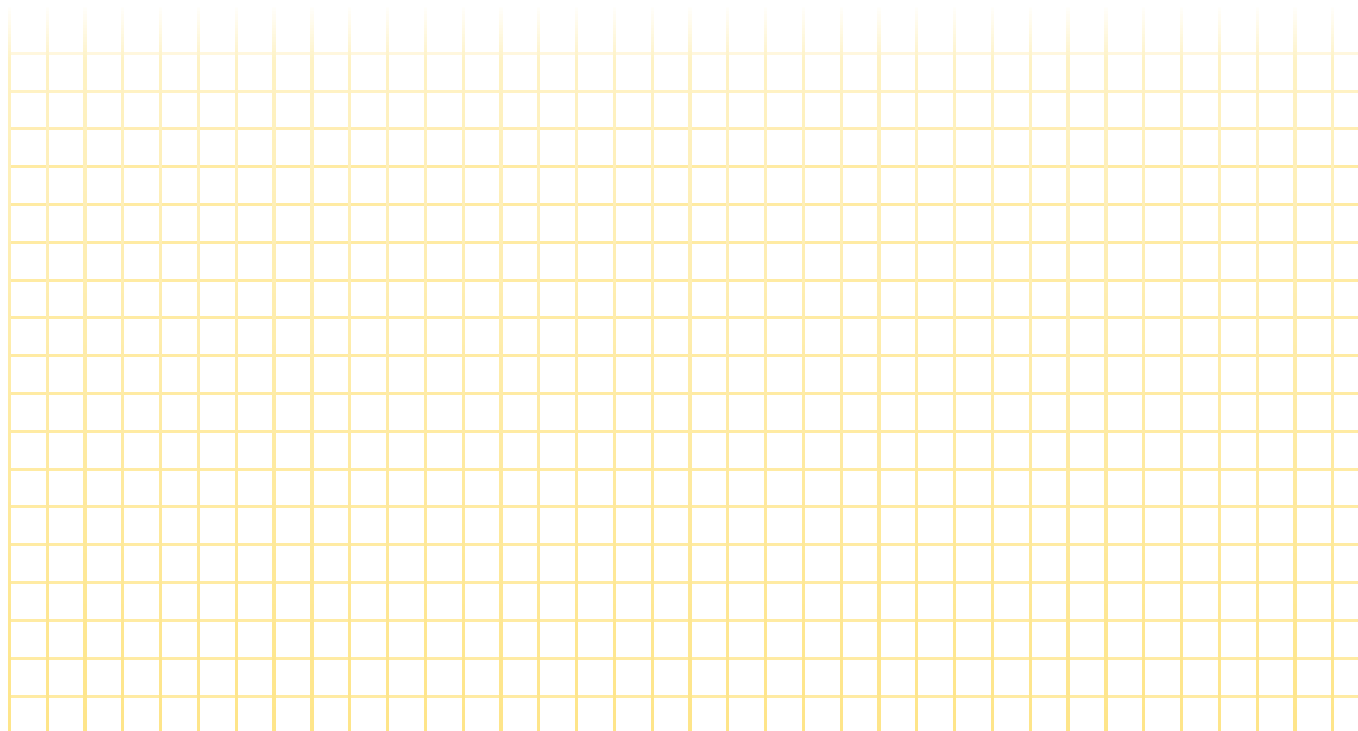
Replacement surge module for 8 ports

LZ xx NET 19 M	
Weight per unit	146g
Packaging dimensions (single unit)	258 x 113 x 49mm
Min. packaging quantity	1 pc.

LZ xx NET 19 PoE	8	16	24
Weight per unit	1.060g	1.160g	1.240g
Packaging dimensions (single unit)	483 x 108 x 45mm		
Min. packaging quantity	1 pc.		

Replacement surge module for 8 ports

LZ xx NET 19 M PoE	
Weight per unit	146g
Packaging dimensions (single unit)	258 x 113 x 49mm
Min. packaging quantity	1 pc.



ZE 200-NET



- **Category IEC / EN / VDE:** Class III/Type 3/D (IEC/EN 61643-11)
- **Category IEC / EN:** C1/C2/C3 (IEC/EN 61643-21)
- **Protection:** Power and Data
- **Nominal operating voltage:** U_n : ± 5V_{DC} (data side); 230V_{AC} (power side)
- **Max. operating voltage:** U_c : ± 6V_{DC} (data side); 275V_{AC} (power side)
- **Frequency range:** < 100MHz, Cat 5 capable
- **Surge Discharge Rating:** I_n : 300A per line (data side)
 I_n : 3kA L-N/L-PE (power side)
- **Enclosure:** UTB in-line patch, AC power outlet
- **Termination:** RJ45, Cat 5 connectors (data side)
- **Complies with:** DIN 49 440-CE(7) III, DIN 49 441-CEE(7) IV (power side)
IEC/EN 61643-11, 61643-21



The ZE 200-NET series is intended to protect Local Area Networks (LAN) from overvoltage 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 4 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 data

Type	ZE 200-NET	
	Power side	Data side
Electrical characteristics		
Number of protected pairs	/	4
Nominal operating voltage	U_n 230V _{AC} / 50Hz	5V _{DC}
Max. continuous operating voltage	U_c 275V _{AC} / 50Hz	6V _{DC}
Nominal discharge current (8/20μs)	I_n 3kA (L(N) - PE, L - N) 10kA (L+N - PE)	300A (line - line) 1kA (lines - PG)
Open circuit voltage of the combination wave generator	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 - PG)
Response time of overvoltage protection	t_A < 25ns (L - N) < 100ns (L(N) - PE)	< 1ns
Limit frequency	f_g /	100MHz
Back-up fuse	16A gL - (needed if not present in the network)	/
Mechanical characteristics		
Connection	DIN 49 440-CE(7) III, DIN 49 441-CEE(7) IV; Grounding contact	Input/Output: RJ45 sockets
Temperature range	- 40°C ... + 80°C	
Degree of protection IEC/EN 60529	IP 20	
Housing material	Thermoplastic; grey, extinguishing degree V-0	
Indication of disconnector operation	Green and red light	

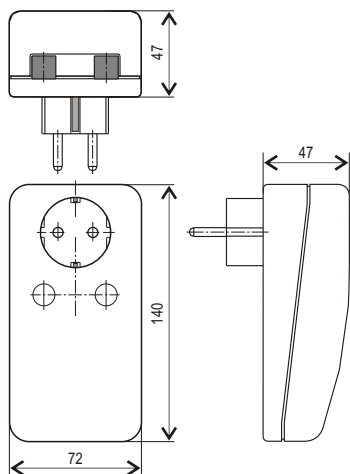
Ordering information

Ordering code ZE 200-NET	121 257
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Dimensions, Internal configuration, Weight and Packaging

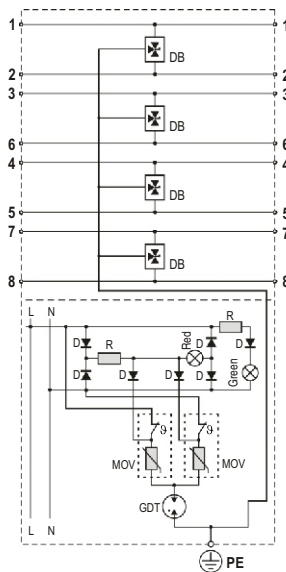
ZE 200-NET

Dimensions

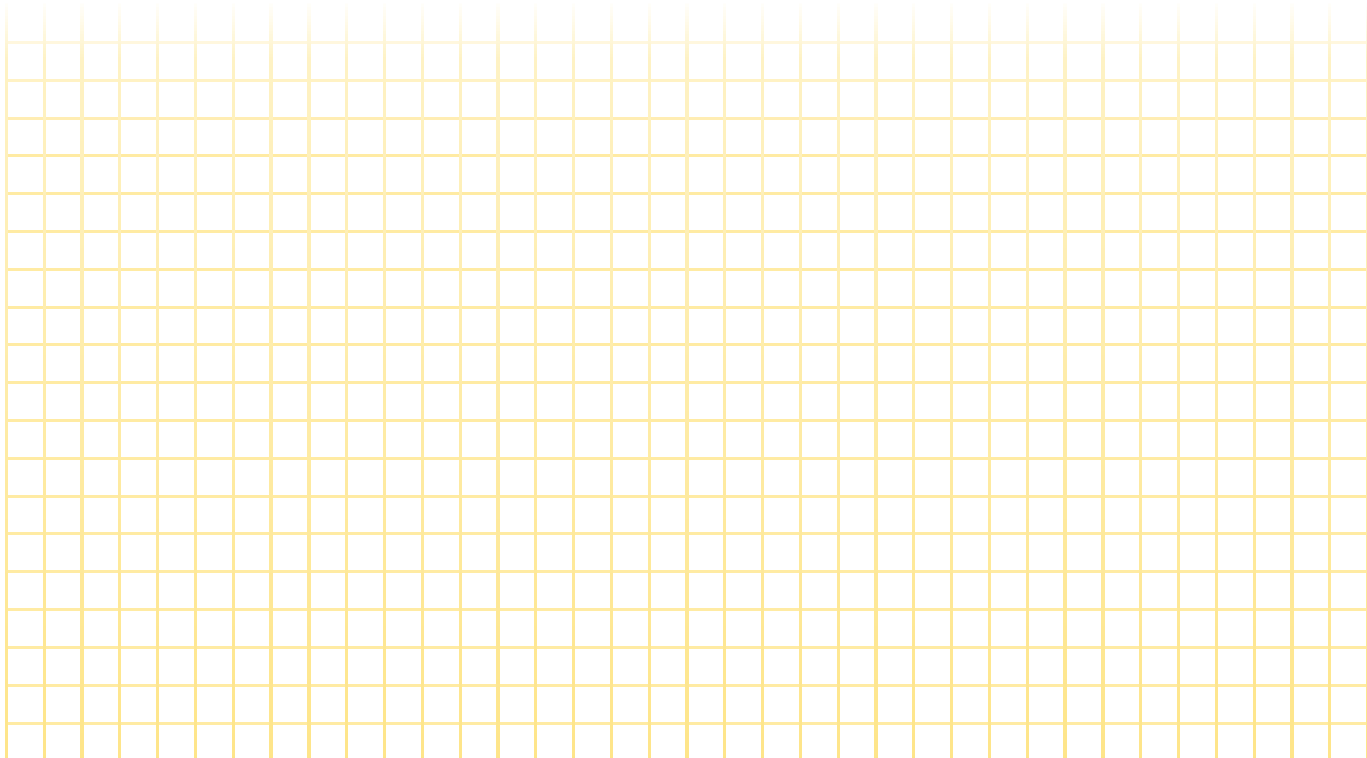


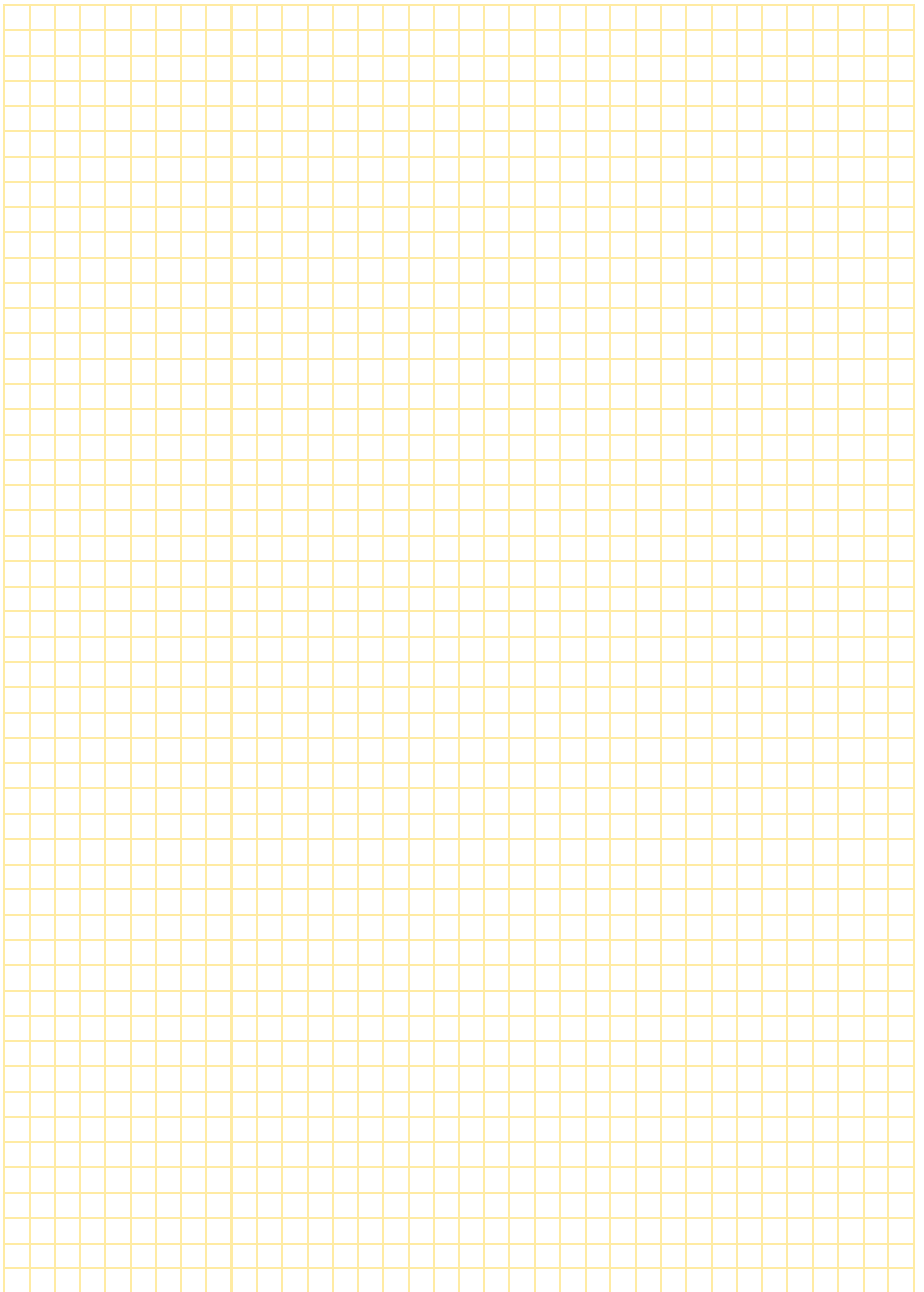
- Legend:
- GDT *gas discharge tube*
 - R *resistor*
 - DB *diode block*
 - D *diode*
 - MOV *varistor*

Internal configuration



ZE 200-NET	
Weight per unit	190g
Packaging dimensions (single unit)	94 x 78 x 151mm
Min. packaging quantity	1 pc.





SPD for Data Protocols



Category IEC / EN:	D1/C1/C2/C3
Location of use:	Data transmission circuits, RS 485, RS 422, RS 232 and V11 and X.12 protocol
Protective elements:	MOV, GDT, diode
Surge discharge ratings:	I_n up to 20kA
Frequency:	up to 35MHz
Complies with:	IEC/EN 61643-21

VM-RS 485 **IM-DB 9** **IM-DB 15 RS**

Data protocol SPDs were developed to protect different types of standard protocols.

VM-RS 485 has been designed to protect all versions of RS 485. It can be used for protection of RS 422 and V.11 protocol as well.

IM-DB has been designed to protect less exposed transmission circuits using the RS 232 protocol.

IM-DB 15 series has been designed to protect data transmission circuits using the RS 422, V.11 and X.12 protocols.



VM-RS 485



- **Category IEC / EN:** D1/C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 2 x 3 terminal GDT, 2 x 2 terminal GDT
- **Nominal operating voltage:** U_n : 5V_{DC}
- **Max. operating voltage:** U_c : 6V_{DC}
- **Serial resistance:** 1.7 - 1.9Ω per line
- **Frequency range:** < 1MHz
- **Surge Discharge Ratings:** I_n : 20kA; I_{imp} : 2.5kA
- **Series load current:** 500mA
- **Enclosure:** DIN 43880 2TE, DIN rail mount
- **Terminals:** Stranded 2 x 2.5mm²
- **Housing:** 16 terminal compact design
- **Complies with:** IEC/EN 61643-21



The VM-RS series has been developed to protect 2 pair data transmission circuits using the RS 485, RS 422 and V.11 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 data

Type		VM-RS 485
Electrical characteristics		
Number of protected pairs		2 (4 conductors)
Nominal operating voltage (DC)	U_n	5V
Max. continuous operating voltage (DC)	U_c	6V
Rated load current at 25°C	I_L	500mA
Nominal discharge current (8/20μs)	I_n	20kA
Impulse current (10/350μs)	I_{imp}	2.5kA
Residual voltage at 5kA (8/20μs)	U_{res} (line - line)	20V
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
Response time of overvoltage protection	t_A (5, 6, 7, 8, SG)	< 1ns
Thermal protection	(5, 6, 7, 8)	YES
Insulation resistance of the protection	R_{iso}	6kΩ
Serial resistance	R	1.7 - 1.9Ω
Transverse capacitance	C	< 2nF
Limit frequency	f_G	> 1MHz
Mechanical characteristics		
Temperature range		- 40°C ... + 80°C
Terminal cross section		Stranded to 2 x 2.5mm ²
Terminal screw torque		2.0Nm
Degree of protection IEC/EN 60529		IP 20
Housing material		Thermoplastic; grey, extinguishing degree V-0
Mounting IEC/EN 60715		35mm DIN rail

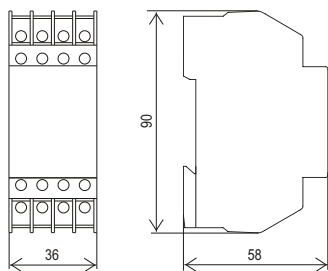
Ordering information

U_n	5V
Ordering code VM-RS 485	703 801

Dimensions, Internal configuration, Weight and Packaging

VM-RS 485

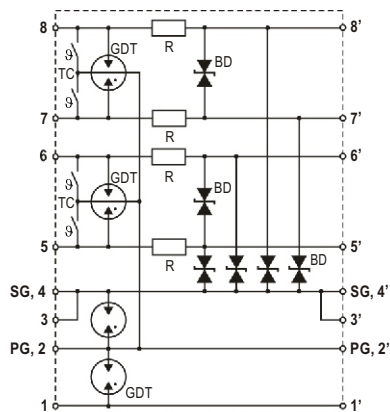
Dimensions



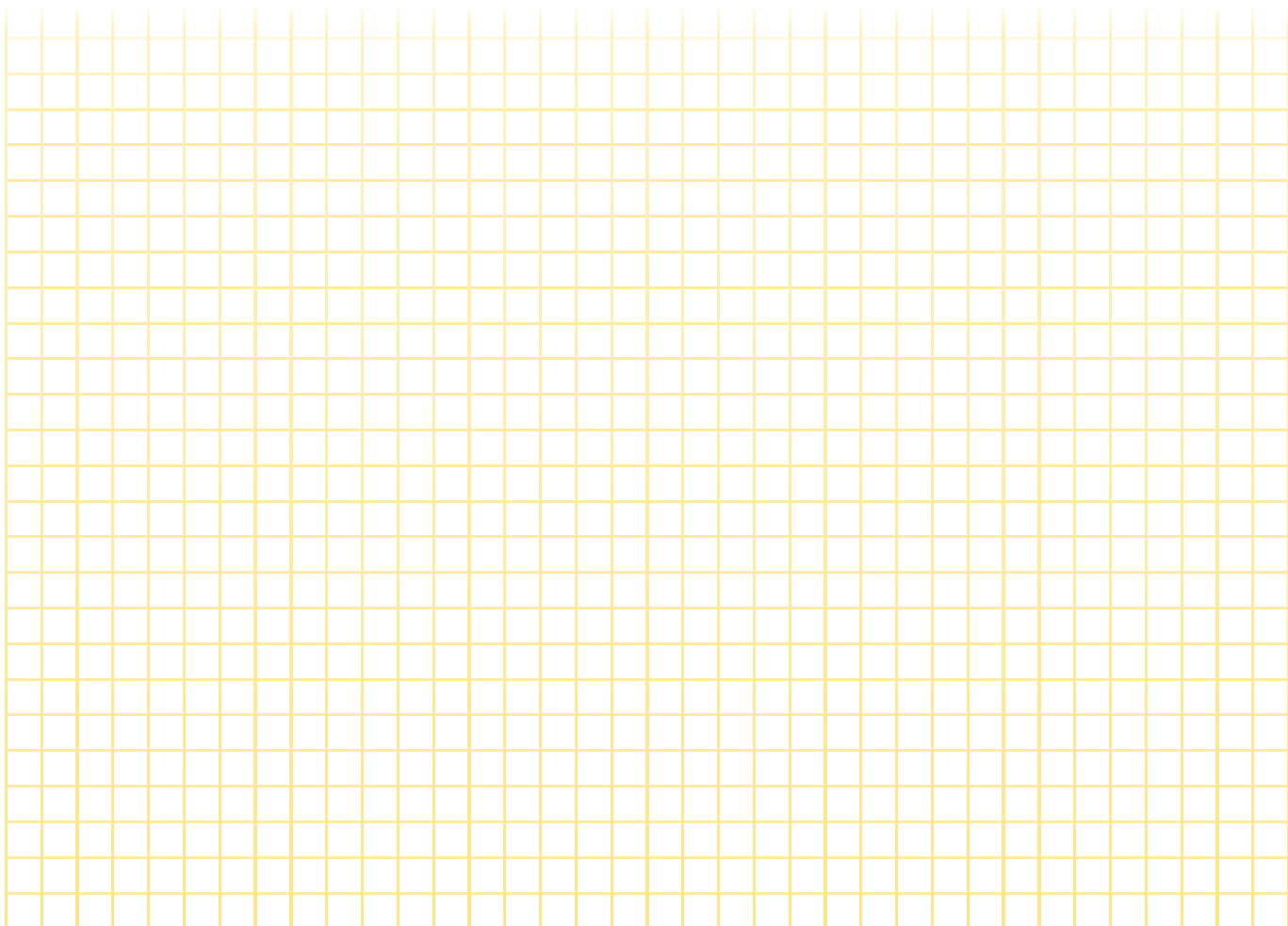
Legend:

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

Internal configuration



VM-RS 485	
Dimensions DIN 43880	2TE
Weight per unit	114g
Packaging dimensions (single unit)	39 x 74 x 106mm
Min. packaging quantity	6 pcs.



IM-DB 9



- Category IEC / EN: C1/C2/C3
- Nominal operating voltage: U_n : 12V_{DC}
- Max. operating voltage: U_c : 15V_{DC}
- Frequency range: 1MHz
- Surge Discharge Ratings: I_n : 1kA, I_{max} : 2kA
- Series load current: 500mA
- Termination: DB 9 male - DB 9 female
- Housing: In-line compact design
- Complies with: IEC/EN 61643-21



The IM-DB 9 series has been developed to protect transmission circuits using the RS 232 protocol.

Protection is achieved via a DB 9, in-line package, comprises a combination of MOV and fast silicon suppressor diodes. All eight lines are protected.

Technical data

Type		IM-DB 9
Electrical characteristics		
Number of protected lines		8
Nominal operating voltage (DC)	U_n	12V
Max. continuous operating voltage (DC)	U_c	15V
Nominal discharge current (8/20 μ s)	I_n (line - line)	100A
	(lines - PG)	1kA
Max. discharge current (8/20 μ s)	I_{max} (line - line)	200A
	(lines - PG)	2kA
Protection level at I_n	U_p (line - line)	$\leq 30V$
	(lines - PG)	$\leq 200V$
Protection level at 1kV/ μ s	U_p (line - line)	$\leq 24V$
	(lines - PG)	$\leq 30V$
Response time	t_A	$\leq 1ns$
Insulation resistance of the protection	R_{iso}	15M Ω
Transverse capacitance	C (line - line)	600pF
	(lines - PG)	700pF
Limit frequency	f_G	500kHz
Mechanical characteristics		
Connector		9 pole M/F
Termination		DB 9 male - DB 9 female
Temperature range		- 40°C + 80°C
Degree of protection IEC/EN 60529		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0

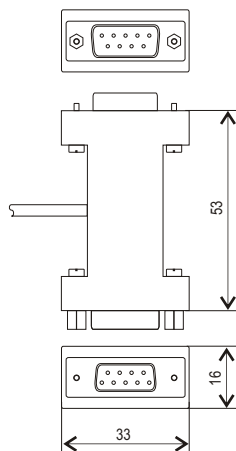
Ordering information

U_n	12V
Ordering code IM-DB 9	127 526

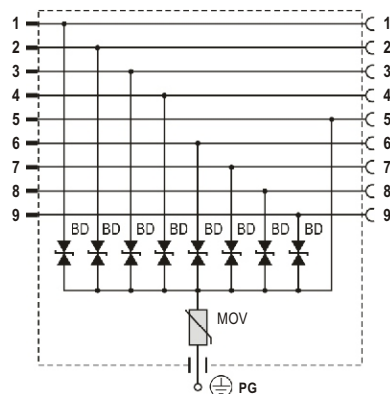
Dimensions, Internal configuration, Weight and Packaging

IM-DB 9

Dimensions



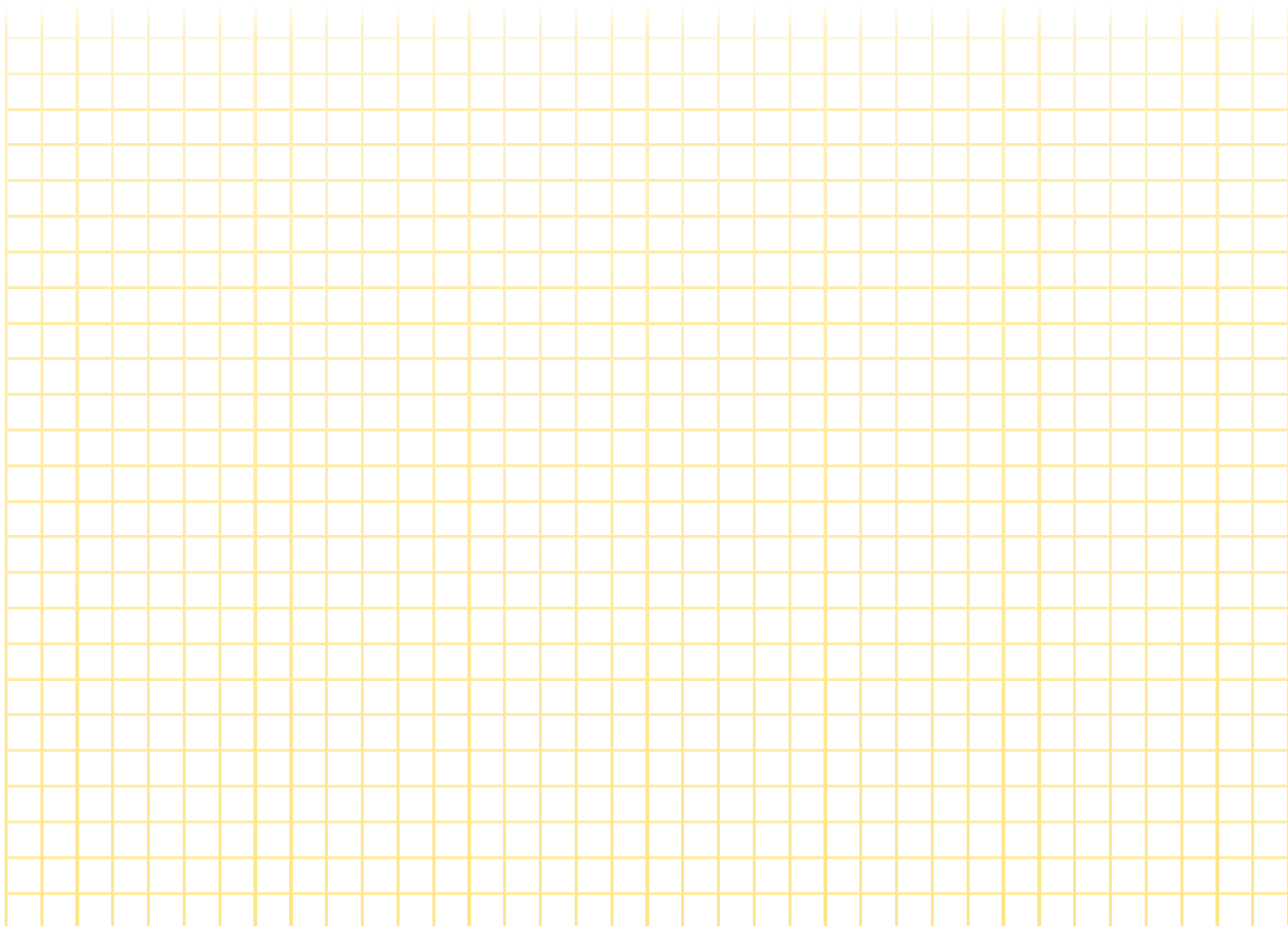
Internal configuration



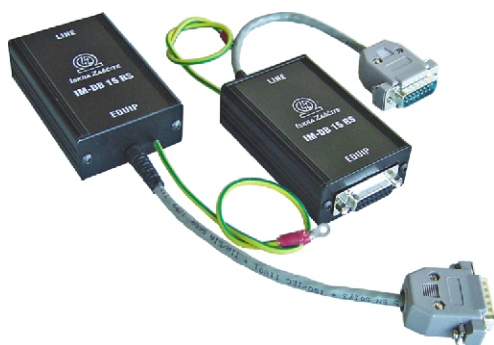
Legend:

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

IM-DB 9	
Weight per unit	28g
Packaging dimensions (single unit)	47 x 59 x 20mm
Min. packaging quantity	/



IM-DB 15 RS Series



- Category IEC / EN: C1/C2/C3
- Coarse Protection: 2 x 3 terminal GDT, 1 x 2 terminal GDT
- Nominal operating voltage: U_n : 5V_{DC}
- Max. operating voltage: U_c : 6V_{DC}
- Serial resistance: 1.7 - 1.9Ω per line
- Frequency range: 35MHz
- Surge Discharge Ratings: I_n : 10kA
- Series load current: 500mA
- Termination: DB 15 male - DB 15 female
- Housing: Compact design - extruded aluminium
- Complies with: IEC/EN 61643-21



The IM-DB 15 series has been developed to protect 2 pair data transmission circuits using the RS 422, V.11 and X.12 protocols.

The DB 15, 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 data

Type	IM-DB 15 RS (M-line)	IM-DB 15 RS (F-line)
Electrical characteristics		
Number of protected pairs		2 (4 lines)
Nominal operating voltage (DC) U_n		5V
Max. continuous operating voltage (DC) U_c		6V
Rated load current at 25°C I_L		500mA
Nominal discharge current (8/20μs) I_n		10kA
Residual voltage at 5kA (8/20μs) U_{res} (line - line)		< 20V
Rated spark overvoltage	(2, 9, 4, 11-8, SG)	6.5V - 8.5V
	(2 - 9 and 4-11)	6.5V - 8.5V
	(2, 9, 4, 11-8, PG)	78V - 116V
Response time t_A (2, 9, 4, 11-8, SG)		< 1ns
Thermal protection (2, 9, 4, 11)		YES
Insulation resistance of the protection R_{iso}		1.7 - 1.9Ω
Serial resistance R		< 30nF
Transverse capacitance C		35MHz
Limit frequency f_G		
Mechanical characteristics		
Connector	DB 15 (M-line)	DB 15 (F-line)
Temperature range		- 40°C + 80°C
Degree of protection IEC/EN 60529		IP 20
Housing material		Extruded Al

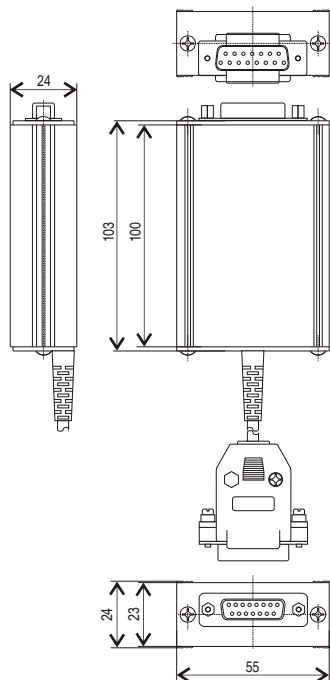
Ordering information

	(M-line)	(F-line)
Ordering code IM-DB 15 RS	127 517	127 516

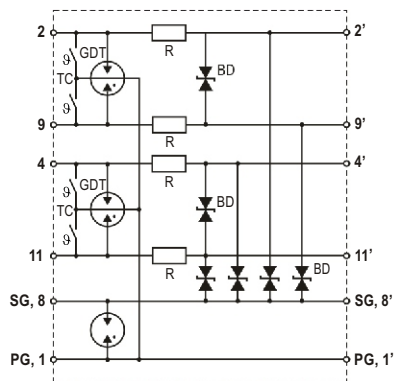
Dimensions, Internal configuration, Weight and Packaging

IM-DB 15 RS

Dimensions



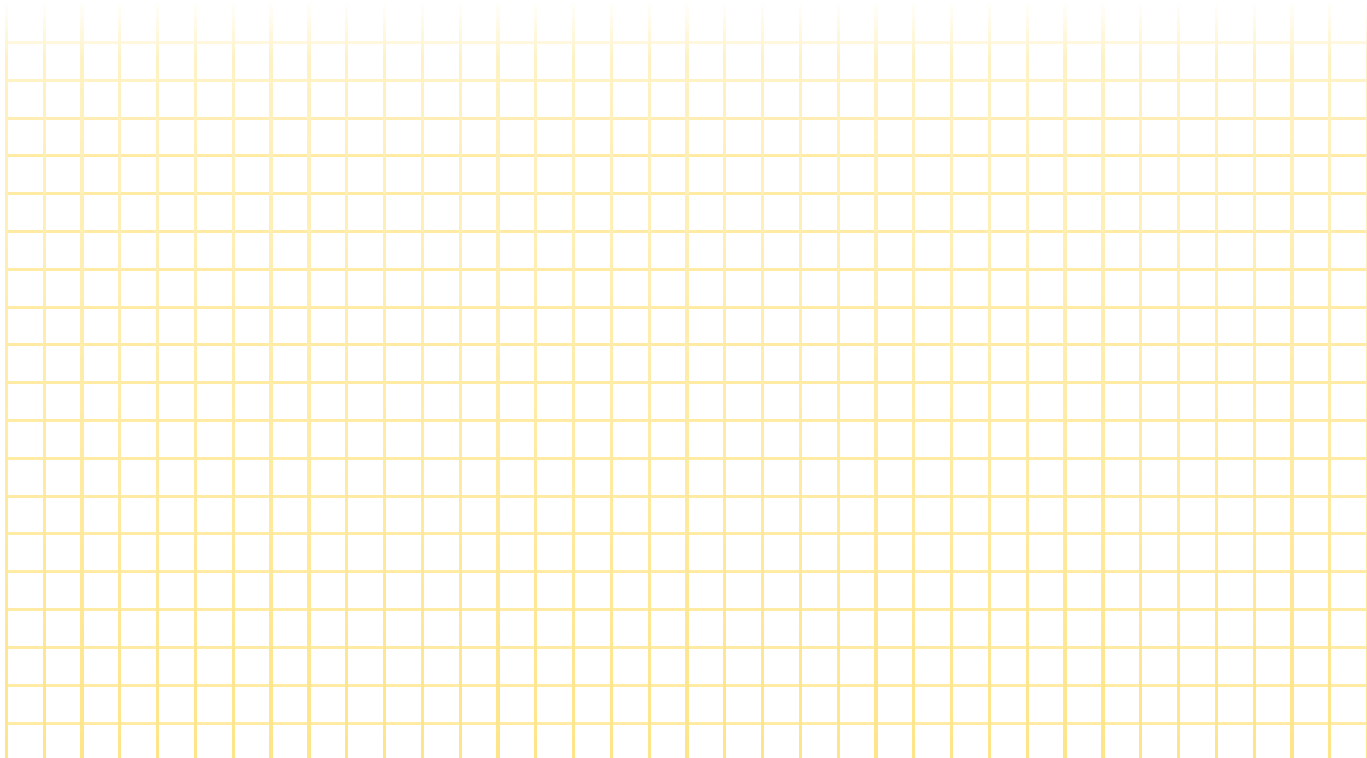
Internal configuration

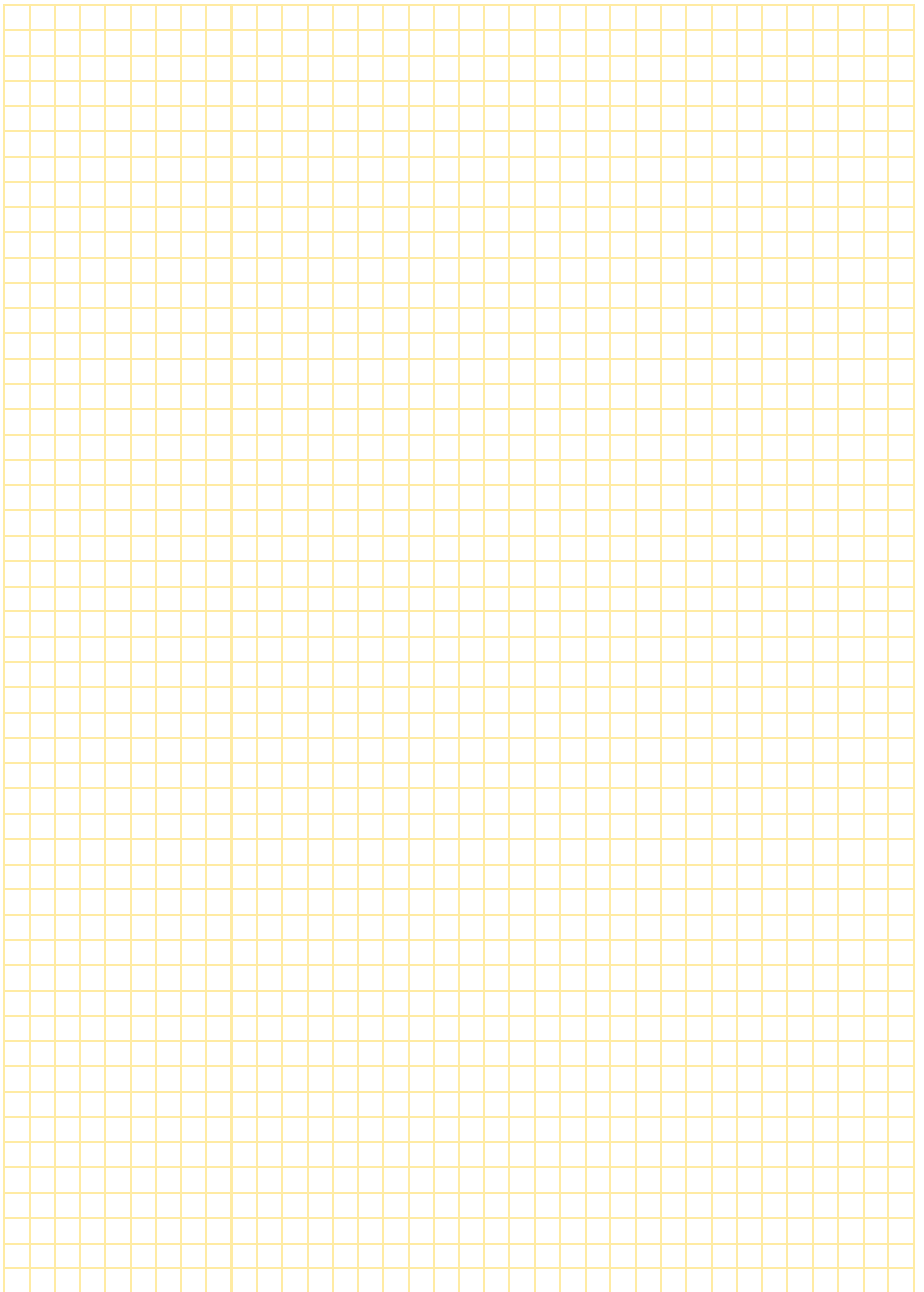


IM-DB 15 RS	(M-line)	(F-line)
Weight per unit	146g	146g
Packaging dimensions (single unit)	78 x 94 x 151mm	
Min. packaging quantity	/	

Legend:

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





Various Data SPD



Category IEC / EN:	C1/C2/C3
Location of use:	Data, signal and communication circuits
Protective elements:	MOV, GDT, diode, PTC resistor
Complies with:	IEC/EN 61643-21

PLP	The PLP-24V surge protective device is intended for the protection of data circuits such as 4-20mA current loops, in industrial environments.
IM-GD	The IM-GD series is intended as a generic protector for data circuits.
IM-NF xx	The IM-NF series is designed as a hybrid, PCB mount, protector against the effects of induced voltages onto data, signal and communication circuits.



PLP-24V



- **Category IEC / EN:** C1/C2/C3
- **Mode of protection:** Longitudinal, Transverse
- **Coarse Protection:** 3 terminal GDT
- **Nominal operating voltage:** U_n : 24V_{DC}
- **Max. operating voltage:** U_c : 28V_{DC}
- **Frequency range:** 3.0MHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA
- **Serial Resistance:** < 5 Ω per line
- **Series load current:** 145mA
- **Enclosure:** 3/4" stainless steel fitting conduit
- **Terminals:** Stranded 2.5 mm²
- **Housing:** in-line, 3/4" conduit fitting
- **Complies with:** IEC/EN 61643-21



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

The 3/4-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 data

Type		PLP-24V
Electrical characteristics		
Number of protected pairs		1 (2 conductors)
Nominal operating voltage (DC)	U_n	24V
Max. continuous operating voltage (DC)	U_c	28V
Rated load current at 25°C	I_L	145mA
Nominal discharge current (8/20 μ s)	I_n	10kA
Max. discharge current (8/20 μ s)	I_{max}	20kA
Residual voltage at 5kA (8/20 μ s)	U_{res} (line-line)	< 59V
Rated spark overvoltage	(a/b-PG)	90 - 110V
	(a-b)	36 - 44V
Response time of overvoltage protection	t_A	< 1ns
Thermal protection		YES
Insulation resistance of the protection	R_{iso}	$\geq 28M\Omega$
Serial resistance	R	< 5 Ω
Transverse capacitance	C	< 3nF
Limit frequency	f_G	3MHz
Mechanical characteristics		
Temperature range		- 40°C ... + 80°C
Terminal cross section		Stranded to 2.5 mm ²
Degree of protection IEC/EN 60529		IP 55
Housing material		Stainless steel
Mounting		On pipe 3/4 inch

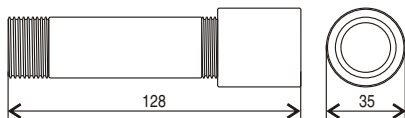
Ordering information

U_n	24V
Ordering code PLP-24V	127 515

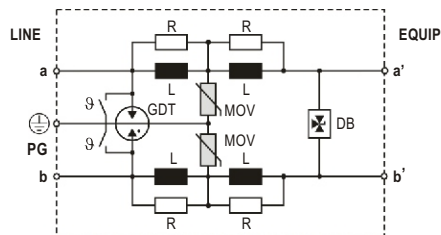
Dimensions, Internal configuration, Weight and Packaging

PLP-24V

Dimensions

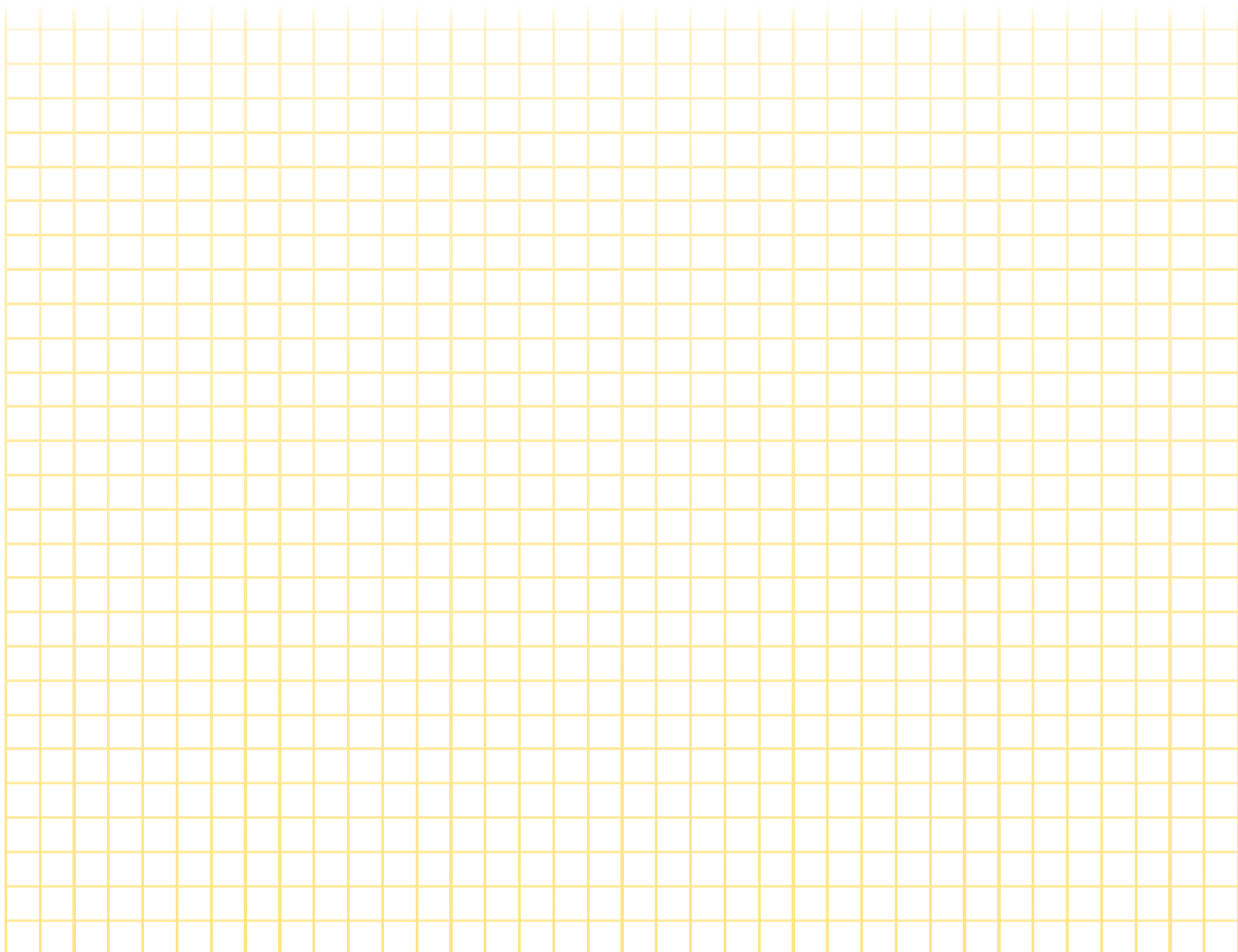


Internal configuration



- Legend:
 GDT gas discharge tube
 DB diode block
 MOV varistor
 R resistor
 L inductor
 PG protective grounding

PLP-xx	24V
Weight per unit	324g
Packaging dimensions (single unit)	144 x 100 x 80mm
Min. packaging quantity	8 pcs.



IM-GD Series



- Category IEC / EN: C1/C2/C3
- Mode of protection: Transverse, Differential
- Nominal operating voltage: U_n : 110V_{DC}
- Max. operating voltage: U_c : 170V_{DC}
- Surge Discharge Ratings: I_n : 5kA, I_{max} : 10kA
- Series load current: 6A
- Enclosure: PCB hybrid
- Terminals: Flying leads or screw terminals
- Housing: Compact design
- Complies with: IEC/EN 61643-21



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 disconnecter provides protection during mains incursion.

Technical data

Type	IM-GD	IM-GDC
Electrical characteristics		
Number of protected pairs	1 (2 conductors)	
Nominal operating voltage (DC) U_n	110V	
Max. continuous operating voltage (DC) U_c	170V	
Rated load current at 25°C I_L	6A	
Nominal discharge current (8/20µs) I_n	5kA	
Max. discharge current (8/20µs) I_{max}	10kA	
Residual voltage at 5kA (8/20µs) U_{res}	< 700V	
Rated spark overvoltage	(a/b-PG)	184 - 312V
	(a-b)	184 - 624V
Response time of overvoltage protection t_A	< 100ns	
Thermal protection	YES	
Insulation resistance of the protection R_{iso}	≥ 1GΩ	
Transverse capacitance C	< 1pF	
Limit frequency f_G	30MHz	
Mechanical characteristics		
Temperature range	- 40°C ... + 80°C	
Terminal cross section	0.5 mm ²	1.5 mm ²
Ground conductor terminal cross section	0.75 mm ²	1.5 mm ²
Length of connecting conductors	150mm	/
Degree of protection IEC/EN 60529	IP 20	
Housing material	Thermoplastic; grey, extinguishing degree V-0	

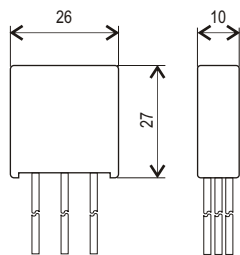
Ordering information

	GD	GDC
Ordering code IM	123 495	123 496

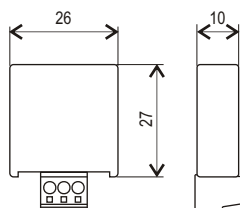
Dimensions, Internal configuration, Weight and Packaging

IM-GD Series

Dimensions

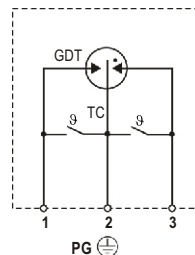


IM-GD



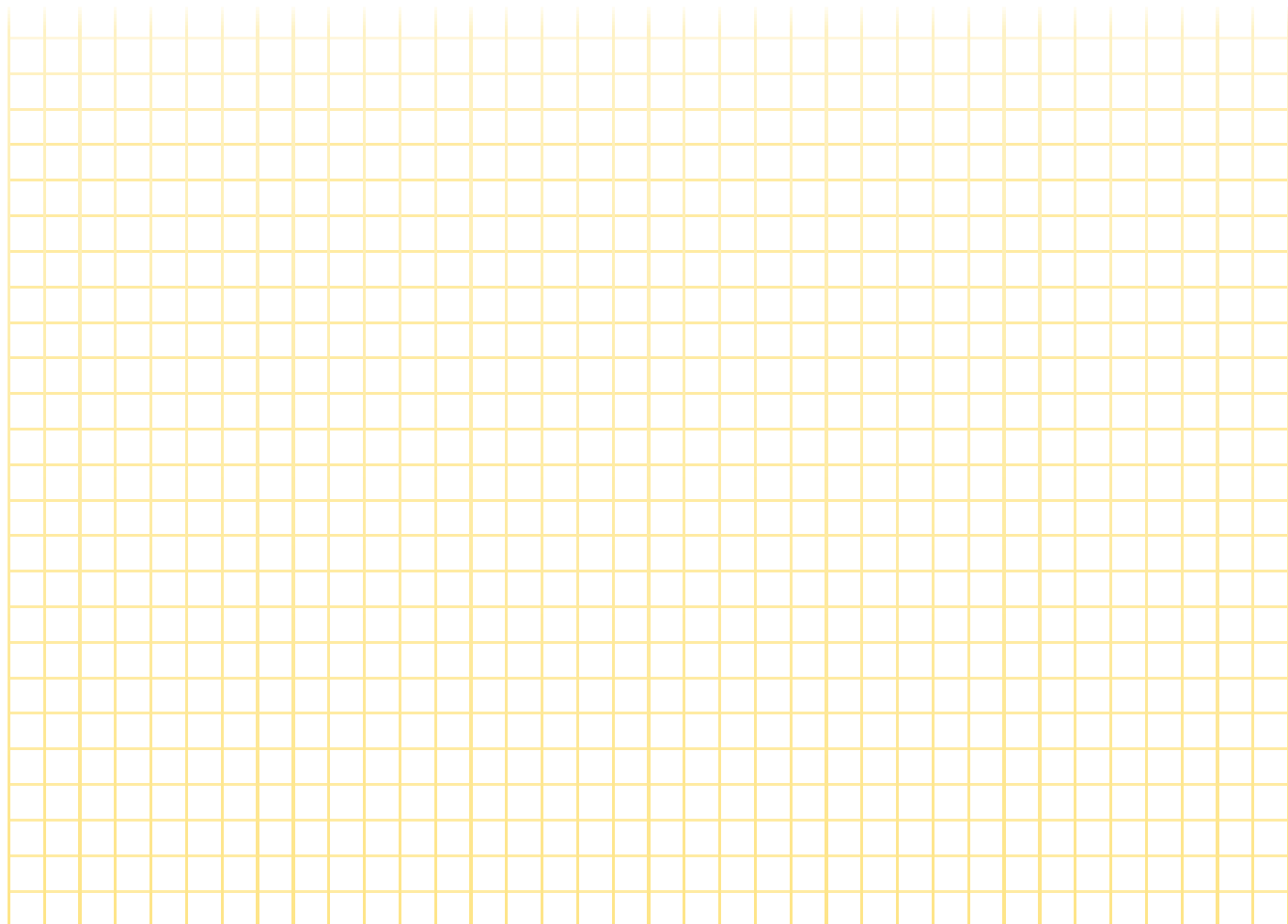
IM-GDC

Internal configuration



IM-	GD	GDC
Weight per unit	12g	8g
Packaging dimensions	61 x 49 x 21mm	
Min. packaging quantity	30 pcs.	

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



IM-NF Series



- **Category IEC / EN:** C1/C2/C3
- **Mode of protection:** Transverse
- **Nominal operating voltage:** U_n : 5, 15, 24V_{DC}
- **Max. operating voltage:** U_c : 6, 18, 28V_{DC}
- **Frequency range:** < 0.6 - 1.4MHz
- **Surge Discharge Ratings:** I_n : 5kA, I_{max} : 10kA
- **Series Elements typical:** 18Ω / 47μH
- **Series load current:** 145mA
- **Enclosure:** PCB hybrid
- **Terminals:** PCB pins
- **Housing:** PCB module
- **Complies with:** IEC/EN 61643-21



The IM-NF series is designed as a PCB mount hybrid protector against the effects of induced voltages onto data, signal and communication circuits. It is used 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.

Overcurrent 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 data

Type		5V	IM-NF 15V	24V
Electrical characteristics				
Number of protected pairs			1 (2 conductors)	
Nominal operating voltage (DC)	U_n	5V	15V	24V
Max. continuous operating voltage (DC)	U_c	6V	18V	28V
Rated load current at 25°C	I_L		145mA	
Nominal discharge current (8/20μs)	I_n		5kA	
Max. discharge current (8/20μs)	I_{max}		10kA	
Residual voltage at 5kA (8/20μs)	U_{res}	< 20V	< 45V	< 65V
Rated spark overvoltage		6.5 - 8V	20 - 24V	30 - 36V
Response time of overvoltage protection	t_A		< 1ns	
Thermal protection			Thermal disconnection	
Insulation resistance of the protection	R_{iso}	≤ 6kΩ	≤ 18MΩ	≤ 28MΩ
Serial resistance	R		15 - 18Ω	
Serial inductance	L		47μH	
Transverse capacitance	C	< 10nF	< 4nF	< 3nF
Limit frequency	f_G	0.6MHz	0.9MHz	1.4MHz
Mechanical characteristics				
Temperature range			- 40°C ... + 80°C	
Degree of protection IEC/EN 60529			IP 20	
Housing material			Thermoplastic; gray, extinguishing degree V-0	
Mounting			On a printed circuit board	

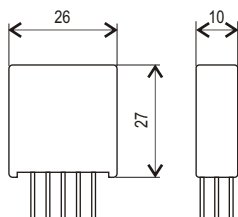
Ordering information

U_n	5V	15V	24V
Ordering code IM-NF	127 138	127 139	127 141

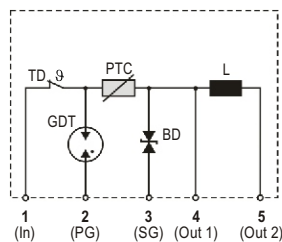
Dimensions, Internal configuration, Weight and Packaging

IM-NF Series

Dimensions



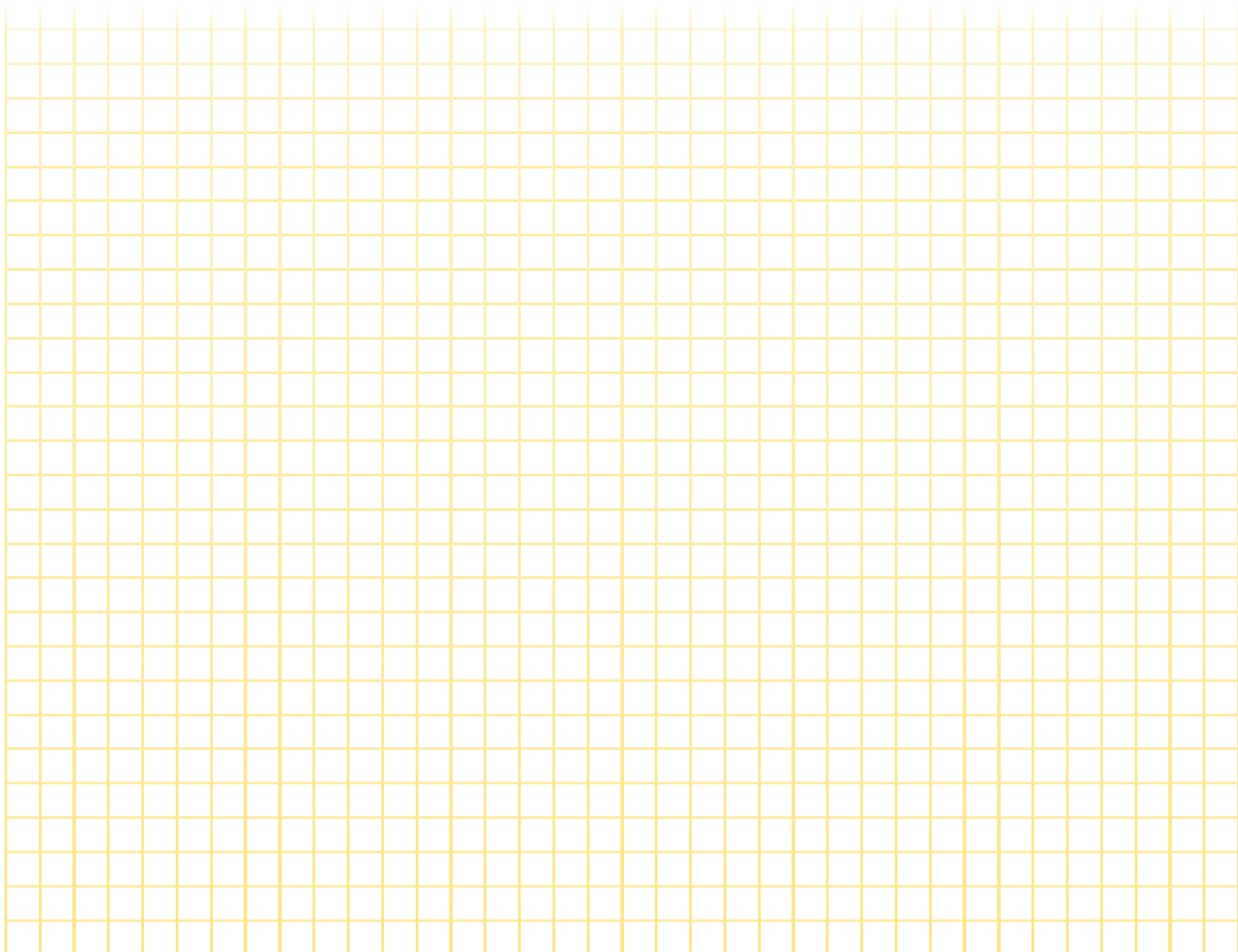
Internal configuration

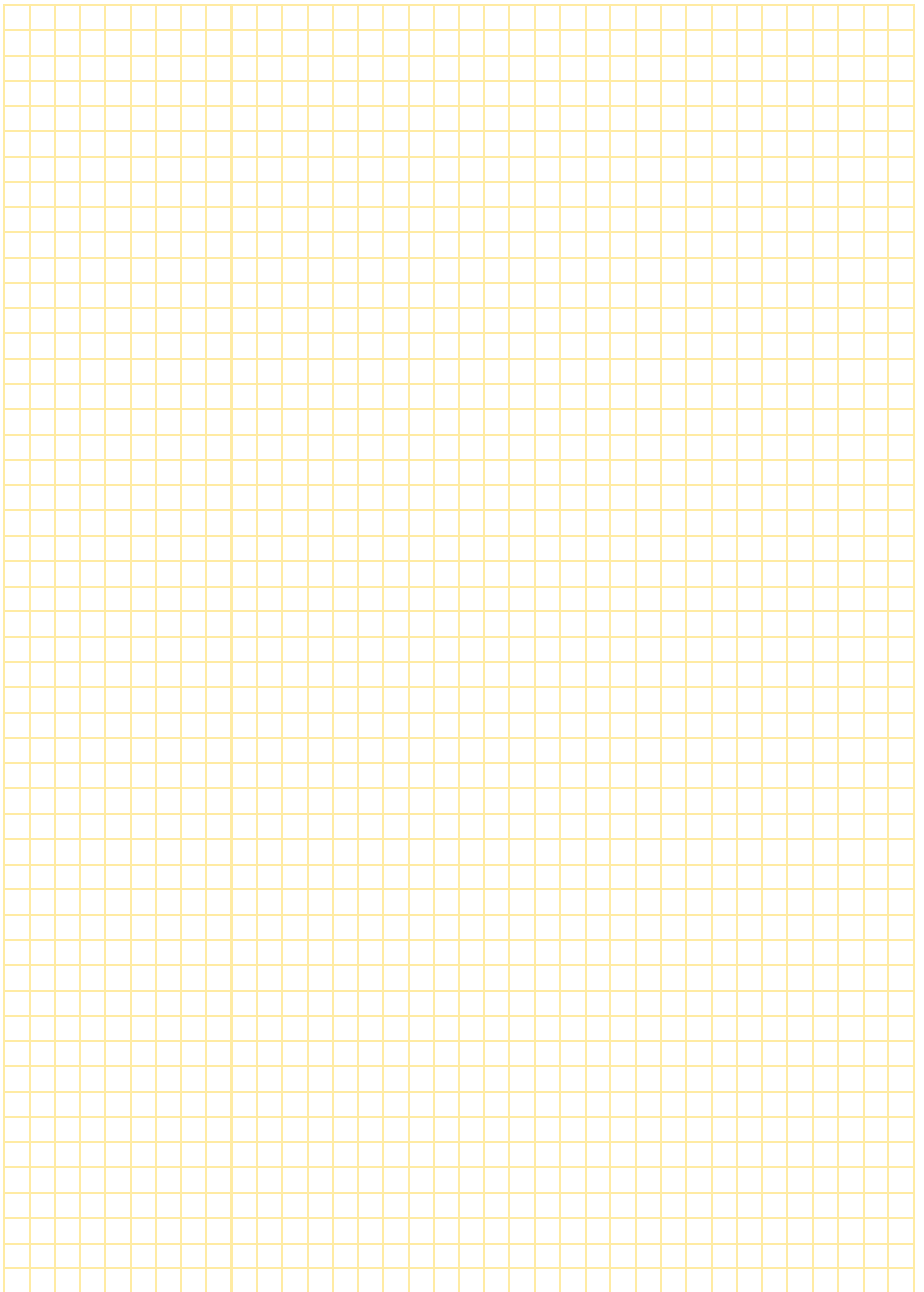


Legend:

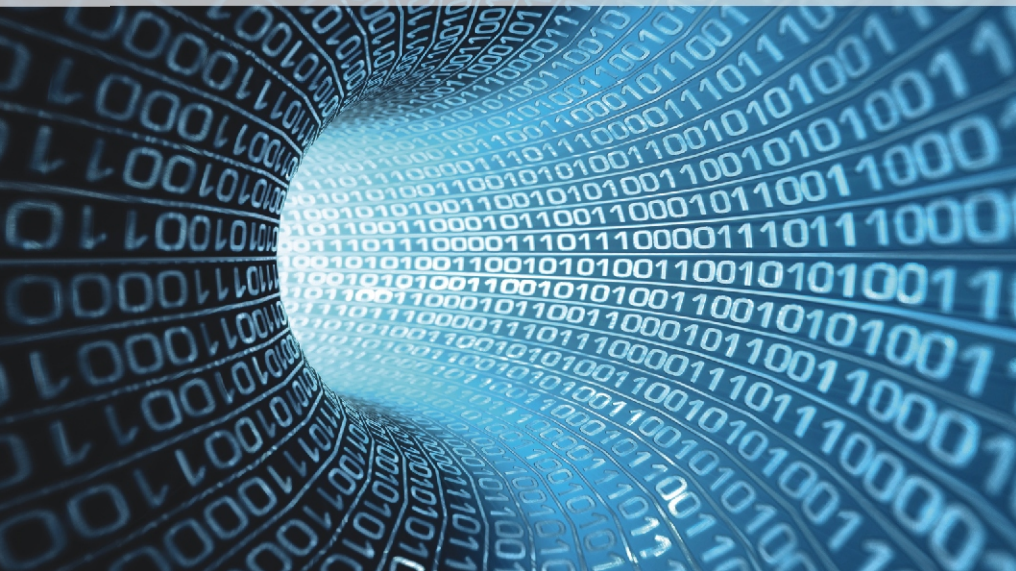
- TD *thermal decoupler*
- GDT *gas discharge tube*
- L *inductor*
- PTC *positive temperature coefficient resistor*
- BD *bi-directional TVS diode*
- SG *signal grounding*
- PG *protective grounding*

IM-NF xx	5V	15V	24V
Weight per unit		14g	
Packaging dimensions (single unit)	61 x 49 x 21mm		
Min. packaging quantity	30 pcs.		





SPD for Coaxial/RF Systems



Category IEC / EN:	C1/C2/C3
Location of use:	Various coaxial transmission systems
Protective elements:	MOV, GDT, diode
Surge discharge ratings:	I_n up to 20kA
Frequency:	up to 35MHz
Complies with:	IEC/EN 61643-21

ZV-BNC xx
ZV-1, ZV1-F
CCPxxx-BNC
CCPxxx-7/16
CCPxxx-N
CCPxxx-N-6G
CCPxxx-TNC-6G
CCPxxx-UHF
CCPxxx-F
CCPxxx-TV
CCP-L/4-7/16
CCP-L/4-N

Coaxial protection devices are intended to protect TV sets, aerial amplifiers, CCTV/CATV systems as well as RF antenna systems and are suitable to frequencies up to 6GHz.

The careful design, low capacitance gas discharge arresters and high quality termination connectors, ensures a minimum of insertion loss throughout the frequency band.



ZV-BNC Series



- Category IEC / EN: C1/C2/C3
- Design: Impedance matched
- Nominal operating voltage: U_n : 10, 24V_{DC}
- Max. operating voltage: U_c : 12, 28V_{DC}
- Frequency range: < 100MHz
- Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA
- Series load current: 100mA
- Housing: Shielded enclosure, in-line installation
- Termination: BNC connectors
- Complies with: IEC/EN 61643-21



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 data

Type	ZV-BNC		
	$\pm 5V$		$\pm 12V$
Electrical characteristics			
Nominal operating voltage	U_n	10VDC	24VDC
Max. operating voltage	U_c	12VDC	28VDC
Rated operating current at 25°C	I_L		100mA
Nominal discharge current (8/20 μ s)	I_n		10kA
Max. discharge current (8/20 μ s)	I_{max}		20kA
Residual voltage at 5kA (8/20 μ s)	U_{res} (wire-shield)	< 35V	< 65V
Rated spark overvoltage	(wire-shield)	13.5 - 16.5V	30 - 36V
	(shield-PG)	72 - 108V	72 - 108V
Response time of overvoltage protection	t_A (wire-shield)		< 10ns
	(shield-PG)		< 100ns
Insulation resistance of the protection	R_{iso} (wire-shield)	$\geq 10M\Omega$	$\geq 28M\Omega$
	(shield-PG)		$\geq 1G\Omega$
Serial resistance	R		9 - 11 Ω
Transverse capacitance	(wire-shield)		30pF
	(shield-PG)		1pF
Limit frequency	f_G		100MHz
Transmission rate			16Mbit/s
Mechanical characteristics			
Operating temperature			- 40°C ... + 80°C
Degree of protection IEC/EN 60529			IP 20
Housing material			Metal
Connection			BNC connector

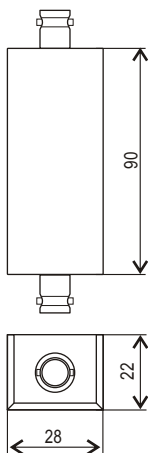
Ordering information

U_n	$\pm 5V$	$\pm 12V$
Ordering code ZV-BNC	7050.01	7050.02

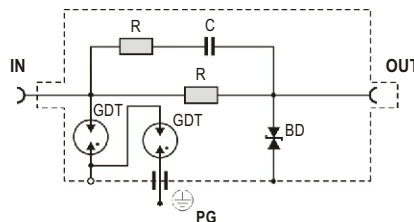
Dimensions, Internal configuration, Weight and Packaging

ZV-BNC Series

Dimensions



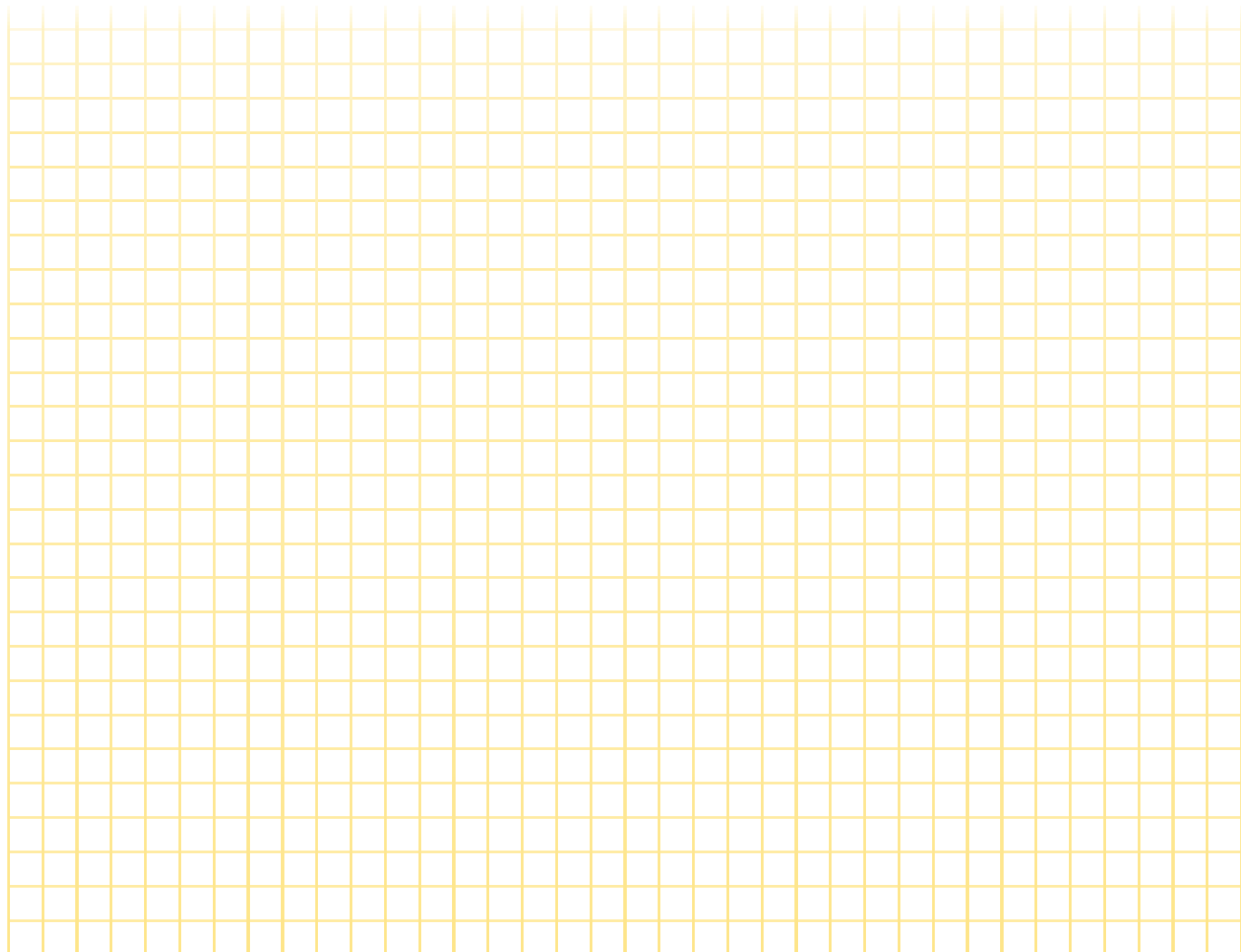
Internal configuration



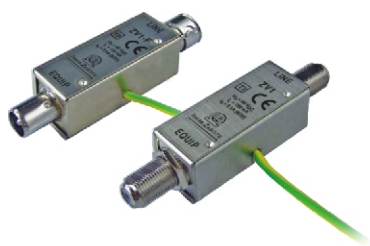
ZV-BNC xx	± 5V	± 12V
Weight per unit	58g	58g
Packaging dimensions (pvc)	140 x 200mm	

Legend:

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



ZV1, ZV1-F



- Category IEC/EN: C1/C2/C3
- Design: In-line, impedance matched
- Nominal operating voltage: U_n : 48V_{DC}
- Max. operating voltage: U_c : 60V_{DC}
- Frequency range: 40 - 860MHz
- Surge Discharge Ratings: I_n : 5kA, I_{max} : 10kA
- Series load current: 100mA
- Housing: Shielded enclosure, in-line installation
- Termination: IEC TV or F connectors
- Complies with: IEC/EN 61643-21



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 data

Type	ZV1	ZV1-F
Electrical characteristics		
Nominal operating voltage	U_n	48V _{DC}
Max. operating voltage	U_c	60V _{DC}
Rated operating current at 25°C	I_L	100mA
Nominal discharge current (8/20µs)	I_n	5kA
Max. discharge current (8/20µs)	I_{max}	10kA
Residual voltage at 5kA (8/20µs)	U_{res}	< 500V
Rated spark overvoltage	(wire-shield)	90 - 110V
Response time of overvoltage protection	t_A (wire-shield)	< 25ns
Insulation resistance of the protection	R_{iso} (wire-shield)	≥ 6MΩ
Serial resistance	R	< 0.1Ω
Frequency range	f_G	40 - 860MHz
Mechanical characteristics		
Operating temperature		-40°C ... +80°C
Degree of protection IEC/EN 60529		IP 20
Housing material		Metal
Connection	TV	F

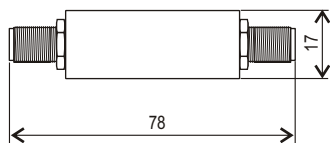
Ordering information

	ZV1	ZV1-F
Ordering code ZV1	125 090	125 210

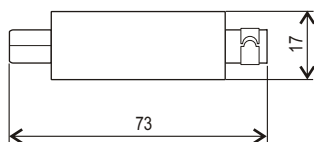
Dimensions, Internal configuration, Weight and Packaging

ZV1, ZV1-F

Dimensions



ZV1

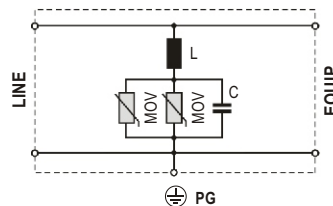


ZV1-F

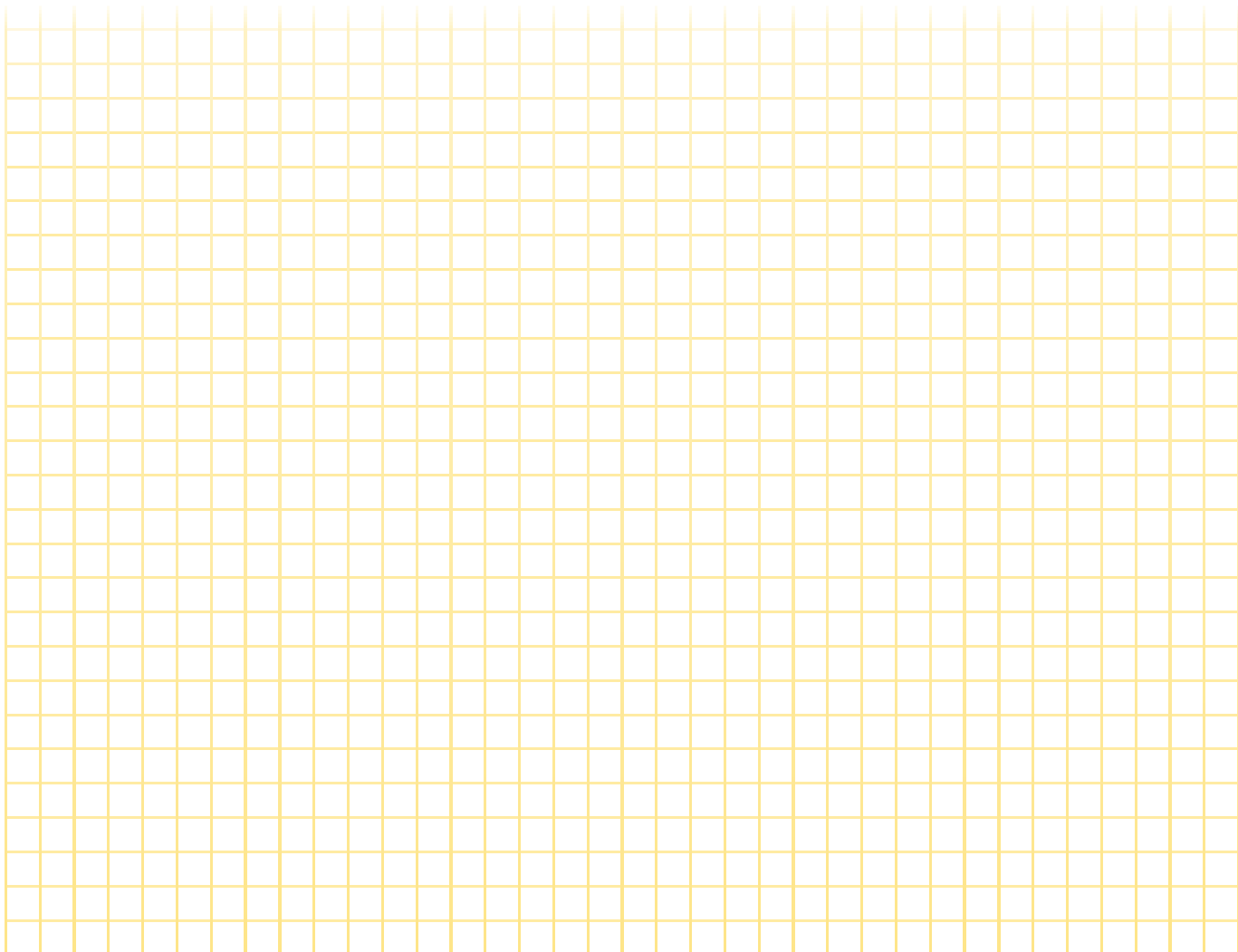
Legend:

- MOV *varistor*
- L *inductor*
- C *capacitor*
- PG *protective grounding*

Internal configuration



ZV	1	1-F
Weight per unit	32g	32g
Packaging dimensions (pvc)	90 x 150mm	



CCP-BNC Series



- **Category IEC/EN:** C1/C2/C3
- **Design:** In-line, impedance matched
- **Max. operating voltage:** U_C : 70, 180, 280V
- **Max. Peak Power:** 40, 125, 300W
- **Frequency range:** DC - 2.6GHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA
- **Characteristic Impedance:** 50Ω
- **Insertion loss:** < 0.4dB
- **Return loss:** > 20dB
- **Housing:** Shielded enclosure, in-line installation
- **Termination:** BNC type, M-F and F-F available
- **Complies with:** IEC/EN 61643-21



The CCP-BNC series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 2.6 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 61643-21:2009

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

Technical data

Type		CCP70	CCP180 -BNC-FF	CCP280	CCP70	CCP180 -BNC-MF	CCP280
Electrical characteristics							
Max. continuous operating voltage	U_C	70V	180V	280V	70V	180V	280V
Max. peak power	P_{max}	40W	125W	300W	40W	125W	300W
Nom. discharge current (8/20μs)	I_n	10kA					
Max. discharge current (8/20μs)	I_{max}	20kA					
Residual voltage (1kV/μs)	U_{res}	< 600V	< 700V	< 900V	< 600V	< 700V	< 900V
Impedance	Z	50Ω					
Frequency range	f_G	0 - 2.6GHz					
Insertion loss	I_L	< 0.4dB					
Return loss	R_L	> 20dB					
Insulation resistance	R_{iso}	> 10GΩ					
Mechanical characteristics							
Operation temperature		- 40°C ... + 80°C					
Style of connector		BNC female/female				BNC male/female	

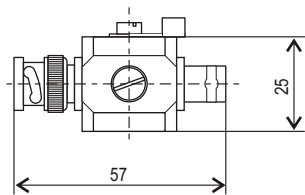
Ordering information

	CCP70	CCP180 -BNC-FF	CCP280	CCP70	CCP180 -BNC-MF	CCP280
Ordering code CCP-BNC	800 729	800 730	800 731	800 732	800 733	800 734

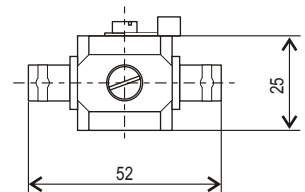
Dimensions, Internal configuration, Weight and Packaging

CCP-BNC Series

Dimensions

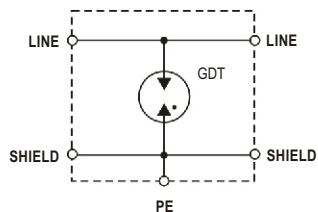


CCP-BNC-MF



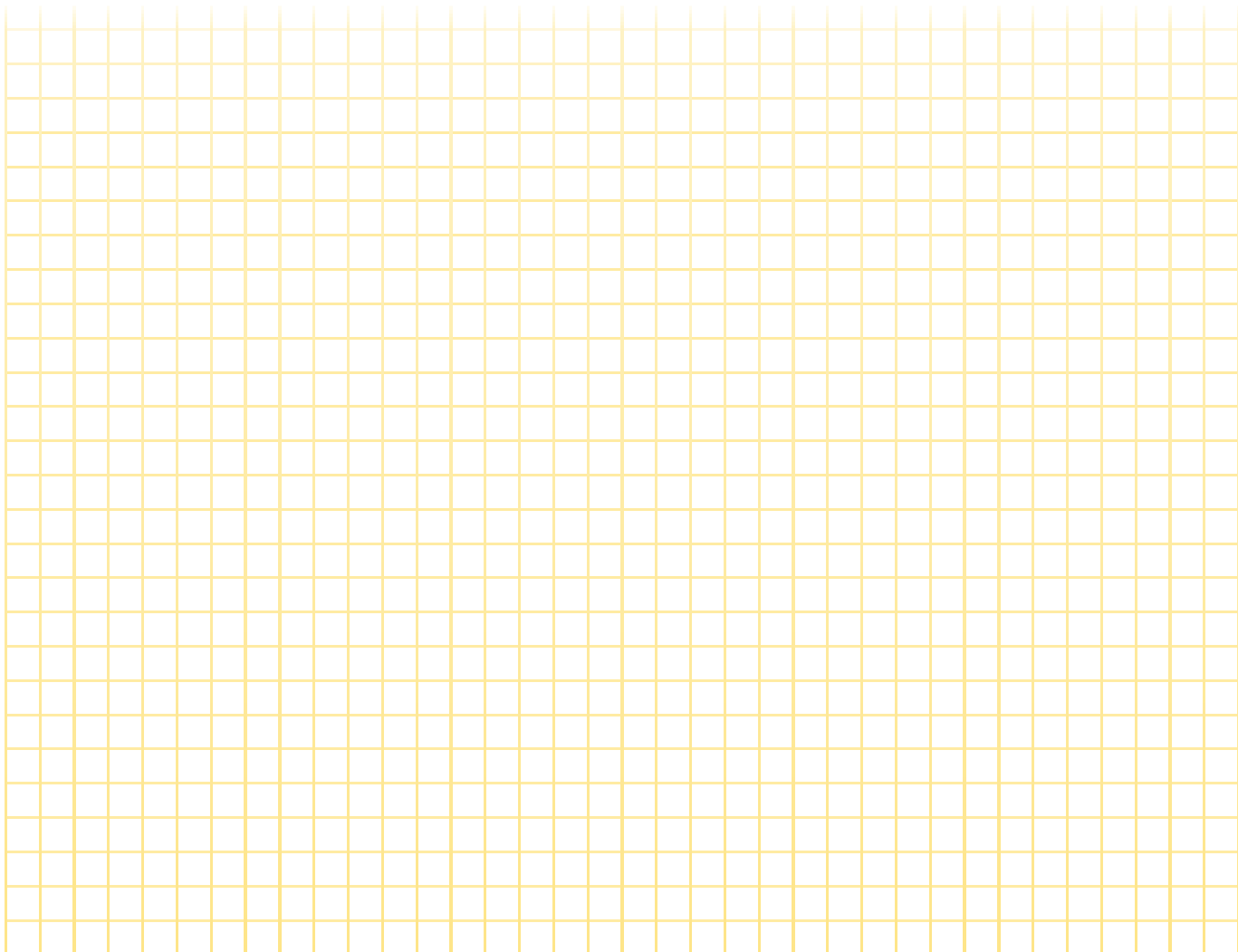
CCP-BNC-FF

Internal configuration



CCP-BNC	70	180	280	70	180	280
	-BNC-FF			-BNC-MF		
Weight per unit	106g			114g		
Packaging dimensions (single unit)	73 x 30 x 30mm					
Min. packaging quantity	100 pcs.					

Legend:
GDT *gas discharge tube*



CCP-7/16 Series



- **Category IEC/EN:** C1/C2/C3
- **Design:** In-line impedance matched
- **Max. operating voltage:** U_C : 70, 180, 280V
- **Max. Peak Power:** 40, 125, 300W
- **Frequency range:** DC - 2.5GHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA
- **Characteristic Impedance:** 50Ω
- **Insertion loss:** < 0.2dB
- **Return loss:** > 20dB
- **Housing:** Shielded enclosure, bulkhead installation
- **Termination:** 7/16 type, M-F
- **Complies with:** IEC/EN 61643-21



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 2.5GHz.

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:

- IEC61643-21:2009

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 data

Type		CCP70	CCP180 -7/16-MF	CCP280
Electrical characteristics				
Max. continuous operating voltage	U_C	70V	180V	280V
Max. peak power	P_{max}	40W	125W	300W
Nom. discharge current (8/20μs)	I_n		10kA	
Max. discharge current (8/20μs)	I_{max}		20kA	
Residual voltage (1kV/μs)	U_{res}	< 600V	< 700V	< 900V
Impedance	Z		50Ω	
Frequency range	f_G		0 - 2.5GHz	
Insertion loss	I_L		< 0.2dB	
Return loss	R_L		> 20dB	
Insulation resistance	R_{iso}		> 10GΩ	
Mechanical characteristics				
Operation temperature			- 40°C ... + 80°C	
Style of connector			7/16 male/female	

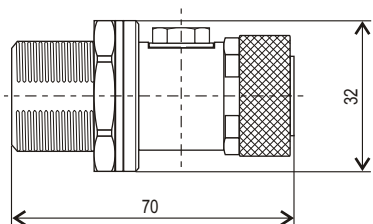
Ordering information

	CCP70	CCP180 -7/16-MF	CCP280
Ordering code CCP-7/16	800 720	800 721	800 722

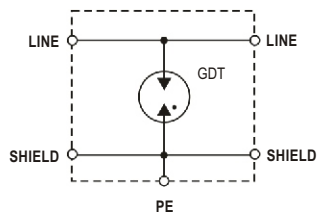
Dimensions, Internal configuration, Weight and Packaging

CCP-7/16 Series

Dimensions

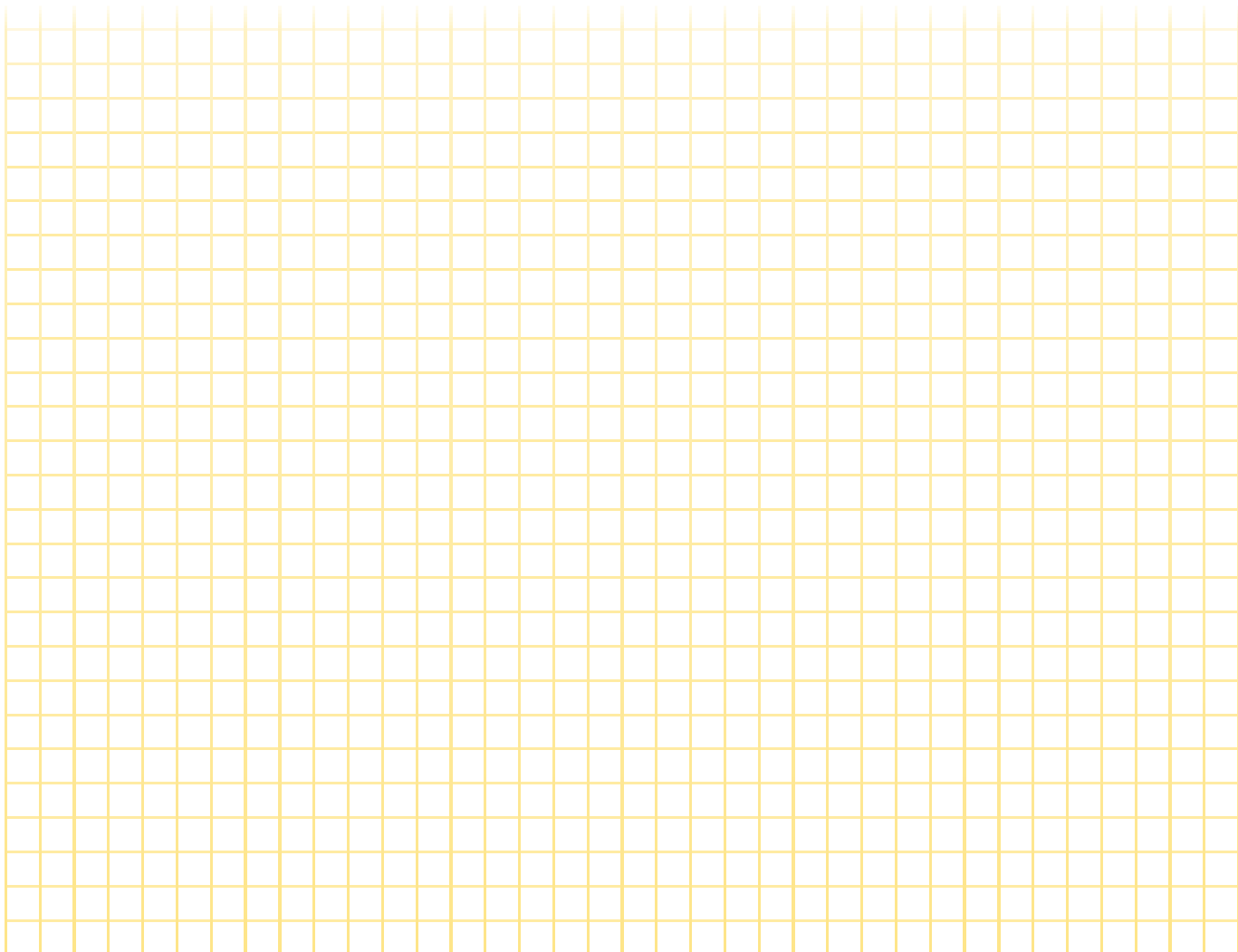


Internal configuration



Legend:
GDT gas discharge tube

CCP-7/16	70	180	280
		-7/16-MF	
Weight per unit		218g	
Packaging dimensions (single unit)		82 x 40 x 40mm	
Min. packaging quantity		100 pcs.	



CCP-N Series



- **Category IEC/EN:** C1/C2/C3
- **Design:** In-line, impedance matched
- **Max. operating voltage:** U_C : 70, 180, 280V
- **Max. Peak Power:** 40, 125, 300W
- **Frequency range:** DC - 2.6GHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA
- **Characteristic Impedance:** 50Ω
- **Insertion loss:** < 0.4dB
- **Return loss:** > 20dB
- **Housing:** Shielded enclosure, in-line installation
- **Termination:** N type, M-F and F-F available
- **Complies with:** IEC/EN 61643-21



The CCP-N series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 2.6GHz.

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 61643-21:2009

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

Technical data

Type		CCP70	CCP180 -N-FF	CCP280	CCP70	CCP180 -N-MF	CCP280
Electrical characteristics							
Max. continuous operating voltage	U_C	70V	180V	280V	70V	180V	280V
Max. peak power	P_{max}	40W	125W	300W	40W	125W	300W
Nom. discharge current (8/20μs)	I_n	10kA					
Max. discharge current (8/20μs)	I_{max}	20kA					
Residual voltage (1kV/μs)	U_{res}	< 600V	< 700V	< 900V	< 600V	< 700V	< 900V
Impedance	Z	50Ω					
Frequency range	f_G	0 - 2.6GHz					
Insertion loss	I_L	< 0.4dB					
Return loss	R_L	> 20dB					
Insulation resistance	R_{iso}	> 10GΩ					
Mechanical characteristics							
Operation temperature		- 40°C ... + 80°C					
Style of connector		N female/female				N male/female	

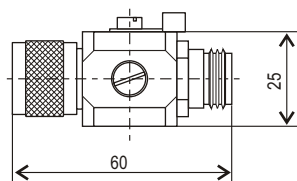
Ordering information

	CCP70	CCP180 -N-FF	CCP280	CCP70	CCP180 -N-MF	CCP280
Ordering code CCP-N	800 723	800 724	800 725	800 726	800 727	800 728

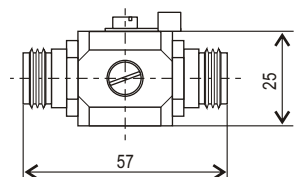
Dimensions, Internal configuration, Weight and Packaging

CCP-N Series

Dimensions

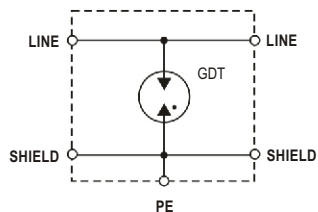


CCP-N-MF



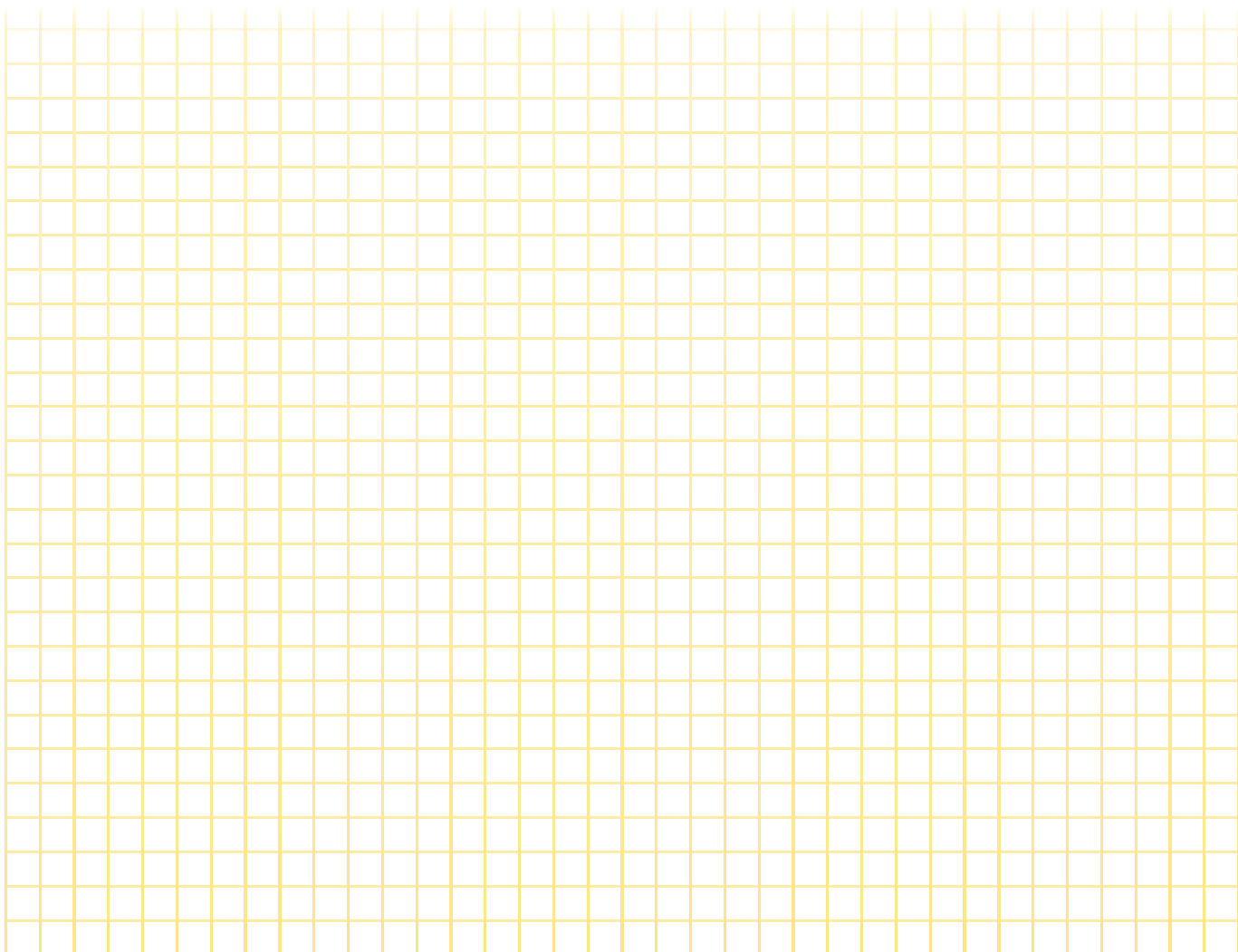
CCP-N-FF

Internal configuration



CCP-N	70	180	280	70	180	280
		-N-FF			-N-MF	
Weight per unit		138g			142g	
Packaging dimensions (single unit)	73 x 30 x 30mm					
Min. packaging quantity	100 pcs.					

Legend:
GDT gas discharge tube



CCP-N-6G



- **Category IEC/EN:** C1/C2/C3
- **Design:** In-line, impedance matched
- **Max. operating voltage:** U_C : 180V
- **Max. Peak Power:** 125W
- **Frequency range:** DC - 6.0GHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA
- **Characteristic Impedance:** 50Ω
- **Insertion loss:** < 0.4dB
- **Return loss:** > 20dB
- **Housing:** Shielded enclosure, bulkhead installation
- **Termination:** N type, M-F and F-F available
- **Complies with:** IEC/EN 61643-21



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 61643-21:2009

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

Technical data

Type	CCP180-N-6G	
	-FF	-MF
Electrical characteristics		
Max. continuous operating voltage	U_C	180V
Max. peak power	P_{max}	125W
Nom. discharge current (8/20μs)	I_n	10kA
Max. discharge current (8/20μs)	I_{max}	20kA
Residual voltage (1kV/μs)	U_{res}	< 700V
Impedance	Z	50Ω
Frequency range	f_G	0 - 6.0GHz
Insertion loss	I_L	< 0.4dB
Return loss	R_L	> 20dB
Insulation resistance	R_{iso}	> 10GΩ
Mechanical characteristics		
Operation temperature	- 40°C ... + 80°C	
Style of connector	N female/female	N male/female

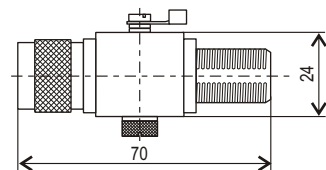
Ordering information

Ordering code CCP-N-6G	CCP180	
	-N-6G-FF	-N-6G-MF
	800 763	800 764

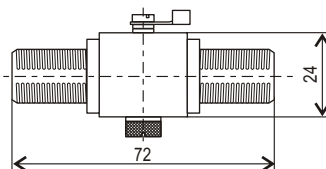
Dimensions, Internal configuration, Weight and Packaging

CCP-N-6G

Dimensions

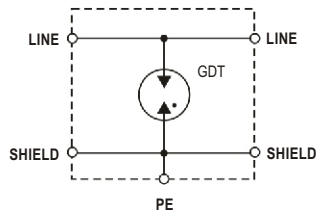


CCP-N-6G-MF



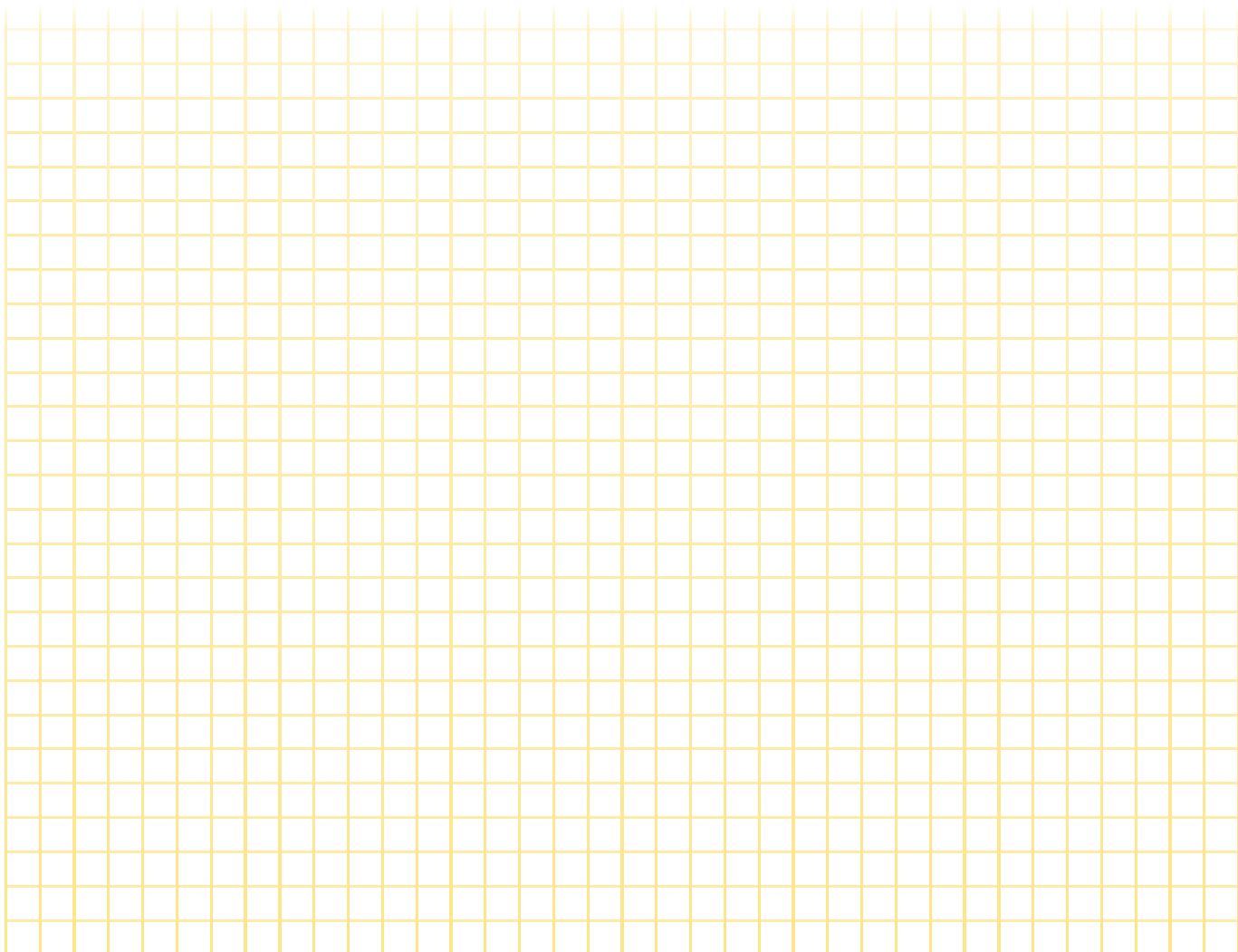
CCP-N-6G-FF

Internal configuration



CCP180-N-6G	-FF	-MF
Weight per unit	132g	130g
Packaging dimensions (single unit)	73 x 30 x 30mm	
Min. packaging quantity	100 pcs.	

Legend:
GDT *gas discharge tube*



CCP-TNC-6G



- **Category IEC/EN:** C1/C2/C3
- **Design:** In-line, impedance matched
- **Max. operating voltage:** U_C : 180V
- **Max. Peak Power:** 125W
- **Frequency range:** DC - 6.0GHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA
- **Characteristic Impedance:** 50Ω
- **Insertion loss:** < 0.4dB
- **Return loss:** > 20dB
- **Housing:** Shielded enclosure, in-line installation
- **Termination:** TNC type, M-F and F-F available
- **Complies with:** IEC/EN 61643-21



The CCP-TNC-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 TNC-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 61643-21:2009

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

Technical data

Type	CCP180-TNC-6G	
	-FF	-MF
Electrical characteristics		
Max. continuous operating voltage	U_C	180V
Max. peak power	P_{max}	125W
Nom. discharge current (8/20μs)	I_n	10kA
Max. discharge current (8/20μs)	I_{max}	20kA
Residual voltage (1kV/μs)	U_{res}	< 700V
Impedance	Z	50Ω
Frequency range	f_G	0 - 6.0GHz
Insertion loss	I_L	< 0.4dB
Return loss	R_L	> 20dB
Insulation resistance	R_{iso}	> 10GΩ
Mechanical characteristics		
Operation temperature	- 40°C ... + 80°C	
Style of connector	TNC female/female	TNC male/female

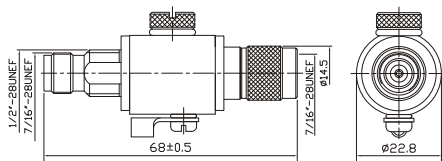
Ordering information

Ordering code CCP-TNC-6G	CCP180	
	-TNC-6G-FF	-TNC-6G-MF
	800 778	800 777

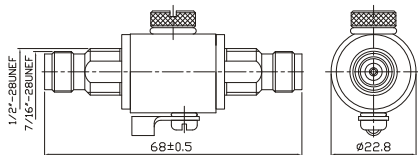
Dimensions, Internal configuration, Weight and Packaging

CCP-TNC-6G

Dimensions

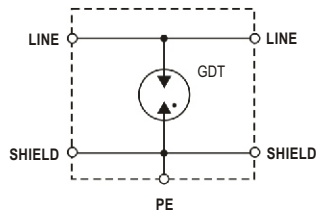


CCP-TNC-6G-MF



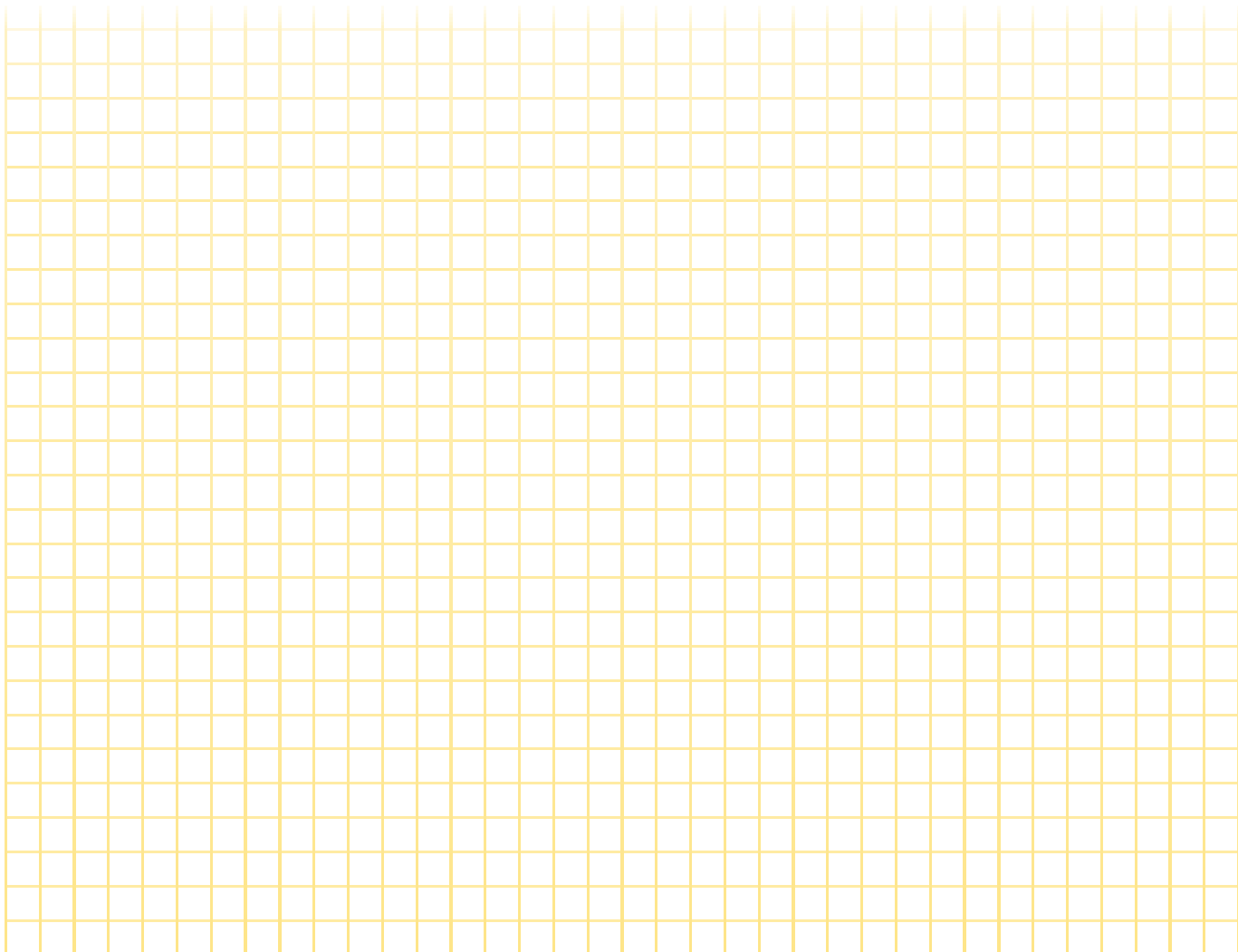
CCP-TNC-6G-FF

Internal configuration



CCP180-TNC-6G	-FF	-MF
Weight per unit	130g	128g
Packaging dimensions (single unit)	73 x 30 x 30mm	
Min. packaging quantity	100 pcs.	

Legend:
GDT gas discharge tube



CCP-UHF Series



- Category IEC/EN: C1/C2/C3
- Design: In-line, impedance matched
- Max. operating voltage: U_C : 70, 180, 280V
- Max. Peak Power: 40, 125, 300W
- Frequency range: DC - 600MHz
- Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA
- Characteristic Impedance: 50Ω
- Insertion loss: < 0.4dB
- Return loss: > 20dB
- Housing: Shielded enclosure, in-line installation
- Termination: UHF type, M-F and F-F available
- Complies with: IEC/EN 61643-21



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 61643-21:2009

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

Technical data

Type		CCP70	CCP180 -UHF-FF	CCP280	CCP70	CCP180 -UHF-MF	CCP280
Electrical characteristics							
Max. continuous operating voltage	U_C	70V	180V	280V	70V	180V	280V
Max. peak power	P_{max}	40W	125W	300W	40W	125W	300W
Nom. discharge current (8/20μs)	I_n	10kA					
Max. discharge current (8/20μs)	I_{max}	20kA					
Residual voltage (1kV/μs)	U_{res}	< 600V	< 700V	< 900V	< 600V	< 700V	< 900V
Impedance	Z	50Ω					
Frequency range	f_G	0 - 600MHz					
Insertion loss	I_L	< 0.4dB					
Return loss	R_L	> 20dB					
Insulation resistance	R_{iso}	> 10GΩ					
Mechanical characteristics							
Operation temperature		- 40°C ... + 80°C					
Style of connector		UHF female/female			UHF male/female		

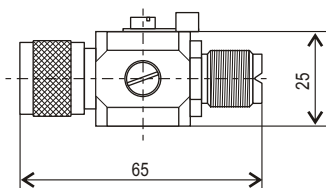
Ordering information

	CCP70	CCP180 -UHF-FF	CCP280	CCP70	CCP180 -UHF-MF	CCP280
Ordering code CCP-UHF	800 735	800 736	800 737	800 738	800 739	800 740

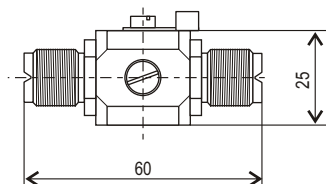
Dimensions, Internal configuration, Weight and Packaging

CCP-UHF Series

Dimensions

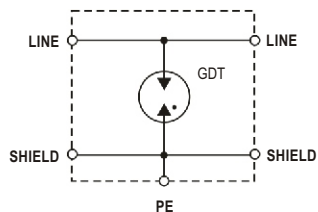


CCP-UHF-MF



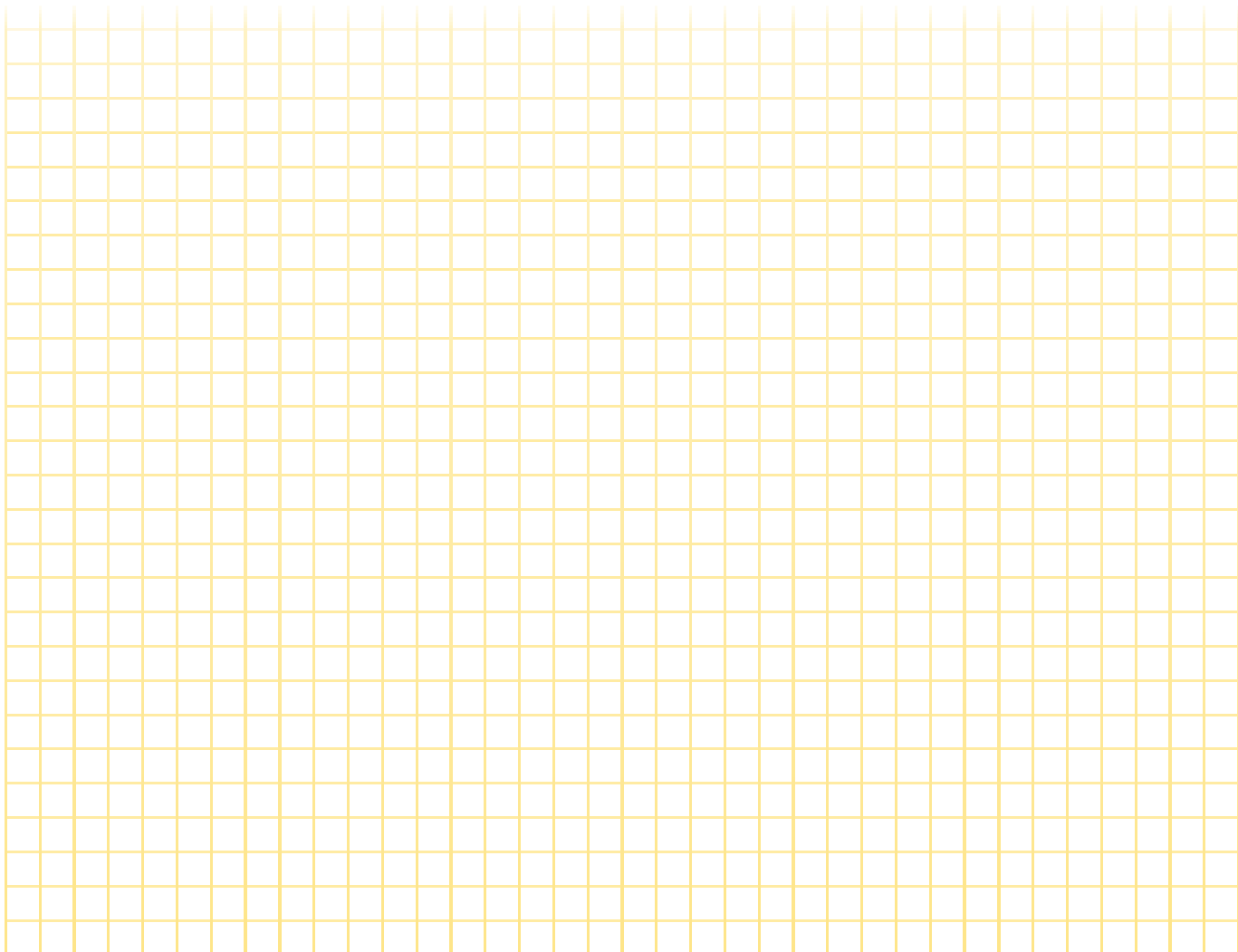
CCP-UHF-FF

Internal configuration



CCP-UHF	70	180	280	70	180	280
		-UHF-FF			-UHF-MF	
Weight per unit		104g			104g	
Packaging dimensions (single unit)	62 x 30 x 35mm					
Min. packaging quantity	100 pcs.					

Legend:
GDT gas discharge tube



CCP-F Series



- **Category IEC/EN:** C1/C2/C3
- **Design:** In-line, impedance matched
- **Max. operating voltage:** U_C : 70, 180V
- **Max. Peak Power:** 40, 125W
- **Frequency range:** DC - 2.0GHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA
- **Characteristic Impedance:** 75Ω
- **Insertion loss:** < 0.4dB
- **Return loss:** > 20dB
- **Housing:** Shielded enclosure, in-line installation
- **Termination:** F type, M-F and F-F available
- **Complies with:** IEC/EN 61643-21



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 2.0GHz. 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 40W to 125W continuous (depending on CCP voltage).

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

- IEC 61643-21:2009

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

Technical data

Type		CCP70 -F75-FF	CCP180	CCP70 -F75-MF	CCP180
Electrical characteristics					
Max. continuous operating voltage	U_C	70V	180V	70V	180V
Max. peak power	P_{max}	40W	125W	40W	125W
Nom. discharge current (8/20μs)	I_n	10kA			
Max. discharge current (8/20μs)	I_{max}	20kA			
Residual voltage (1kV/μs)	U_{res}	< 600V	< 700V	< 600V	< 700V
Impedance	Z	75Ω			
Frequency range	f_G	0 - 2.0GHz			
Insertion loss	I_L	< 0.4dB			
Return loss	R_L	> 20dB			
Insulation resistance	R_{iso}	> 10GΩ			
Mechanical characteristics					
Operation temperature		- 40°C ... + 80°C			
Style of connector		F female/female		F male/female	

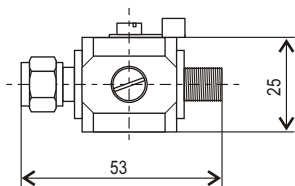
Ordering information

	CCP70 -F75-FF	CCP180	CCP70 -F75-MF	CCP180
Ordering code CCP-F	800 741	800 742	800 743	800 744

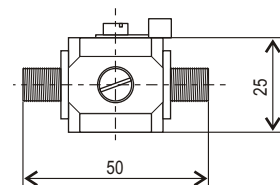
Dimensions, Internal configuration, Weight and Packaging

CCP-F Series

Dimensions

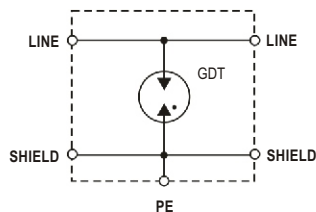


CCP-F-MF



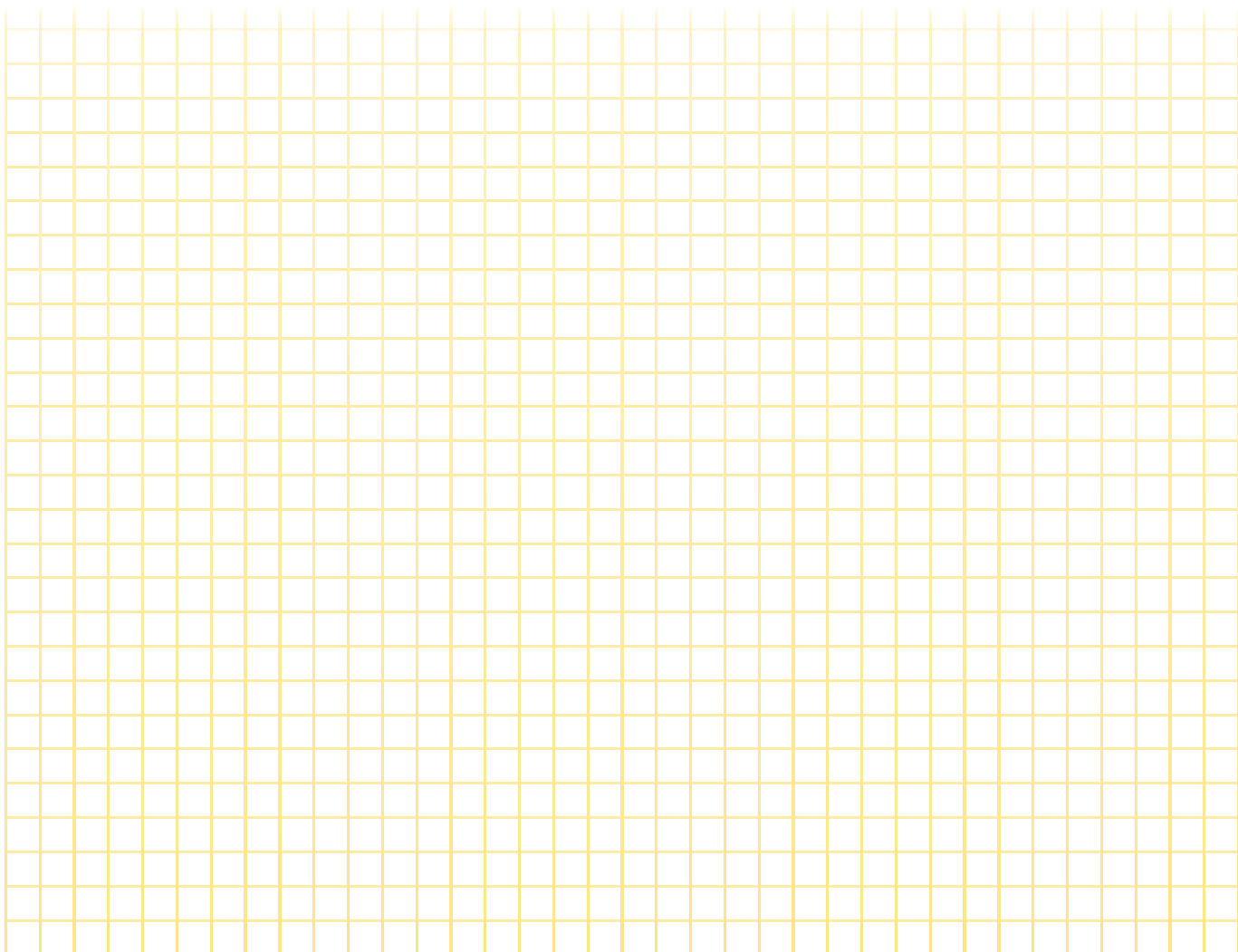
CCP-F-FF

Internal configuration



CCP-F	70	180	70	180
	-F75-FF		-F75-MF	
Weight per unit	80g		84g	
Packaging dimensions (single unit)	73 x 30 x 30mm			
Min. packaging quantity	100 pcs.			

Legend:
GDT *gas discharge tube*



CCP-TV Series



- **Category IEC/EN:** C1/C2/C3
- **Design:** In-line, impedance matched
- **Max. operating voltage:** U_C : 70, 180V
- **Max. Peak Power:** 40, 125W
- **Frequency range:** DC - 2.0GHz
- **Surge Discharge Ratings:** I_n : 10kA, I_{max} : 20kA
- **Characteristic Impedance:** 75Ω
- **Insertion loss:** < 0.4dB
- **Return loss:** > 20dB
- **Housing:** Shielded enclosure, in-line installation
- **Termination:** TV type, M-F and F-F available
- **Complies with:** IEC/EN 61643-21



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 2.0 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 61643-21:2009

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

Technical data

Type		CCP70 -TV75-FF	CCP180	CCP70 -TV75-MF	CCP180
Electrical characteristics					
Max. continuous operating voltage	U_C	70V	180V	70V	180V
Max. peak power	P_{max}	40W	125W	40W	125W
Nom. discharge current (8/20μs)	I_n	10kA			
Max. discharge current (8/20μs)	I_{max}	20kA			
Residual voltage (1kV/μs)	U_{res}	< 600V	< 700V	< 600V	< 700V
Impedance	Z	75Ω			
Frequency range	f_G	0 - 2.0GHz			
Insertion loss	I_L	< 0.4dB			
Return loss	R_L	> 20dB			
Insulation resistance	R_{iso}	> 10GΩ			
Mechanical characteristics					
Operation temperature		- 40°C ... + 80°C			
Style of connector		TV female/female		TV male/female	

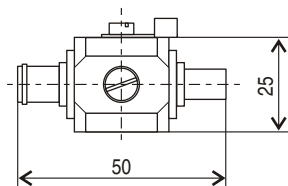
Ordering information

	CCP70 -TV75-FF	CCP180	CCP70 -TV75-MF	CCP180
Ordering code CCP-TV	800 745	800 746	800 747	800 748

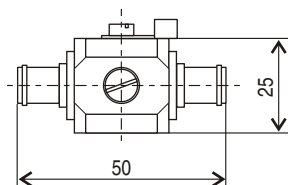
Dimensions, Internal configuration, Weight and Packaging

CCP-TV Series

Dimensions

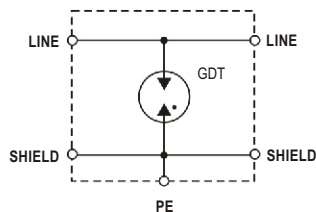


CCP-TV-MF



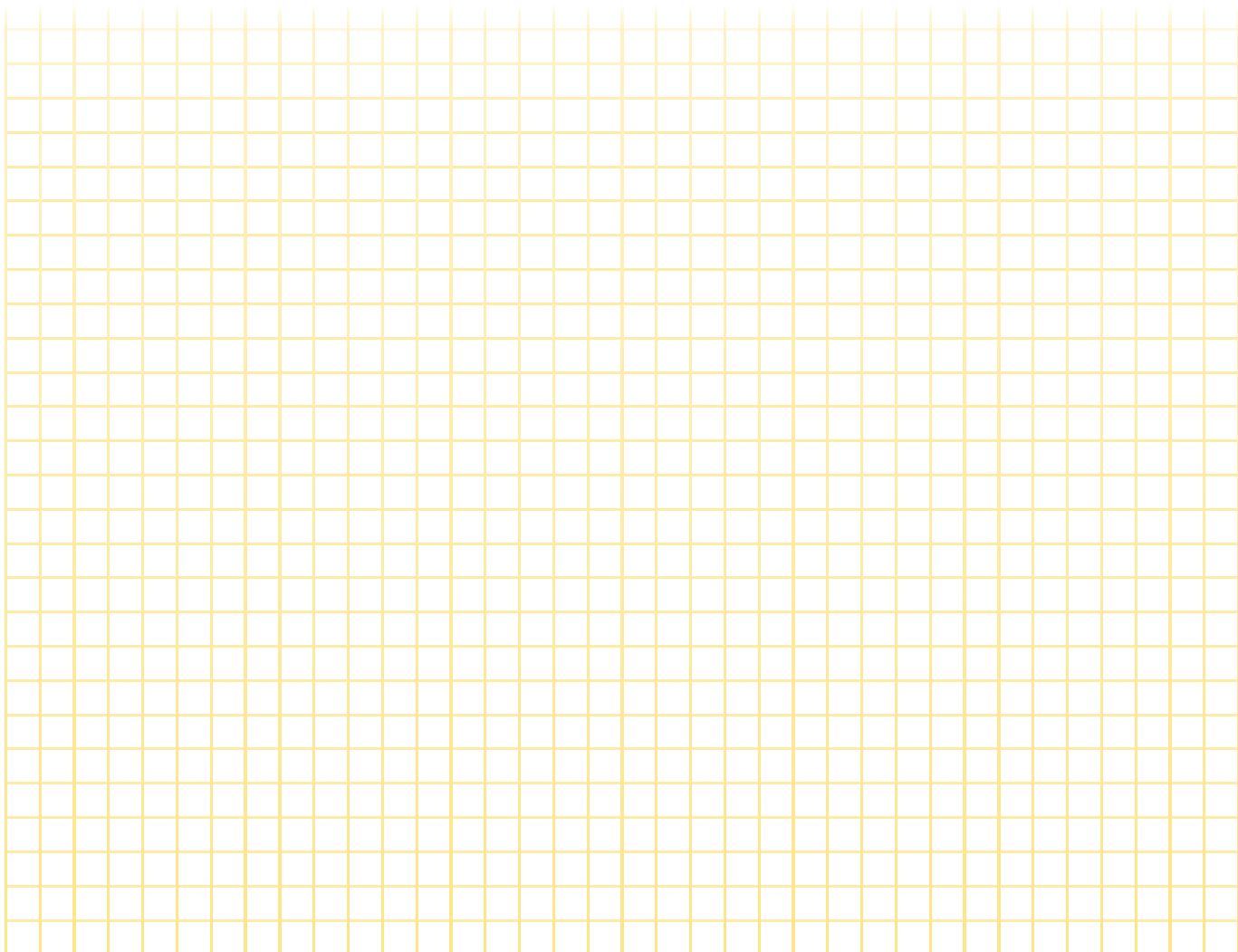
CCP-TV-FF

Internal configuration



CCP xxx	70	180	70	180
	-TV75-FF		-TV75-MF	
Weight per unit	80g		82g	
Packaging dimensions (single unit)	73 x 30 x 30mm			
Min. packaging quantity	100 pcs.			

Legend:
GDT *gas discharge tube*



CCP-L/4-7/16



- Category IEC/EN: C1/C2/C3
- Design: Bulkhead, impedance matched
- Max. Peak Power: 500W
- Frequency range: 865 - 965MHz, 1.7 - 1.95GHz
- Surge Discharge Ratings: I_n : 15kA, I_{max} : 30kA
- Characteristic Impedance: 50Ω
- Insertion loss: < 0.2dB
- Return loss: > 20dB
- Housing: Shielded enclosure, bulkhead installation
- Termination: L/4-7/16 type, M-F and F-F available
- Complies with: IEC/EN 61643-21



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, 1.7 - 1.95GHz.

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 61643-21:2009

Technical data

Type	CCP-L/4-7/16	
	-FF	-MF
Electrical characteristics		
Max. continuous operating voltage	U_c	0V
Max. peak power	P_{max}	500W
Nom. discharge current (8/20μs)	I_n	15kA
Max. discharge current (8/20μs)	I_{max}	30kA
Voltage protection level	U_p	< 100V
Impedance	Z	50Ω
Frequency range	f_G	865 - 965MHz, 1.7 - 1.95GHz
Insertion loss	I_L	< 0.2dB
Return loss	R_L	> 20dB
Mechanical characteristics		
Operation temperature	- 40°C ... + 80°C	
Style of connector	L/4-7/16 female/female	L/4-7/16 male/female

Ordering information

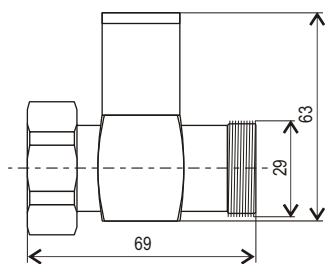
Ordering code CCP-L/4-7/16	CCP-L/4	
	-7/16-FF	-7/16-MF
	800 756	800 755

CCP-L/4-7/16

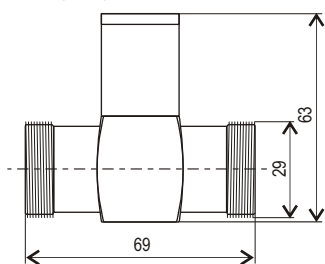
Dimensions, Internal configuration, Weight and Packaging

CCP-L/4-7/16

Dimensions

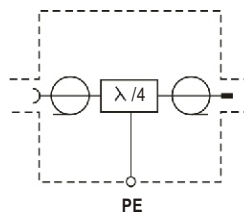


CCP-L/4-7/16-MF

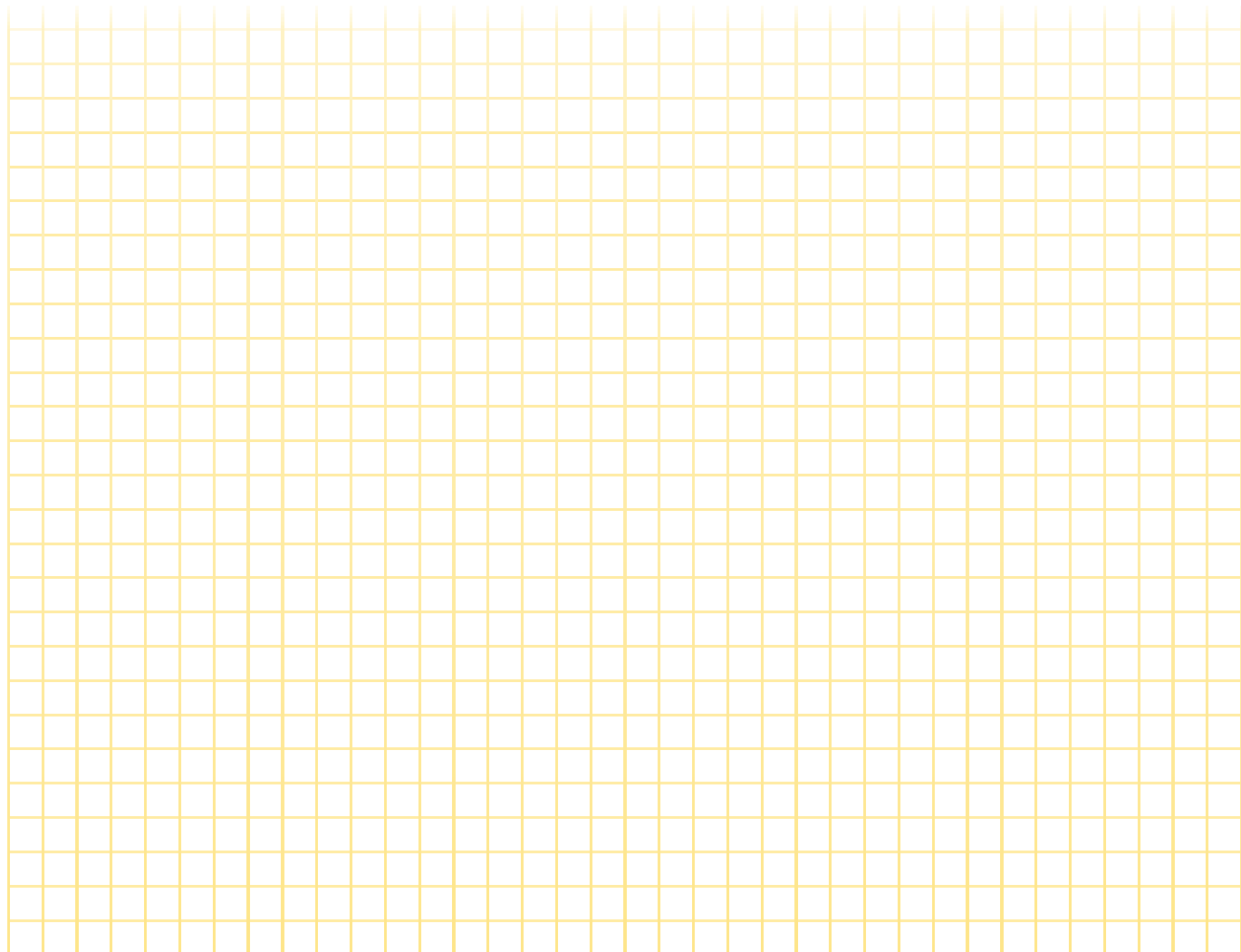


CCP-L/4-7/16-FF

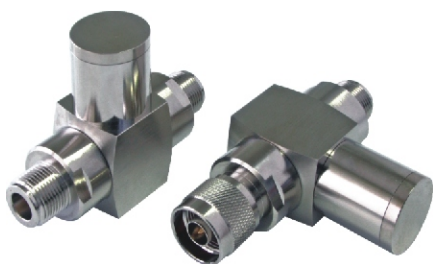
Internal configuration



CCP-L/4-7/16	-FF	-MF
Weight per unit	320g	312g
Packaging dimensions (single unit)	73 x 35 x 70mm	
Min. packaging quantity	100 pcs.	



CCP-L/4-N



- Category IEC/EN: C1/C2/C3
- Design: Bulkhead, impedance matched
- Max. Peak Power: 500W
- Frequency range: 865 - 965MHz, 1.7 - 1.95GHz
- Surge Discharge Ratings: I_n : 15kA, I_{max} : 30kA
- Characteristic Impedance: 50Ω
- Insertion loss: < 0.2dB
- Return loss: > 20dB
- Housing: Shielded enclosure, bulkhead installation
- Termination: L/4-N type, M-F and F-F available
- Complies with: IEC/EN 61643-21



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, 1.7 - 1.95GHz.

It is designed for bulkhead or in-line installation. The careful design, low intermodulation and high quality N-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 61643-21:2009

Technical data

Type	CCP-L/4-N	
	-FF	-MF
Electrical characteristics		
Max. continuous operating voltage	U_c	0V
Max. peak power	P_{max}	500W
Nom. discharge current (8/20μs)	I_n	15kA
Max. discharge current (8/20μs)	I_{max}	30kA
Voltage protection level	U_p	< 100V
Impedance	Z	50Ω
Frequency range	f_G	865 - 965MHz, 1.7 - 1.95GHz
Insertion loss	I_L	< 0.2dB
Return loss	R_L	> 20dB
Mechanical characteristics		
Operation temperature	- 40°C ... + 80°C	
Style of connector	L/4-N female/female	L/4-N male/female

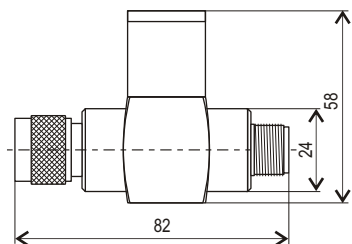
Ordering information

Ordering code CCP-L/4-N	CCP-L/4	
	-N-FF	-N-MF
	800 758	800 757

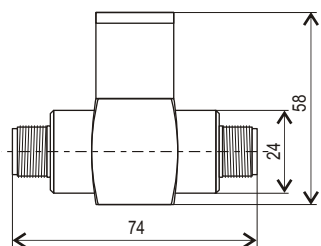
Dimensions, Internal configuration, Weight and Packaging

CCP-L/4-N

Dimensions

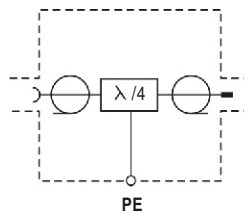


CCP-L/4-N-MF

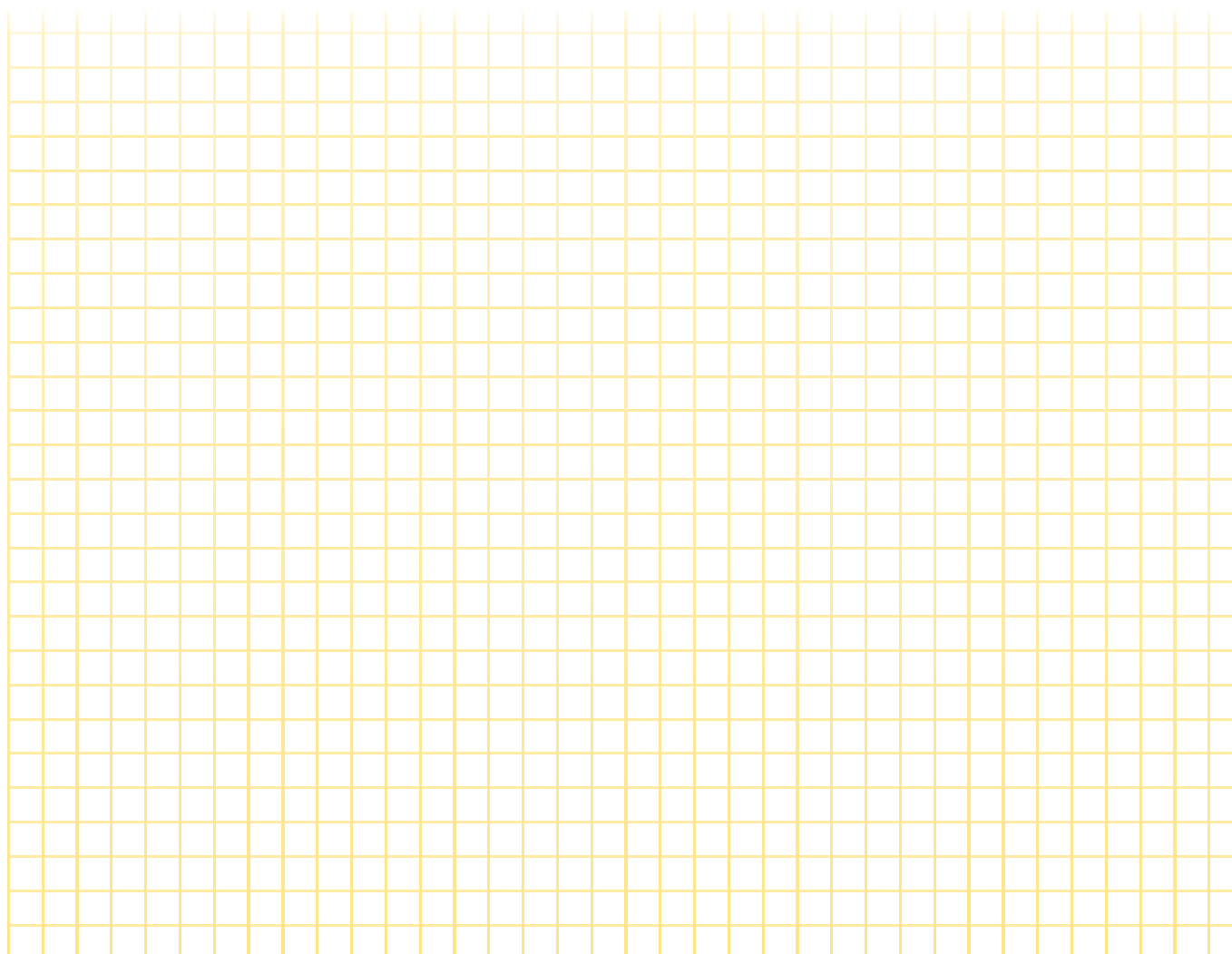


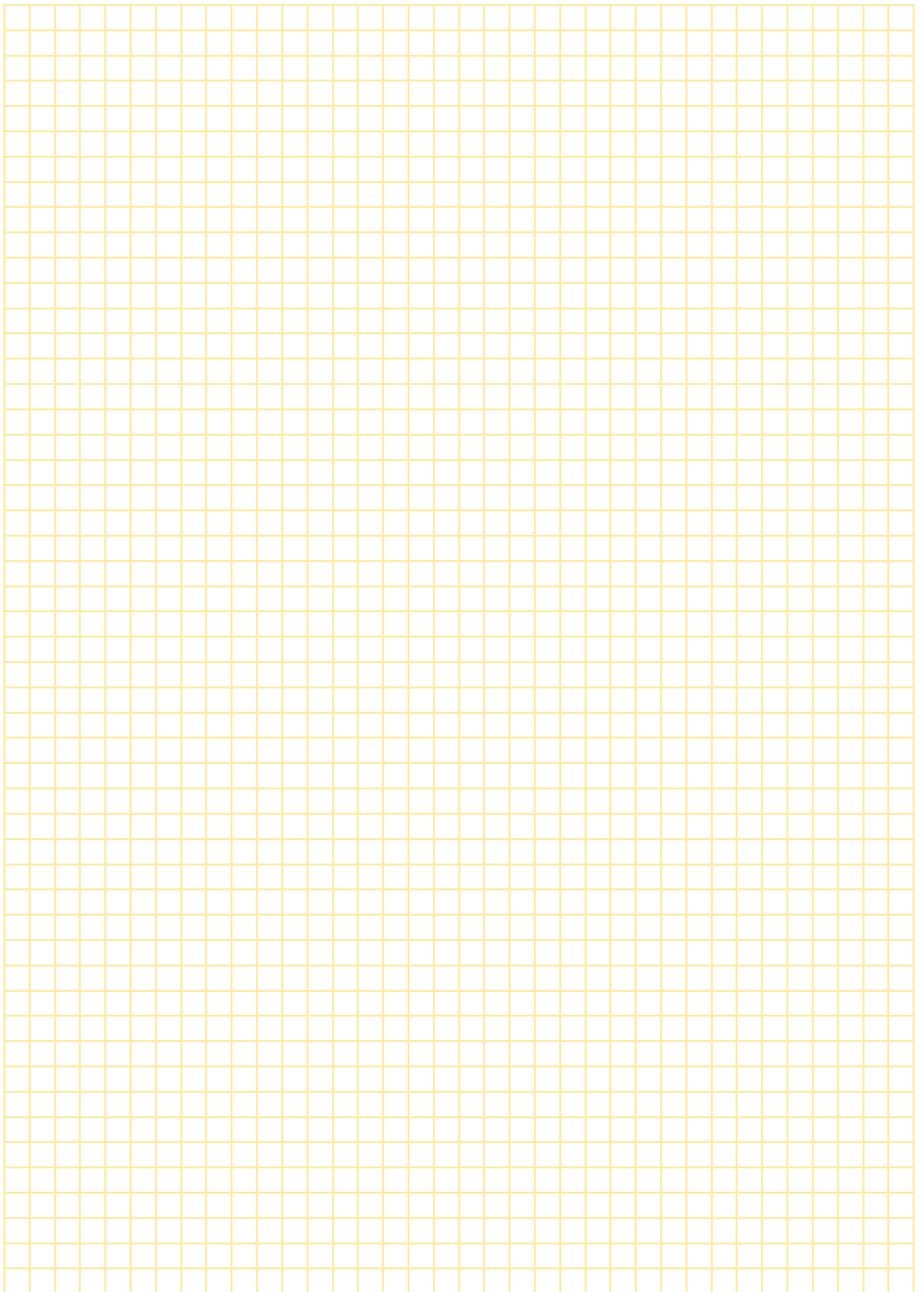
CCP-L/4-N-FF

Internal configuration



CCP-L/4-N	-FF	-MF
Weight per unit	282g	266g
Packaging dimensions (single unit)	77 x 30 x 60mm	
Min. packaging quantity	100 pcs.	





Combined Plug-in SPD



Category IEC / EN / VDE:

Class III / Type 3 / D (IEC/EN 61643-11)

Category IEC / EN:

C1/C2/C3 (IEC/EN 61643-21)

Location of use:

Multimedia devices

Complies with:

IEC/EN 61643-11, IEC/EN 61643-21

ZES-76 TEL-TV

ZES-7 TEL-TV

ZES 1M+5S

ZES 1M+4S TEL-NET USB Hub

ZES 6

Combined plug-in surge protective devices are designed for 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, LAN protection and TV protection.

ZES-76 is equipped with 1 protected power socket, telephone line protection and TV protection.

ZES-7 TEL-TV is equipped with 7 protected power sockets, overload protection, telephone line protection and TV protection.

ZES 1M+5S is equipped with 6 protected power sockets, overload protection, telephone line protection and TV protection.

ZES 1M+4S TEL-NET USB Hub is equipped with 5 protected power sockets, overload protection, passive USB hub and telephone/LAN Cat 5 protection.

ZES 6 is equipped with 6 protected power sockets and overload protection.



ZES-76 TEL-TV



- **Category IEC/EN:** Class III/Type 3/D; /C1/C2/C3
- **Protection:** Power, telecommunication and TV
- **Nominal operating voltage:** U_n : 230V_{AC} (power side)
- **Max. operating voltage:** U_c : 250V_{AC} (power side)
 U_c : 170V_{DC} (telecomm. side)
 U_c : 70V_{DC} (TV side)
- **Surge Discharge Rating:** U_{oc} : 3kV (power side)
 I_n : 2.5kA per line (telecomm. side)
 I_n : 5kA per line (TV side)
- **Enclosure:** UTB in-line patch, AC power outlet
- **Termination:** DIN 49 440-CEE(7) III, DIN 49 441-CEE(7) IV (power side)
RJ11 input / RJ11 output (telecomm. side)
IEC connector (TV side)
- **Complies with:** IEC/EN 61643-11, 61643-21



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.

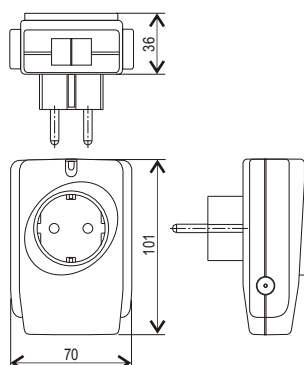
Technical data

Type		Power side	ZES-76 TEL-TV Tel. side	TV side
Electrical characteristics				
Nominal operating voltage	U_n	230V _{AC} / 50Hz	110V _{DC}	50V _{DC}
Max. continuous operating voltage	U_c	250V _{AC} / 50Hz	170V _{DC}	70V _{DC}
Nominal discharge current (8/20 μ s)	I_n	/	2.5kA	5kA
Open circuit voltage of the combination wave generator	U_{oc}	3kV	/	/
Voltage protection level at I_n	U_p	< 1000V (L-N)	700V	700V
Response time of overvoltage protection	t_A	< 25ns (L-N)	< 100ns	< 100ns
Limit frequency	f_G	/	30MHz	860MHz
Back-up fuse		16A gL - (needed if not present in the network)	/	/
Mechanical characteristics				
Connection		DIN 49 440-CE(7) III DIN 49 441-CEE(7) IV; Grounding contact	Input/Output: RJ11 socket	IEC connector
Temperature range			- 40°C ... + 80°C	
Degree of protection IEC/EN 60529			IP 20	
Housing material			Thermoplastic; grey, extinguishing degree V-0	
Indication of disconnector operation			Green light	

Ordering information

Ordering code ZES-76 TEL-TV	121 368
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Dimensions



ZES-76 TEL-TV	
Weight per unit	220g
Packaging dimensions (single unit)	220 x 160 x 74mm
Min. packaging quantity	1

ZES-7 TEL-TV



- **Category IEC/EN:** Class III/Type 3/D; /C1/C2/C3
- **Protection:** Power, telecommunication and TV
- **Nominal operating voltage:** U_n : 230V_{AC} (power side)
- **Max. operating voltage:** U_c : 250V_{AC} (power side)
 U_c : 170V_{DC} (telecomm. side)
 U_c : 70V_{DC} (TV side)
- **Surge Discharge Rating:** U_{oc} : 3kV (power side)
 I_n : 2.5kA per line (telecomm. side)
 I_n : 5kA per line (TV side)
- **Enclosure:** UTB in-line patch; 7 AC power outlets
- **Termination:** DIN 49 440-CEE(7) III, DIN 49 441-CEE(7) IV (power side)
 RJ11 input / RJ11 output (telecomm. side)
 IEC connector (TV side)
- **Complies with:** IEC/EN 61643-11, 61643-21  

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.

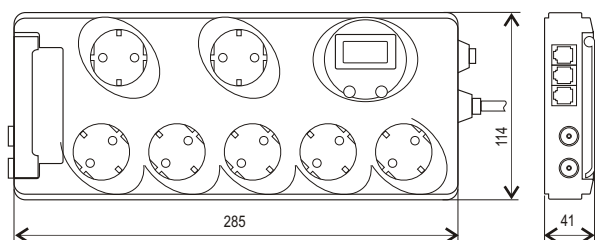
Technical data

Type		ZES-7 TEL-TV		
		Power side	Tel. side	TV side
Electrical characteristics				
Nominal operating voltage	U_n	230V _{AC} / 50Hz	110V _{DC}	50V _{DC}
Max. continuous operating voltage	U_c	250V _{AC} / 50Hz	170V _{DC}	70V _{DC}
Nominal discharge current (8/20 μ s)	I_n	/	2.5kA	5kA
Open circuit voltage of the combination wave generator	U_{oc}	3kV	/	/
Voltage protection level at I_n	U_p	< 1000V (L-N)	700V	700V
Response time of overvoltage protection	t_A	< 25ns (L-N)	< 100ns	< 100ns
Limit frequency	f_G	/	30MHz	860MHz
Back-up fuse		16A gL - (needed if not present in the network)	/	/
Mechanical characteristics				
Connection		DIN 49 440-CE(7) III DIN 49 441-CEE(7) IV; Grounding contact	Input/Output: RJ11 socket	IEC connector
Temperature range		- 40°C ... + 80°C		
Degree of protection IEC/EN 60529		IP 20		
Housing material		Thermoplastic; grey, extinguishing degree V-0		
Indication of disconnector operation		Green and yellow light		

Ordering information

Ordering code ZES-7 TEL-TV	121 369
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Dimensions



ZES-7 TEL-TV

Weight per unit	790g
Packaging dimensions (single unit)	3300 x 175 x 52mm
Min. packaging quantity	1

ZES 1M+5S



- **Category IEC/EN:** Class III/Type 3/D; /C1/C2/C3
- **Protection:** Power, telecommunication and TV
- **Nominal operating voltage:** U_n : 230V_{AC} (power side)
- **Max. operating voltage:** U_c : 250V_{AC} (power side)
 U_c : 170V_{DC} (telecomm. side)
 U_c : 70V_{DC} (TV side)
- **Surge Discharge Rating:** U_{oc} : 3kV (power side)
 I_n : 2.5kA per line (telecomm. side)
 I_n : 5kA per line (TV side)
- **Enclosure:** UTB in-line patch; 6 AC power outlets
- **Termination:** DIN 49 440-CEE(7) III, DIN 49 441-CEE(7) IV (power side)
RJ11 input / RJ11 output (telecomm. side)
IEC connector (TV side)
- **Complies with:** IEC/EN 61643-11, 61643-21



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.

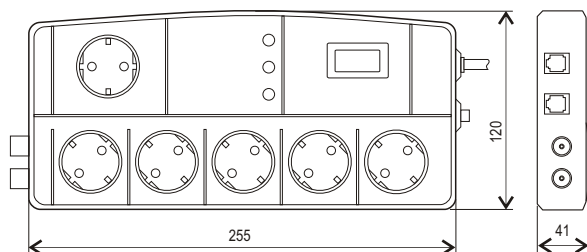
Technical data

Type		Power side	ZES 1M+5S Tel. side	TV side
Electrical characteristics				
Nominal operating voltage	U_n	230V _{AC} / 50Hz	110V _{DC}	50V _{DC}
Max. continuous operating voltage	U_c	250V _{AC} / 50Hz	170V _{DC}	70V _{DC}
Nominal discharge current (8/20 μ s)	I_n	/	2.5kA	5kA
Open circuit voltage of the combination wave generator	U_{oc}	3kV	/	/
Voltage protection level at I_n	U_p	< 1000V (L-N)	700V	700V
Response time of overvoltage protection	t_A	< 25ns (L-N)	< 100ns	< 100ns
Limit frequency	f_G	/	30MHz	860MHz
Back-up fuse		16A gL - (needed if not present in the network)	/	/
Mechanical characteristics				
Connection		DIN 49 440-CE(7) III DIN 49 441-CEE(7) IV; Grounding contact	Input/Output: RJ11 socket	IEC connector
Temperature range		- 40°C ... + 80°C		
Degree of protection IEC/EN 60529		IP 20		
Housing material		Thermoplastic; grey, extinguishing degree V-0		
Indication of disconnector operation		Green and yellow light		

Ordering information

Ordering code ZES 1M+5S	121 370
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Dimensions



ZES 1M+5S	
Weight per unit	790g
Packaging dimensions (single unit)	350 x 185 x 52mm
Min. packaging quantity	1

ZES 1M+4S TEL-NET USB Hub



- **Category IEC/EN:** Class III/Type 3/D; /C1/C2/C3
- **Protection:** Power, telecommunication / Ethernet Cat 5
- **Nominal operating voltage:** U_n : 230V_{AC} (power side)
- **Max. operating voltage:** U_c : 250V_{AC} (power side)
 U_c : 170V_{DC} (data side)
- **Surge Discharge Rating:** U_{oc} : 3kV (power side)
 I_n : 2.5kA per line (data side)
- **Enclosure:** UTB in-line patch; 5 AC power outlets
- **Termination:** DIN 49 440-CEE(7) III, DIN 49 441-CEE(7) IV (power side)
RJ45 input / RJ45 output (data side)
- **Complies with:** IEC/EN 61643-11, 61643-21



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

Cat 5 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.

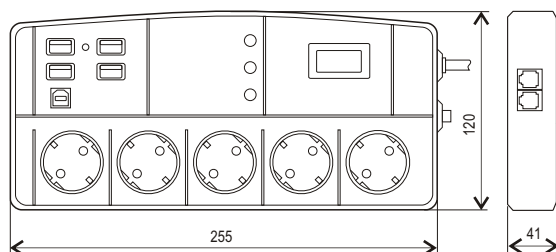
Technical data

Type	ZES 1M+4S TEL-NET USB Hub	
	Power side	Data side
Electrical characteristics		
Number of protected pairs	/	3
Nominal operating voltage	U_n 230V _{AC} / 50Hz	110V _{DC}
Max. continuous operating voltage	U_c 250V _{AC} / 50Hz	170V _{DC}
Nominal discharge current (8/20μs)	I_n /	2.5kA
Open circuit voltage of the combination wave generator	U_{oc} 3kV	/
Voltage protection level at I_n	U_p < 1000V (L-N)	700V
Response time of overvoltage protection	t_A < 25ns	< 100ns
Limit frequency	f_G /	100MHz
Back-up fuse	16A gL - (needed if not present in the network)	
Mechanical characteristics		
Connection	DIN 49 440-CE(7) III DIN 49 441-CEE(7) IV; Grounding contact	Input/Output: RJ45 sockets
Temperature range	- 40°C ... + 80°C	
Degree of protection IEC/EN 60529	IP 20	
Housing material	Thermoplastic; grey, extinguishing degree V-0	
Indication of disconnector operation	Green and yellow light	

Ordering information

Ordering code ZES 1M+4S TEL-NET USB Hub	121 380
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Dimensions



ZES 1M+4S TEL-NET	
Weight per unit	800g
Packaging dimensions (single unit)	350 x 185 x 52mm
Min. packaging quantity	1

ZES 6



- **Category IEC/EN:** Class III/Type 3/D
- **Protection:** Power
- **Nominal operating voltage:** U_n : 230V_{AC}
- **Max. operating voltage:** U_c : 250V_{AC}
- **Surge Discharge Rating:** U_{oc} : 3kV
- **Enclosure:** 6 AC power outlets
- **Termination:** DIN 49 440-CEE(7) III, DIN 49 441-CEE(7) IV
- **Complies with:** IEC/EN 61643-11



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.

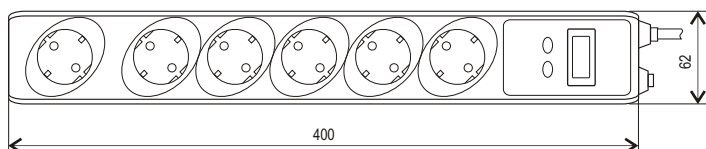
Technical data

Type		ZES 6
Electrical characteristics		
Nominal operating voltage	U_n	230V _{AC} / 50Hz
Max. continuous operating voltage	U_c	250V _{AC} / 50Hz
Open circuit voltage of the combination wave generator	U_{oc}	3kV
Voltage protection level at I_n	U_p	< 1000V (L-N)
Response time of overvoltage protection	t_A	< 25ns
Limit frequency	f_G	/
Mechanical characteristics		
Connection		DIN 49 440-CE(7) III DIN 49 441-CEE(7) IV; Grounding contact
Temperature range		- 40°C ... + 80°C
Degree of protection IEC/EN 60529		IP 20
Housing material		Thermoplastic; grey, extinguishing degree V-0
Indication of disconnector operation		Green and yellow light

Ordering information

Ordering code ZES 6	121 374
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Dimensions




ZES 6	
Weight per unit	590g
Packaging dimensions (single unit)	430 x 120 x 52mm
Min. packaging quantity	1


Signal / Data transmission



Signal	Recommended SPD	Page	Signal	Recommended SPD	Page	
0-20mA, 4-20mA Current loops	SMH-SG 24V	34	Industrial Ethernet	LZ-NET 6	86	
	NMH-TC 24V	26		Interbus inline (remote bus)	SMH-TC 5V	22
	VMO 24V	38			SMH2-TC 5V	24
	PLP-24V	104			NMH-TC 5V	26
Arcnet	ZV-BNC +5V	112	NMH2-TC 5V		28	
Binary signals	SMH-TC 5V - SMH-TC 60V	22	SMH-SH 5V	16		
	SMH2-TC 5V - SMH2-TC 60V	24	Interbus inline (I/O)	SMH2-TC 24V	24	
	SMH-SG 5V - SMH-SG 60V	34		NMH2-TC 24V	28	
	SMH-SH 5V - SMH-SH 60V	16		SMI2 24V	20	
	SMI2 5V - SMI2 60V	20		VMO 24V	38	
	NMH-TC 5V - NMH-TC 60V	26	Interbus field multiplexer	SMH-SG 5V	34	
	NMH2-TC 5V - NMH2-TC 60V	28		KNX Bus	IM-GD	106
IM-TD 5V - IM-TD 60V	30	IM-GDC	106			
Bitbus (IEEE-1118)	SMH-TC 5V	22	Local Operating Network (LON)	SMH-TC 5V	22	
	SMH2-TC 5V	24		SMH2-TC 5V	24	
	SMH-SG 5V	34		SMH-SG 5V	34	
	SMH-SH 5V	16	MODBUS	SMH-TC 5V	22	
CAN Bus (data line only)	SMH-TC 12V	22		SMH2-TC 5V	24	
	SMH2-TC 12V	24		SMH-SG 5V	34	
	SMH-SG 12V	34		SMH-SH 5V	16	
	SMH-SH 12V	16	Opto interface	SMH2-TC 24V	24	
CAN Bus (power line only)	SMH-PS 24V	80		NMH2-TC 24V	28	
	PROTEC DMDR 20/24V	78		SMH-SH 24V	16	
CAN Bus (data + power line)	SMH-TC+PS	56		IM-TD 24V	30	
	CCTV	ZV-BNC +12V	112	VMO 24V	38	
Control-Net		ZV-BNC +12V	112	SMI2 24V	20	
	Data Highway Plus	SMH2-TC 12V	24	SMH-SH 24V	16	
Device Net (data line only)		SMH-TC 12V	22	Power Over Ethernet (PoE)	LZ-NET 6	86
	SMH2-TC 12V	24	LZ-NET PoE		88	
	SMH-SG 12V	34	LZ-24NET 19 PoE		90	
SMH-PS 24V	80	Power Supply (DC or AC)	SMH-PS 12V - SMH-PS 48V		90	
Device Net (power line only)	SMH-PS 24V		80	VM-DC 12V - VM-DC 24V	82	
	Device Net (data + power line)		SMH-TC+PS	56	PROTEC DMDR 20/24V - 120V	78
PROTEC DMDR 20/24V			78	DC PROTEC B(R) 24V - 48V	70	
EIB	IM-GD		106	DC PROTEC C(R) 24V - 48V	72	
	IM-GDC		106	PROTEC C(R) 40/75V	74	
Ex(i) circuits	IM-15Ex	66	PROTEC CN(R) 40/75V	76		
	IM-30Ex	66	Profibus DP	SMH-TC 5V	22	
Ethernet Cat 5	LZ-NET 6	86		SMH2-TC 5V	24	
	LZ-NET	88		SMH-SG 5V	34	
	ZE 200 NET	92		SMH-SH 5V	16	
	LZ-24NET 19	90	Profibus PA	SMH-SG 24V	34	
Ethernet Cat 6	LZ-NET 6	86		SMH-TC 24V	22	
	LZ-NET	88		SMH2-TC 24V	24	
	LZ-24NET 19	90	SMH-SH 24V	16		
FDDI, CDDI	LZ-NET 6	86	Profibus PA (Ex)	IM-30Ex	66	
	LZ-NET	88		RS 232	SMH-SG 12V	34
	LZ-24NET 19	90	IM-DB 9		98	
Fieldbus (Ex)	IM-15Ex	66	RS 422, V.11, X.21	SMH2-TC 12V	24	
	IM-30Ex	66		NMH2-TC 12V	28	
Genius Bus	SMH2-TC 12V	24		VM-RS 485	96	
	SMH-TC 12V	22				
	SMH-SH 12V	16				

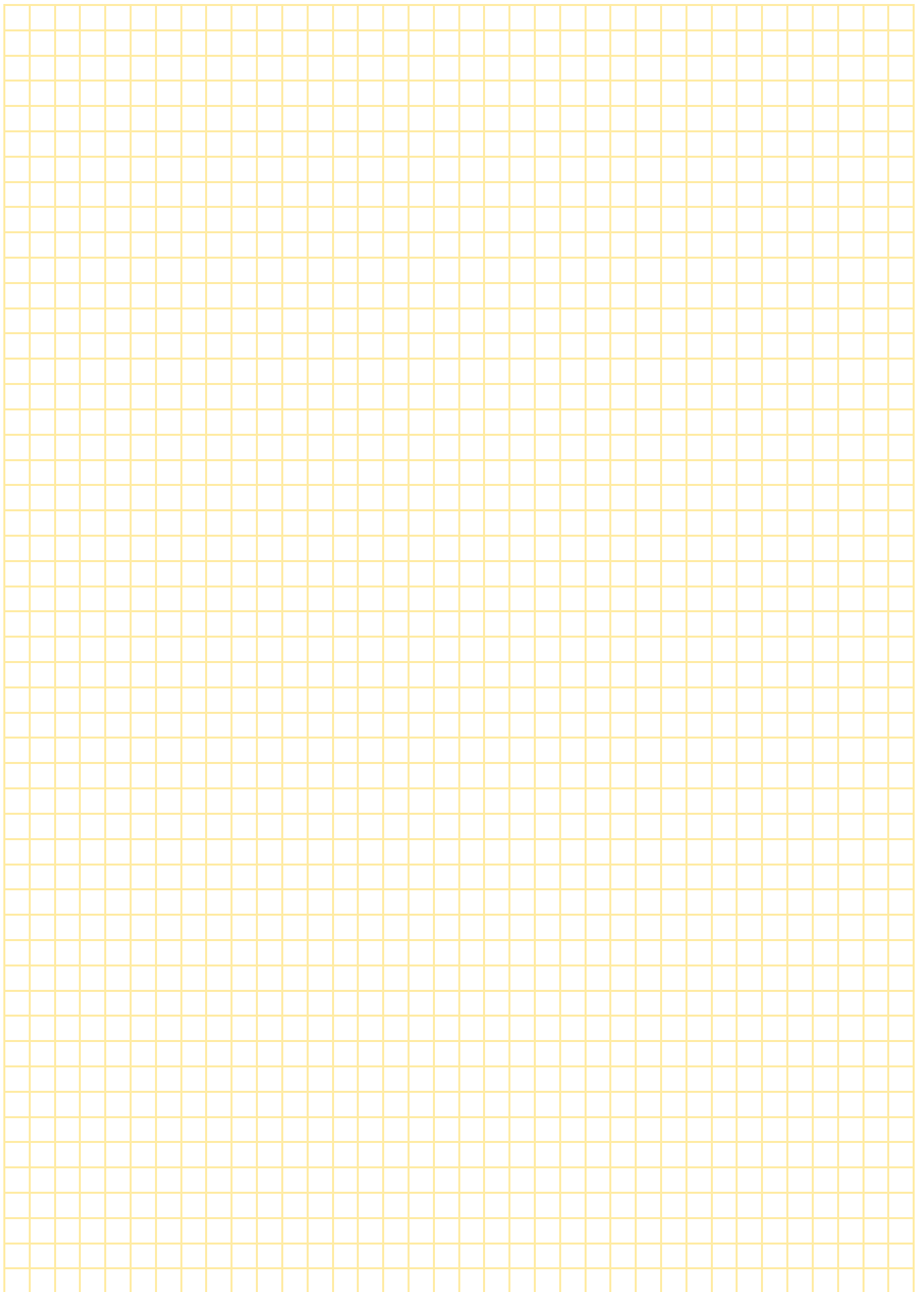
Signal / Data transmission			Telecommunication		
Signal	Recommended SPD	Page	Signal	Recommended SPD	Page
RS 423A	IM-DB 15 RS	100	ADSL	SMH-TC 110V	22
	SMH2-TC 12V	24		IM-xDSL	62
	NMH2-TC 12V	28		IM-xDSL-T	62
	VM-RS 485	96		IM-xDSL-V	62
RS 485	SMH2-TC 12V	24	ADSL 2+	SMH-TC 110V	22
	NMH2-TC 12V	28		IM-xDSL	62
	SMI2 12V	20		IM-xDSL-T	62
	VM-RS 485	96	E1	LZ-NET 6	86
	IM-DB 15 RS	100		SMH2-TC 24V	24
Synchronous Data Link Control (SDLC)	SMH-TC 5V	22	SMI2-24V	20	
	SMH2-TC 5V	24	G.703/G.704	LZ-NET 6	86
	SMH-SG 5V	34		SMH2-TC 24V	24
	SMH-SH 5V	16		SMI2-24V	20
SINEC L1	SMH-TC 5V	22	HDSL	SMH2-TC 24V	24
	SMH2-TC 5V	24		SMI2-24V	20
	SMH-SG 5V	34		LZ-NET 6	86
	SMH-SH 5V	16	ISDN S₀	NMH2-TC 12V	28
SINEC L2	SMH-TC 5V	22		SMI2-12V	20
	SMH2-TC 5V	24		LZ-NET 6	86
	SMH-SG 5V	34	ISDN U₀	SMH-TC 110V	22
	SMH-SH 5V	16		IM-xDSL	62
Suconet	SMH-TC 5V	22		IM-xDSL-T	62
	SMH2-TC 5V	24	POTS	IM-TD 110V	30
	SMH-SG 5V	34		VMO 110V	38
	SMH-SH 5V	16		SMH-TC 110V	22
Voice over IP (VoIP)	LZ-NET 6	86		IM-xDSL	62
	LZ-NET PoE	88	IM-xDSL-T	62	
	LZ-24NET 19 PoE	90	SDSL	NMH2-TC 12V	28
Temperature measurement	SMH-SG 24V	34		SMI2 110V	20
	NMH-TC 24V	26		LZ-NET 6	86
	VMO 24V	38	SHDSL	SMH-SG 5V	34
	SMI2 24V	20		SMH-TC 5V	22
	PLP-24V	104		SMH2-TC 5V	24
	Token ring	SMH-SH 24V	16	T-DSL	SMH-TC 110V
LZ-NET 6		86	IM-xDSL		62
LZ-NET		88	IM-xDSL-T		62
TTL	LZ-24NET 19	90	VDSL	SMH-TC 110V	22
	SMH-SG 12V	34		IM-xDSL	62
	SMH-TC 12V	22		IM-xDSL-T	62
	SMH-SH 12V	16			
	NMH-TC 12V	26			
	IM-DB 9	98			





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Wastewater management			
	Level measurement equipment / PROFIBUS PA	SMH-SG 24V	34
		SMH-TC 24V	22
		SMH2-TC 24V	24
	PH measurement equipment / PROFIBUS DP	SMH-TC 5V	22
		SMH2-TC 5V	24
		SMH-SG 5V	34
		SMH-SH 5V	16
	Flow measurement equipment / 4-20mA	SMH-SG 24V	34
		NMH-TC 24V	26
		VMO 24V	38
		PLP 24V	104
	Temperature measurement / Pt1000	SMH-SG 24V	34
		NMH-TC 24V	26
		VMO 24V	38
		SMI2 24V	20
PLP-24V		104	
SMH-SH 24V		16	
Security agencies			
	Analog video	ZV-BNC 12V	112
	PoE video	LZ NET 6	86
	Voice over IP (VoIP)	LZ-NET 6	86
		LZ-NET PoE	88
		LZ-24NET 19 PoE	90
Industrial automation			
	Industrial buses	SMH-TC 5V - SMH-TC 60V	22
		SMH2-TC 5V - SMH2-TC 60V	24
		SMH-SG 5V - SMH-SG 60V	34
		SMH-SH 5V - SMH-SH 60V	16
		SMI2 5V - SMI2 60V	20
		NMH-TC 5V - NMH-TC 60V	26
		NMH2-TC 5V - NMH2-TC 60V	28
		IM-TD 5V - IM-TD 60V	30
		LZ-NET 6	86
	Ethernet	LZ-NET 6	86
		LZ-NET	88
		ZE 200 NET	92
	Industrial Ethernet	LZ-24NET 19	90
		LZ-NET 6	86









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Wind systems 	Wind speed measurement / 4-20mA	SMH-SG 24V	34
		NMH-TC 24V	26
	Temperature measurement / Pt1000	VMO 24V	38
		SMH-SG 24V	34
		NMH-TC 24V	26
		VMO 24V	38
	Data transmission / RS 485	SMI2 24V	20
		SMH-SH 24V	16
		SMH2-TC 12V	24
		NMH2-TC 12V	28
		SMI2-TC 12V	20
		VM-RS 485	96
	Data transmission / Ethernet POTS/ISDN/DSL line	IM-DB 15 RS	100
		LZ-NET 6	86
		SMH-TC 110V	22
IM-xDSL		62	
IM-xDSL-T		62	








Photovoltaic systems 	Wind speed measurement / 4-20mA	SMH-SG 24V	34
		NMH-TC 24V	26
		VMO 24V	38
	Temperature measurement / Pt1000	SMH-SG 24V	34
		NMH-TC 24V	26
		VMO 24V	38
		SMI2 24V	20
	Data transmission / RS 485	SMH-SH 24V	16
		SMH2-TC 12V	24
		NMH2-TC 12V	28
		SMI2-TC 12V	20
		VM-RS 485	96
		IM-DB 15 RS	100
	POTS/ISDN/DSL line	SMH-TC 110V	22
		IM-xDSL	62
IM-xDSL-T		62	











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Telecommunication transmitter systems				
	GSM, UMTS, LTE, GPS, Radio systems	CCP 180-N-6G-MF	122	
		CCP 180-N-6G-FF	122	
		CCP 180-TNC-6G-MF	124	
		CCP 180-TNC-6G-FF	124	
		CCP xxx-7/16-MF	118	
		CCP xxx-7/16-FF	118	
		CCP xxx-N-MF	120	
		CCP xxx-N-FF	120	
		GSM, UMTS, LTE	CCP L/4-7/16-MF	132
			CCP L/4-7/16-FF	132
	CCP L/4-N-MF		134	
	CCP L/4-N-FF		134	
	Radio systems	CCP 180-UHF-MF	126	
		CCP 280-UHF-MF	126	
		CCP 180-UHF-FF	126	
CCP 280-UHF-FF		126		
Oil and gas industry; Biogas plants				
	Ex zone	Flow measurement	IM-15 Ex	66
			IM-30 Ex	66
	Pressure measurement	IM-15 Ex	66	
		IM-30 Ex	66	
	Level measurement	IM-15 Ex	66	
		IM-30 Ex	66	
	Outside Ex zones	Flow measurement	SMH-SG 12V	34
			SMH-SG 24V	34
	Pressure measurement	SMH-SG 12V	34	
		SMH-SG 24V	34	
	Level measurement	SMH-SG 12V	34	
		SMH-SG 24V	34	
	LAN protection	LZ-NET 6	86	




















Product name	Ordering code	Product dimensions DIN 43880	Packaging dimensions (single unit)	MOQ	Weight netto	Page	
D1/C1/C2/C3 Universal Modular and Compact SPD for Data/Signal Lines							
	SMH-SH 5V	7082.01	2/3TE	87 x 15 x 102mm	15 pcs.	60g	16
	SMH-SH 12V	7082.02	2/3TE	87 x 15 x 102mm	15 pcs.	60g	16
	SMH-SH 15V	7082.03	2/3TE	87 x 15 x 102mm	15 pcs.	60g	16
	SMH-SH 24V	7082.04	2/3TE	87 x 15 x 102mm	15 pcs.	60g	16
	SMH-SH 30V	7082.05	2/3TE	87 x 15 x 102mm	15 pcs.	60g	16
	SMH-SH 48V	7082.06	2/3TE	87 x 15 x 102mm	15 pcs.	60g	16
	SMH-SH 60V	7082.07	2/3TE	87 x 15 x 102mm	15 pcs.	60g	16
	SMH-SH 110V	7082.08	2/3TE	87 x 15 x 102mm	15 pcs.	60g	16
	Module SMH-SH 5V	7082.11	2/3TE	87 x 15 x 102mm	15 pcs.	26g	16
	Module SMH-SH 12V	7082.12	2/3TE	87 x 15 x 102mm	15 pcs.	26g	16
Module SMH-SH 15V	7082.13	2/3TE	87 x 15 x 102mm	15 pcs.	26g	16	
Module SMH-SH 24V	7082.14	2/3TE	87 x 15 x 102mm	15 pcs.	26g	16	
Module SMH-SH 30V	7082.15	2/3TE	87 x 15 x 102mm	15 pcs.	26g	16	
Module SMH-SH 48V	7082.16	2/3TE	87 x 15 x 102mm	15 pcs.	26g	16	
Module SMH-SH 60V	7082.17	2/3TE	87 x 15 x 102mm	15 pcs.	26g	16	
Module SMH-SH 110V	7082.18	2/3TE	87 x 15 x 102mm	15 pcs.	26g	16	
	SMH-RC 5V	7082.21	2/3TE	87 x 15 x 102mm	15 pcs.	58g	18
	SMH-RC 12V	7082.22	2/3TE	87 x 15 x 102mm	15 pcs.	58g	18
	SMH-RC 15V	7082.23	2/3TE	87 x 15 x 102mm	15 pcs.	58g	18
	SMH-RC 24V	7082.24	2/3TE	87 x 15 x 102mm	15 pcs.	58g	18
	SMH-RC 30V	7082.25	2/3TE	87 x 15 x 102mm	15 pcs.	58g	18
	SMH-RC 48V	7082.26	2/3TE	87 x 15 x 102mm	15 pcs.	58g	18
	SMH-RC 60V	7082.27	2/3TE	87 x 15 x 102mm	15 pcs.	58g	18
	SMH-RC 110V	7082.28	2/3TE	87 x 15 x 102mm	15 pcs.	58g	18
	Module SMH-RC 5V	7082.31	2/3TE	87 x 15 x 102mm	15 pcs.	24g	18
	Module SMH-RC 12V	7082.32	2/3TE	87 x 15 x 102mm	15 pcs.	24g	18
Module SMH-RC 15V	7082.33	2/3TE	87 x 15 x 102mm	15 pcs.	24g	18	
Module SMH-RC 24V	7082.34	2/3TE	87 x 15 x 102mm	15 pcs.	24g	18	
Module SMH-RC 30V	7082.35	2/3TE	87 x 15 x 102mm	15 pcs.	24g	18	
Module SMH-RC 48V	7082.36	2/3TE	87 x 15 x 102mm	15 pcs.	24g	18	
Module SMH-RC 60V	7082.37	2/3TE	87 x 15 x 102mm	15 pcs.	24g	18	
Module SMH-RC 110V	7082.38	2/3TE	87 x 15 x 102mm	15 pcs.	24g	18	
	SMI2 5V	7083.01	2/3TE	87 x 15 x 102mm	15 pcs.	70g	20
	SMI2 12V	7083.02	2/3TE	87 x 15 x 102mm	15 pcs.	70g	20
	SMI2 15V	7083.03	2/3TE	87 x 15 x 102mm	15 pcs.	70g	20
	SMI2 24V	7083.04	2/3TE	87 x 15 x 102mm	15 pcs.	70g	20
	SMI2 30V	7083.05	2/3TE	87 x 15 x 102mm	15 pcs.	70g	20
	SMI2 48V	7083.06	2/3TE	87 x 15 x 102mm	15 pcs.	70g	20
	SMI2 60V	7083.07	2/3TE	87 x 15 x 102mm	15 pcs.	70g	20
	SMI2 110V	7083.08	2/3TE	87 x 15 x 102mm	15 pcs.	70g	20
	Module SMI2 5V	7083.11	2/3TE	87 x 15 x 102mm	15 pcs.	30g	20
	Module SMI2 12V	7083.12	2/3TE	87 x 15 x 102mm	15 pcs.	30g	20
Module SMI2 15V	7083.13	2/3TE	87 x 15 x 102mm	15 pcs.	30g	20	
Module SMI2 24V	7083.14	2/3TE	87 x 15 x 102mm	15 pcs.	30g	20	
Module SMI2 30V	7083.15	2/3TE	87 x 15 x 102mm	15 pcs.	30g	20	
Module SMI2 48V	7083.16	2/3TE	87 x 15 x 102mm	15 pcs.	30g	20	
Module SMI2 60V	7083.17	2/3TE	87 x 15 x 102mm	15 pcs.	30g	20	
Module SMI2 110V	7083.18	2/3TE	87 x 15 x 102mm	15 pcs.	30g	20	
	SMH-TC 5V	7080.62	2/3TE	87 x 15 x 102mm	15 pcs.	52g	22
	SMH-TC 12V	7080.63	2/3TE	87 x 15 x 102mm	15 pcs.	52g	22
	SMH-TC 15V	7080.64	2/3TE	87 x 15 x 102mm	15 pcs.	52g	22
	SMH-TC 24V	7080.65	2/3TE	87 x 15 x 102mm	15 pcs.	52g	22
	SMH-TC 30V	7080.66	2/3TE	87 x 15 x 102mm	15 pcs.	52g	22
	SMH-TC 48V	7080.67	2/3TE	87 x 15 x 102mm	15 pcs.	52g	22
	SMH-TC 60V	7080.68	2/3TE	87 x 15 x 102mm	15 pcs.	52g	22
	SMH-TC 110V	7080.61	2/3TE	87 x 15 x 102mm	15 pcs.	52g	22
	Module SMH-TC 5V	7080.52	2/3TE	87 x 15 x 102mm	15 pcs.	24g	22
	Module SMH-TC 12V	7080.53	2/3TE	87 x 15 x 102mm	15 pcs.	24g	22
Module SMH-TC 15V	7080.54	2/3TE	87 x 15 x 102mm	15 pcs.	24g	22	
Module SMH-TC 24V	7080.55	2/3TE	87 x 15 x 102mm	15 pcs.	24g	22	
Module SMH-TC 30V	7080.56	2/3TE	87 x 15 x 102mm	15 pcs.	24g	22	
Module SMH-TC 48V	7080.57	2/3TE	87 x 15 x 102mm	15 pcs.	24g	22	
Module SMH-TC 60V	7080.58	2/3TE	87 x 15 x 102mm	15 pcs.	24g	22	
Module SMH-TC 110V	7080.51	2/3TE	87 x 15 x 102mm	15 pcs.	24g	22	

	Product name	Ordering code	Product dimensions DIN 43880	Packaging dimensions (single unit)	MOQ	Weight netto	Page
	SMH2 5V	7080.12	2/3TE	87 x 15 x 102mm	15 pcs.	66g	24
	SMH2 12V	7080.13	2/3TE	87 x 15 x 102mm	15 pcs.	66g	24
	SMH2 15V	7080.14	2/3TE	87 x 15 x 102mm	15 pcs.	66g	24
	SMH2 24V	7080.15	2/3TE	87 x 15 x 102mm	15 pcs.	66g	24
	SMH2 30V	7080.16	2/3TE	87 x 15 x 102mm	15 pcs.	66g	24
	SMH2 48V	7080.17	2/3TE	87 x 15 x 102mm	15 pcs.	66g	24
	SMH2 60V	7080.18	2/3TE	87 x 15 x 102mm	15 pcs.	66g	24
	SMH2 110V	7080.11	2/3TE	87 x 15 x 102mm	15 pcs.	66g	24
	Module SMH2 5V	7080.02	2/3TE	87 x 15 x 102mm	15 pcs.	30g	24
	Module SMH2 12V	7080.03	2/3TE	87 x 15 x 102mm	15 pcs.	30g	24
	Module SMH2 15V	7080.04	2/3TE	87 x 15 x 102mm	15 pcs.	30g	24
	Module SMH2 24V	7080.05	2/3TE	87 x 15 x 102mm	15 pcs.	30g	24
	Module SMH2 30V	7080.06	2/3TE	87 x 15 x 102mm	15 pcs.	30g	24
	Module SMH2 48V	7080.07	2/3TE	87 x 15 x 102mm	15 pcs.	30g	24
	Module SMH2 60V	7080.08	2/3TE	87 x 15 x 102mm	15 pcs.	30g	24
	Module SMH2 110V	7080.01	2/3TE	87 x 15 x 102mm	15 pcs.	30g	24
	NMH-TC 5V	7070.02	2/3TE	70 x 16 x 110mm	15 pcs.	54g	26
	NMH-TC 12V	7070.03	2/3TE	70 x 16 x 110mm	15 pcs.	54g	26
	NMH-TC 15V	7070.04	2/3TE	70 x 16 x 110mm	15 pcs.	54g	26
	NMH-TC 24V	7070.05	2/3TE	70 x 16 x 110mm	15 pcs.	54g	26
	NMH-TC 30V	7070.06	2/3TE	70 x 16 x 110mm	15 pcs.	54g	26
	NMH-TC 48V	7070.07	2/3TE	70 x 16 x 110mm	15 pcs.	54g	26
	NMH-TC 60V	7070.08	2/3TE	70 x 16 x 110mm	15 pcs.	54g	26
	NMH-TC 110V	7070.01	2/3TE	70 x 16 x 110mm	15 pcs.	54g	26
	NMH2-TC 5V	7072.02	2/3TE	70 x 16 x 110mm	15 pcs.	64g	28
	NMH2-TC 12V	7072.03	2/3TE	70 x 16 x 110mm	15 pcs.	64g	28
	NMH2-TC 15V	7072.04	2/3TE	70 x 16 x 110mm	15 pcs.	64g	28
	NMH2-TC 24V	7072.05	2/3TE	70 x 16 x 110mm	15 pcs.	64g	28
	NMH2-TC 30V	7072.06	2/3TE	70 x 16 x 110mm	15 pcs.	64g	28
	NMH2-TC 48V	7072.07	2/3TE	70 x 16 x 110mm	15 pcs.	64g	28
	NMH2-TC 60V	7072.08	2/3TE	70 x 16 x 110mm	15 pcs.	64g	28
	NMH2-TC 110V	7072.01	2/3TE	70 x 16 x 110mm	15 pcs.	64g	28
	IM-TD 5V	700.010	1TE	78 x 23 x 108mm	12 pcs.	88g	30
	IM-TD 12V	700.016	1TE	78 x 23 x 108mm	12 pcs.	88g	30
	IM-TD 15V	700.022	1TE	78 x 23 x 108mm	12 pcs.	88g	30
	IM-TD 24V	700.028	1TE	78 x 23 x 108mm	12 pcs.	88g	30
	IM-TD 30V	700.034	1TE	78 x 23 x 108mm	12 pcs.	88g	30
	IM-TD 48V	700.040	1TE	78 x 23 x 108mm	12 pcs.	88g	30
	IM-TD 60V	700.046	1TE	78 x 23 x 108mm	12 pcs.	88g	30
	IM-TD 110V	700.003	1TE	78 x 23 x 108mm	12 pcs.	88g	30
	IM-TD 5V S-GDT	700.011	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 12V S-GDT	700.017	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 15V S-GDT	700.023	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 24V S-GDT	700.029	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 30V S-GDT	700.035	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 48V S-GDT	700.041	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 60V S-GDT	700.047	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 110V S-GDT	700.004	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 5V RC	700.012	1TE	78 x 23 x 108mm	12 pcs.	92g	30
	IM-TD 12V RC	700.018	1TE	78 x 23 x 108mm	12 pcs.	92g	30
	IM-TD 15V RC	700.024	1TE	78 x 23 x 108mm	12 pcs.	92g	30
	IM-TD 24V RC	700.030	1TE	78 x 23 x 108mm	12 pcs.	92g	30
	IM-TD 30V RC	700.036	1TE	78 x 23 x 108mm	12 pcs.	92g	30
	IM-TD 48V RC	700.042	1TE	78 x 23 x 108mm	12 pcs.	92g	30
	IM-TD 60V RC	700.048	1TE	78 x 23 x 108mm	12 pcs.	92g	30
	IM-TD 110V RC	700.005	1TE	78 x 23 x 108mm	12 pcs.	92g	30
	IM-TD 5V 2GND	700.013	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 12V 2GND	700.019	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 15V 2GND	700.025	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 24V 2GND	700.031	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 30V 2GND	700.037	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 48V 2GND	700.043	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 60V 2GND	700.049	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	IM-TD 110V 2GND	700.006	1TE	78 x 23 x 108mm	12 pcs.	96g	30
	Module IM-TD 5V	700.009	1TE	61 x 49 x 21mm	24 pcs.	32g	30
	Module IM-TD 12V	700.015	1TE	61 x 49 x 21mm	24 pcs.	32g	30

	Product name	Ordering code	Product dimensions DIN 43880	Packaging dimensions (single unit)	MOQ	Weight netto	Page
	Module IM-TD 15V	700.021	1TE	61 x 49 x 21mm	24 pcs.	32g	30
	Module IM-TD 24V	700.027	1TE	61 x 49 x 21mm	24 pcs.	32g	30
	Module IM-TD 30V	700.033	1TE	61 x 49 x 21mm	24 pcs.	32g	30
	Module IM-TD 48V	700.039	1TE	61 x 49 x 21mm	24 pcs.	32g	30
	Module IM-TD 60V	700.045	1TE	61 x 49 x 21mm	24 pcs.	32g	30
	Module IM-TD 110V	700.002	1TE	61 x 49 x 21mm	24 pcs.	32g	30
	IMTEST	127 145	1TE	61 x 49 x 21mm		26g	31
	IMH-TC 5V	701.007	1TE	78 x 23 x 108mm	12 pcs.	84g	32
	IMH-TC 12V	701.012	1TE	78 x 23 x 108mm	12 pcs.	84g	32
	IMH-TC 15V	701.017	1TE	78 x 23 x 108mm	12 pcs.	84g	32
	IMH-TC 24V	701.022	1TE	78 x 23 x 108mm	12 pcs.	84g	32
	IMH-TC 30V	701.027	1TE	78 x 23 x 108mm	12 pcs.	84g	32
	IMH-TC 48V	701.032	1TE	78 x 23 x 108mm	12 pcs.	84g	32
	IMH-TC 60V	701.037	1TE	78 x 23 x 108mm	12 pcs.	84g	32
	IMH-TC 110V	701.002	1TE	78 x 23 x 108mm	12 pcs.	84g	32
	IMH-TC 5V S-GDT	701.008	1TE	78 x 23 x 108mm	12 pcs.	94g	32
	IMH-TC 12V S-GDT	701.013	1TE	78 x 23 x 108mm	12 pcs.	94g	32
	IMH-TC 15V S-GDT	701.018	1TE	78 x 23 x 108mm	12 pcs.	94g	32
	IMH-TC 24V S-GDT	701.023	1TE	78 x 23 x 108mm	12 pcs.	94g	32
	IMH-TC 30V S-GDT	701.028	1TE	78 x 23 x 108mm	12 pcs.	94g	32
	IMH-TC 48V S-GDT	701.033	1TE	78 x 23 x 108mm	12 pcs.	94g	32
	IMH-TC 60V S-GDT	701.038	1TE	78 x 23 x 108mm	12 pcs.	94g	32
	IMH-TC 110V S-GDT	701.003	1TE	78 x 23 x 108mm	12 pcs.	94g	32
	IMH-TC 5V 2GND	701.009	1TE	78 x 23 x 108mm	12 pcs.	92g	32
	IMH-TC 12V 2GND	701.014	1TE	78 x 23 x 108mm	12 pcs.	92g	32
	IMH-TC 15V 2GND	701.019	1TE	78 x 23 x 108mm	12 pcs.	92g	32
	IMH-TC 24V 2GND	701.024	1TE	78 x 23 x 108mm	12 pcs.	92g	32
	IMH-TC 30V 2GND	701.029	1TE	78 x 23 x 108mm	12 pcs.	92g	32
	IMH-TC 48V 2GND	701.034	1TE	78 x 23 x 108mm	12 pcs.	92g	32
	IMH-TC 60V 2GND	701.039	1TE	78 x 23 x 108mm	12 pcs.	92g	32
	IMH-TC 110V 2GND	701.004	1TE	78 x 23 x 108mm	12 pcs.	92g	32
	Module IMH-TC 5V	701.006	1TE	61 x 49 x 21mm	24 pcs.	28g	32
	Module IMH-TC 12V	701.011	1TE	61 x 49 x 21mm	24 pcs.	28g	32
	Module IMH-TC 15V	701.016	1TE	61 x 49 x 21mm	24 pcs.	28g	32
	Module IMH-TC 24V	701.021	1TE	61 x 49 x 21mm	24 pcs.	28g	32
	Module IMH-TC 30V	701.026	1TE	61 x 49 x 21mm	24 pcs.	28g	32
	Module IMH-TC 48V	701.031	1TE	61 x 49 x 21mm	24 pcs.	28g	32
	Module IMH-TC 60V	701.036	1TE	61 x 49 x 21mm	24 pcs.	28g	32
	Module IMH-TC 110V	701.001	1TE	61 x 49 x 21mm	24 pcs.	28g	32
	IMTEST	127 145	1TE	61 x 49 x 21mm		26g	33
	SMH-SG 5V	7081.42	2/3TE	87 x 15 x 102mm	15 pcs.	60g	34
	SMH-SG 12V	7081.43	2/3TE	87 x 15 x 102mm	15 pcs.	60g	34
	SMH-SG 15V	7081.44	2/3TE	87 x 15 x 102mm	15 pcs.	60g	34
	SMH-SG 24V	7081.45	2/3TE	87 x 15 x 102mm	15 pcs.	60g	34
	SMH-SG 30V	7081.46	2/3TE	87 x 15 x 102mm	15 pcs.	60g	34
	SMH-SG 48V	7081.47	2/3TE	87 x 15 x 102mm	15 pcs.	60g	34
	SMH-SG 60V	7081.48	2/3TE	87 x 15 x 102mm	15 pcs.	60g	34
	SMH-SG 110V	7081.41	2/3TE	87 x 15 x 102mm	15 pcs.	60g	34
	Module SMH-SG 5V	7081.32	2/3TE	87 x 15 x 102mm	15 pcs.	26g	34
	Module SMH-SG 12V	7081.33	2/3TE	87 x 15 x 102mm	15 pcs.	26g	34
	Module SMH-SG 15V	7081.34	2/3TE	87 x 15 x 102mm	15 pcs.	26g	34
	Module SMH-SG 24V	7081.35	2/3TE	87 x 15 x 102mm	15 pcs.	26g	34
	Module SMH-SG 30V	7081.36	2/3TE	87 x 15 x 102mm	15 pcs.	26g	34
	Module SMH-SG 48V	7081.37	2/3TE	87 x 15 x 102mm	15 pcs.	26g	34
	Module SMH-SG 60V	7081.38	2/3TE	87 x 15 x 102mm	15 pcs.	26g	34
	Module SMH-SG 110V	7081.31	2/3TE	87 x 15 x 102mm	15 pcs.	26g	34
	VMS-TC 5V	7020.05	1TE	78 x 23 x 108mm	12 pcs.	92g	36
	VMS-TC 12V	7020.08	1TE	78 x 23 x 108mm	12 pcs.	92g	36
	VMS-TC 15V	7020.11	1TE	78 x 23 x 108mm	12 pcs.	92g	36
	VMS-TC 24V	7020.14	1TE	78 x 23 x 108mm	12 pcs.	92g	36
	VMS-TC 30V	7020.17	1TE	78 x 23 x 108mm	12 pcs.	92g	36
	VMS-TC 48V	7020.20	1TE	78 x 23 x 108mm	12 pcs.	92g	36
	VMS-TC 60V	7020.23	1TE	78 x 23 x 108mm	12 pcs.	92g	36
	VMS-TC 110V	7020.02	1TE	78 x 23 x 108mm	12 pcs.	92g	36

	Product name	Ordering code	Product dimensions DIN 43880	Packaging dimensions (single unit)	MOQ	Weight netto	Page
	Module VMS-TC 5V	7020.04	1TE	61 x 49 x 21mm	12 pcs.	30g	36
	Module VMS-TC 12V	7020.07	1TE	61 x 49 x 21mm	12 pcs.	30g	36
	Module VMS-TC 15V	7020.10	1TE	61 x 49 x 21mm	12 pcs.	30g	36
	Module VMS-TC 24V	7020.13	1TE	61 x 49 x 21mm	12 pcs.	30g	36
	Module VMS-TC 30V	7020.16	1TE	61 x 49 x 21mm	12 pcs.	30g	36
	Module VMS-TC 48V	7020.19	1TE	61 x 49 x 21mm	12 pcs.	30g	36
	Module VMS-TC 60V	7020.22	1TE	61 x 49 x 21mm	12 pcs.	30g	36
	Module VMS-TC 110V	7020.01	1TE	61 x 49 x 21mm	12 pcs.	30g	36
	VMTEST	127 144	1TE	61 x 49 x 21mm		26g	37
	VMO 5V	7025.05	1TE	78 x 23 x 108mm	12 pcs.	96g	38
	VMO 12V	7025.08	1TE	78 x 23 x 108mm	12 pcs.	96g	38
	VMO 15V	7025.11	1TE	78 x 23 x 108mm	12 pcs.	96g	38
	VMO 24V	7025.14	1TE	78 x 23 x 108mm	12 pcs.	96g	38
	VMO 30V	7025.17	1TE	78 x 23 x 108mm	12 pcs.	96g	38
	VMO 48V	7025.20	1TE	78 x 23 x 108mm	12 pcs.	96g	38
	VMO 60V	7025.23	1TE	78 x 23 x 108mm	12 pcs.	96g	38
	VMO 110V	7025.02	1TE	78 x 23 x 108mm	12 pcs.	96g	38
	Module VMO 5V	7025.04	1TE	61 x 49 x 21mm	24 pcs.	34g	38
	Module VMO 12V	7025.07	1TE	61 x 49 x 21mm	24 pcs.	34g	38
	Module VMO 15V	7025.10	1TE	61 x 49 x 21mm	24 pcs.	34g	38
	Module VMO 24V	7025.13	1TE	61 x 49 x 21mm	24 pcs.	34g	38
	Module VMO 30V	7025.16	1TE	61 x 49 x 21mm	24 pcs.	34g	38
	Module VMO 48V	7025.19	1TE	61 x 49 x 21mm	24 pcs.	34g	38
	Module VMO 60V	7025.22	1TE	61 x 49 x 21mm	24 pcs.	34g	38
	Module VMO 110V	7025.02	1TE	61 x 49 x 21mm	24 pcs.	34g	38
	VMTEST	127 144	1TE	61 x 49 x 21mm		26g	39
	SMH-TDR 110V	7081.50	2/3TE	87 x 15 x 102mm	15 pcs.	52g	40
	Module SMH-TDR 110V	7081.52	2/3TE	87 x 15 x 102mm	15 pcs.	24g	40
	SMH2-TDR 110V	7081.51	2/3TE	87 x 15 x 102mm	15 pcs.	66g	42
	Module SMH2-TDR 110V	7081.53	2/3TE	87 x 15 x 102mm	15 pcs.	28g	42
	VM-TDR 110V	7031.52	1TE	78 x 23 x 108mm	12 pcs.	94g	44
	Module VM-TDR 110V	7031.51	1TE	61 x 49 x 21mm	24 pcs.	32g	44
	SMH2-DF 12V	7082.58	2/3TE	87 x 15 x 102mm	15 pcs.	64g	46
	SMH2-DF 24V	7082.59	2/3TE	87 x 15 x 102mm	15 pcs.	64g	46
	IM-DF 5V	7045.08	1/3TE	90 x 150mm (pvc)	40 pcs.	26g	50
	IM-DF 12V	7045.02	1/3TE	90 x 150mm (pvc)	40 pcs.	26g	50
	IM-DF 24V	7045.04	1/3TE	90 x 150mm (pvc)	40 pcs.	26g	50
	IM-DF 60V	7045.06	1/3TE	90 x 150mm (pvc)	40 pcs.	26g	50
	SMH-20K 230V	7081.54	2/3TE	87 x 15 x 102mm	15 pcs.	52g	52
	SMH-20D 24V	7081.55	2/3TE	87 x 15 x 102mm	15 pcs.	52g	52
	SMH-20D 48V	7081.56	2/3TE	87 x 15 x 102mm	15 pcs.	52g	52
	Module SMH-20K 230V	7081.57	2/3TE	87 x 15 x 102mm	15 pcs.	24g	52
	Module SMH-20D 24V	7081.58	2/3TE	87 x 15 x 102mm	15 pcs.	24g	52
	Module SMH-20D 48V	7081.59	2/3TE	87 x 15 x 102mm	15 pcs.	24g	52
	SMH2-20K 230V	7081.60	2/3TE	87 x 15 x 102mm	15 pcs.	66g	54
	SMH2-20D 24V	7081.61	2/3TE	87 x 15 x 102mm	15 pcs.	66g	54
	SMH2-20D 48V	7081.62	2/3TE	87 x 15 x 102mm	15 pcs.	66g	54
	Module SMH2-20K 230V	7081.63	2/3TE	87 x 15 x 102mm	15 pcs.	28g	54
	Module SMH2-20D 24V	7081.64	2/3TE	87 x 15 x 102mm	15 pcs.	28g	54
	Module SMH2-20D 48V	7081.65	2/3TE	87 x 15 x 102mm	15 pcs.	28g	54
	SMH-TC+PS 24V	7081.81	2/3TE	87 x 15 x 102mm	15 pcs.	72g	56
	Module SMH-TC+PS 24V	7081.82	2/3TE	87 x 15 x 102mm	15 pcs.	34g	56






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	Product name	Ordering code	Product dimensions DIN 43880	Packaging dimensions (single unit)	MOQ	Weight netto	Page
	LZ-SMH 12V	127 555	/	25 x 65 x 25mm	30 pcs.	30g	58
	LZ-SMH 24V	127 556	/	25 x 65 x 25mm	30 pcs.	30g	58
D1/C1/C2/C3 Modular SPD for xDSL Technologies							
	IM-xDSL	7040.02	1TE	78 x 23 x 108mm	12 pcs.	84g	62
	IM-xDSL V	7040.06	1TE	78 x 23 x 108mm	12 pcs.	84g	62
	IM-xDSL T	7040.10	1TE	78 x 23 x 108mm	12 pcs.	84g	62
	IM-xDSL 2GND	7040.03	1TE	78 x 23 x 108mm	12 pcs.	92g	62
	IM-xDSL V 2GND	7040.07	1TE	78 x 23 x 108mm	12 pcs.	92g	62
	IM-xDSL T 2GND	7040.11	1TE	78 x 23 x 108mm	12 pcs.	92g	62
	Module IM-xDSL	7040.01	1TE	61 x 49 x 21mm	24 pcs.	28g	62
	Module IM-xDSL V	7040.05	1TE	61 x 49 x 21mm	24 pcs.	28g	62
	Module IM-xDSL T	7040.09	1TE	61 x 49 x 21mm	24 pcs.	28g	62
	IMTEST	127 145	1TE	61 x 49 x 21mm		26g	63
C1/C2/C3 Modular SPD for Explosive environments (Ex)							
	IM-15Ex	704 102	1TE	78 x 23 x 108mm	12 pcs.	96g	66
	IM-30Ex	704 104	1TE	78 x 23 x 108mm	12 pcs.	96g	66
	Module IM-15Ex	704 101	1TE	61 x 49 x 21mm	24 pcs.	32g	66
	Module IM-30Ex	704 103	1TE	61 x 49 x 21mm	24 pcs.	32g	66
Class I, II, III; D1/C1/C2/C3 Modular and Compact SPD for DC Power Systems							
	DC PROTEC B 10/24	510 598	4TE	78 x 71 x 106mm	3 pcs.	327g	70
	DC PROTEC B 10/48	510 600	4TE	78 x 71 x 106mm	3 pcs.	327g	70
	DC PROTEC B(R) 10/24	510 599	4TE	78 x 71 x 106mm	3 pcs.	332g	70
	DC PROTEC B(R) 10/48	510 601	4TE	78 x 71 x 106mm	3 pcs.	332g	70
	DC PROTEC C 40/24	510 564	2TE	39 x 74 x 106mm	7 pcs.	204g	72
	DC PROTEC C 40/48	510 566	2TE	39 x 74 x 106mm	7 pcs.	204g	72
	DC PROTEC CR 40/24	510 565	2TE	39 x 74 x 106mm	7 pcs.	208g	72
	DC PROTEC CR 40/48	510 567	2TE	39 x 74 x 106mm	7 pcs.	208g	72
	PROTEC C 40/75	50.0001	1TE	78 x 23 x 108mm	12 pcs.	112g	74
	PROTEC CR 40/75	50.0011	1TE	78 x 23 x 108mm	12 pcs.	117g	74
	Module PROTEC C 40/75	50.0216	1TE	78 x 23 x 108mm	12 pcs.	40g	74
	PROTEC CN 40/75	507.001	1TE	78 x 23 x 108mm	12 pcs.	127g	76
	PROTEC CNR 40/75	507.011	1TE	78 x 23 x 108mm	12 pcs.	132g	76
	PROTEC DMDR 20/24V	515 051	1TE	78 x 23 x 108mm	12 pcs.	96g	78
	PROTEC DMDR 20/48V	515 053	1TE	78 x 23 x 108mm	12 pcs.	96g	78
	PROTEC DMDR 20/60V	515 054	1TE	78 x 23 x 108mm	12 pcs.	96g	78
	PROTEC DMDR 20/120V	515 055	1TE	78 x 23 x 108mm	12 pcs.	96g	78
	Module PROTEC DMDR 20/24V	515 086	1TE	61 x 49 x 21mm	24 pcs.	32g	78
	Module PROTEC DMDR 20/48V	515 087	1TE	61 x 49 x 21mm	24 pcs.	32g	78
	Module PROTEC DMDR 20/60V	515 088	1TE	61 x 49 x 21mm	24 pcs.	32g	78
	Module PROTEC DMDR 20/120V	515 089	1TE	61 x 49 x 21mm	24 pcs.	32g	78
	VM-DC 12V	7035.02	1TE	78 x 23 x 108mm	12 pcs.	90g	80
	VM-DC 24V	7035.04	1TE	78 x 23 x 108mm	12 pcs.	90g	80
	Module VM-DC 12V	7035.01	1TE	61 x 49 x 21mm	24 pcs.	28g	80
	Module VM-DC 24V	7035.03	1TE	61 x 49 x 21mm	24 pcs.	28g	80
	SMH-PS 12V	7081.20	2/3TE	87 x 15 x 102mm	15 pcs.	64g	82
	SMH-PS 24V	7081.21	2/3TE	87 x 15 x 102mm	15 pcs.	64g	82
	SMH-PS 48V	7081.22	2/3TE	87 x 15 x 102mm	15 pcs.	64g	82
	Module SMH-PS 12V	7081.25	2/3TE	87 x 15 x 102mm	15 pcs.	36g	82
	Module SMH-PS 24V	7081.26	2/3TE	87 x 15 x 102mm	15 pcs.	36g	82
	Module SMH-PS 48V	7081.27	2/3TE	87 x 15 x 102mm	15 pcs.	36g	82


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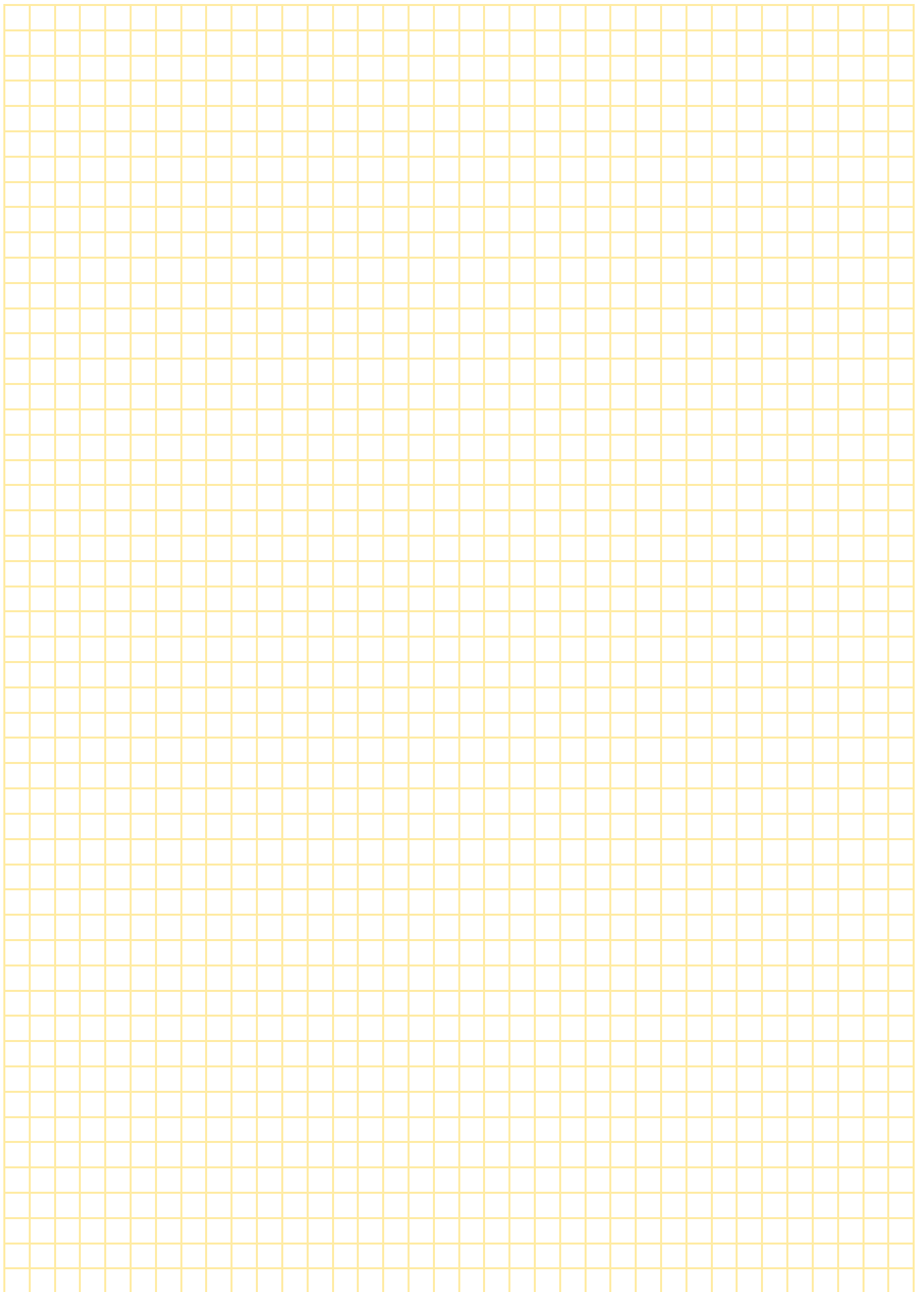
	Product name	Ordering code	Product dimensions DIN 43880	Packaging dimensions (single unit)	MOQ	Weight netto	Page	
Class III, D1/C1/C2/C3 SPD for LAN								
	LZ-NET 6	706 301	/	78 x 23 x 108mm	12 pcs.	120g	86	
	LZ-NET	706 001	/	55 x 50 x 106mm	12 pcs.	56g	88	
	LZ-NET-PoE	706 002	/	55 x 50 x 106mm	12 pcs.	56g	88	
	LZ-NET-STP	706 011	/	55 x 50 x 106mm	12 pcs.	60g	88	
	LZ 8 NET 19	706 110	/	483 x 108 x 45mm	1 pc.	1.060g	90	
	LZ 16 NET 19	706 111	/	483 x 108 x 45mm	1 pc.	1.160g	90	
	LZ 24 NET 19	706 112	/	483 x 108 x 45mm	1 pc.	1.240g	90	
	LZ 8 NET 19 M	706 113	/	258 x 113 x 49mm	1 pc.	146g	90	
	LZ 8 NET 19 PoE	706 130	/	483 x 108 x 45mm	1 pc.	1.060g	90	
	LZ 16 NET 19 PoE	706 131	/	483 x 108 x 45mm	1 pc.	1.160g	90	
	LZ 24 NET 19 PoE	706 132	/	483 x 108 x 45mm	1 pc.	1.240g	90	
	LZ 8 NET 19 M PoE	706 133	/	258 x 113 x 49mm	1 pc.	146g	90	
	ZE 200 NET	121 257	/	94 x 78 x 151mm	1 pc.	190g	92	
	D1/C1/C2/C3 SPD for Data Protocols							
		VM-RS 485	703 801	2TE	39 x 74 x 106mm	6 pcs.	114g	96
IM-DB 9		127 526	/	47 x 59 x 20mm	1 pc.	28g	98	
IM-DB 15 RS (M-line)		127 517	/	78 x 94 x 151mm	1 pc.	146g	100	
IM-DB 15 RS (F-line)		127 516	/	78 x 94 x 151mm	1 pc.	146g	100	
C1/C2/C3 Various Data SPD								
	PLP-24V	127 515	/	144 x 100 x 80mm	8 pcs.	324g	104	
	IM-GD	123 495	/	61 x 49 x 21mm	30 pcs.	12g	106	
	IM-GDC	123 496	/	61 x 49 x 21mm	30 pcs.	8g	106	
	IM-NF 5V	127 138	/	61 x 49 x 21mm	30 pcs.	14g	108	
	IM-NF 15V	127 139	/	61 x 49 x 21mm	30 pcs.	14g	108	
	IM-NF 24V	127 141	/	61 x 49 x 21mm	30 pcs.	14g	108	
C1/C2/C3 SPD for Coaxial / RF Systems								
	ZV-BNC ±5V	7050.01	/	140 x 200mm (pvc)	1 pc.	58g	112	
	ZV-BNC ±12V	7050.02	/	140 x 200mm (pvc)	1 pc.	58g	112	
	ZV1	125 090	/	90 x 150mm (pvc)	1 pc.	32g	114	
	ZV1-F	125 210	/	90 x 150mm (pvc)	1 pc.	32g	114	
	CPP 70-BNC-FF	800 729	/	73 x 30 x 30mm	100 pcs.	106g	116	
	CPP 180-BNC-FF	800 730	/	73 x 30 x 30mm	100 pcs.	106g	116	
	CCP 280-BNC-FF	800 731	/	73 x 30 x 30mm	100 pcs.	106g	116	
	CCP 70-BNC-MF	800 732	/	73 x 30 x 30mm	100 pcs.	114g	116	
	CCP 180-BNC-MF	800 733	/	73 x 30 x 30mm	100 pcs.	114g	116	
	CCP 280-BNC-MF	800 734	/	73 x 30 x 30mm	100 pcs.	114g	116	
	CCP 70-7/16-MF	800 720	/	82 x 40 x 40mm	100 pcs.	218g	118	
	CCP 180-7/16-MF	800 721	/	82 x 40 x 40mm	100 pcs.	218g	118	
	CCP 280-7/16-MF	800 722	/	82 x 40 x 40mm	100 pcs.	218g	118	
	CCP 70-N-FF	800 723	/	73 x 30 x 30mm	100 pcs.	138g	120	
	CCP 180-N-FF	800 724	/	73 x 30 x 30mm	100 pcs.	138g	120	
	CCP 280-N-FF	800 725	/	73 x 30 x 30mm	100 pcs.	138g	120	
	CCP 70-N-MF	800 726	/	73 x 30 x 30mm	100 pcs.	142g	120	
	CCP 180-N-MF	800 727	/	73 x 30 x 30mm	100 pcs.	142g	120	
	CCP 280-N-MF	800 728	/	73 x 30 x 30mm	100 pcs.	142g	120	
	CCP 180-N-6G-FF	800 763	/	73 x 30 x 30mm	100 pcs.	132g	122	
	CCP 180-N-6G-MF	800 764	/	73 x 30 x 30mm	100 pcs.	130g	122	
CCP 180-TNC-6G-FF	800 778	/	73 x 30 x 30mm	100 pcs.	130g	124		
CCP 180-TNC-6G-MF	800 777	/	73 x 30 x 30mm	100 pcs.	128g	124		

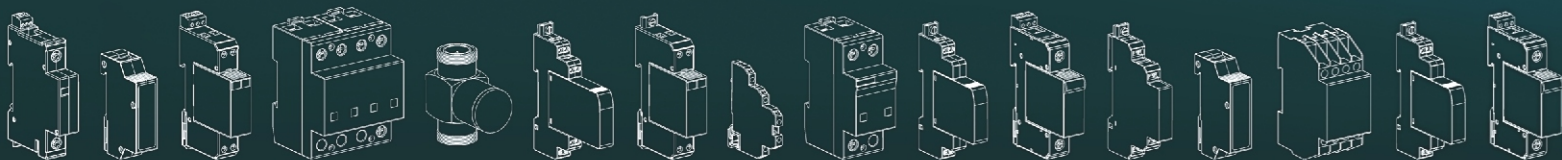
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	Product name	Ordering code	Product dimensions DIN 43880	Packaging dimensions (single unit)	MOQ	Weight netto	Page
	CCP 70-UHF-FF	800 735	/	62 x 30 x 35mm	100 pcs.	104g	126
	CCP 180-UHF-FF	800 736	/	62 x 30 x 35mm	100 pcs.	104g	126
	CCP 270-UHF-FF	800 737	/	62 x 30 x 35mm	100 pcs.	104g	126
	CCP 70-UHF-MF	800 738	/	62 x 30 x 35mm	100 pcs.	104g	126
	CCP 180-UHF-MF	800 739	/	62 x 30 x 35mm	100 pcs.	104g	126
	CCP 280-UHF-MF	800 740	/	62 x 30 x 35mm	100 pcs.	104g	126
	CCP 70-F75-FF	800 741	/	73 x 30 x 30mm	100 pcs.	80g	128
	CCP 180-F75-FF	800 742	/	73 x 30 x 30mm	100 pcs.	80g	128
	CCP 70-F75-MF	800 742	/	73 x 30 x 30mm	100 pcs.	84g	128
	CCP 180-F75-MF	800 744	/	73 x 30 x 30mm	100 pcs.	84g	128
	CCP 70-TV75-FF	800 745	/	73 x 30 x 30mm	100 pcs.	80g	130
	CCP 180-TV75-FF	800 746	/	73 x 30 x 30mm	100 pcs.	80g	130
	CCP 70-TV75-MF	800 747	/	73 x 30 x 30mm	100 pcs.	82g	130
	CCP 180-TV75-MF	800 748	/	73 x 30 x 30mm	100 pcs.	82g	130
	CCP-L/4-7/16-MF	800 755	/	73 x 35 x 70mm	100 pcs.	320g	132
	CCP-L/4-7/16-FF	807 556	/	73 x 35 x 70mm	100 pcs.	312g	132
	CCP-L/4-N-MF	800 757	/	77 x 30 x 60mm	100 pcs.	282g	134
	CCP-L/4-N-FF	800 758	/	77 x 30 x 60mm	100 pcs.	266g	134

Class III; C1/C2/C3 Combined Plug-in SPD

	ZES-76 TEL-TV	121 368	/	220 x 160 x 74mm	1 pc.	220g	138
	ZES-7 TEL-TV	121 369	/	330 x 175 x 52mm	1 pc.	790g	139
	ZES 1M+5S	121 370	/	350 x 185 x 52mm	1 pc.	790g	140
	ZES 1M+4S TEL-NET USB Hub	121 380	/	350 x 185 x 52mm	1 pc.	800g	141
	ZES-6	121 374	/	430 x 120 x 52mm	1 pc.	590g	142





QR code

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