



**BE ON THE SAFE SIDE**

# Surge Protection

Low Voltage Power Systems



**ISKRA ZAŠČITE**

# Is your equipment at risk from surges? We can help!

Dear reader! We are proud to be able to present you our new catalog. We want to offer to you our knowledge and experience and thus contribute our share to the progress in the field of surge protection devices. The **quality of our products** has been recognized by a number of independent institutions which have **rewarded** our efforts with **internationally** recognized certificates, while we ourselves, strive to share our findings with professional associations and committees responsible for providing users with safe, reliable and technologically advanced devices.

Our team is having over 20 years of experiences in lightning and surge protection. With our **new series of Safetec and Power Quality products** we became one of the **leaders of the market**. Our mission is to offer products which will help mankind to tame unpredictable possible damages caused by lightning and other overvoltages. Because of global warming process, our weather is changing and we have to face with more unpredictable storm situations. On the other hand, usage of the modern electrical and electronic equipment which is very sensitive to overvoltage, increases every day.

## Marketing and Sales

In today's world of quick changing technologies there are customers who create our policy and strategies, therefore, marketing and sales departments are the one who have to support you! We offer wide range of products and total flexibility in product development. Our sales people will take care of all your needs so do not hesitate to contact us or our representatives (more on [www.iskrazascite.si](http://www.iskrazascite.si)).

## R & D

We easily keep pace with the world trends. Our main interests are **safety, reliability and green technology**. We believe that in long-term company will grow only on the basis of its own development. Therefore, unlimited attention is paid to innovations and new solutions are constantly encouraged. Our own R&D equipment and **testing laboratory** is enabling us to have fast and quality R&D processes. Because of that we can offer maximal flexibility and **custom made solutions**.

## Quality

The company is **ISO 9001:2008** certified. It is also certified to **EN 13980 (94/9/EC ATEX)** directives for intrinsic safety. These two international standards ensure that quality is part of each step from conceptual design to fitting. A number of our employees are technical experts to various committees developing international and local standards. Such involvement at the standards development level ensures that our products are always at the cutting edge of design and are in compliance with relevant certifications such as **VDE, ÖVE, IEC, IECEx and UL**.

## International standards participation

We are presented on the following Standards and Conformity Assessment Committees and their Working Groups:

- ◆ **Slovenian institute for standardization - SIST**  
SIST/TC STZ - Protection against effects of lightning  
SIST/TC POD - Surge protection devices  
SIST/TC PVS - Photovoltaic systems
- ◆ **European Committee for Electrotechnical Standardization - CENELEC**  
CLC/TC37A - Low voltage surge protective devices  
WG1 and WG2
- ◆ **International Electrotechnical Committees - IEC**  
IEC TC81 - Lightning Protection. WG3 / WG9.  
IEC SC37A - Surge Protective Devices. WG3 / WG4 / WG5.  
IEC SC37B - Surge Protective Components.
- ◆ **Institute of Electrical and Electronic Engineers IEEE. SPDC 3.0 Surge Protective Devices Main Committee**  
WG3.6.4 LV Surge Protective Devices.  
WG3.6.6 Low Voltage Circuit Protective Devices.  
WG3.6.9 Low Voltage AC Power System SPDs - Line Side of the Service Equipment files.  
WG3.6.10 Protection of Equipment connected to both ac power and communication circuits.
- ◆ **Underwriters Laboratories Inc**  
STP 1449 - Standards Technical Panel, Surge protective Devices.

# Common Power Distribution Systems (Europe)

IEC 364-4-41 (1992) designates low voltage distribution systems (networks) using two letters. The first letter details the grounding method used at the source (i.e. the secondary side of the power distribution transformer). The second letter details the grounding method used at the consumer's electrical installation for any conductive metal parts.

This method is used to define three basic systems:

- TN system;
- TT system;
- IT system.

Where the abbreviations have the following meaning:

First letter - grounding method used at the source:

- T** direct connection to ground of power supply source (star point of transformer secondary winding).
- I** isolation of power supply source from ground, or connection via a high impedance.

Second letter - grounding method used at exposed conductive parts in the electrical installation:

- T** exposed conductive parts are directly grounded independent of eventual existing grounded feeding point
- N** exposed conductive parts are directly connected to grounding electrode (grounding resistor)

Subsequent prefixes may be used to describe the arrangement of neutral and protective conductors

- S** neutral and protective conductor are separated
- C** neutral and protective conductor are connected

Hence it follows that there are three possible TN systems: TN-S, TN-C and TN-C-S

Various protective devices may be installed on different distribution systems:

- Over-current protective device (CB, Fuses etc),
- Residual protective device (RCD, GFI)
- Insulation monitoring device
- Fault-voltage-operated protective device

It is important to ensure that an SPD is correctly selected and co-ordinated with the type of power system in use and any over-current protection devices installed. The following protective devices are encountered in the power systems shown:

## TN System

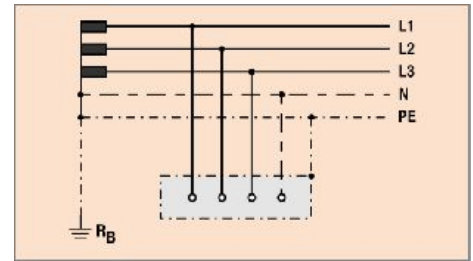
- Over-current protective device;
- Residual current protective device

## TT System

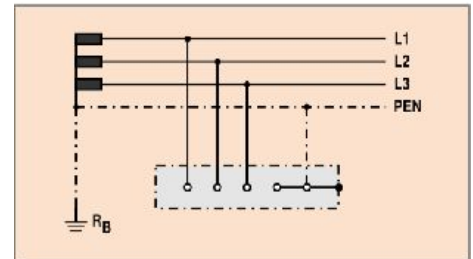
- Over-current protective device;
- Residual current protective device
- Fault-voltage-operated protective device

## IT System

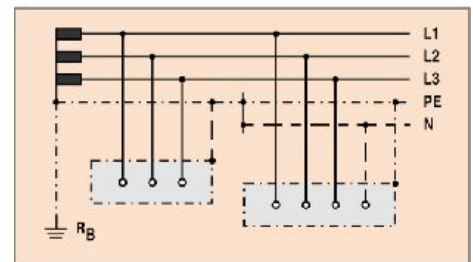
- Over-current protective device;
- Residual current protective device
- Insulation monitoring device
- Fault-voltage-operated protective device



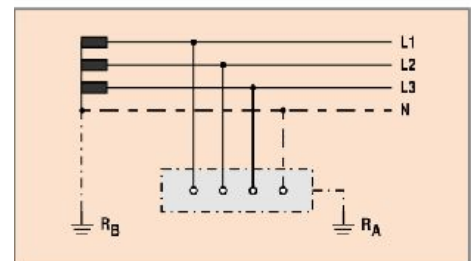
TN-S system



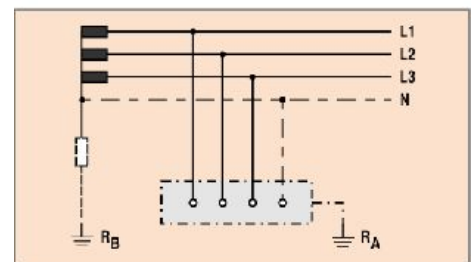
TN-C system



TN-C-S system

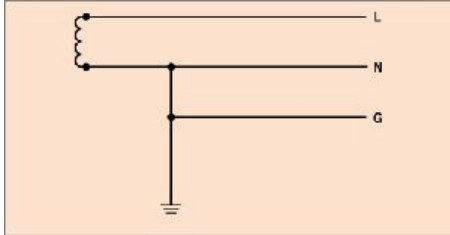
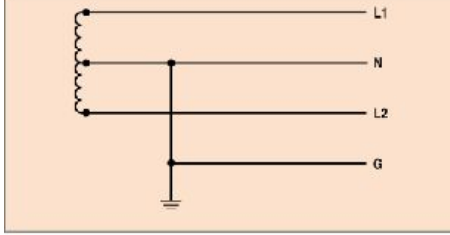
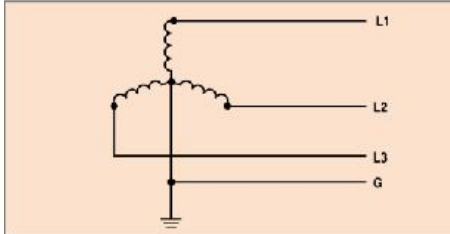
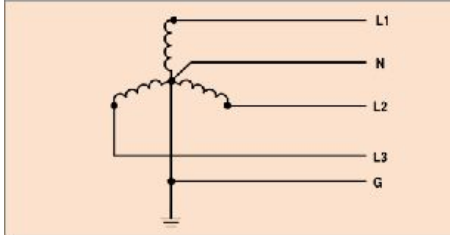
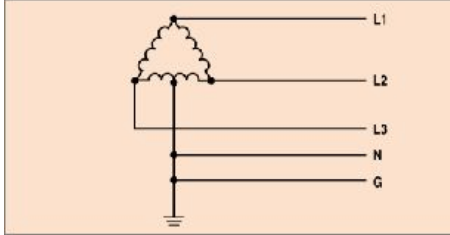
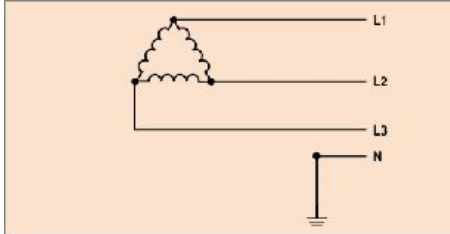
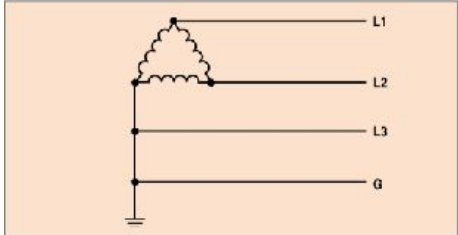


TT system



IT system

# Common Power Distribution Systems (North America, Asia, Latin America)

Description	Typical Supply Voltages	Source Configuration
<b>Single-phase</b> <b>1Ph,2W+G</b>	110V, 120V, 220V, 240V (L-N)	
<b>Single-phase</b> <b>1Ph,W+G</b> Also known as Split phase or Edison system	120/240V (L-N/L-L)	
<b>3-phase WYE without neutral</b> <b>3Ph Y,4W+G</b>	480V (L-L)	
<b>3-phase WYE with neutral</b> <b>3Ph Y,4W+G</b>	120/208V, 220/380V 230/400V, 240/415V 277/480V, 347/600V (L-N/L-L)	
<b>Delta High Leg</b> <b>3Ph,4W+G</b>	120/240V (L-N/L-L)	
<b>Delta Ungrounded</b> <b>3Ph,3W+G</b>	240V, 480V (L-L)	
<b>Delta Grounded Corner</b> <b>3Ph,3W+G</b>	240V, 480V (L-L)	

# SPD Terminology

## Surge Protective Device SPD

A device that is intended to limit transient overvoltages and divert surge currents. It contains at least one nonlinear component.

## Maximum continuous operating voltage $U_c$

The maximum r.m.s. or d.c. voltage, which may be continuously applied to the SPD's mode of protection.

## Voltage protection level $U_p$

A parameter that characterizes the performance of the SPD in limiting the voltage across its terminals, which is selected from a list of preferred values. This value shall be greater than the highest value of the measured limiting voltages.

## Residual voltage $U_{res}$

The peak value of voltage that appears between the terminals of an SPD due to the passage of discharge current temporary overvoltage test value.

## Impulse discharge current for class I test $I_{imp}$

The crest value of discharge current through the SPD with specific charge transferred  $Q$  and specified energy  $W/R$  in the specified time.

## Nominal discharge current $I_n$

The crest value of the current through the SPD having a current waveshape of 8/20. This is used for the classification of the SPD for class II test and also for preconditioning of the SPD for class I and II tests.

## Maximum discharge current $I_{max}$ for class II test

Crest value of a current through the SPD having an 8/20 waveshape and magnitude according to the test sequence of the class II operating duty test.  $I_{max}$  is greater than  $I_n$ .

## 1.2/50 voltage impulse

Voltage impulse with a virtual front time of  $1.2\mu s$  and a time to half-value of  $50\mu s$ .

## 8/20 current impulse

Current impulse with a virtual front time of  $8\mu s$  and a time to half-value of  $20\mu s$ .

## Combination wave

The combination wave is delivered by a generator that applies a 1.2/50 voltage impulse across an open circuit and an 8/20 current impulse into a short circuit. The voltage, current amplitude and waveforms that are delivered to the SPD are determined by the generator and the impedance of the SPD to which the surge is applied. The short-circuit current is symbolized by  $I_{SC}$ . The open-circuit voltage is symbolized by  $U_{OC}$ .

## Degrees of protection provided by enclosure IP code

The extent of protection provided by an enclosure against access to hazardous parts, against ingress of solid foreign objects and/or against ingress of water (see IEC 60529).

## SPD disconnector

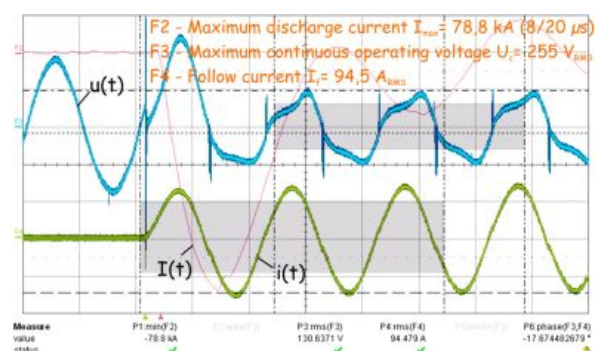
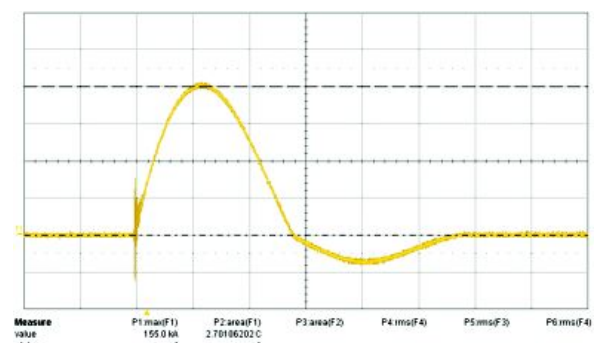
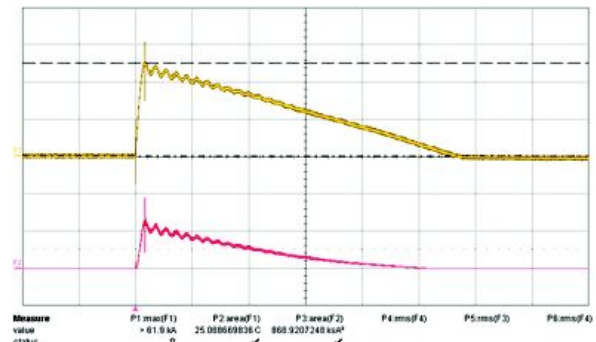
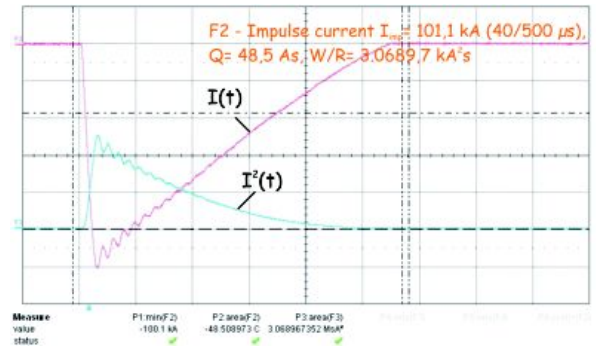
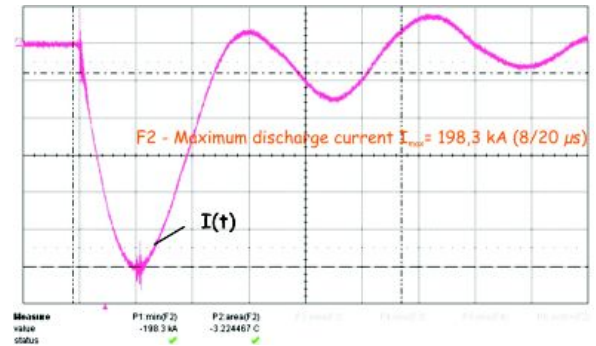
Device (internal and/or external) required for disconnecting an SPD from the power system.

## Follow current $I_f$

Current supplied by the electrical power system and flowing through the SPD after a discharge current impulse. The follow current is significantly different from the continuous operating current  $I_c$ .

## Back-up fuse

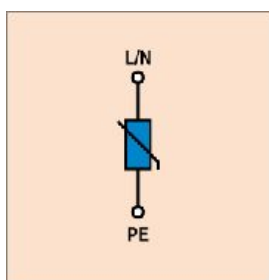
Overcurrent device (for example, circuit-breaker or fuse), which could be part of the electrical installation located externally upstream of the SPD.



## Reference

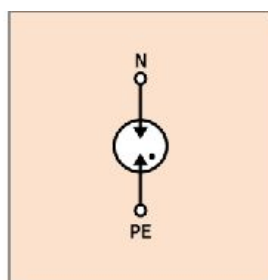
1. IEC 61643-1 Surge protective devices connected to low voltage power distribution systems - requirements and tests;
2. IEC 61643-12 Surge protective devices connected to low voltage power distribution systems - Selection and application principles;
3. IEC 61312-1 Protection against lightning electromagnetic impulse (LEMP) - Part 1: General principle
4. IEC 61312-2 Protection against lightning electromagnetic impulse (LEMP) - Part 2: Shielding of structures, bonding inside structures and earthing;
5. IEC 61312-3 Protection against lightning electromagnetic impulse (LEMP) - Part 3: Requirements of surge protection devices (SPDs);
6. IEC 61312-4 Protection against lightning electromagnetic impulse (LEMP) - Part 4: Protection of equipment in existing structures;
7. SIST EN 50614-3 Lightning Protection Components (LCP) - Part 3: Requirements for isolating spark gaps;
8. CEI IEC 60364-5-53 Electrical installation of buildings - Part 5-53: Selection and erection of electrical equipment - isolation, switching and control;
9. IEC PAS 60099-7 Surge arresters - Part 7: Glossary of terms and definitions from IEC publications 60099-1, 60099-4, 60099-6, 61643-1, 61643-12, 61643-21, 61643-311, 61643-321, 61643-331 and 61643-341;
10. IEC 61000-4-5: Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test;
11. IEC 62305-1 Protection against lightning - Part 1: General principles;
12. IEC 62305-2 Protection against lightning - Part 2: Risk management;
13. IEC 62305-3 Protection against lightning - Part 3: Physical damage to structures and life hazard;
14. IEC 62305-4 Protection against lightning - Part 4: Electrical and electronic systems within structures;
15. ITU-T K.20 Protection against interferences: Resistibility of telecommunication switching equipment to overvoltages and overcurrents;
16. ITU-T K.21 Protection against interferences: Resistibility of subscriber's terminal to overvoltages and overcurrents;
17. ITU-T K.44 Protection against interferences: Resistibility test for telecommunication equipment exposed to overvoltages and overcurrents - Basic Recommendation;
18. IEC 61643-21 Low voltage surge protective devices - Part 21: Surge protective devices connected to telecommunications and signaling networks - Performance requirements and testing methods;
19. IEC 61643-22 Low-Voltage Surge Protective Devices - Part 22: Surge protection devices connected to telecommunications and signaling networks - Selection and application principles;
20. UL 1449

## Typical component typologies used in SPDs



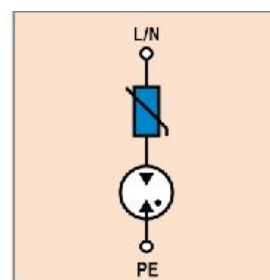
### SPD comprising metal oxide varistor

- no problems with following current  $I_f$
- quick response time  $t_A (\leq 25\mu s)$  means low residual voltage
- responds well to very low overvoltages
- high surge capacity, up to 50kA 10/350 $\mu s$



### SPD comprising gas discharge tube



- high surge capacity 100kA 10/350 $\mu s$
- no exhausting of ionised gases
- used in TT systems as galvanic separation between N-PE conductors



### SPD comprising series arrangement of varistor and gas discharge tube

- no following current  $I_f$
- quick response time  $t_A (\leq 25\mu s)$  means low residual voltage
- responds well to low overvoltages
- high surge capacity, up to 25kA 10/350 $\mu s$

<b>2</b>	<b>QUICK PRODUCT SELECTION</b>
<b>7</b>	<b>SINGLE-POLE Surge Protective Devices, Type 1, 2</b> PROTEC BS(R) Series I <sub>imp</sub> : up to 100kA (10/350)
<b>17</b>	<b>MULTI-POLE Surge Protective Devices, Type 1, 2, 3</b> PROBLOC BS(R) Series I <sub>imp</sub> = up to 50kA per pole(10/350)
<b>27</b>	<b>MULTI-POLE Surge Protective Devices, Type 1, 2, 3</b> PROBLOC BS(R) Series I <sub>imp</sub> = 12.5kA per pole(10/350)
<b>35</b>	<b>MULTI-POLE Surge Protective Devices, Type 1, 2</b> INPROTEC (R) Series I <sub>imp</sub> = 12.5kA per pole(10/350)
<b>41</b>	<b>MULTI-POLE Surge Protective Devices, Type 1, 2</b> PROBLOC BSG(R) Series I <sub>imp</sub> = up to 25kA per pole (10/350)
<b>51</b>	<b>Modular MULTI-POLE Surge Protective Devices, Type 1, 2, 3</b> PROTEC B2S(R) Series I <sub>imp</sub> = 12.5kA per pole (10/350)
<b>59</b>	<b>Modular MULTI-POLE Surge Protective Devices, Type 2</b> SAFETEC C(R) Series I <sub>max</sub> = 40kA per pole (8/20)
<b>67</b>	<b>Modular MULTI-POLE Surge Protective Devices, Type 2</b> PROTEC C(R) Series I <sub>max</sub> = 40kA per pole (8/20)
<b>81</b>	<b>Modular MULTI-POLE Surge Protective Devices, Type 2</b> PROTEC CM(R) Series I <sub>max</sub> = 40kA per pole (8/20)
<b>87</b>	<b>Modular SINGLE-POLE and MULTI-POLE Surge Protective Devices, Type 2</b> PROTEC CG(R) and PROTEC CMG(R) Series I <sub>max</sub> = up to 40kA per pole (8/20)
<b>93</b>	<b>Modular and Compact SINGLE-POLE and MULTI-POLE Surge Protective Devices, Type 3</b> PROTEC D(R), PROTEC DM(R), PROTEC DMG(R) Series MPE-ZE50, MPE-MINI, ZE 200 PS, VTC 10 Series PROFILT D Series U <sub>oc</sub> /I <sub>sc</sub> = up to 10kV/5kA per pole (1.2/50, 8/20)
<b>103</b>	<b>Surge Protective Devices for Overhead Power Lines</b> PROTEC A Series
<b>109</b>	<b>Isolating Spark Gaps (ISG) for Equipotential Bonding</b> EPZ Series
<b>113</b>	<b>MULTI-POLE Surge Protective Devices for Photovoltaic Systems</b> PV PROTEC and SAFETEC PV Series
<b>119</b>	<b>MULTI-POLE Surge Protective Devices for Wind Generation Systems</b> WT PROTEC BS(R) and SAFETEC C(R) WT Series
<b>125</b>	<b>Power Quality Surge Protection Solutions</b>
<b>137</b>	<b>Connection Accessories</b>
<b>143</b>	<b>Product Index</b>

Category IEC/EN/VDE	Description	Product Name	Page	Product Photo	
<b>Class I, II Type 1, 2 B+C</b>	SINGLE-POLE Surge Protective Devices $I_{imp}$ : up to 100kA (10/350)	<b>PROTEC BS(R) 50</b>	<b>8</b>		
		<b>PROTEC BS(R) 35</b>	<b>9</b>		
		<b>PROTEC BS(R) 25</b>	<b>10</b>		
		<b>PROTEC B2N(R) 12.5</b>	<b>11</b>		
		<b>PROTUBE BS 100</b>	<b>12</b>		
		<b>PROTUBE BS 50</b>	<b>12</b>		
		<b>PROTUBE B2N(R) 50</b>	<b>13</b>		
<b>Class I, II, III Type 1, 2, 3 B+C+D</b>	MULTI-POLE Surge Protective Devices $I_{imp}$ : up to 50kA per pole (10/350)	<b>PROBLOC BS(R) 100 (1+1)</b>	<b>18</b>		
		<b>PROBLOC BS(R) 50 (2+0)</b>	<b>19</b>		
		<b>PROBLOC BS(R) 50 (1+1)</b>	<b>20</b>		
		<b>PROBLOC BS(R) 75 (3+0)</b>	<b>21</b>		
		<b>PROBLOC BS(R) 100 (4+0)</b>	<b>22</b>		
		<b>PROBLOC BS(R) 100 (3+1)</b>	<b>23</b>		
	MULTI-POLE Surge Protective Devices $I_{imp}$ : 12.5kA per pole (10/350)	<b>PROBLOC BS(R) 25 (2+0)</b>	<b>28</b>		
		<b>PROBLOC BS(R) 25 (1+1)</b>	<b>29</b>		
		<b>PROBLOC BS(R) 37.5 (3+0)</b>	<b>30</b>		
		<b>PROBLOC BS(R) 50 (4+0)</b>	<b>31</b>		
		<b>PROBLOC BS(R) 50 (3+1)</b>	<b>32</b>		
		<b>Class I, II Type 1, 2 B+C</b>	MULTI-POLE Surge Protective Devices $I_{imp}$ : 12.5kA per pole (10/350)		<b>INPROTEC VV(R) (2+0)</b>
<b>INPROTEC VG(R) (1+1)</b>	<b>37</b>				
<b>INPROTEC VS(R) (1+0)</b>	<b>38</b>				
SINGLE & MULTI-POLE Surge Protective Devices $I_{imp}$ : up to 25kA per pole (10/350)	<b>PROBLOC BSG(R) 100 (4+0)</b>		<b>42</b>		
	<b>PROBLOC BSG(R) 100 (3+1)</b>		<b>43</b>		
	<b>PROBLOC BSG(R) 100N (3+1)</b>		<b>44</b>		
	<b>PROBLOC BSG(R) 25</b>		<b>45</b>		
	<b>PROBLOC BSG(R) 50 (4+0)</b>		<b>46</b>		
	<b>PROBLOC BSG(R) 50 (3+1)</b>		<b>47</b>		
	<b>PROBLOC BSG(R) 12.5</b>		<b>48</b>		
	<b>Class I, II, III Type 1, 2, 3 B+C+D</b>		SINGLE & MULTI-POLE Surge Protective Devices $I_{imp}$ : 12.5kA per pole (10/350)	<b>PROTEC B2S(R) 12.5</b>	<b>52</b>
				<b>PROTEC B2S(R) 25 (2+0)</b>	<b>53</b>
<b>PROTEC B2S(R) 25 (1+1)</b>				<b>54</b>	
<b>PROTEC B2S(R) 37.5 (3+0)</b>				<b>55</b>	
<b>PROTEC B2S(R) 50 (4+0)</b>				<b>56</b>	
<b>PROTEC B2S(R) 50 (3+1)</b>		<b>57</b>			
<b>Class II Type 2 C</b>	SINGLE & MULTI-POLE Surge Protective Devices $I_{max}$ : 40kA per pole (8/20)	<b>SAFETEC C(R) 40</b>	<b>60</b>		
		<b>SAFETEC C(R) 80 (2+0)</b>	<b>61</b>		
		<b>SAFETEC C(R) 80 (1+1)</b>	<b>62</b>		
		<b>SAFETEC C(R) 120 (3+0)</b>	<b>63</b>		
		<b>SAFETEC C(R) 160 (4+0)</b>	<b>64</b>		
		<b>SAFETEC C(R) 160 (3+1)</b>	<b>65</b>		



**TECHNICAL CHARACTERISTICS**
**Surge Protective Devices for Low Voltage Power Systems**

$U_c$ (V <sub>AC</sub> )	$I_{imp}$ per pole (kA) (10/350)	$I_{max}$ per pole (kA) (8/20)	$U_{oc}/I_{sc}$ per pole (kV/kA) (1.2/50, 8/20)	Network Type				Remote Signalization of Failure	Housing
				TN-C	TN-S	TT	IT		
150, 275, 320, 385, 440 *	50	100		✓	✓		✓	✓	Compact
150, 275, 320, 385, 440 *	35	100		✓	✓		✓	✓	Compact
150, 275, 320, 385, 440 *	25	100		✓	✓		✓	✓	Compact
150, 275, 320, 385, 440 *	12.5	50						✓	Compact
255	100	100				✓			Compact
255	50	100				✓			Compact
255	50	100				✓	✓		Compact
150, 275, 320, 385, 440 *	50/100 (L-N/N/PE)	100/100 (L-N/N/PE)				✓		✓	Compact
150, 275, 320, 385, 440 *	25	100			✓			✓	Compact
150, 275, 320, 385, 440 *	25/50 (L-N/N/PE)	100/100 (L-N/N/PE)				✓		✓	Compact
150, 275, 320, 385, 440 *	25	100	10/5	✓				✓	Compact
150, 275, 320, 385, 440 *	25	100	10/5		✓			✓	Compact
150, 275, 320, 385, 440 *	25/100 (L-N/N/PE)	100/100 (L-N/N/PE)	10/5			✓		✓	Compact
150, 275, 320, 385, 440 *	12.5	50			✓			✓	Compact
150, 275, 320, 385, 440 *	12.5/50 (L-N/N/PE)	50/100 (L-N/N/PE)				✓		✓	Compact
150, 275, 320, 385, 440 *	12.5	50	10/5	✓				✓	Compact
150, 275, 320, 385, 440 *	12.5	50	10/5		✓			✓	Compact
150, 275, 320, 385, 440 *	12.5/50 (L-N/N/PE)	50/100 (L-N/N/PE)	10/5			✓		✓	Compact
150, 275, 320, 385, 440 *	12.5	80			✓		✓	✓	Compact
150, 275, 320, 385, 440 *	12.5/50 (L-N/N/PE)	80/80 (L-N/N/PE)				✓		✓	Compact
150, 275, 320, 385, 440 *	12.5	80		✓				✓	Compact
150, 320	25	100			✓			✓	Compact
150, 320	25/100 (L-N/N/PE)	100/100 (L-N/N/PE)				✓		✓	Compact
150, 320	25/50 (L-N/N/PE)	100/100 (L-N/N/PE)				✓		✓	Compact
150, 320	25	100		✓	✓	✓	✓	✓	Compact
150, 320	12.5	50		✓		✓	✓	✓	Compact
150, 320	12.5/50 (L-N/N/PE)	50/100 (L-N/N/PE)				✓		✓	Compact
150, 320	12.5	50		✓	✓	✓	✓	✓	Compact
150, 275, 320, 385, 440 *	12.5	60	10/5	✓	✓		✓	✓	Modular
150, 275, 320, 385, 440 *	12.5	60	10/5		✓			✓	Modular
150, 275, 320, 385, 440 *	12.5/50 (L-N/N/PE)	60/50 (L-N/N/PE)	10/5			✓		✓	Modular
150, 275, 320, 385, 440 *	12.5	60	10/5	✓				✓	Modular
150, 275, 320, 385, 440 *	12.5	60	10/5		✓			✓	Modular
150, 275, 320, 385, 440 *	12.5/50 (L-N/N/PE)	60/50 (L-N/N/PE)	10/5			✓		✓	Modular
150, 275, 320, 385, 440 *		40		✓	✓		✓	✓	Modular
150, 275, 320, 385, 440 *		40			✓			✓	Modular
150, 275, 320, 385, 440 *		40				✓		✓	Modular
150, 275, 320, 385, 440 *		40		✓				✓	Modular
150, 275, 320, 385, 440 *		40			✓			✓	Modular
150, 275, 320, 385, 440 *		40				✓		✓	Modular

\* Other voltages on customer request

Category IEC/EN/VDE	Description	Product Name	Page	Product Photo
<b>Class II</b> <b>Type 2</b> <b>C</b>	SINGLE & MULTI-POLE Surge Protective Devices $I_{max}$ : up to 40kA per pole (8/20)	<b>PROTEC C(R) 40</b>	68	
		<b>PROTUBE C 40</b>	69	
		<b>PROTEC C(R) 80 (2+0)</b>	70	
		<b>PROTEC C(R) 80 (1+1)</b>	71	
		<b>PROTEC C(R) 120 (3+0)</b>	72	
		<b>PROTEC C(R) 160 (4+0)</b>	73	
		<b>PROTEC C(R) 160 (3+1)</b>	74	
		<b>PROTEC C(R) 20</b>	76	
		<b>PROTEC CN(R) 40</b>	77	
		<b>PROTEC CN(R) 20</b>	78	
<b>PROTUBE CN 40</b>	79			
Modular MULTI-POLE Surge Protective Devices $I_{max}$ : 40kA per pole (8/20)	<b>PROTEC CM(R) 80 (2+0)</b>	82		
	<b>PROTEC CM(R) 80 (1+1)</b>	83		
	<b>PROTEC CM(R) 80A (1+1)</b>	84		
Modular SINGLE & MULTI-POLE Surge Protective Devices $I_{max}$ : up to 40kA per pole (8/20)	<b>PROTEC CG(R) 40</b>	88		
	<b>PROTEC CG(R) 20</b>	89		
	<b>PROTEC CMG(R) 40 (2+0)</b>	91		
<b>Class III</b> <b>Type 3</b> <b>D</b>	Modular and Compact SINGLE & MULTI-POLE Surge Protective Devices $U_{oc}/I_{sc}$ : up to 10kV/5kA per pole (1.2/50, 8/20)	<b>PROTEC D(R) 10</b>	94	
		<b>PROTEC DM(R) 20 (2+0)</b>	95	
		<b>PROTEC DMG(R) 20 (2+0)</b>	96	
		<b>MPE-ZE50</b>	97	
		<b>MPE-MINI</b>	98	
		<b>ZE 200 PS</b>	99	
		<b>VTC 10</b>	100	
<b>PROFIL D</b>	101			
<b>Class II</b> <b>Type 2</b> <b>A</b>	SINGLE-POLE Surge Protective Devices for Overhead power Lines $I_{max}$ : up to 40kA (8/20)	<b>PROTEC AQ 40</b>	104	
		<b>PROTEC AQS 40</b>	105	
		<b>PROTEC A 30</b>	106	
		<b>PROTEC AQ 25</b>	107	
<b>ISG</b>	Isolation Spark Gap for Equipotential Bonding $I_{max}$ : 100kA (8/20)	<b>EPZ 100</b>	110	
		<b>EPZ 100 Ex</b>	111	
<b>Class I, II; II</b> <b>Type 1, 2; 2</b> <b>B+C; C</b>	MULTI-POLE Surge Protective Devices for Photovoltaic Systems $I_{imp}$ : 12.5kA per pole (10/350) $I_{max}$ : 40kA per pole (8/20)	<b>PV PROTEC BS(R) 12.5</b>	114	
		<b>SAFETEC C(R) 40 PV</b>	115	
		<b>PV PROTEC C(R) 40</b>	116	
<b>Class I, II; II</b> <b>Type 1, 2; 2</b> <b>B+C; C</b>	SINGLE & MULTI-POLE Surge Protective Devices for Wind Generation Systems $I_{imp}$ : up to 25kA (10/350) $I_{max}$ : 40kA (8/20)	<b>WT PROTEC BS(R) 25</b>	119	
		<b>WT PROTEC BS(R) 12.5</b>	120	
		<b>SAFETEC C(R) 750 (3+0) WT</b>	121	

# TECHNICAL CHARACTERISTICS

# Surge Protective Devices for Low Voltage Power Systems

U <sub>c</sub> (V <sub>AC</sub> )	I <sub>imp</sub> per pole (kA) (10/350)	I <sub>max</sub> per pole (kA) (8/20)	U <sub>oc</sub> /I <sub>sc</sub> per pole (kV/kA) (1.2/50, 8/20)	Network Type				Remote Signalization of Failure	Housing
				TN-C	TN-S	TT	IT		
75, 150, 275, 320, 385, 440 *		40		✓	✓		✓	✓	Modular
255		40				✓			Modular
150, 275, 320, 385, 440 *		40			✓			✓	Modular
150, 275, 320, 385, 440 *		40/40 (L-N/N/PE)				✓		✓	Modular
150, 275, 320, 385, 440 *		40		✓				✓	Modular
150, 275, 320, 385, 440 *		40			✓		✓	✓	Modular
150, 275, 320, 385, 440 *		40/40 (L-N/N/PE)				✓		✓	Modular
150, 275, 320, 385, 440 *		20		✓	✓		✓	✓	Modular
150, 275, 320, 385, 440 *		40		✓	✓		✓	✓	Compact
150, 275, 320, 385, 440 *		20		✓	✓		✓	✓	Compact
255		40				✓			Compact
150, 275, 320, 385, 440 *		40			✓			✓	Modular
150, 275, 320, 385, 440 *		40/40 (L-N/N/PE)				✓		✓	Modular
150, 275, 320, 385, 440 *		40/40 (L-N/N/PE)				✓		✓	Modular
150, 275, 385		40		✓	✓	✓	✓	✓	Modular
75, 275, 385		20		✓	✓	✓	✓	✓	Modular
150, 275		20			✓	✓	✓	✓	Modular
150, 275, 320, 385, 440 *		10	10/5	✓	✓		✓	✓	Modular
150, 275, 320, 385, 440 *		10	10/5		✓		✓	✓	Modular
320		10	10/5		✓	✓	✓	✓	Modular
320		5	5/2.5		✓	✓	✓		Compact
275			6/3		✓	✓	✓		Compact
275			6/3		✓	✓	✓		Compact
150, 275, 320, 440		10	10/5	✓	✓		✓		Compact
275			6/3		✓	✓	✓		Compact
150, 275, 320, 385, 440 *		40		✓	✓		✓		Compact
150, 275, 320, 440 *		40		✓	✓		✓		Compact
150, 275, 320, 385, 440 *		30		✓	✓		✓		Compact
150, 275, 320, 385, 440 *		25		✓	✓		✓		Compact
350, 500		100							Compact
350, 500		100							Compact
550, 1000	12.5	40						✓	Compact
75, 300, 600, 1000, 1200		40, 40, 40, 25, 40						✓	Modular
100, 550, 1000		40						✓	Modular
750	25	80						✓	Compact
750	12.5	40						✓	Compact
750		25						✓	Modular

\* Other voltages on customer request



# SINGLE-POLE Surge Protective Devices



<b>Category IEC / EN / VDE:</b>	<b>Class I, II / Type 1, 2 / B+ C</b>
<b>Location of use:</b>	<b>Main distribution boards</b>
<b>Protection modes:</b>	<b>L/N-PE, L-PEN</b>
<b>Protective elements:</b>	<b>High Energy MOV and GDT</b>
<b>High surge discharge ratings:</b>	<b>I<sub>imp</sub> = up to 50kA</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnector for each MOV block</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>1TE ,2TE, 3TE, 4TE</b>

**PROTEC BS(R) 50**  
**PROTEC BS(R) 35**  
**PROTEC BS(R) 25**  
**PROTUBE BS 100**  
**PROTUBE BS 50**

The PROTEC BS and PROTUBE BS series of over-voltage surge protective devices have been developed to protect against partial direct and indirect lightning discharges and are intended to provide protection in zones 0<sub>A</sub> - 1 per IEC 62305.

PROTEC BS consists of two separate, high performance varistor blocks, each with a separate disconnection device.

PROTUBE BS consists of a high energy encapsulated air gap device and is used to provide galvanic separation between the N and PE conductors in a 1+1 or 3+1 power distribution system (TT single phase or three phase networks).

**PROTEC B2N(R) 12.5**  
**PROTUBE B2N(R) 50**

The PROTEC B2N series of overvoltage surge protective devices has been developed to protect against partial direct and indirect lightning discharges and is intended to provide protection in zones 0<sub>A</sub> - 1, per IEC 62305. The enclosure housing is a compact design. PROTEC B2N consists of a high performance varistor block with thermal disconnection device.

PROTUBE B2N consists of a high energy encapsulated air gap device and is used to provide galvanic separation between the N and PE conductors in a 1+1 or 3+1 power distribution system (TT single phase or three phase networks).

# PROTEC BS(R) 50

## Class I, II Single-pole Surge Protective Device $I_{imp} = 50kA (10/350)$

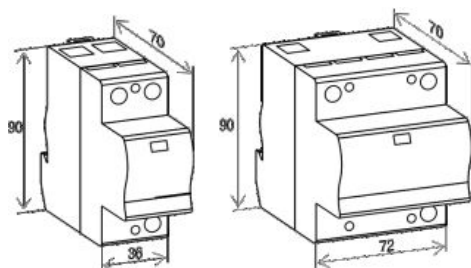


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S, TN-C, IT
- ◆ Protection modes: L/N - PE, L- PEN
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 50kA$
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 150kA$
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

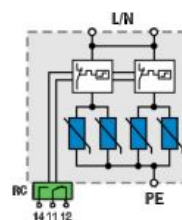
### Technical data

Type	PROTEC BS(R) 50/xxx				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			25kA		
Max. discharge current (8/20) $I_{max}$			100kA		
Impulse current (10/350) $I_{imp}$			50kA		
Specific energy			625kJ/Ω		
Charge			25As		
Protection level $U_p$	< 0.6kV	< 1.2kV	< 1.2kV	< 1.6kV	< 1.9kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.7kV	< 1.2kV	< 1.2kV	< 1.5kV	< 1.8kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 500A)			500A gL		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range			- 40°C ....+ 80°C		
Terminal screw torque			max. 4.5Nm		
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715			35mm top-hat rail		
Degree of protection			IP 20		
Housing material			Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880	2TE	2TE	2TE	4TE	4TE
Weight per unit	266g	374g	374g	438g	458g
Ordering code <b>PROTEC BS 50/xxx</b>	<b>502 314</b>	<b>502 315</b>	<b>502 316</b>	<b>502 296</b>	<b>502 297</b>
Remote contacts			YES		
Contact ratings			AC: 250V/0.5A; 125V/3A		
Terminal cross section			max. 1.5mm <sup>2</sup>		
Remote terminal torque			0.25Nm		
Weight per unit	271g	379g	379g	443g	463g
Ordering code <b>PROTEC BSR 50/xxx - with remote contacts</b>	<b>502 317</b>	<b>502 318</b>	<b>502 319</b>	<b>502 298</b>	<b>502 299</b>
Packaging dimensions (single unit)		109 x 76.5 x 41.5mm		109 x 76.5 x 78mm	

### Dimensions



### Connection diagram



# PROTEC BS(R) 35

## Class I, II Single-pole Surge Protective Device I<sub>imp</sub> = 35kA (10/350)

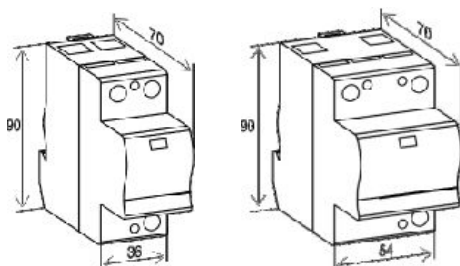


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S, TN-C, IT
- ◆ Protection modes: L/N - PE, L- PEN
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating: I<sub>imp</sub> = 35kA
- ◆ MOV max withstand capability 1 x 8/20: I<sub>max</sub> = 150kA
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

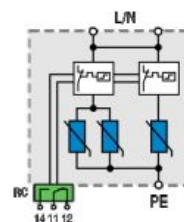
### Technical data

Type	PROTEC BS(R) 35/xxx				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) U <sub>c</sub>	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) I <sub>n</sub>			25kA		
Max. discharge current (8/20) I <sub>max</sub>			100kA		
Impulse current (10/350) I <sub>imp</sub>			35kA		
Specific energy			306kJ/Ω		
Charge			17.5As		
Protection level U <sub>p</sub>	< 0.6kV	< 1.2kV	< 1.2kV	< 1.6kV	< 1.9kV
Residual voltage at I <sub>imp</sub> U <sub>res</sub>	< 0.7kV	< 1.2kV	< 1.2kV	< 1.5kV	< 1.8kV
Follow current I <sub>f</sub>			NO		
Response time t <sub>A</sub>			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 315A)			315A gL		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range			- 40°C ....+ 80°C		
Terminal screw torque			max. 4.5Nm		
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715			35mm top-hat rail		
Degree of protection			IP 20		
Housing material			Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880	2TE	2TE	2TE	3TE	3TE
Weight per unit	254g	336g	336g	385g	415g
Ordering code PROTEC BS 35/xxx	502 320	502 321	502 322	502 306	502 307
Remote contacts			YES		
Contact ratings			AC: 250V/0.5A; 125V/3A		
Terminal cross section			max. 1.5mm <sup>2</sup>		
Remote terminal torque			0.25Nm		
Weight per unit	259g	341g	341g	390g	420g
Ordering code PROTEC BSR 35/xxx - with remote contacts	502 323	502 324	502 325	502 308	502 309
Packaging dimensions (single unit)			109 x 76.5 x 41.5mm		109 x 76.5 x 60mm

### Dimensions



### Connection diagram



# PROTEC BS(R) 25

## Class I, II Single-pole Surge Protective Device $I_{imp} = 25kA (10/350)$

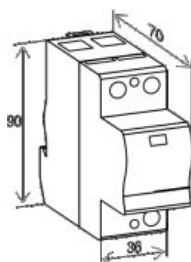


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S, TN-C, IT
- ◆ Protection modes: L/N - PE, L- PEN
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 25kA$
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 120kA$
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

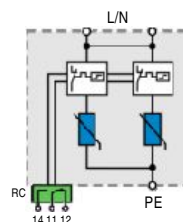
### Technical data

Type	PROTEC BS(R) 25/xxx				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			25kA		
Max. discharge current (8/20) $I_{max}$			100kA		
Impulse current (10/350) $I_{imp}$			25kA		
Specific energy			156kJ/Ω		
Charge			12.5As		
Protection level $U_p$	< 0.7kV	< 1.3kV	< 1.3kV	< 1.7kV	< 2.0kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.7kV	< 1.2kV	< 1.2kV	< 1.5kV	< 1.8kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 250A)			250A gL		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	2TE				
Weight per unit	200g	252g	252g	268g	284g
Ordering code <b>PROTEC BS 25/xxx</b>	<b>502 326</b>	<b>502 327</b>	<b>502 328</b>	<b>502 329</b>	<b>502 330</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	205g	257g	257g	273g	289g
Ordering code <b>PROTEC BSR 25/xxx - with remote contacts</b>	<b>502 331</b>	<b>502 332</b>	<b>502 333</b>	<b>502 334</b>	<b>502 335</b>
Packaging dimensions (single unit)	109 x 76.5 x 41.5mm				

### Dimensions



### Connection diagram





# PROTEC B2N(R) 12.5

## Class I, II Single-pole Surge Protective Device $I_{imp} = 12.5kA (10/350)$

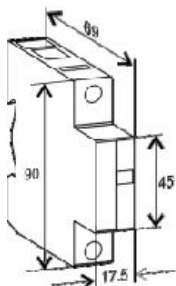


◆ Category IEC / EN / VDE:	Class I, II / Type 1, 2 / B+C
◆ Location of use:	Main distribution boards
◆ Connections:	TN-S, TN-C, IT
◆ Protection modes:	L/N - PE, L- PEN
◆ Protective element:	High Energy MOV
◆ High surge discharge rating:	$I_{imp} = 12.5kA$
◆ MOV max withstand capability 1 x 8/20:	$I_{max} = 80kA$
◆ Housing:	Compact design
◆ Complies with:	IEC-61643-1

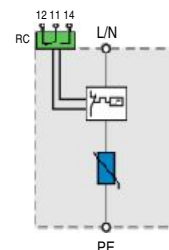
### Technical data

Type	PROTEC B2N(R) 12.5/xxx				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			20kA		
Max. discharge current (8/20) $I_{max}$			50kA		
Impulse current (10/350) $I_{imp}$			12.5kA		
Specific energy			39kJ/Q		
Charge			6.25As		
Protection level $U_p$	< 0.8kV	< 1.5kV	< 1.5kV	< 1.7kV	< 2.0kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.7kV	< 1.2kV	< 1.2kV	< 1.4kV	< 1.9kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 160A)			160A gL		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	max. 3.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	1TE				
Weight per unit	124g	150g	150g	143g	146g
Ordering code <b>PROTEC B2N 12.5/xxx</b>	<b>507 501</b>	<b>507 503</b>	<b>507 505</b>	<b>507 535</b>	<b>507 507</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	129g	155g	155g	148g	151g
Ordering code <b>PROTEC B2NR 12.5/xxx - with remote contacts</b>	<b>507 509</b>	<b>507 511</b>	<b>507 513</b>	<b>507 537</b>	<b>507 515</b>
Packaging dimensions (single unit)	108 x 74 x 24mm				

### Dimensions



### Connection diagram



# PROTUBE BS

## Class I, II Single-pole N-PE Surge Protective Device $I_{imp} = 100kA, 50kA (10/350)$

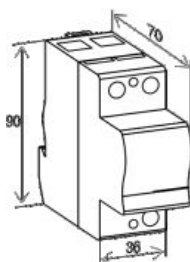


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TT
- ◆ Protection modes: N - PE
- ◆ Protective element: High Energy GDT
- ◆ High surge discharge rating:  $I_{imp} = 100kA, 50kA$
- ◆ GDT max withstand capability 1 x 8/20:  $I_{max} = 150kA$
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

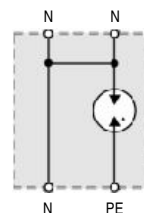
### Technical data

Type	PROTUBE BS 100	PROTUBE BS 50
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC)	$U_c$	255V
Nominal discharge current (8/20)	$I_n$	100kA
Max. discharge current (8/20)	$I_{max}$	100kA
Impulse current (10/350)	$I_{imp}$	50kA
Specific energy		2.5MJ/Ω
Charge		625kJ/Ω
Protection level	$U_p$	< 1.75kV
Follow current	$I_f$	> 100ARMS
Response time	$t_A$	100ns
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ... + 80°C
Terminal screw torque		max. 4.5Nm
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)
Mounting EN 60715		35mm top-hat rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		2TE
Weight per unit		238g
Ordering code <b>PROTUBE BS</b>	<b>503 044</b>	<b>503 042</b>
Packaging dimensions (single unit)		109 x 76.5 x 41.5mm

### Dimensions



### Connection diagram



# PROTUBE B2N(R) 50

Class I, II Single-pole N-PE Surge Protective Device  
 $I_{imp} = 50kA (10/350)$

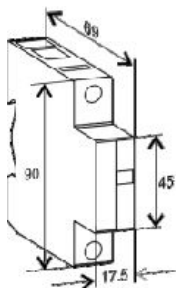


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TT
- ◆ Protection modes: N - PE
- ◆ Protective element: High Energy GDT
- ◆ High surge discharge rating:  $I_{imp} = 50kA$
- ◆ GDT max withstand capability 1 x 8/20:  $I_{max} = 150kA$
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

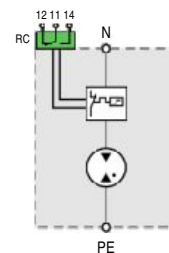
## Technical data

Type	PROTUBE B2N(R) 50	
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC)	$U_c$	255V
Nominal discharge current (8/20)	$I_n$	50kA
Max. discharge current (8/20)	$I_{max}$	100kA
Impulse current (10/350)	$I_{imp}$	50kA
Specific energy		625kJ/Ω
Charge		25As
Protection level	$U_p$	< 1.5kV
Follow current	$I_f$	> 100A <sub>RMS</sub>
Response time	$t_A$	100ns
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ...+ 80°C
Terminal screw torque		max. 3.5Nm
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)
Mounting EN 60715		35mm top-hat rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		1TE
Weight per unit		106g
Ordering code <b>PROTUBE B2N 50</b>		<b>507 572</b>
Remote contacts		YES
Contact ratings		AC: 250V/0.5A; 125V/3A
Terminal cross section		max. 1.5mm <sup>2</sup>
Remote terminal torque		0.25Nm
Weight per unit		111g
Ordering code <b>PROTUBE B2NR 50 - with remote contacts</b>		<b>507 573</b>
Packaging dimensions (single unit)		108 x 74 x 24mm

## Dimensions

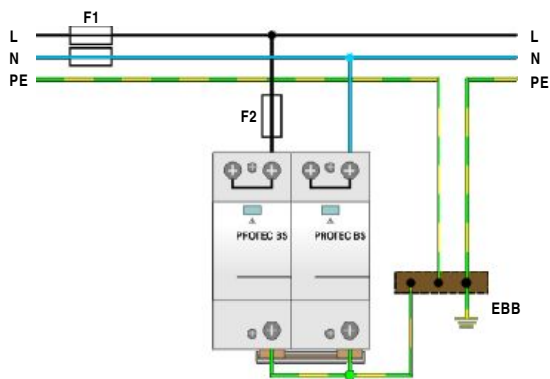


## Connection diagram

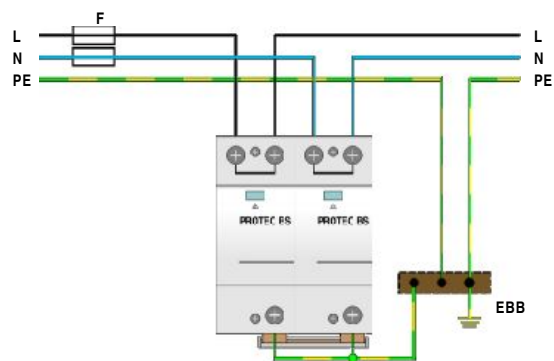


# PROTEC BS(R), PROTUBE BS - Connections

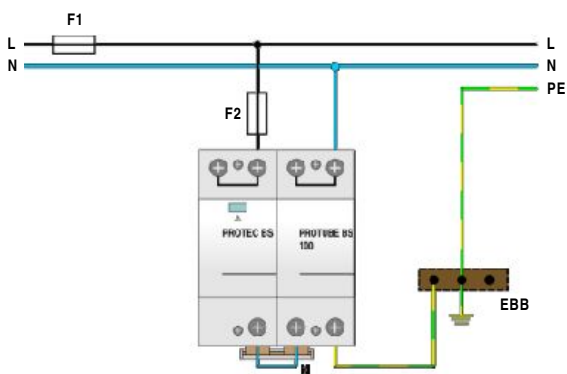
TN-S Network - Single-phase (T-connection)



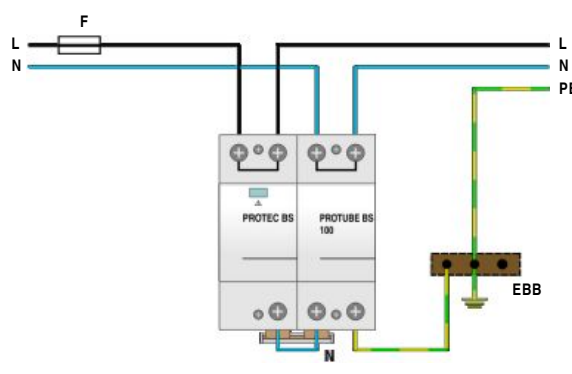
TN-S Network - Single-phase (V-connection)



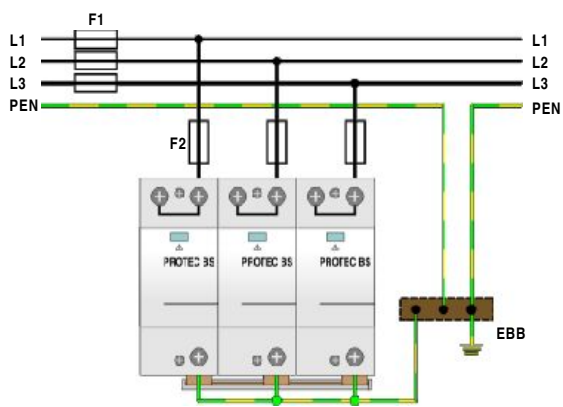
TT Network - Single-phase (T-connection)



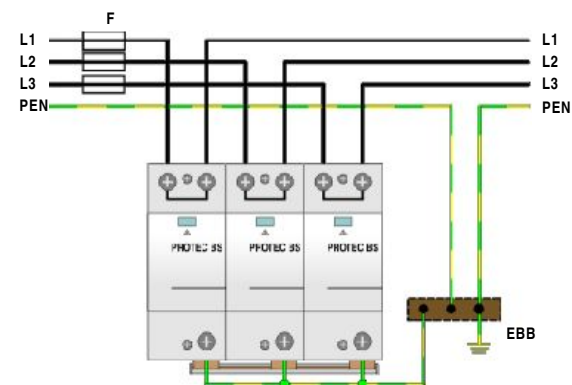
TT Network - Single-phase (V-connection)



TN-C Network - Three-phase (T-connection)

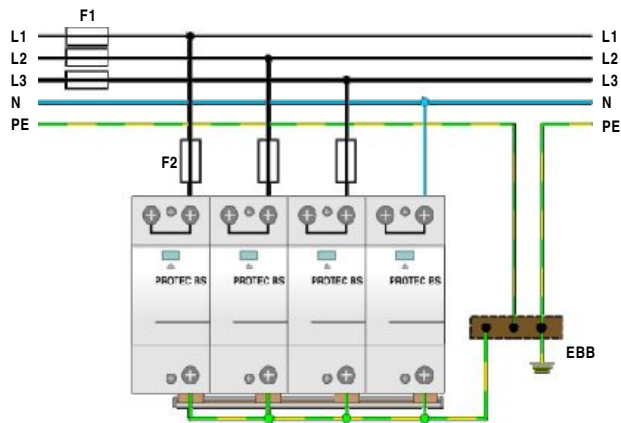


TN-C Network - Three-phase (V-connection)

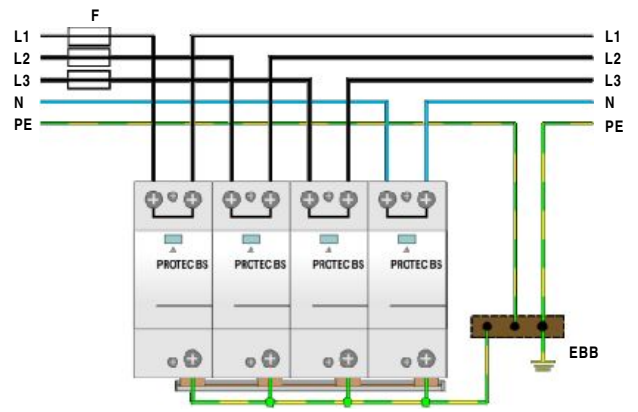


# PROTEC BS(R), PROTUBE BS - Connections

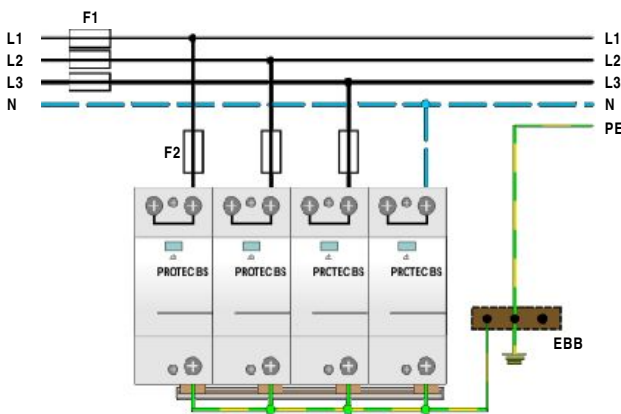
TN-S Network - Three-phase (T-connection)



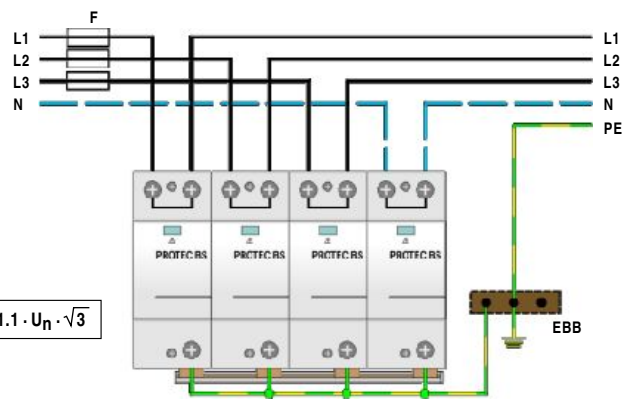
TN-S Network - Three-phase (V-connection)



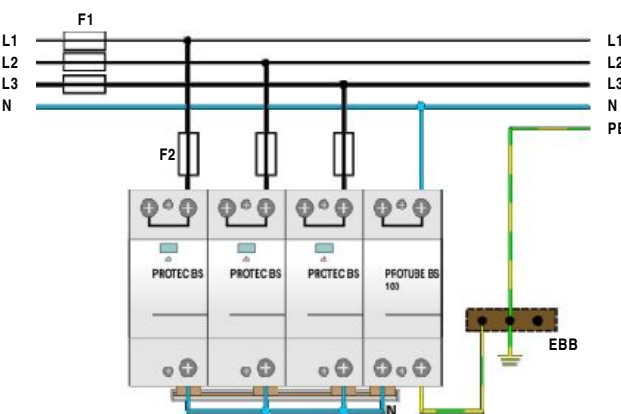
IT Network - Three-phase (T-connection)



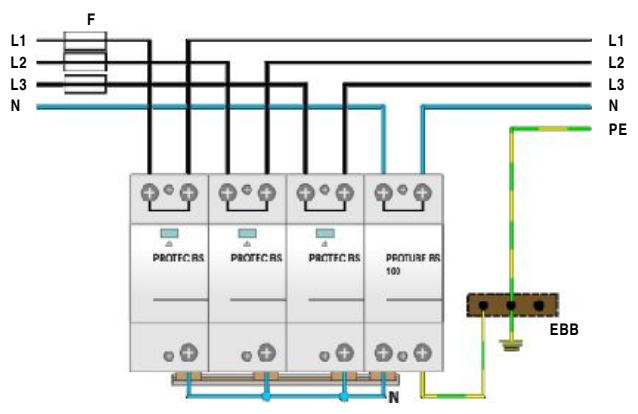
IT Network - Three-phase (V-connection)



TT Network - Three-phase (T-connection)

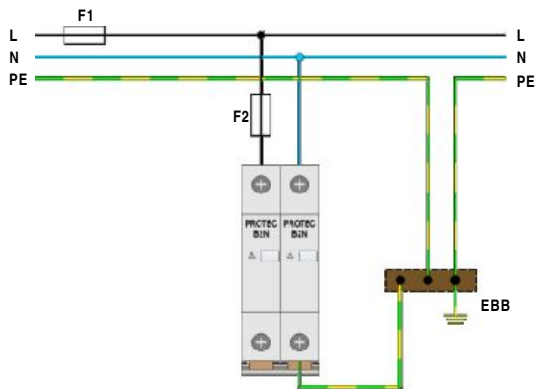


TT Network - Three-phase (V-connection)

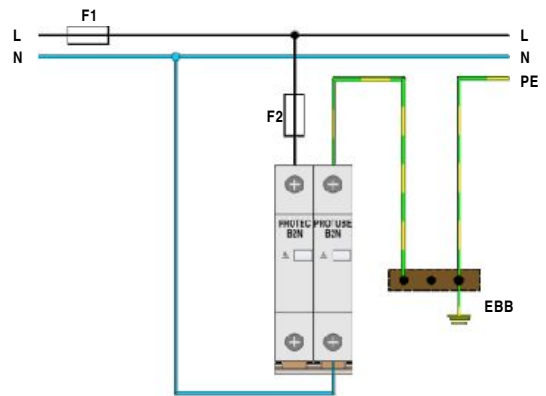


# PROTEC B2N(R), PROTUBE B2N(R) - Connections

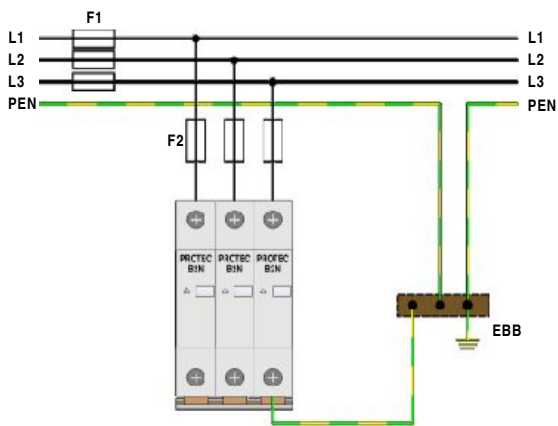
TN-S Network - Single-phase



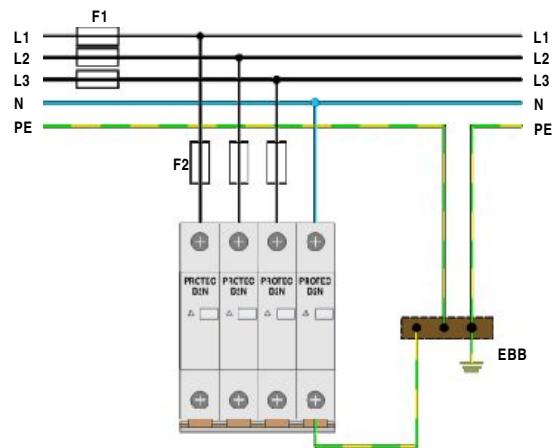
TT Network - Single-phase



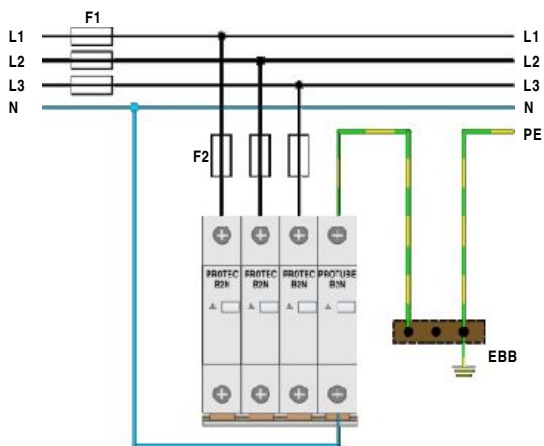
TN-C Network - Three-phase



TN-S Network - Three-phase



TT Network - Three-phase



## MULTI-POLE Surge Protective Devices



<b>Category IEC / EN / VDE:</b>	<b>Class I, II, III / Type 1, 2, 3 / B+C+D</b>
<b>Location of use:</b>	<b>Main distribution boards</b>
<b>Protection modes:</b>	<b>L/N-PE, L-PEN</b>
<b>Protective elements:</b>	<b>High Energy MOV and GDT</b>
<b>High surge discharge ratings:</b>	<b><math>I_{imp} = 50kA / pole, 25kA / pole</math></b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnector for each MOV block</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>2TE, 3TE, 4TE, 5TE, 8TE</b>

**PROBLOC BS(R) 100 (1+1)**  
**PROBLOC BS(R) 50 (2+0)**  
**PROBLOC BS(R) 50 (1+1)**  
**PROBLOC BS(R) 75 (3+0)**  
**PROBLOC BS(R) 100 (4+0)**  
**PROBLOC BS(R) 100 (3+1)**

The PROBLOC BS series of over-voltage surge protective devices has been developed to protect against partial direct and indirect lightning discharges and is intended to provide protection in zones 0<sub>A</sub> - 1, per IEC 62305.

PROBLOC BS(R) (1+1): for TT single phase networks, where N to PE galvanic isolation is required.

PROBLOC BS(R) (2+0): for TNS single phase networks with separate N and PE conductors.

PROBLOC BS(R) (3+0): for TNC three phase networks with combined PEN conductor.

PROBLOC BS(R) (4+0): for TNS three phase networks with separate N and PE conductors.

PROBLOC BS(R) (3+1): for TT three phase networks, where N to PE galvanic isolation is required.

# PROBLOC BS(R) 100 (1+1)

Class I, II Multi-pole Surge Protective Device  
 $I_{imp} = 50kA$  per pole (10/350)

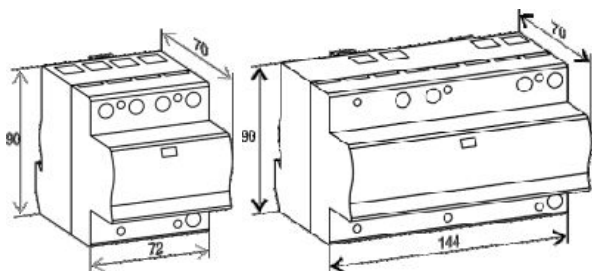


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N , N - PE
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating:  $I_{imp}$  (MOV/GDT)= 50/100kA
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max}$ = 150kA per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

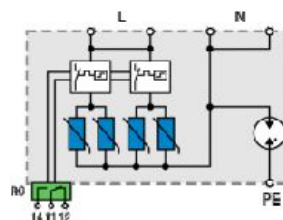
## Technical data

Type	PROBLOC BS(R) 100/xxx (1+1)					
	150	275	320	385	440	
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC)	$U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20)	$I_n$ (L-N/N-PE)			25/100kA		
Max. discharge current (8/20)	$I_{max}$ (L-N/N-PE)			100kA/100kA		
Impulse current (10/350)	$I_{imp}$ (L-N/N-PE)			50kA/100kA		
Impulse current (10/350)	$I_{imp}$ (L+N-PE)			100kA		
Specific energy	(L-N/N-PE)			625kJ/Ω/2.5MJ/Ω		
Charge	(L-N/N-PE)			25As/50As		
Protection level	$U_p$ (L-N)	< 0.7kV	< 1.4kV	< 1.4kV	< 1.8kV	< 2.1kV
	$U_p$ (N-PE)			< 1.75kV		
Residual voltage at $I_{imp}$	$U_{res}$ (L-N)	< 0.7kV	< 1.2kV	< 1.2kV	< 1.5kV	< 1.8kV
Follow current	$I_f$ (N-PE)			> 100A <sub>RMS</sub>		
Response time	$t_A$ (L-N/N-PE)			< 25ns/100ns		
Thermal protection	(L-N/N-PE)			YES/-		
Back-up fuse (if mains > 250A)	(L-N/N-PE)			250A gL/-		
Short-circuit withstand current	(L-N/N-PE)			25kA/50Hz/-		
<b>Mechanical characteristics</b>						
Temperature range				- 40°C ....+ 80°C		
Terminal screw torque				max. 4.5Nm		
Terminal cross section				35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715				35mm top-hat rail		
Degree of protection				IP 20		
Housing material				Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880	4TE	4TE	4TE	8TE	8TE	
Weight per unit	430g	540g	540g	654g	698g	
Ordering code <b>PROBLOC BS 100/xxx (1+1)</b>	<b>504 512</b>	<b>504 513</b>	<b>504 514</b>	<b>504 396</b>	<b>504 397</b>	
Remote contacts				YES		
Contact ratings				AC: 250V/0.5A; 125V/3A		
Terminal cross section				max. 1.5mm <sup>2</sup>		
Remote terminal torque				0.25Nm		
Weight per unit	435g	545g	545g	559g	703g	
Ordering code <b>PROBLOC BSR 100/xxx (1+1) - with remote contacts</b>	<b>504 515</b>	<b>504 516</b>	<b>504 517</b>	<b>504 398</b>	<b>504 399</b>	
Packaging dimensions (single unit)		109 x 76.5 x 78mm		109 x 76.5 x 148mm		

## Dimensions



## Connection diagram





# PROBLOC BS(R) 50 (2+0)

**Class I, II Multi-pole Surge Protective Device**  
 $I_{imp} = 25kA$  per pole (10/350)

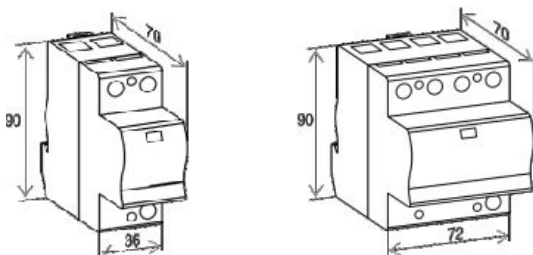


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S
- ◆ Protection modes: L/N - PE
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 25kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 150kA$  per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

## Technical data

Type	PROBLOC BS(R) 50/xxx (2+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	25kA per pole				
Max. discharge current (8/20) $I_{max}$	100kA per pole				
Impulse current (10/350) $I_{imp}$	25kA per pole				
Impulse current (10/350) $I_{imp}$ (L+N-PE)	50kA				
Specific energy	156kJ/Ω per pole				
Charge	12.5As per pole				
Protection level $U_p$	< 0.7kV	< 1.4kV	< 1.4kV	< 1.8kV	< 2.1kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.7kV	< 1.2kV	< 1.2kV	< 1.5kV	< 1.8kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 250A)	250A gL				
Short-circuit withstand current	25kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	2TE	2TE	2TE	4TE	4TE
Weight per unit	266g	374g	374g	438g	458g
Ordering code <b>PROBLOC BS 50/xxx (2+0)</b>	<b>504 435</b>	<b>504 436</b>	<b>504 437</b>	<b>504 438</b>	<b>504 439</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	271g	379g	379g	443g	463g
Ordering code <b>PROBLOC BSR 50/xxx (2+0) - with remote contacts</b>	<b>504 445</b>	<b>504 446</b>	<b>504 447</b>	<b>504 448</b>	<b>504 449</b>
Packaging dimensions (single unit)	109 x 76.5 x 41.5mm			109 x 76.5 x 78mm	

## Dimensions



## Connection diagram



# PROBLOC BS(R) 50 (1+1)

**Class I, II Multi-pole Surge Protective Device**  
 $I_{imp} = 25kA$  per pole (10/350)



- ◆ **Category IEC / EN / VDE:** Class I, II / Type 1, 2 / B+C
- ◆ **Location of use:** Main distribution boards
- ◆ **Connections:** TT
- ◆ **Protection modes:** L - N , N - PE
- ◆ **Protective element:** High Energy MOV & GDT
- ◆ **High surge discharge rating:**  $I_{imp}$  (MOV/GDT)= 25/50kA
- ◆ **MOV max withstand capability 1 x 8/20:**  $I_{max}$ = 150kA per pole
- ◆ **Housing:** Compact design
- ◆ **Complies with:** IEC-61643-1

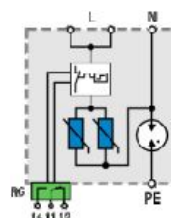
## Technical data

Type	PROBLOC BS(R) 50/xxx (1+1)					
	150	275	320	385	440	
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC)	$U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20)	$I_n$ (L-N/N-PE)			25/50kA		
Max. discharge current (8/20)	$I_{max}$ (L-N/N-PE)			100kA/100kA		
Impulse current (10/350)	$I_{imp}$ (L-N/N-PE)			25kA/50kA		
Impulse current (10/350)	$I_{imp}$ (L+N-PE)			50kA		
Specific energy (L-N/N-PE)				156kJ/Ω/625MJ/Ω		
Charge (L-N/N-PE)				12.5As/25As		
Protection level	$U_p$ (L-N)	< 0.8kV	< 1.4kV	< 1.4kV	< 1.8kV	< 2.1kV
	$U_p$ (N-PE)			< 1.5kV		
Residual voltage at $I_{imp}$	$U_{res}$ (L-N)	< 0.7kV	< 1.2kV	< 1.2kV	< 1.5kV	< 1.8kV
Follow current	$I_f$ (N-PE)			> 100A <sub>RMS</sub>		
Response time	$t_A$ (L-N/N-PE)			< 25ns/100ns		
Thermal protection (L-N/N-PE)				YES/-		
Back-up fuse (if mains > 250A) (L-N/N-PE)				250A gL/-		
Short-circuit withstand current (L-N/N-PE)				25kA/50Hz/-		
<b>Mechanical characteristics</b>						
Temperature range				- 40°C ....+ 80°C		
Terminal screw torque				max. 4.5Nm		
Terminal cross section				35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715				35mm top-hat rail		
Degree of protection				IP 20		
Housing material				Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880				3TE		
Weight per unit		308g	364g	364g	386g	408g
Ordering code <b>PROBLOC BS 50/xxx (1+1)</b>		<b>504 454</b>	<b>504 455</b>	<b>504 456</b>	<b>504 457</b>	<b>504 458</b>
Remote contacts				YES		
Contact ratings				AC: 250V/0.5A; 125V/3A		
Terminal cross section				max. 1.5mm <sup>2</sup>		
Remote terminal torque				0.25Nm		
Weight per unit		313g	369g	369g	391g	414g
Ordering code <b>PROBLOC BSR 50/xxx (1+1) - with remote contacts</b>		<b>504 459</b>	<b>504 460</b>	<b>504 461</b>	<b>504 462</b>	<b>504 463</b>
Packaging dimensions (single unit)				109 x 76.5 x 60mm		

## Dimensions



## Connection diagram



# PROBLOC BS(R) 75 (3+0)

Class I, II, III Multi-pole Surge Protective Device  
 $I_{imp} = 25kA$  per pole (10/350)

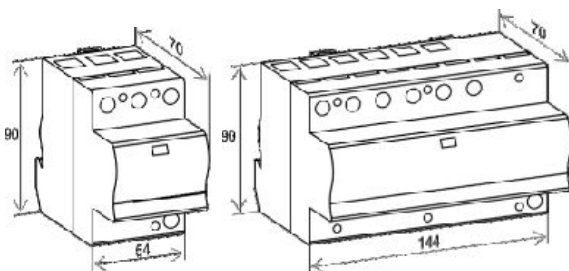


- ◆ Category IEC / EN / VDE: Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN - C
- ◆ Protection modes: L - PEN
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 25kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 150kA$  per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

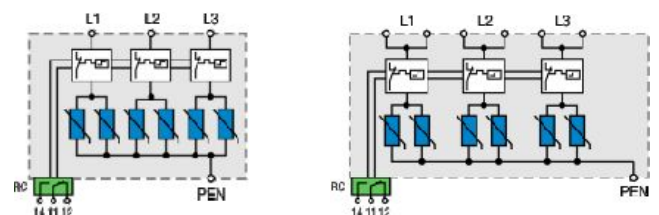
## Technical data

Type	PROBLOC BS(R) 75/xxx (3+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			25kA per pole		
Max. discharge current (8/20) $I_{max}$			100kA per pole		
Combination wave (1.2/50, 8/20) $U_{oc}/I_{sc}$			10kV/5kA		
Impulse current (10/350) $I_{imp}$			25kA per pole		
Impulse current (10/350) $I_{imp}$ (L1+L2+L3-PEN)			75kA		
Specific energy			156kJ/Ω per pole		
Charge			12.5As per pole		
Protection level $U_p$	< 0.8kV	< 1.4kV	< 1.4kV	< 1.9kV	< 2.2kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.8kV	< 1.3kV	< 1.3kV	< 1.6kV	< 1.9kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 250A)			250A gL		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range			- 40°C ....+ 80°C		
Terminal screw torque			max. 4.5Nm		
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715			35mm top-hat rail		
Degree of protection			IP 20		
Housing material			Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880	3TE	3TE	3TE	8TE	8TE
Weight per unit	400g	570g	570g	726g	792g
Ordering code <b>PROBLOC BS 75/xxx (3+0)</b>	<b>504 518</b>	<b>504 519</b>	<b>504 520</b>	<b>504 464</b>	<b>504 465</b>
Remote contacts			YES		
Contact ratings			AC: 250V/0.5A; 125V/3A		
Terminal cross section			max. 1.5mm <sup>2</sup>		
Remote terminal torque			0.25Nm		
Weight per unit	405g	575g	575g	731g	797g
Ordering code <b>PROBLOC BSR 75/xxx (3+0) - with remote contacts</b>	<b>504 521</b>	<b>504 522</b>	<b>504 523</b>	<b>504 466</b>	<b>504 467</b>
Packaging dimensions (single unit)		109 x 76.5 x 60mm		109 x 76.5 x 148mm	

## Dimensions



## Connection diagram



# PROBLOC BS(R) 100 (4+0)

**Class I, II, III Multi-pole Surge Protective Device**  
 $I_{imp} = 25kA$  per pole (10/350)

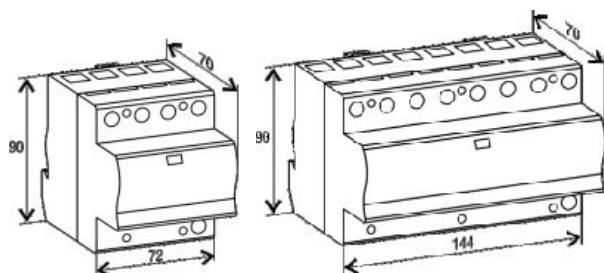


- ◆ **Category IEC / EN / VDE:** Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ **Location of use:** Main distribution boards
- ◆ **Connections:** TN - S
- ◆ **Protection modes:** L/N - PE
- ◆ **Protective element:** High Energy MOV
- ◆ **High surge discharge rating:**  $I_{imp} = 25kA$  per pole
- ◆ **MOV max withstand capability 1 x 8/20:**  $I_{max} = 150kA$  per pole
- ◆ **Housing:** Compact design
- ◆ **Complies with:** IEC-61643-1

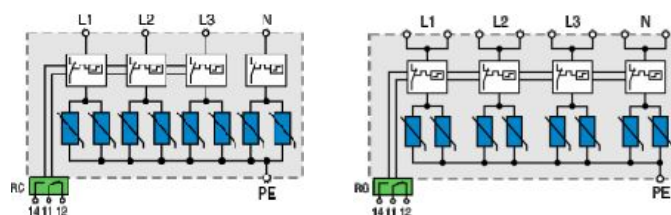
## Technical data

Type	PROBLOC BS(R) 100/xxx (4+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			25kA per pole		
Max. discharge current (8/20) $I_{max}$			100kA per pole		
Combination wave (1.2/50, 8/20) $U_{oc}/I_{sc}$			10kV/5kA		
Impulse current (10/350) $I_{imp}$			25kA per pole		
Impulse current (10/350) $I_{imp}$ (L1+L2+L3+N-PE)			100kA		
Specific energy			156kJ/Ω per pole		
Charge			12.5As per pole		
Protection level $U_p$	< 0.8kV	< 1.4kV	< 1.4kV	< 1.9kV	< 2.2kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.8kV	< 1.3kV	< 1.3kV	< 1.6kV	< 1.9kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 250A)			250A gL		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range			- 40°C ... + 80°C		
Terminal screw torque			max. 4.5Nm		
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715			35mm top-hat rail		
Degree of protection			IP 20		
Housing material			Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880	4TE	4TE	4TE	8TE	8TE
Weight per unit	532g	756g	756g	912g	1000g
Ordering code <b>PROBLOC BS 100/xxx (4+0)</b>	<b>504 524</b>	<b>504 525</b>	<b>504 526</b>	<b>504 468</b>	<b>504 469</b>
Remote contacts			YES		
Contact ratings			AC: 250V/0.5A; 125V/3A		
Terminal cross section			max. 1.5mm <sup>2</sup>		
Remote terminal torque			0.25Nm		
Weight per unit	537g	761g	761g	917g	1005g
Ordering code <b>PROBLOC BSR 100/xxx (4+0) - with remote contacts</b>	<b>504 527</b>	<b>504 528</b>	<b>504 529</b>	<b>504 470</b>	<b>504 471</b>
Packaging dimensions (single unit)		109 x 76.5 x 78mm		109 x 76.5 x 148mm	

## Dimensions



## Connection diagram



# PROBLOC BS(R) 100 (3+1)

Class I, II, III Multi-pole Surge Protective Device  
 $I_{imp} = 25kA$  per pole (10/350)

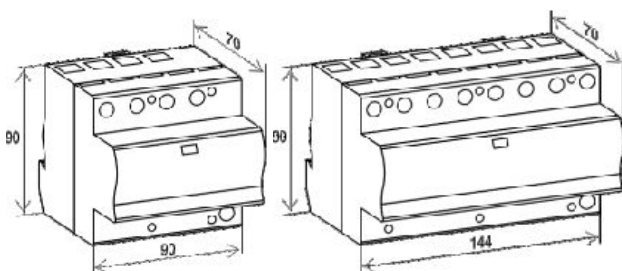


- ◆ Category IEC / EN / VDE: Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N , N - PE
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating:  $I_{imp}$  (MOV/GDT)= 25/100kA
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max}$ = 150kA per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

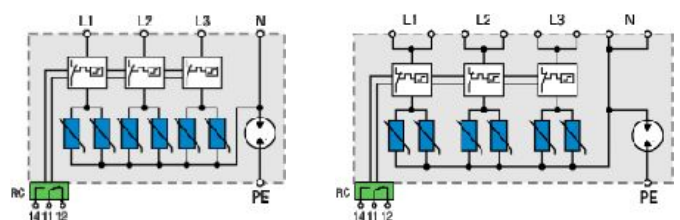
## Technical data

Type	PROBLOC BS(R) 100/xxx (3+1)					
	150	275	320	385	440	
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC)	$U_C$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20)	$I_n$ (L-N/N-PE)			25/100kA		
Max. discharge current (8/20)	$I_{max}$ (L-N/N-PE)			100kA/100kA		
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$			10kV/5kA		
Impulse current (10/350)	$I_{imp}$ (L-N/N-PE)			25kA/100kA		
Impulse current (10/350)	$I_{imp}$ (L1+L2+L3+N-PE)			100kA		
Specific energy	(L-N/N-PE)			156kJ/Ω/2.5MJ/Ω		
Charge	(L-N/N-PE)			12.5As/50As		
Protection level	$U_p$ (L-N)	< 0.9kV	< 1.4kV	< 1.4kV	< 1.9kV	< 2.2kV
	$U_p$ (N-PE)			< 1.75kV		
Residual voltage at $I_{imp}$	$U_{res}$ (L-N)	< 0.8kV	< 1.3kV	< 1.3kV	< 1.6kV	< 1.9kV
Follow current	$I_f$ (N-PE)			> 100ARMS		
Response time	$t_A$ (L-N/N-PE)			< 25ns/100ns		
Thermal protection	(L-N/N-PE)			YES/-		
Back-up fuse (if mains > 250A)	(L-N/N-PE)			250A gL/-		
Short-circuit withstand current	(L-N/N-PE)			25kA/50Hz/-		
<b>Mechanical characteristics</b>						
Temperature range				- 40°C ....+ 80°C		
Terminal screw torque				max. 4.5Nm		
Terminal cross section				35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715				35mm top-hat rail		
Degree of protection				IP 20		
Housing material				Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880		5TE	5TE	5TE	8TE	8TE
Weight per unit		568g	728g	728g	834g	900g
Ordering code <b>PROBLOC BS 100/xxx (3+1)</b>		<b>504 530</b>	<b>504 531</b>	<b>504 532</b>	<b>504 472</b>	<b>504 473</b>
Remote contacts				YES		
Contact ratings				AC: 250V/0.5A; 125V/3A		
Terminal cross section				max. 1.5mm <sup>2</sup>		
Remote terminal torque				0.25Nm		
Weight per unit		573g	733g	733g	839g	905g
Ordering code <b>PROBLOC BSR 100/xxx (3+1) - with remote contacts</b>		<b>504 533</b>	<b>504 534</b>	<b>504 535</b>	<b>504 474</b>	<b>504 475</b>
Packaging dimensions (single unit)		109 x 76.5 x 96mm			109 x 76.5 x 148mm	

## Dimensions

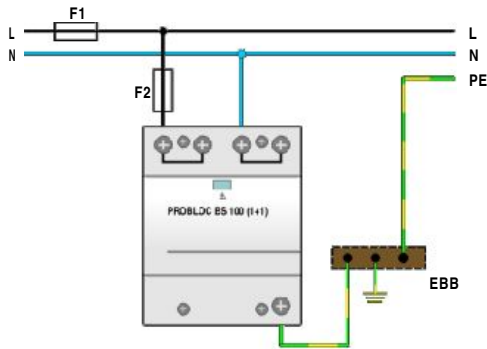


## Connection diagram

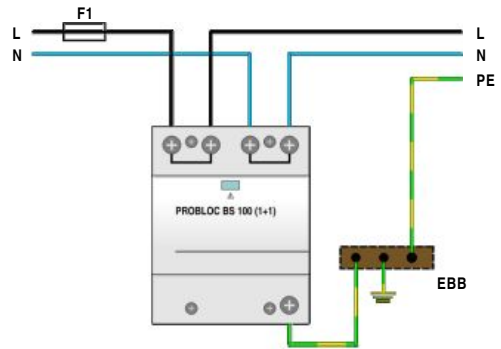


# PROBLOC BS(R) - Connections

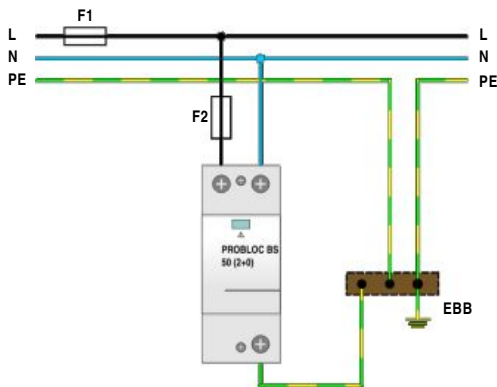
TT Network - Single-phase (T-connection)



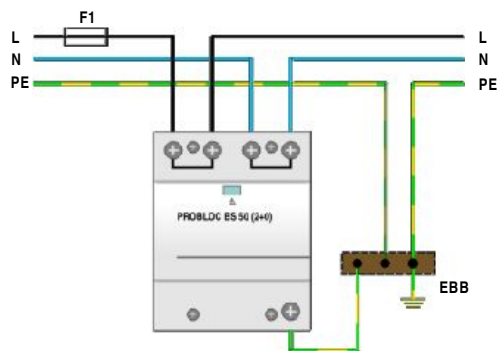
TT Network - Single-phase (V-connection)



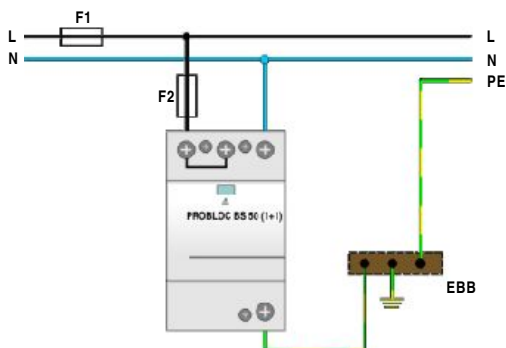
TN-S Network - Single-phase (T-connection)



TN-S Network - Single-phase (V-connection)

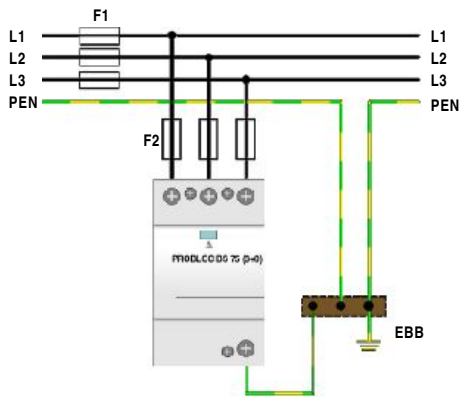


TT Network - Single-phase (T-connection)

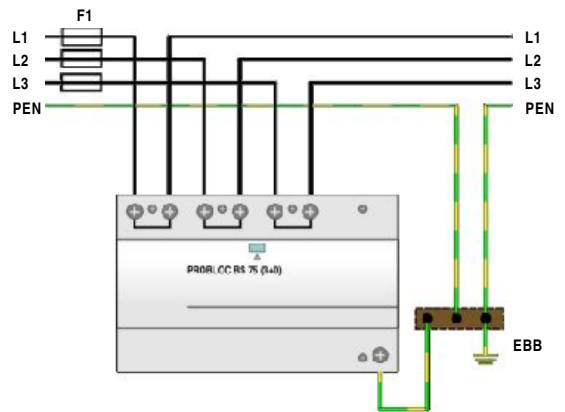


# PROBLOC BS(R) - Connections

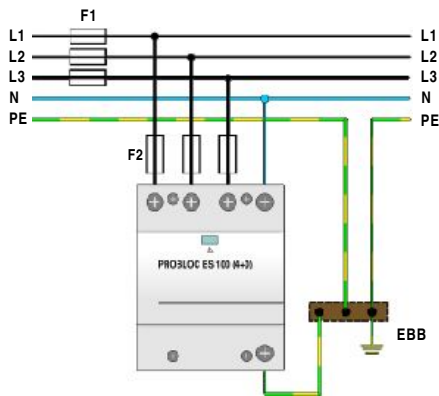
TN-C Network - Three-phase (T-connection)



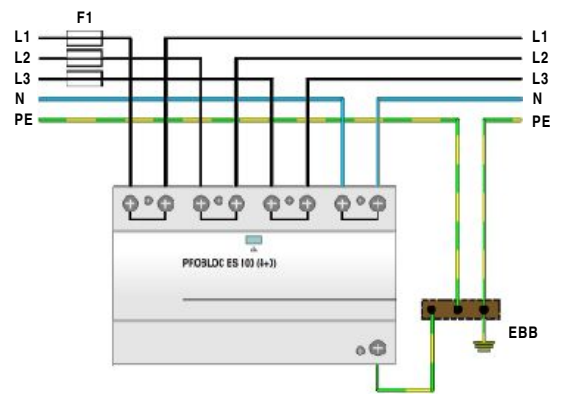
TN-C Network - Three-phase (V-connection)



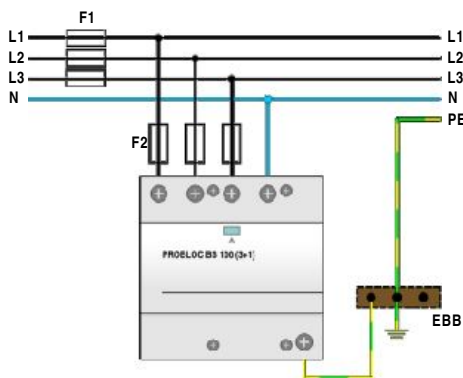
TN-S Network - Three-phase (T-connection)



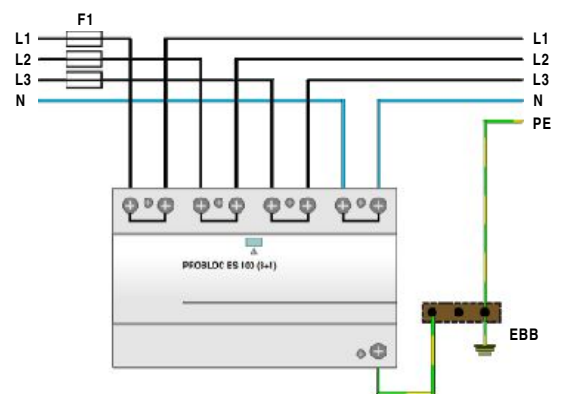
TN-S Network - Three-phase (V-connection)



TT Network - Three-phase (T-connection)



TT Network - Three-phase (V-connection)







## MULTI-POLE Surge Protective Devices



<b>Category IEC / EN / VDE:</b>	<b>Class I, II, III / Type 1, 2, 3 / B+C+D</b>
<b>Location of use:</b>	<b>Main distribution boards</b>
<b>Protection modes:</b>	<b>L/N-PE, L-PEN, L-N, N-PE</b>
<b>Protective elements:</b>	<b>High Energy MOV and GDT</b>
<b>High surge discharge ratings:</b>	<b><math>I_{imp} = 12.5kA</math> per pole</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnector for each MOV block</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>2TE, 3TE, 4TE</b>

**PROBLOC BS(R) 25 (2+0)**  
**PROBLOC BS(R) 25 (1+1)**  
**PROBLOC BS(R) 37.5 (3+0)**  
**PROBLOC BS(R) 50 (4+0)**  
**PROBLOC BS(R) 50 (3+1)**

The PROBLOC BS series of over-voltage surge protective devices have been developed to protect against partial direct and indirect lightning discharges and are intended to provide protection in zones  $0_A - 1$ , per IEC 62305.

PROBLOC BS(R) (2+0): for TNS single phase networks with separate N and PE conductors.

PROBLOC BS(R) (1+1): for TT single phase networks, where N to PE galvanic isolation is required.

PROBLOC BS(R) (3+0): for TNC three phase networks with combined PEN conductor.

PROBLOC BS(R) (4+0): for TNS three phase networks with separate N and PE conductors.

PROBLOC BS(R) (3+1): for TT three phase networks, where N to PE galvanic isolation is required.

# PROBLOC BS(R) 25 (2+0)

**Class I, II Multi-pole Surge Protective Device**  
 $I_{imp} = 12.5\text{kA}$  per pole (10/350)

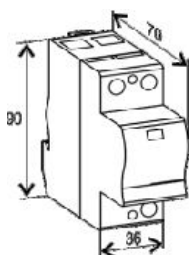


- ◆ **Category IEC / EN / VDE:** Class I, II / Type 1, 2 / B+C
- ◆ **Location of use:** Main distribution boards
- ◆ **Connections:** TN-S
- ◆ **Protection modes:** L/N - PE
- ◆ **Protective element:** High Energy MOV
- ◆ **High surge discharge rating:**  $I_{imp} = 12.5\text{kA}$  per pole
- ◆ **MOV max withstand capability 1 x 8/20:**  $I_{max} = 100\text{kA}$  per pole
- ◆ **Housing:** Compact design
- ◆ **Complies with:** IEC-61643-1

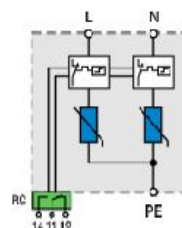
## Technical data

Type	PROBLOC BS(R) 25/xxx (2+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	20kA per pole				
Max. discharge current (8/20) $I_{max}$	50kA per pole				
Impulse current (10/350) $I_{imp}$	12.5kA per pole				
Impulse current (10/350) $I_{imp}$ (L+N-PE)	25kA				
Specific energy Charge	39kJ/Q per pole 6.25As per pole				
Protection level $U_p$	< 0.7kV	< 1.4kV	< 1.4kV	< 1.6kV	< 1.9kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.6kV	< 1.1kV	< 1.1kV	< 1.4kV	< 1.7kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 250A)	250A gL				
Short-circuit withstand current	25kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ... + 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	2TE				
Weight per unit	198g	251g	251g	267g	283g
Ordering code <b>PROBLOC BS 25/xxx (2+0)</b>	<b>504 405</b>	<b>504 406</b>	<b>504 407</b>	<b>504 408</b>	<b>504 409</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	203g	256g	256g	272g	288g
Ordering code <b>PROBLOC BSR 25/xxx (2+0) - with remote contacts</b>	<b>504 420</b>	<b>504 421</b>	<b>504 422</b>	<b>504 423</b>	<b>504 424</b>
Packaging dimensions (single unit)	109 x 76.5 x 41.5mm				

## Dimensions



## Connection diagram



# PROBLOC BS 25 (1+1)

## Class I, II Multi-pole Surge Protective Device I<sub>imp</sub> = 12.5kA per pole (10/350)

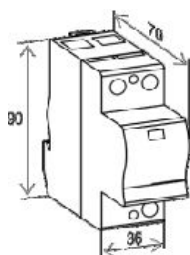


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N , N - PE
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating: I<sub>imp</sub> (MOV/GDT) = 12.5/50kA
- ◆ MOV max withstand capability 1 x 8/20: I<sub>max</sub>= 100kA per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

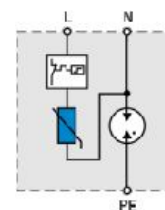
### Technical data

Type	PROBLOC BS(R) 50/xxx (1+1)					
	150	275	320	385	440	
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC)	U <sub>C</sub>	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20)	I <sub>n</sub> (L-N/N-PE)			20/50kA		
Max. discharge current (8/20)	I <sub>max</sub> (L-N/N-PE)			50kA/100kA		
Impulse current (10/350)	I <sub>imp</sub> (L-N/N-PE)			12.5kA/50kA		
Impulse current (10/350)	I <sub>imp</sub> (L+N-PE)			25kA		
Specific energy	(L-N/N-PE)			39kJ/Ω/625kJ/Ω		
Charge	(L-N/N-PE)			6.25As/25As		
Protection level	U <sub>p</sub> (L-N)	< 0.7kV	< 1.4kV	< 1.4kV	< 1.6kV	< 1.9kV
	U <sub>p</sub> (N-PE)			< 1.5kV		
Residual voltage at I <sub>imp</sub>	U <sub>res</sub> (L-N)	< 0.6kV	< 1.1kV	< 1.1kV	< 1.4kV	< 1.7kV
Follow current	I <sub>f</sub> (N-PE)			> 100A <sub>RMS</sub>		
Response time	t <sub>A</sub> (L-N/N-PE)			< 25ns/100ns		
Thermal protection	(L-N/N-PE)			YES/-		
Back-up fuse (if mains > 250A)	(L-N/N-PE)			250A gL/-		
Short-circuit withstand current	(L-N/N-PE)			25kA/50Hz/-		
<b>Mechanical characteristics</b>						
Temperature range				- 40°C ....+ 80°C		
Terminal screw torque				max. 4.5Nm		
Terminal cross section				35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715				35mm top-hat rail		
Degree of protection				IP 20		
Housing material				Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880				2TE		
Weight per unit		192g	245g	245g	261g	277g
Ordering code PROBLOC BS 25/xxx (1+1)		504 410	504 411	504 412	504 413	504 414
Packaging dimensions (single unit)				109 x 76.5 x 41.5mm		

### Dimensions



### Connection diagram



# PROBLOC BS(R) 37.5 (3+0)

Class I, II, III Multi-pole Surge Protective Device  
 $I_{imp} = 12.5\text{kA}$  per pole (10/350)

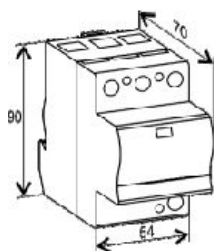


- ◆ Category IEC / EN / VDE: Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connection: TN-C
- ◆ Protection modes: L - PEN
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 12.5\text{kA}$  per pole
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 100\text{kA}$  per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

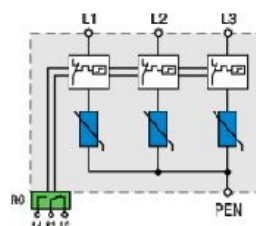
## Technical data

Type	PROBLOC BS(R) 37.5/xxx (3+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	20kA per pole				
Max. discharge current (8/20) $I_{max}$	50kA per pole				
Combination wave (1.2/50, 8/20) $U_{oc}/I_{sc}$	10kA/5kV				
Impulse current (10/350) $I_{imp}$	12.5kA per pole				
Impulse current (10/350) $I_{imp}$ (L1+L2+L3-PEN)	37.5kA				
Specific energy	39kJ/Ω per pole				
Charge	6.25As per pole				
Protection level $U_p$	< 0.9kV	< 1.4kV	< 1.4kV	< 1.8kV	< 2.1kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.7kV	< 1.2kV	< 1.2kV	< 1.5kV	< 1.8kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 250A)	250A gL				
Short-circuit withstand current	25kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	3TE				
Weight per unit	300g	382g	382g	394g	432g
Ordering code <b>PROBLOC BS 37.5/xxx (3+0)</b>	<b>504 049</b>	<b>504 051</b>	<b>504 053</b>	<b>504 267</b>	<b>504 055</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	305g	387g	387g	399g	437g
Ordering code <b>PROBLOC BSR 37.5/xxx (3+0) - with remote contacts</b>	<b>504 057</b>	<b>504 059</b>	<b>504 061</b>	<b>504 269</b>	<b>504 063</b>
Packaging dimensions (single unit)	109 x 76.5 x 60mm				

## Dimensions



## Connection diagram



# PROBLOC BS(R) 50 (4+0)

Class I, II, III Multi-pole Surge Protective Device  
 $I_{imp} = 12.5kA$  per pole (10/350)

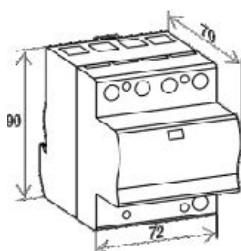


- ◆ Category IEC / EN / VDE: Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S
- ◆ Protection modes: L/N - PE
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 12.5kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 100kA$  per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

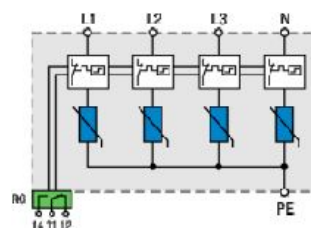
## Technical data

Type	PROBLOC BS(R) 50/xxx (4+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	20kA per pole				
Max. discharge current (8/20) $I_{max}$	50kA per pole				
Combination wave (1.2/50, 8/20) $U_{oc}/I_{sc}$	10kV/5kA				
Impulse current (10/350) $I_{imp}$	12.5kA per pole				
Impulse current (10/350) $I_{imp}$ (L1+L2+L3+N-PE)	50kA				
Specific energy	39kJ/Ω per pole				
Charge	6.25As per pole				
Protection level $U_p$	< 0.9kV	< 1.4kV	< 1.4kV	< 1.8kV	< 2.1kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.7kV	< 1.2kV	< 1.2kV	< 1.5kV	< 1.8kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 250A)	250A gL				
Short-circuit withstand current	25kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	366g	462g	462g	494g	526g
Weight per unit	504 065	504 067	504 069	504 271	504 071
Ordering code <b>PROBLOC BS 50/xxx (4+0)</b>	YES				
Remote contacts	AC: 250V/0.5A; 125V/3A				
Contact ratings	max. 1.5mm <sup>2</sup>				
Terminal cross section	0.25Nm				
Remote terminal torque	371g	467g	467g	499g	531g
Weight per unit	504 073	504 075	504 077	504 273	504 079
Ordering code <b>PROBLOC BSR 50/xxx (4+0) - with remote contacts</b>	109 x 76.5 x 78mm				
Packaging dimensions (single unit)					

## Dimensions



## Connection diagram



# PROBLOC BS(R) 50 (3+1)

Class I, II, III Multi-pole Surge Protective Device  
 $I_{imp} = 12.5kA$  per pole (10/350)

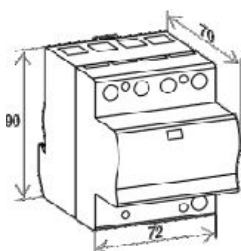


- ◆ Category IEC / EN / VDE: Class I, II, III/Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N, N - PE
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating:  $I_{imp}$  (MOV/GDT)= 12.5/50kA
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max}$ = 100kA per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

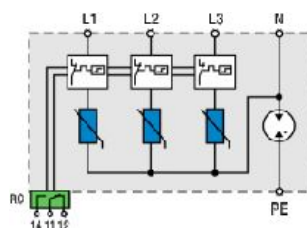
## Technical data

Type	PROBLOC BS(R) 50/xxx (3+1)					
	150	275	320	385	440	
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC)	$U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20)	$I_n$ (L-N/N-PE)			20/50kA		
Max. discharge current (8/20)	$I_{max}$ (L-N/N-PE)			50kA/100kA		
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$			10kV/5kA		
Impulse current (10/350)	$I_{imp}$ (L-N/N-PE)			12.5kA/50kA		
Impulse current (10/350)	$I_{imp}$ (L1+L2+L3+N-PE)			50kA		
Specific energy	(L-N/N-PE)			39kJ/Ω/625kJ/Ω		
Charge	(L-N/N-PE)			6.25As/25As		
Protection level	$U_p$ (L-N)	< 0.9kV	< 1.4kV	< 1.4kV	< 1.8kV	< 2.1kV
	$U_p$ (N-PE)			< 1.5kV		
Residual voltage at $I_{imp}$	$U_{res}$ (L-N)	< 0.7kV	< 1.2kV	< 1.2kV	< 1.5kV	< 1.8kV
Follow current	$I_f$ (N-PE)			> 100ARMS		
Response time	$t_A$ (L-N/N-PE)			< 25ns/100ns		
Thermal protection	(L-N/N-PE)			YES/-		
Back-up fuse (if mains > 250A)	(L-N/N-PE)			250A gL/-		
Short-circuit withstand current	(L-N/N-PE)			25kA/50Hz/-		
<b>Mechanical characteristics</b>						
Temperature range				- 40°C ... + 80°C		
Terminal screw torque				max. 4.5Nm		
Terminal cross section				35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715				35mm top-hat rail		
Degree of protection				IP 20		
Housing material				Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880				4TE		
Weight per unit		442g	538g	538g	548g	577g
Ordering code <b>PROBLOC BS 50/xxx (3+1)</b>		<b>504 480</b>	<b>504 481</b>	<b>504 482</b>	<b>504 483</b>	<b>504 484</b>
Remote contacts				YES		
Contact ratings				AC: 250V/0.5A; 125V/3A		
Terminal cross section				max. 1.5mm <sup>2</sup>		
Remote terminal torque				0.25Nm		
Weight per unit		447g	543g	543g	553g	582g
Ordering code <b>PROBLOC BSR 50/xxx (3+1) - with remote contacts</b>		<b>504 485</b>	<b>504 486</b>	<b>504 487</b>	<b>504 488</b>	<b>504 489</b>
Packaging dimensions (single unit)				109 x 76.5 x 78mm		

## Dimensions

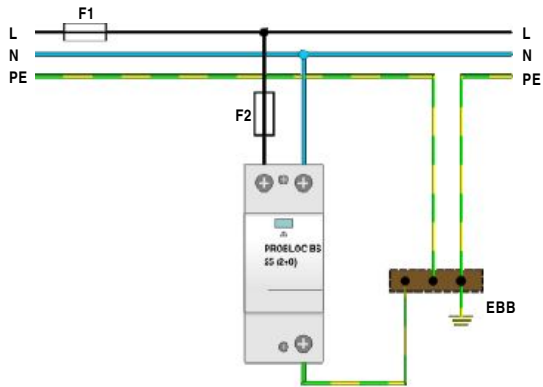


## Connection diagram

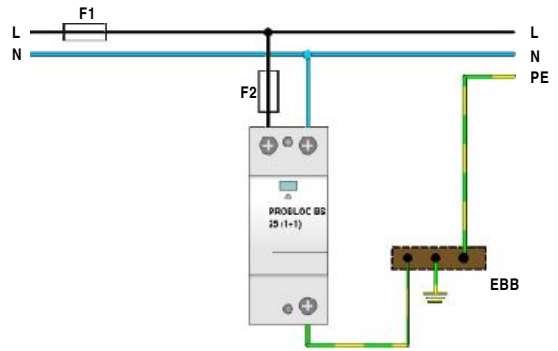


# PROBLOC BS(R) - Connections

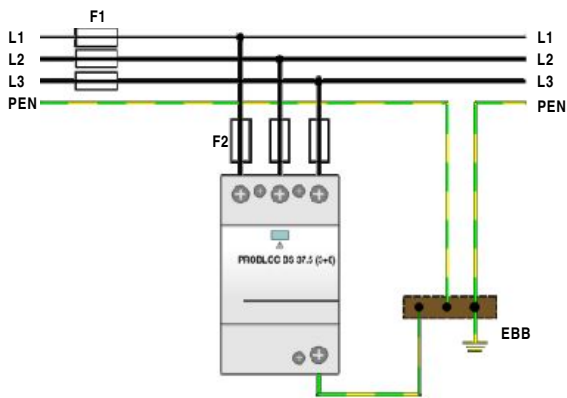
TN-S Network - Single-phase



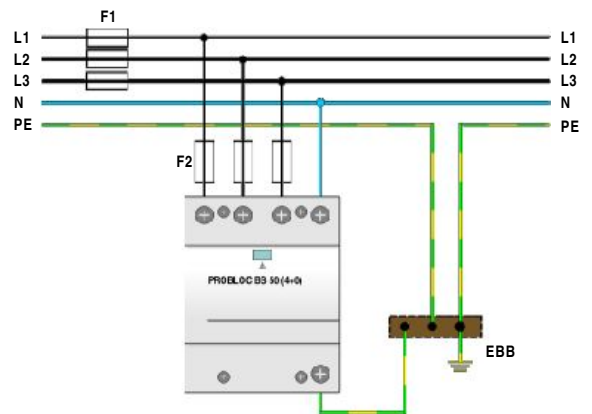
TT Network - Single-phase



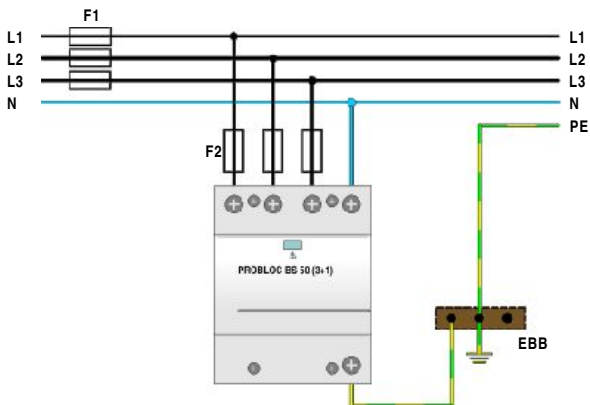
TN-C Network - Three-phase



TN-S Network - Three-phase



TT Network - Three-phase







# MULTI-POLE Surge Protective Devices



<b>Category IEC / EN / VDE:</b>	<b>Class I, II / Type 1, 2 / B+ C</b>
<b>Location of use:</b>	<b>Main distribution boards</b>
<b>Protection modes:</b>	<b>L/N-PE, L-PEN, L-N, N-PE</b>
<b>Protective elements:</b>	<b>High Energy MOV and GDT</b>
<b>High surge discharge ratings:</b>	<b><math>I_{imp} = 12.5kA</math> per pole</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnector for each MOV block</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>2TE</b>

**INPROTEC VV(R) (2+0)**  
**INPROTEC VG(R) (1+1)**  
**INPROTEC VS(R) (1+0)**

The INPROTEC series of over-voltage surge protective devices have been developed to protect against partial direct and indirect lightning discharges and are intended to provide protection in zones  $0_A - 1$ , per IEC 62305.

The INPROTEC VV series of over-voltage surge protective devices is intended for stand-alone use in single phase systems or for use in conjunction with the INPROTEC VV or INPROTEC VS or INPROTEC VG series when protecting a three phase system. With simple combinations of the three variants, an over-voltage protection system can be constructed for TT, TNC, TNC-S and IT networks.

INPROTEC VG(R) (1+1): for TT single phase networks, where N to PE galvanic isolation is required.

INPROTEC VV(R) (2+0): for TNS single phase networks with separate N and PE conductors.

INPROTEC VV(R)+VS(R) (3+0): for TNC three phase networks with combined PEN conductor.

INPROTEC VV(R)+VV(R) (4+0): for TNS three phase networks with separate N and PE conductors.

INPROTEC VV(R)+VV(R) (3+1): for TT three phase networks, where N to PE galvanic isolation is required.

# INPROTEC VV(R) (2+0)

**Class I, II Multi-pole Surge Protective Device**  
 $I_{imp} = 12.5\text{kA}$  per pole (10/350)

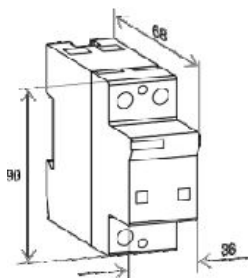


- ◆ **Category IEC / EN / VDE:** Class I, II / Type 1, 2 / B+C
- ◆ **Location of use:** Main distribution boards
- ◆ **Connections:** TN-S, IT
- ◆ **Protection modes:** L/N - PE, L - PEN
- ◆ **Protective element:** High Energy MOV
- ◆ **High surge discharge rating:**  $I_{imp} = 12.5\text{kA}$  per pole
- ◆ **MOV max withstand capability 1 x 8/20:**  $I_{max} = 100\text{kA}$  per pole
- ◆ **Housing:** Compact design
- ◆ **Complies with:** IEC-61643-1

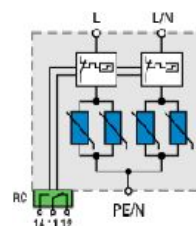
## Technical data

Type	INPROTEC VV(R) (2+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	40kA per pole				
Max. discharge current (8/20) $I_{max}$	80kA per pole				
Impulse current (10/350) $I_{imp}$	12.5kA per pole				
Impulse current (10/350) $I_{imp}$ (L+N-PE)	25kA				
Specific energy Charge	39kJ/Q per pole 6.25As per pole				
Protection level $U_p$	< 1.0kV	< 1.8kV	< 1.8kV	< 2.2kV	< 2.4kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.6kV	< 1.1kV	< 1.1kV	< 2.1kV	< 2.3kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 250A)	250A gL				
Short-circuit withstand current	25kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	2TE				
Weight per unit	270g	300g	300g	322g	290g
Ordering code <b>INPROTEC VV (2+0)</b>	<b>505 017</b>	<b>505 019</b>	<b>505 021</b>	<b>505 061</b>	<b>505 023</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	275g	305g	305g	327g	295g
Ordering code <b>INPROTEC VVR (2+0) - with remote contacts</b>	<b>505 025</b>	<b>505 027</b>	<b>505 029</b>	<b>505 063</b>	<b>505 031</b>
Packaging dimensions (single unit)	109 x 76.5 x 41.5mm				

## Dimensions



## Connection diagram



# INPROTEC VG(R) (1+1)

**Class I, II Multi-pole Surge Protective Device**  
 $I_{imp} = 12.5kA$  per pole (10/350)

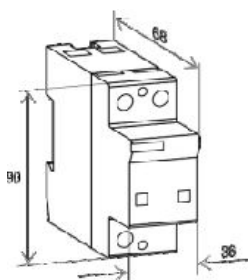


- ◆ **Category IEC / EN / VDE:** Class I, II / Type 1, 2 / B+C
- ◆ **Location of use:** Main distribution boards
- ◆ **Connections:** TT
- ◆ **Protection modes:** L - N , N - PE
- ◆ **Protective element:** High Energy MOV & GDT
- ◆ **High surge discharge rating:**  $I_{imp}$  (MOV/GDT)= 12.5/50kA
- ◆ **MOV max withstand capability 1 x 8/20:**  $I_{max}$ = 100kA per pole
- ◆ **Housing:** Compact design
- ◆ **Complies with:** IEC-61643-1

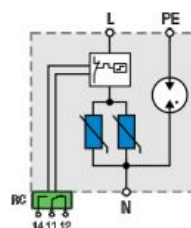
## Technical data

Type	INPROTEC VG(R) (1+1)					
	150	275	320	385	440	
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC)	$U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20)	$I_n$ (L-N/N-PE)			40/40kA		
Max. discharge current (8/20)	$I_{max}$ (L-N/N-PE)			80kA/80kA		
Impulse current (10/350)	$I_{imp}$ (L-N/N-PE)			12.5kA/50kA		
Impulse current (10/350)	$I_{imp}$ (L+N-PE)			25kA		
Specific energy	(L-N/N-PE)			39kJ/Ω/625kJ/Ω		
Charge	(L-N/N-PE)			6.25As/25As		
Protection level	$U_p$ (L-N)	< 1.0kV	< 1.8kV	< 1.8kV	< 2.2kV	< 2.4kV
	$U_p$ (N-PE)			< 1.5kV		
Residual voltage at $I_{imp}$	$U_{res}$ (L-N)	< 0.6kV	< 1.1kV	< 1.1kV	< 2.1kV	< 2.3kV
Follow current	$I_f$ (N-PE)			> 100A <sub>RMS</sub>		
Response time	$t_A$ (L-N/N-PE)			< 25ns/100ns		
Thermal protection	(L-N/N-PE)			YES/-		
Back-up fuse (if mains > 250A)	(L-N/N-PE)			250A gL/-		
Short-circuit withstand current	(L-N/N-PE)			25kA/50Hz/-		
<b>Mechanical characteristics</b>						
Temperature range				- 40°C ....+ 80°C		
Terminal screw torque				max. 4.5Nm		
Terminal cross section				35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715				35mm top-hat rail		
Degree of protection				IP 20		
Housing material				Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880				2TE		
Weight per unit		234g	268g	268g	288g	254g
Ordering code INPROTEC VG (1+1)		505 033	505 035	505 037	505 065	505 039
Remote contacts				YES		
Contact ratings				AC: 250V/0.5A; 125V/3A		
Terminal cross section				max. 1.5mm <sup>2</sup>		
Remote terminal torque				0.25Nm		
Weight per unit		239g	273g	273g	293g	259g
Ordering code INPROTEC VGR (1+1) - with remote contacts		505 041	505 043	505 045	505 067	505 047
Packaging dimensions (single unit)				109 x 76.5 x 41.5mm		

## Dimensions



## Connection diagram



# INPROTEC VS(R) (1+0)

## Class I, II Single-pole Surge Protective Device $I_{imp} = 12.5kA$ (10/350)

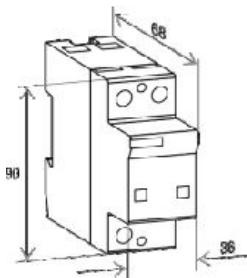


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-C
- ◆ Protection modes: L/N - PE, L - PEN
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 12.5kA$
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 100kA$
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

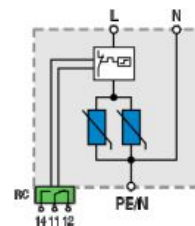
### Technical data

Type	INPROTEC VS(R) (1+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			40kA		
Max. discharge current (8/20) $I_{max}$			80kA		
Impulse current (10/350) $I_{imp}$			12.5kA		
Impulse current (10/350) $I_{imp}$ (L+N-PE)			12.5kA		
Specific energy Charge			39kJ/Ω		
			6.25As		
Protection level $U_p$	< 1.0kV	< 1.8kV	< 1.8kV	< 2.2kV	< 2.4kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.6kV	< 1.1kV	< 1.1kV	< 2.1kV	< 2.3kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 250A)			250A gL		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range			- 40°C ....+ 80°C		
Terminal screw torque			max. 4.5Nm		
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715			35mm top-hat rail		
Degree of protection			IP 20		
Housing material			Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880			2TE		
Weight per unit	198g	232g	232g	252g	218g
Ordering code <b>INPROTEC VV (2+0)</b>	<b>505 001</b>	<b>505 003</b>	<b>505 005</b>	<b>505 057</b>	<b>505 007</b>
Remote contacts			YES		
Contact ratings			AC: 250V/0.5A; 125V/3A		
Terminal cross section			max. 1.5mm <sup>2</sup>		
Remote terminal torque			0.25Nm		
Weight per unit	203g	237g	237g	257g	223g
Ordering code <b>INPROTEC VVR (2+0) - with remote contacts</b>	<b>505 009</b>	<b>505 011</b>	<b>505 013</b>	<b>505 059</b>	<b>505 015</b>
Packaging dimensions (single unit)			109 x 76.5 x 41.5mm		

### Dimensions

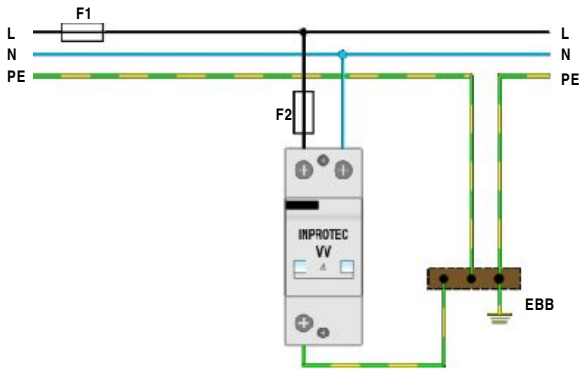


### Connection diagram

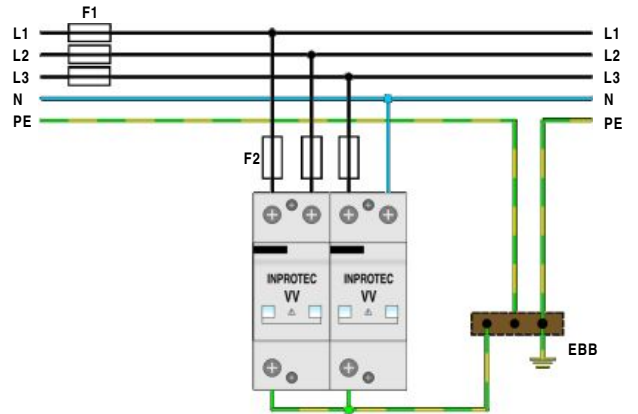


# INPROTEC - Connections

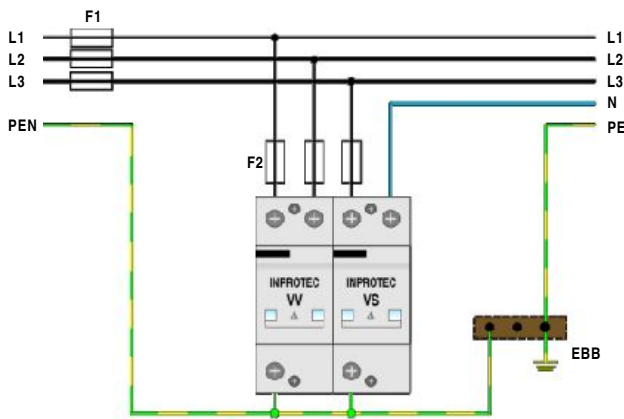
TN-S Network - Single-phase



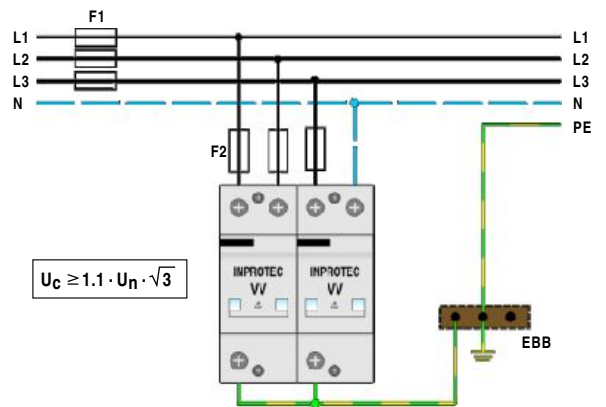
TNS Network - Three-phase



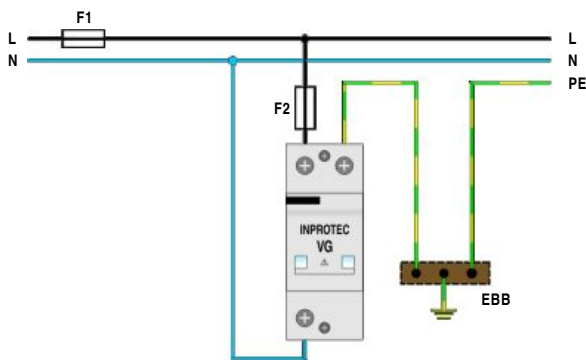
TN-C Network - Three-phase



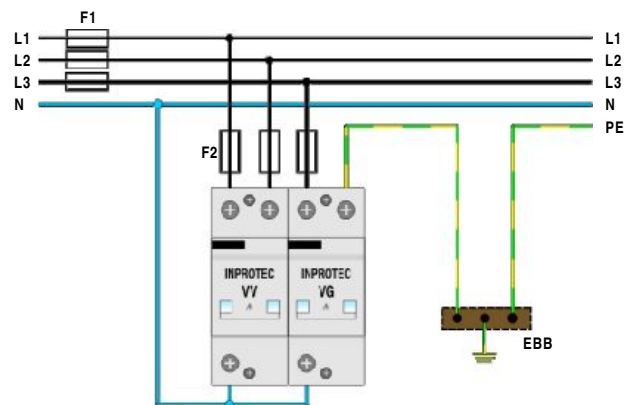
IT Network - Three-phase



TT Network - Single-phase



TT Network - Three-phase





# MULTI-POLE Surge Protective Devices - NO leakage current

# NEW



<b>Category IEC / EN / VDE:</b>	<b>Class I, II / Type 1, 2 / B+ C</b>
<b>Location of use:</b>	<b>Main distribution boards</b>
<b>Protection modes:</b>	<b>L/N-PE, L-PEN, L-N, N-PE</b>
<b>Protective elements:</b>	<b>High Energy MOV and GDT</b>
<b>High surge discharge ratings:</b>	<b>I<sub>imp</sub> = 25kA per pole</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnector for each MOV block</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>2TE, 5TE</b>

**PROBLOC BSG(R) 100 (4+0)**  
**PROBLOC BSG(R) 100 (3+1)**  
**PROBLOC BSG(R) 100N (3+1)**  
**PROBLOC BSG(R) 25**  
**PROBLOC BSG(R) 50 (4+0)**  
**PROBLOC BSG(R) 50 (3+1)**  
**PROBLOC BSG(R) 12.5**

The PROBLOC BSG series of over-voltage surge protective devices have been developed to protect against partial direct and indirect lightning discharges and are intended to provide protection in zones 0<sub>A</sub> - 1, per IEC 62305.

As a protective element the serial connection MOV and GDT is used. Advantage of this kind of connection is absence of leakage current.

PROBLOC BSG(R) (4+0) series: for TNS three phase networks with separate N and PE conductors.

PROBLOC BSG(R) (3+1) series: for TT three phase networks, where N to PE galvanic isolation is required.

PROBLOC BSG(R) 25 and 12.5 series: for TNS single phase networks with separate N and PE conductors, TNC three phase networks with combined PEN conductor, TT single phase networks, where N to PE galvanic isolation is required.

# PROBLOC BSG(R) 100 (4+0)

**Class I, II Multi-pole Surge Protective Device**  
 $I_{imp} = 25kA$  per pole (10/350)

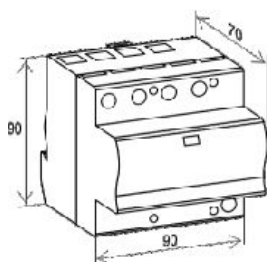


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S
- ◆ Protection modes: L - N/PE
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating:  $I_{imp} = 25kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 150kA$  per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

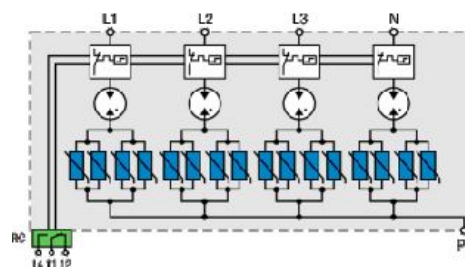
## Technical data

Type	PROBLOC BSG(R) 100/xxx (4+0)	
	150	320
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	320/420V
Nominal discharge current (8/20) $I_n$	25kA per pole	
Max. discharge current (8/20) $I_{max}$	100kA per pole	
Impulse current (10/350) $I_{imp}$	25kA per pole	
Impulse current (10/350) $I_{imp}$ (L1+L2+L3+N-PE)	100kA	
Specific energy Charge	156kJ/Ω	
	12.5As	
Protection level $U_p$	< 1.4kV	< 1.6kV
Residual voltage at $I_n$ $U_{res}$	< 0.9kV	< 1.1kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.6kV	< 0.8kV
Follow current $I_f$	NO	
Response time $t_A$	< 25ns	
Thermal protection	YES	
Back-up fuse (if mains > 250A)	250A gL	
Short-circuit withstand current	25kA/50Hz	
<b>Mechanical characteristics</b>		
Temperature range	- 40°C ... + 80°C	
Terminal screw torque	max. 4.5Nm	
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)	
Mounting EN 60715	35mm top-hat rail	
Degree of protection	IP 20	
Housing material	Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880	5TE	
Weight per unit	656g	748g
Ordering code <b>PROBLOC BSG 100/xxx (4+0)</b>	<b>513 034</b>	<b>513 036</b>
Remote contacts	YES	
Contact ratings	AC: 250V/0.5A; 125V/3A	
Terminal cross section	max. 1.5mm <sup>2</sup>	
Remote terminal torque	0.25Nm	
Weight per unit	660g	752g
Ordering code <b>PROBLOC BSGR 100/xxx (4+0) - with remote contacts</b>	<b>513 035</b>	<b>513 037</b>
Packaging dimensions (single unit)	109 x 76.5 x 96mm	

## Dimensions



## Connection diagram





# PROBLOC BSG(R) 100 (3+1)

## Class I, II Multi-pole Surge Protective Device $I_{imp} = 25kA$ per pole (10/350)

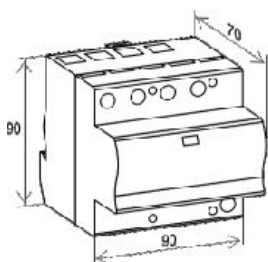


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N , N - PE
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating:  $I_{imp}$  (MOV/GDT) = 25/100kA
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 150kA$  per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

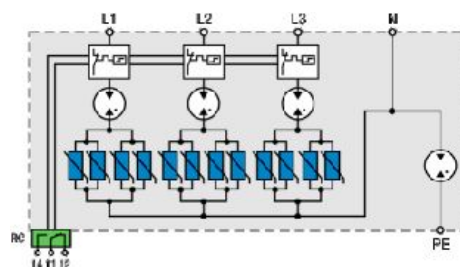
### Technical data

Type	PROBLOC BSG(R) 100/xxx (3+1)		
	150	320	
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC)	$U_c$	150/200V	320/420V
Nominal discharge current (8/20)	$I_n$ (L-N/N-PE)	25/100kA	
Max. discharge current (8/20)	$I_{max}$ (L-N/N-PE)	100kA/100kA	
Impulse current (10/350)	$I_{imp}$ (L-N/N-PE)	25kA/100kA	
Impulse current (10/350)	$I_{imp}$ (L1+L2+L3+N-PE)	100kA	
Specific energy	(L-N/N-PE)	156kJ/Ω/2.5MJ/Ω	
Charge	(L-N/N-PE)	12.5As/50As	
Protection level	$U_p$ (L-N)	< 1.4kV	< 1.6kV
	$U_p$ (N-PE)	< 1.75kV	
Residual voltage at $I_n$	$U_{res}$ (L-N)	< 0.9kV	< 1.1kV
Residual voltage at $I_{imp}$	$U_{res}$ (L-N)	< 0.6kV	< 0.8kV
Follow current	$I_f$ (N-PE)	> 100ARMS	
Response time	$t_A$ (L-N/N-PE)	< 25ns/100ns	
Thermal protection	(L-N/N-PE)	YES/-	
Back-up fuse (if mains > 250A)	(L-N/N-PE)	250A gL/-	
Short-circuit withstand current	(L-N/N-PE)	25kA/50Hz/-	
<b>Mechanical characteristics</b>			
Temperature range		- 40°C ....+ 80°C	
Terminal screw torque		max. 4.5Nm	
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)	
Mounting EN 60715		35mm top-hat rail	
Degree of protection		IP 20	
Housing material		Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		5TE	
Weight per unit		646g	738g
Ordering code <b>PROBLOC BSG 100/xxx (3+1)</b>		<b>513 011</b>	<b>513 005</b>
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm <sup>2</sup>	
Remote terminal torque		0.25Nm	
Weight per unit		650g	742g
Ordering code <b>PROBLOC BSGR 100/xxx (3+1) - with remote contacts</b>		<b>513 012</b>	<b>513 006</b>
Packaging dimensions (single unit)		109 x 76.5 x 96mm	

### Dimensions



### Connection diagram



# PROBLOC BSG(R) 100N (3+1)

**Class I, II Multi-pole Surge Protective Device**  
 $I_{imp} = 25kA$  per pole (10/350)

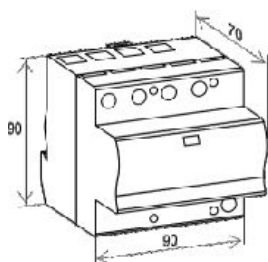


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N , N - PE
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating:  $I_{imp}$  (MOV/GDT) = 25/50kA
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 150kA$  per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

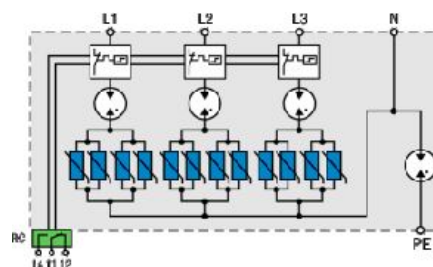
## Technical data

Type	PROBLOC BSG(R) 100N/x xx (3+1)	
	150	320
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	320/420V
Nominal discharge current (8/20) $I_n$ (L-N/N-PE)	25/50kA	
Max. discharge current (8/20) $I_{max}$ (L-N/N-PE)	100kA/100kA	
Impulse current (10/350) $I_{imp}$ (L-N/N-PE)	25kA/50kA	
Impulse current (10/350) $I_{imp}$ (L1+L2+L3+N-PE)	100kA	
Specific energy (L-N/N-PE)	156kJ/Ω/625kJ/Ω	
Charge (L-N/N-PE)	12.5As/25As	
Protection level $U_p$ (L-N)	< 1.4kV	< 1.6kV
$U_p$ (N-PE)	< 1.5kV	
Residual voltage at $I_n$ $U_{res}$ (L-N)	< 0.9kV	< 1.1kV
Residual voltage at $I_{imp}$ $U_{res}$ (L-N)	< 0.6kV	< 0.8kV
Follow current $I_f$ (N-PE)	> 100ARMS	
Response time $t_A$ (L-N/N-PE)	< 25ns/100ns	
Thermal protection (L-N/N-PE)	YES/-	
Back-up fuse (if mains > 250A) (L-N/N-PE)	250A gL/-	
Short-circuit withstand current (L-N/N-PE)	25kA/50Hz/-	
<b>Mechanical characteristics</b>		
Temperature range	- 40°C ....+ 80°C	
Terminal screw torque	max. 4.5Nm	
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)	
Mounting EN 60715	35mm top-hat rail	
Degree of protection	IP 20	
Housing material	Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880	5TE	
Weight per unit	656g	706g
Ordering code <b>PROBLOC BSG 100N/xxx (3+1)</b>	<b>513 015</b>	<b>513 003</b>
Remote contacts	YES	
Contact ratings	AC: 250V/0.5A; 125V/3A	
Terminal cross section	max. 1.5mm <sup>2</sup>	
Remote terminal torque	0.25Nm	
Weight per unit	660g	710g
Ordering code <b>PROBLOC BSGR 100N/xxx (3+1) - with remote contacts</b>	<b>513 016</b>	<b>513 004</b>
Packaging dimensions (single unit)	109 x 76.5 x 96mm	

## Dimensions



## Connection diagram



# PROBLOC BSG(R) 25

**Class I, II Single-pole Surge Protective Device**  
 $I_{imp} = 25kA$  per pole (10/350)

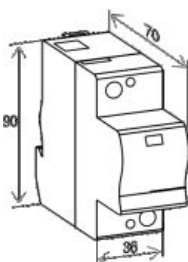


- ◆ **Category IEC / EN / VDE:** Class I, II / Type 1, 2 / B+C
- ◆ **Location of use:** Main distribution boards
- ◆ **Connections:** TN-S, TN-C, IT, TT
- ◆ **Protection modes:** L - N/PE
- ◆ **Protective element:** High Energy MOV & GDT
- ◆ **High surge discharge rating:**  $I_{imp} = 25kA$
- ◆ **MOV max withstand capability 1 x 8/20:**  $I_{max} = 150kA$
- ◆ **Housing:** Compact design
- ◆ **Complies with:** IEC-61643-1

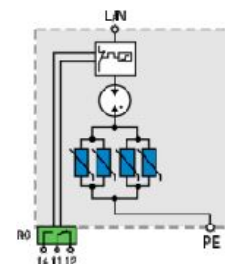
## Technical data

Type	PROBLOC BSG(R) 25/xxx	
	150	320
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	320/420V
Nominal discharge current (8/20) $I_n$		25kA
Max. discharge current (8/20) $I_{max}$		100kA
Impulse current (10/350) $I_{imp}$		25kA
Specific energy		156kJ/Ω
Charge		12.5As
Protection level $U_p$	< 1.4kV	< 1.6kV
Residual voltage at $I_n$ $U_{res}$	< 0.9kV	< 1.1kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.6kV	< 0.8kV
Follow current $I_f$		NO
Response time $t_A$		< 25ns
Thermal protection		YES
Back-up fuse (if mains > 250A)		250A gL
Short-circuit withstand current		25kA/50Hz
<b>Mechanical characteristics</b>		
Temperature range	- 40°C ...+ 80°C	
Terminal screw torque	max. 4.5Nm	
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)	
Mounting EN 60715	35mm top-hat rail	
Degree of protection	IP 20	
Housing material	Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880	2TE	
Weight per unit	213g	233g
Ordering code <b>PROBLOC BSG 25/xxx</b>	<b>513 026</b>	<b>513 028</b>
Remote contacts	YES	
Contact ratings	AC: 250V/0.5A; 125V/3A	
Terminal cross section	max. 1.5mm <sup>2</sup>	
Remote terminal torque	0.25Nm	
Weight per unit	218g	235g
Ordering code <b>PROBLOC BSGR 25/xxx - with remote contacts</b>	<b>513 027</b>	<b>513 029</b>
Packaging dimensions (single unit)	109 x 76.5 x 41.5mm	

## Dimensions



## Connection diagram



# PROBLOC BSG(R) 50 (4+0)

**Class I, II Multi-pole Surge Protective Device**  
 $I_{imp} = 12.5\text{kA}$  per pole (10/350)

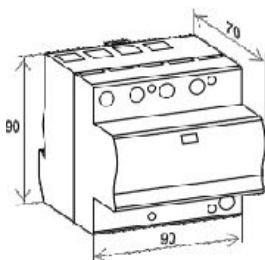


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S, IT, TT
- ◆ Protection modes: L - N/PE
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating:  $I_{imp}$  (MOV/GDT) = 12.5/50kA
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 100\text{kA}$  per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

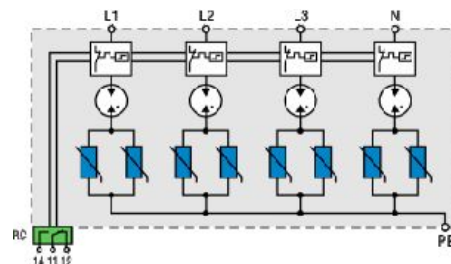
## Technical data

Type	PROBLOC BSG(R) 50/xxx (4+0)	
	150	320
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	320/420V
Nominal discharge current (8/20) $I_n$	25kA	
Max. discharge current (8/20) $I_{max}$	50kA	
Impulse current (10/350) $I_{imp}$	12.5kA	
Impulse current (10/350) $I_{imp}$ (L1+L2+L3+N-PE)	50kA	
Specific energy Charge	39kJ/Ω	
	6.5As	
Protection level $U_p$	< 1.3kV	< 1.6kV
Residual voltage at $I_n$ $U_{res}$	< 1.0kV	< 1.1kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.6kV	< 0.7kV
Follow current $I_f$	NO	
Response time $t_A$	< 25ns	
Thermal protection	YES	
Back-up fuse (if mains > 250A)	250A gL	
Short-circuit withstand current	25kA/50Hz	
<b>Mechanical characteristics</b>		
Temperature range	- 40°C ... + 80°C	
Terminal screw torque	max. 4.5Nm	
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)	
Mounting EN 60715	35mm top-hat rail	
Degree of protection	IP 20	
Housing material	Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880	5TE	
Weight per unit	474g	540g
Ordering code <b>PROBLOC BSG 50/xxx (4+0)</b>	<b>513 030</b>	<b>513 032</b>
Remote contacts	YES	
Contact ratings	AC: 250V/0.5A; 125V/3A	
Terminal cross section	max. 1.5mm <sup>2</sup>	
Remote terminal torque	0.25Nm	
Weight per unit	479g	545g
Ordering code <b>PROBLOC BSGR 50/xxx (4+0) - with remote contacts</b>	<b>513 031</b>	<b>513 033</b>
Packaging dimensions (single unit)	109 x 76.5 x 96mm	

## Dimensions



## Connection diagram



# PROBLOC BSG(R) 50 (3+1)

**Class I, II Multi-pole Surge Protective Device**  
 $I_{imp} = 12.5kA$  per pole (10/350)

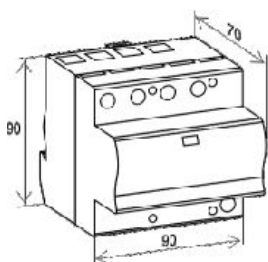


- ◆ **Category IEC / EN / VDE:** Class I, II / Type 1, 2 / B+C
- ◆ **Location of use:** Main distribution boards
- ◆ **Connections:** TT
- ◆ **Protection modes:** L - N , N - PE
- ◆ **Protective element:** High Energy MOV & GDT
- ◆ **High surge discharge rating:**  $I_{imp}$  (MOV/GDT) = 12.5/50kA
- ◆ **MOV max withstand capability 1 x 8/20:**  $I_{max} = 100kA$  per pole
- ◆ **Housing:** Compact design
- ◆ **Complies with:** IEC-61643-1

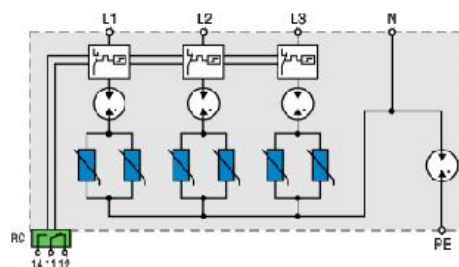
## Technical data

Type	PROBLOC BSG(R) 50/x xx (3+1)		
	150	320	
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC)	$U_c$	150/200V	320/420V
Nominal discharge current (8/20)	$I_n$ (L-N/N-PE)		25/50kA
Max. discharge current (8/20)	$I_{max}$ (L-N/N-PE)		50kA/100kA
Impulse current (10/350)	$I_{imp}$ (L-N/N-PE)		12.5kA/50kA
Impulse current (10/350)	$I_{imp}$ (L1+L2+L3+N-PE)		50kA
Specific energy	(L-N/N-PE)		39kJ/Ω/625kJ/Ω
Charge	(L-N/N-PE)		6.5As/25As
Protection level	$U_p$ (L-N)	< 1.3kV	< 1.6kV
	$U_p$ (N-PE)		< 1.5kV
Residual voltage at $I_n$	$U_{res}$ (L-N)	< 1.0kV	< 1.1kV
Residual voltage at $I_{imp}$	$U_{res}$ (L-N)	< 0.5kV	< 0.7kV
Follow current	$I_f$ (N-PE)		> 100ARMS
Response time	$t_A$ (L-N/N-PE)		< 25ns/100ns
Thermal protection	(L-N/N-PE)		YES/-
Back-up fuse (if mains > 250A)	(L-N/N-PE)		250A gL/-
Short-circuit withstand current	(L-N/N-PE)		25kA/50Hz/-
<b>Mechanical characteristics</b>			
Temperature range			- 40°C ....+ 80°C
Terminal screw torque			max. 4.5Nm
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)
Mounting EN 60715			35mm top-hat rail
Degree of protection			IP 20
Housing material			Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880			5TE
Weight per unit		475g	530g
Ordering code <b>PROBLOC BSG 50/xxx (3+1)</b>		<b>513 007</b>	<b>513 001</b>
Remote contacts			YES
Contact ratings			AC: 250V/0.5A; 125V/3A
Terminal cross section			max. 1.5mm <sup>2</sup>
Remote terminal torque			0.25Nm
Weight per unit		480g	535g
Ordering code <b>PROBLOC BSGR 50/xxx (3+1) - with remote contacts</b>		<b>513 008</b>	<b>513 002</b>
Packaging dimensions (single unit)			109 x 76.5 x 96mm

## Dimensions



## Connection diagram



# PROBLOC BSG(R) 12.5

## Class I, II Single-pole Surge Protective Device $I_{imp} = 12.5\text{kA}$ (10/350)

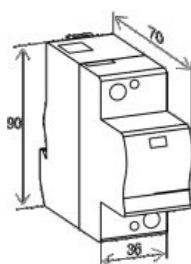


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S, TN-C, IT, TT
- ◆ Protection modes: L/N - PE
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating:  $I_{imp} = 12.5\text{kA}$
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 100\text{kA}$
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

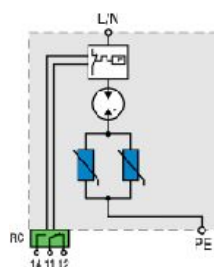
### Technical data

Type	PROBLOC BSG(R) 12.5/xxx	
	150	320
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	320/420V
Nominal discharge current (8/20) $I_n$		25kA
Max. discharge current (8/20) $I_{max}$		50kA
Impulse current (10/350) $I_{imp}$		12.5kA
Specific energy		39kJ/Ω
Charge		6.5As
Protection level $U_p$	< 1.3kV	< 1.6kV
Residual voltage at $I_n$ $U_{res}$	< 1.0kV	< 1.1kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.5kV	< 0.7kV
Follow current $I_f$		NO
Response time $t_A$		< 25ns
Thermal protection		YES
Back-up fuse (if mains > 250A)		250A gL
Short-circuit withstand current		25kA/50Hz
<b>Mechanical characteristics</b>		
Temperature range	- 40°C ....+ 80°C	
Terminal screw torque	max. 4.5Nm	
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)	
Mounting EN 60715	35mm top-hat rail	
Degree of protection	IP 20	
Housing material	Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880	2TE	
Weight per unit	143g	183g
Ordering code <b>PROBLOC BSG 12.5/xxx</b>	<b>513 022</b>	<b>513 024</b>
Remote contacts	YES	
Contact ratings	AC: 250V/0.5A; 125V/3A	
Terminal cross section	max. 1.5mm <sup>2</sup>	
Remote terminal torque	0.25Nm	
Weight per unit	148g	188g
Ordering code <b>PROBLOC BSGR 12.5/xxx - with remote contacts</b>	<b>513 023</b>	<b>513 025</b>
Packaging dimensions (single unit)	109 x 76.5 x 41,5mm	

### Dimensions

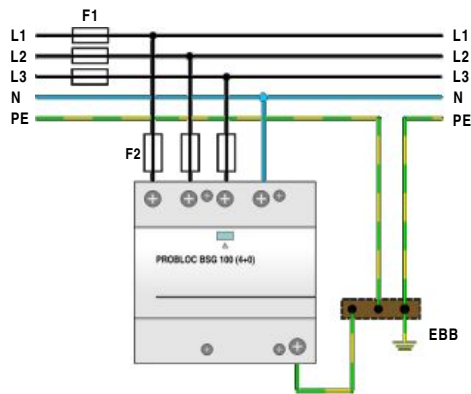


### Connection diagram

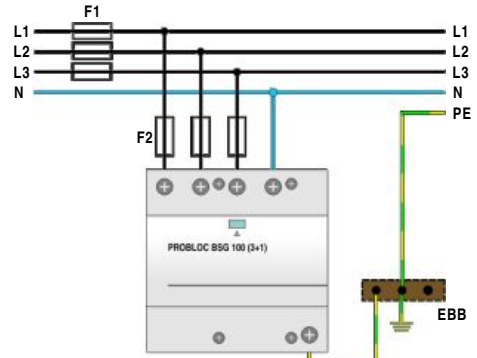


# PROBLOC BSG(R) - Connections

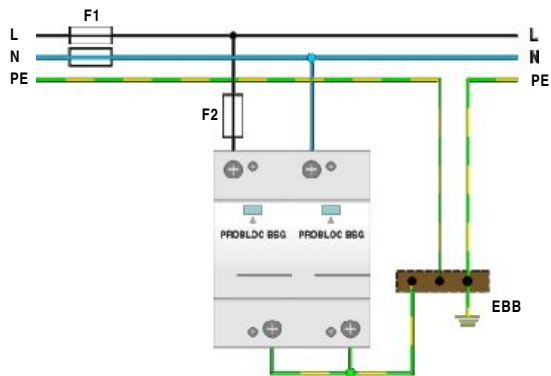
TN-S Network - Three-phase (T-connection)



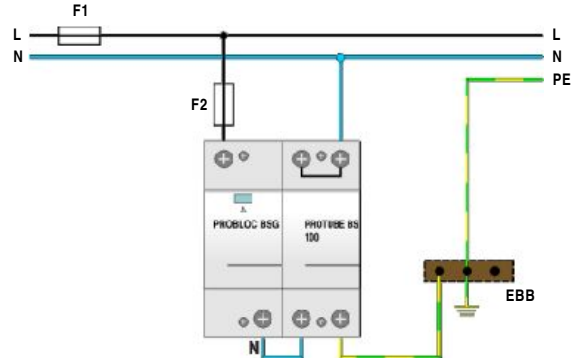
TT Network - Three-phase (T-connection)



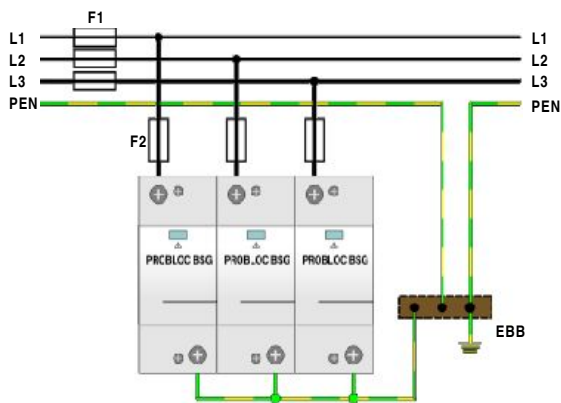
TN-S Network - Single-phase (T-connection)



TT Network - Single-phase (T-connection)



TN-C Network - Three-phase (T-connection)







# Modular MULTI-POLE and SINGLE-POLE Surge Protective Devices



<b>Category IEC / EN / VDE:</b>	<b>Class I, II, III / Type 1, 2, 3 / B+C+D</b>
<b>Location of use:</b>	<b>Main distribution boards</b>
<b>Protection modes:</b>	<b>L/N-PE, L-PEN, L-N, N-PE</b>
<b>Protective elements:</b>	<b>High Energy MOV &amp; GDT</b>
<b>High surge discharge ratings:</b>	<b><math>I_{imp} = 12.5kA</math> / pole</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnector for each MOV block</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>1TE, 2TE, 3TE, 4TE</b>

**PROTEC B2S(R) 12.5**  
**PROTEC B2S(R) 25 (2+0)**  
**PROTEC B2S(R) 25 (1+1)**  
**PROTEC B2S(R) 37.5 (3+0)**  
**PROTEC B2S(R) 50 (4+0)**  
**PROTEC B2S(R) 50 (3+1)**

The PROTEC B2S 12.5 series of overvoltage surge protective devices has been developed to protect against partial direct and indirect lightning discharges and is intended to provide protection in zones  $O_A - 1$ , per IEC 62305.

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

PROTEC B2S 12.5 consists of a high performance varistor block with thermal disconnection device.

PROTEC B2S 25 (2+0) series combines two PROTEC B2S 12.5 modules to provide protection for single phase TNS networks.

PROTEC B2S 25 (1+1) combines a PROTEC B2S 12.5 and PROTUBE B2S to provide protection for TT single phase networks, where N to PE galvanic isolation is required.

PROTEC B2S 37.5 (3+0) combines three PROTEC B2S 12.5 units, to provide protection for TNC three phase networks with a combined PEN conductor.

PROTEC B2S 50 (4+0) combines four PROTEC B2S 12.5 units, to provide protection for TNS three phase networks with a separate N and PE conductor.

PROTEC B2S 50 (3+1) combines three PROTEC B2S 12.5 units and a PROTUBE B2S, to provide protection for TT three phase networks, where N to PE galvanic isolation is required.

# PROTEC B2S(R) 12.5

## Class I, II, III Single-pole Surge Protective Device I<sub>imp</sub> = 12.5kA (10/350)

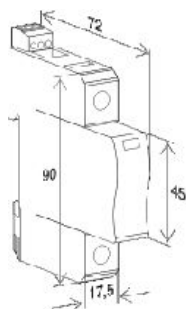


- ◆ Category IEC / EN / VDE: Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S, TN-C, IT
- ◆ Protection modes: L/N - PE, L - PEN
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating: I<sub>imp</sub> = 12.5kA
- ◆ MOV max withstand capability 1 x 8/20: I<sub>max</sub> = 100kA
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

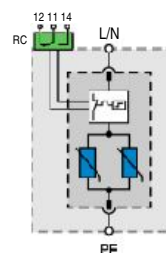
### Technical data

Type	PROTEC B2S(R) 12.5/xxx				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) U <sub>c</sub>	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) I <sub>n</sub>			25kA		
Max. discharge current (8/20) I <sub>max</sub>			60kA		
Combination wave (1.2/50, 8/20) U <sub>oc</sub> /I <sub>sc</sub>			10kV/5kA		
Impulse current (10/350) I <sub>imp</sub>			12.5kA		
Specific energy			39kJ/Ω		
Charge			6.25As		
Protection level U <sub>p</sub>	< 1.0kV	< 1.4kV	< 1.5kV	< 1.7kV	< 2.0kV
Residual voltage at I <sub>imp</sub> U <sub>res</sub>	< 0.7kV	< 1.0kV	< 1.1kV	< 1.4kV	< 1.5kV
Follow current I <sub>f</sub>			NO		
Response time t <sub>A</sub>			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 160A)			160A gL		
Short-circuit withstand current			25kA / 50Hz		
<b>Mechanical characteristics</b>					
Temperature range			- 40°C ....+ 80°C		
Terminal screw torque			max. 3.5Nm		
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715			35mm top-hat rail		
Degree of protection			IP 20		
Housing material			Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880			1TE		
Weight per unit	141g	161g	177g	189g	191g
Ordering code <b>PROTEC B2S 12.5/xxx</b>	<b>506 017</b>	<b>506 018</b>	<b>506 019</b>	<b>506 020</b>	<b>506 021</b>
Remote contacts			YES		
Contact ratings			AC: 250V/0.5A; 125V/3A		
Terminal cross section			max. 1.5mm <sup>2</sup>		
Remote terminal torque			0.25Nm		
Weight per unit	146g	166g	182g	194g	196g
Ordering code <b>PROTEC B2SR 12.5/xxx - with remote contacts</b>	<b>506 022</b>	<b>506 023</b>	<b>506 024</b>	<b>506 025</b>	<b>506 026</b>
Packaging dimensions (single unit)			108 x 74 x 24mm		
Ordering code <b>Module PROTEC B2S(R) 12.5/xxx</b>	<b>506 001</b>	<b>506 002</b>	<b>506 003</b>	<b>506 004</b>	<b>506 005</b>
Packaging dimensions (12 pcs.)			219 x 62 x 47mm		

### Dimensions



### Connection diagram



# PROTEC B2S(R) 25 (2+0)

Class I, II, III Multi-pole Surge Protective Device  
 $I_{imp} = 12.5kA$  per pole (10/350)

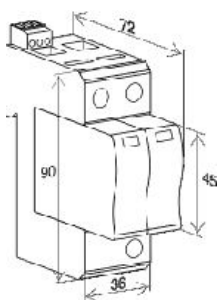


- ◆ Category IEC / EN / VDE: Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S
- ◆ Protection modes: L/N - PE, L - PEN
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 12.5kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 100kA$  per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

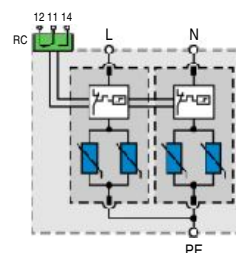
## Technical data

Type	PROTEC B2S(R) 25/xxx (2+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	25kA per pole				
Max. discharge current (8/20) $I_{max}$	60kA per pole				
Combination wave (1.2/50, 8/20) $U_{oc}/I_{sc}$	10kV/5kA				
Impulse current (10/350) $I_{imp}$	12.5kA per pole				
Impulse current (10/350) $I_{imp}$ (L+N-PE)	25kA				
Specific energy	39kJ/Ω per pole				
Charge	6.25As per pole				
Protection level $U_p$	< 1.0kV	< 1.4kV	< 1.5kV	< 1.7kV	< 2.0kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.7kV	< 1.0kV	< 1.1kV	< 1.4kV	< 1.5kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 160A)	160A gL				
Short-circuit withstand current	25kA / 50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	max. 3.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	2TE				
Weight per unit	274g	314g	346g	370g	374g
Ordering code <b>PROTEC B2S 25/xxx (2+0)</b>	<b>506 027</b>	<b>506 028</b>	<b>506 029</b>	<b>506 030</b>	<b>506 031</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	279g	319g	351g	375g	379g
Ordering code <b>PROTEC B2SR 25/xxx (2+0) - with remote contacts</b>	<b>506 032</b>	<b>506 033</b>	<b>506 034</b>	<b>506 035</b>	<b>506 036</b>
Packaging dimensions (single unit)	109 x 76.5 x 41.5mm				
Ordering code <b>Module PROTEC B2S(R) 12.5/xxx</b>	<b>506 001</b>	<b>506 002</b>	<b>506 003</b>	<b>506 004</b>	<b>506 005</b>
Packaging dimensions (12 pcs.)	219 x 62 x 47mm				

## Dimensions



## Connection diagram



# PROTEC B2S(R) 25 (1+1)

Class I, II, III Multi-pole Surge Protective Device  
 $I_{imp} = 12.5kA$  per pole (10/350)

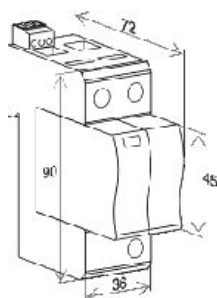


- ◆ Category IEC / EN / VDE: Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N, N - PE
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating:  $I_{imp}$  (MOV/GDT)= 1 2.5/50kA
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max}$ = 100kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

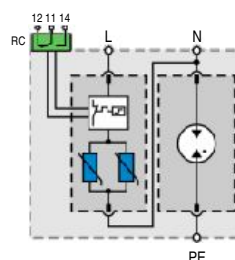
## Technical data

Type	PROTEC B2S(R) 25/xxx (1+1)					
	150	275	320	385	440	
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC)	$U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20)	$I_n$ (L-N/N-PE)			25kA/30kA		
Max. discharge current (8/20)	$I_{max}$ (L-N/N-PE)			60kA/50kA		
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$ (L-N/N-PE)			10kV/5kA		
Impulse current (10/350)	$I_{imp}$ (L-N/N-PE)			12.5kA/50kA		
Impulse current (10/350)	$I_{imp}$ (L+N-PE)			25kA		
Specific energy	(L-N/N-PE)			39kJ/Ω/2.5MJ/Ω		
Charge	(L-N/N-PE)			6.25As/50As		
Protection level	$U_p$ (L-N)	< 1.0kV	< 1.4kV	< 1.5kV	< 1.7kV	< 2.0kV
	$U_p$ (N-PE)			< 1.7kV		
Residual voltage at $I_{imp}$	$U_{res}$ (L-N)	< 0.7kV	< 1.0kV	< 1.1kV	< 1.4kV	< 1.5kV
Follow current	$I_f$ (N-PE)			> 100A <sub>RMS</sub>		
Response time	$t_A$ (L-N/N-PE)			< 25ns/100ns		
Thermal protection	(L-N/N-PE)			YES/-		
Back-up fuse (if mains > 160A)	(L-N/N-PE)			160A gL/-		
Short-circuit withstand current	(L-N/N-PE)			25kA/50Hz/-		
<b>Mechanical characteristics</b>						
Temperature range				- 40°C ....+ 80°C		
Terminal screw torque				max. 3.5Nm		
Terminal cross section				35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715				35mm top-hat rail		
Degree of protection				IP 20		
Housing material				Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880				2TE		
Weight per unit		270g	310g	342g	366g	370g
Ordering code <b>PROTEC B2S 25/xxx (1+1)</b>	<b>506 037</b>	<b>506 038</b>	<b>506 039</b>	<b>506 040</b>	<b>506 041</b>	
Remote contacts				YES		
Contact ratings				AC: 250V/0.5A; 125V/3A		
Terminal cross section				max. 1.5mm <sup>2</sup>		
Remote terminal torque				0.25Nm		
Weight per unit		275g	315g	347g	371g	375g
Ordering code <b>PROTEC B2SR 25/xxx (1+1) - with remote contacts</b>	<b>506 042</b>	<b>506 043</b>	<b>506 044</b>	<b>506 045</b>	<b>506 046</b>	
Packaging dimensions (single unit)				109 x 76.5 x 41.5mm		
Ordering code <b>Module PROTEC B2S(R) 12.5/xxx</b>	<b>506 001</b>	<b>506 002</b>	<b>506 003</b>	<b>506 004</b>	<b>506 005</b>	
Ordering code <b>Module PROTUBE B2S 50/255</b>				<b>506 006</b>		
Packaging dimensions (12 pcs.)				219 x 62 x 47mm		

## Dimensions



## Connection diagram



# PROTEC B2S(R) 37.5 (3+0)

Class I, II, III Multi-pole Surge Protective Device  
 $I_{imp} = 12.5kA$  per pole (10/350)

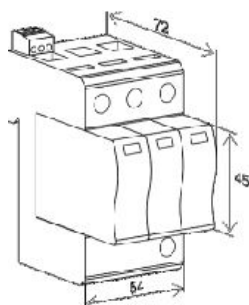


- ◆ Category IEC / EN / VDE: Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-C
- ◆ Protection modes: L - PEN
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 12.5kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 100kA$  per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

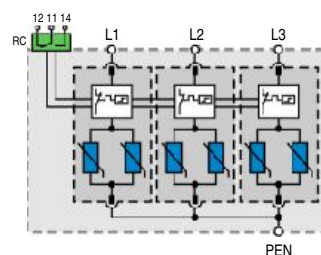
## Technical data

Type	PROTEC B2S(R) 37.5/xxx (3+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			25kA per pole		
Max. discharge current (8/20) $I_{max}$			60kA per pole		
Combination wave (1.2/50, 8/20) $U_{oc}/I_{sc}$			10kV/5kA		
Impulse current (10/350) $I_{imp}$			12.5kA per pole		
Impulse current (10/350) $I_{imp}$ (L1+L2+L3-PEN)			37.5kA		
Specific energy			39kJ/Ω per pole		
Charge			6.25As per pole		
Protection level $U_p$	< 1.0kV	< 1.4kV	< 1.5kV	< 1.7kV	< 2.0kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.7kV	< 1.0kV	< 1.1kV	< 1.4kV	< 1.5kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 160A)			160A gL		
Short-circuit withstand current			25kA / 50Hz		
<b>Mechanical characteristics</b>					
Temperature range			- 40°C .... + 80°C		
Terminal screw torque			max. 3.5Nm		
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715			35mm top-hat rail		
Degree of protection			IP 20		
Housing material			Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880			3TE		
Weight per unit	408g	468g	516g	552g	558g
Ordering code <b>PROTEC B2S 37.5/xxx (3+0)</b>	<b>506 047</b>	<b>506 048</b>	<b>506 049</b>	<b>506 050</b>	<b>506 051</b>
Remote contacts			YES		
Contact ratings			AC: 250V/0.5A; 125V/3A		
Terminal cross section			max. 1.5mm <sup>2</sup>		
Remote terminal torque			0.25Nm		
Weight per unit	413g	473g	521g	557g	563g
Ordering code <b>PROTEC B2SR 37.5/xxx (3+0) - with remote contacts</b>	<b>506 052</b>	<b>506 053</b>	<b>506 054</b>	<b>506 055</b>	<b>506 056</b>
Packaging dimensions (single unit)			109 x 76.5 x 60mm		
Ordering code <b>Module PROTEC B2S(R) 12.5/xxx</b>	<b>506 001</b>	<b>506 002</b>	<b>506 003</b>	<b>506 004</b>	<b>506 005</b>
Packaging dimensions (12 pcs.)			219 x 62 x 47mm		

## Dimensions



## Connection diagram



# PROTEC B2S(R) 50 (4+0)

Class I, II, III Multi-pole Surge Protective Device  
 $I_{imp} = 12.5\text{kA}$  per pole (10/350)

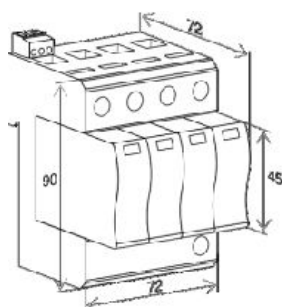


- ◆ Category IEC / EN / VDE: Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connections: TN-S
- ◆ Protection modes: L/N - PE, L - PEN
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 12.5\text{kA}$  per pole
- ◆ MOV max withstand capability 1 x 8/20:  $I_{max} = 100\text{kA}$  per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

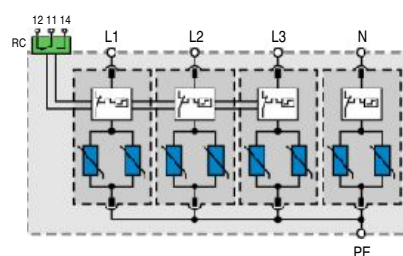
## Technical data

Type	PROTEC B2S(R) 50/xxx (4+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			25kA per pole		
Max. discharge current (8/20) $I_{max}$			60kA per pole		
Combination wave (1.2/50, 8/20) $U_{oc}/I_{sc}$			10kV/5kA		
Impulse current (10/350) $I_{imp}$			12.5kA per pole		
Impulse current (10/350) $I_{imp}$ (L1+L2+L3+N+PE)			50kA		
Specific energy			39kJ/Ω per pole		
Charge			6.25As per pole		
Protection level $U_p$	< 1.0kV	< 1.4kV	< 1.5kV	< 1.7kV	< 2.0kV
Residual voltage at $I_{imp}$ $U_{res}$	< 0.7kV	< 1.0kV	< 1.1kV	< 1.4kV	< 1.5kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 160A)			160A gL		
Short-circuit withstand current			25kA / 50Hz		
<b>Mechanical characteristics</b>					
Temperature range			- 40°C ... + 80°C		
Terminal screw torque			max. 3.5Nm		
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715			35mm top-hat rail		
Degree of protection			IP 20		
Housing material			Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880					
Weight per unit	517g	597g	661g	709g	717g
Ordering code <b>PROTEC B2S 50/xxx (4+0)</b>	<b>506 057</b>	<b>506 058</b>	<b>506 059</b>	<b>506 060</b>	<b>506 061</b>
Remote contacts			YES		
Contact ratings			AC: 250V/0.5A; 125V/3A		
Terminal cross section			max. 1.5mm <sup>2</sup>		
Remote terminal torque			0.25Nm		
Weight per unit	522g	602g	667g	714g	722g
Ordering code <b>PROTEC B2SR 50/xxx (4+0) - with remote contacts</b>	<b>506 062</b>	<b>506 063</b>	<b>506 064</b>	<b>506 065</b>	<b>506 066</b>
Packaging dimensions (single unit)			109 x 76.5 x 78mm		
Ordering code <b>Module PROTEC B2S(R) 12.5/xxx</b>	<b>506 001</b>	<b>506 002</b>	<b>506 003</b>	<b>506 004</b>	<b>506 005</b>
Packaging dimensions (12 pcs.)			219 x 62 x 47mm		

## Dimensions



## Connection diagram



# PROTEC B2S(R) 50 (3+1)

## Class I, II, III Multi-pole Surge Protective Device I<sub>imp</sub> = 12.5kA per pole (10/350)

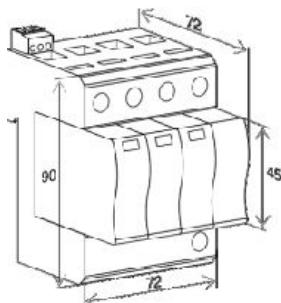


- ◆ Category IEC / EN / VDE: Class I, II, III / Type 1, 2, 3 / B+C+D
- ◆ Location of use: Main distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L/N - PE, L - PEN
- ◆ Protective element: High Energy MOV & GDT
- ◆ High surge discharge rating: I<sub>imp</sub> (MOV/GDT) = 12.5/50kA
- ◆ MOV max withstand capability 1 x 8/20: I<sub>max</sub> = 100kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

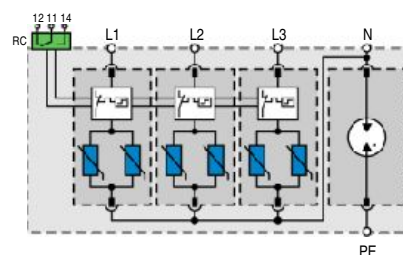
### Technical data

Type	PROTEC B2S(R) 50/xxx (3+1)					
	150	275	320	385	440	
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC)	<b>U<sub>c</sub></b>	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20)	<b>I<sub>n</sub></b> (L-N/N-PE)	25kA per pole/30kA				
Max. discharge current (8/20)	<b>I<sub>max</sub></b> (L-N/N-PE)	60kA per pole/50kA				
Combination wave (1.2/50, 8/20)	<b>U<sub>oc</sub>/I<sub>sc</sub></b>	10kV/5kA				
Impulse current (10/350)	<b>I<sub>imp</sub></b> (L-N/N-PE)	12.5kA per pole/50kA				
Impulse current (10/350)	<b>I<sub>imp</sub></b> (L1+L2+L3+N-PE)	50kA				
Specific energy	(L-N/N-PE)	39kJ/Ω/2.5MJ/Ω				
Charge	(L-N/N-PE)	6.25As/50As				
Protection level	<b>U<sub>p</sub></b> (L-N)	< 1.0kV	< 1.4kV	< 1.5kV	< 1.7kV	< 2.0kV
	<b>U<sub>p</sub></b> (N-PE)	< 1.7kV				
Residual voltage at I <sub>imp</sub>	<b>U<sub>res</sub></b> (L-N)	< 0.7kV	< 1.0kV	< 1.1kV	< 1.4kV	< 1.5kV
Follow current	<b>I<sub>f</sub></b> (N-PE)	> 100ARMS				
Response time	<b>t<sub>A</sub></b> (L-N/N-PE)	< 25ns/100ns				
Thermal protection	(L-N/N-PE)	YES/-				
Back-up fuse (if mains > 160A)	(L-N/N-PE)	160A gL/-				
Short-circuit withstand current	(L-N/N-PE)	25kA/50Hz/-				
<b>Mechanical characteristics</b>						
Temperature range		- 40°C ....+ 80°C				
Terminal screw torque		max. 3.5Nm				
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715		35mm top-hat rail				
Degree of protection		IP 20				
Housing material		Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880		4TE				
Weight per unit		498g	578g	642g	690g	698g
Ordering code <b>PROTEC B2S 50/xxx (3+1)</b>		<b>506 067</b>	<b>506 068</b>	<b>506 069</b>	<b>506 070</b>	<b>506 071</b>
Remote contacts		YES				
Contact ratings		AC: 250V/0.5A; 125V/3A				
Terminal cross section		max. 1.5mm <sup>2</sup>				
Remote terminal torque		0.25Nm				
Weight per unit		503g	583g	647g	695g	703g
Ordering code <b>PROTEC B2SR 50/xxx (3+1) - with remote contacts</b>		<b>506 072</b>	<b>506 073</b>	<b>506 074</b>	<b>506 075</b>	<b>506 076</b>
Packaging dimensions (single unit)		109 x 76.5 x 78mm				
Ordering code <b>Module PROTEC B2S(R) 12.5/xxx</b>		<b>506 001</b>	<b>506 002</b>	<b>506 003</b>	<b>506 004</b>	<b>506 005</b>
Ordering code <b>Module PROTUBE B2S 50/255</b>		<b>506 006</b>				
Packaging dimensions (12 pcs.)		219 x 62 x 47mm				

### Dimensions

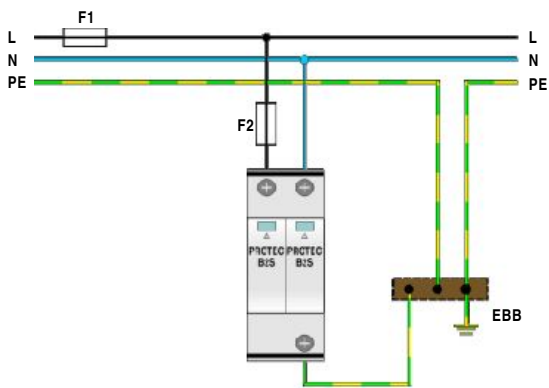


### Connection diagram

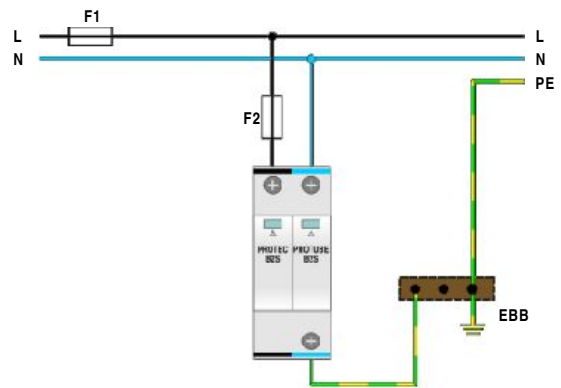


# PROTEC B2S(R) Connections

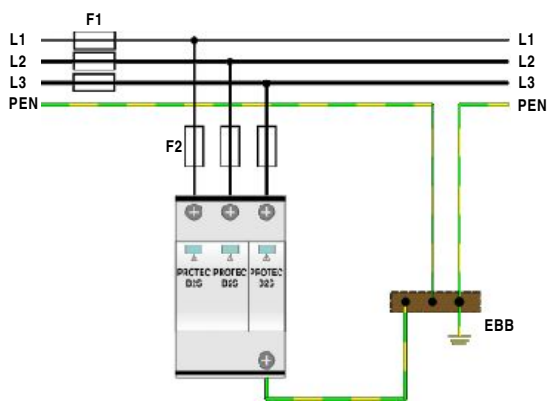
TN-S Network (Single-phase)



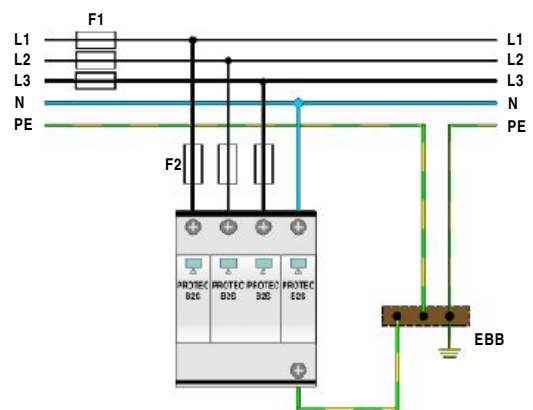
TT Network (Single-phase)



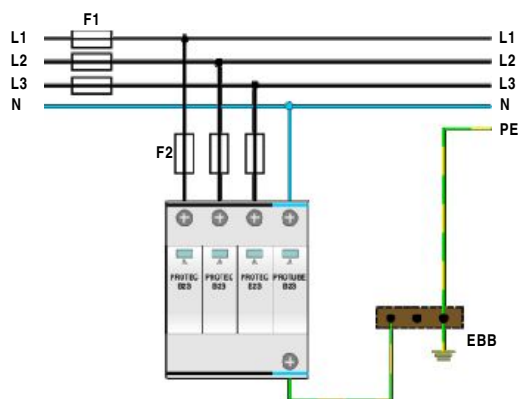
TN-C Network (Three-phase)



TN-S Network (Three-phase)



TT Network (Three-phase)





# Modular SINGLE-POLE and MULTI-POLE Surge Protective Devices

# NEW

Category IEC / EN / VDE:	Class II / Type 2 / C
Location of use:	Branch Sub-distribution Boards
Protection modes:	L/N-PE, L-PEN, N-PE
Protective elements:	MOV and GDT
Surge discharge ratings:	$I_{max} = 40kA$ per pole
Internal protection and safety:	Separate thermal disconnector for each MOV
Status indication:	Mechanical flag + remote contacts (R)
Dimensions DIN 43880:	1TE, 2TE, 3TE, 4TE

**SAFETEC C(R) 40**  
**SAFETEC C(R) 80 (2+0)**  
**SAFETEC C(R) 80 (1+1)**  
**SAFETEC C(R) 120 (3+0)**  
**SAFETEC C(R) 160 (4+0)**  
**SAFETEC C(R) 160 (3+1)**

The new SAFETEC series of surge protective devices (SPDs) provide:

- Protection from overvoltages, surge and transients on the system network
- Protection against loss of neutral, or loose neutral connections, which are common to MEN (Multiple earthed neutral) systems
- Unstable or poorly regulated power networks where sustained overvoltages for some minutes or longer may exist
- Patented TC technology prevent catastrophic failures in case of TOV (temporary overvoltages)

# SAFETEC C(R) 40

## Class II Single-pole Surge Protective Device $I_{max} = 40kA (8/20)$

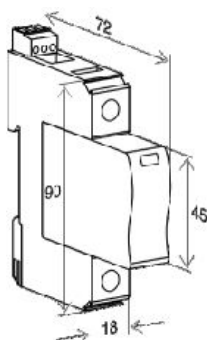


◆ Category IEC / EN / VDE:	Class II / Type 2 / C
◆ Location of use:	Branch sub-distribution boards
◆ Connections:	TN-S, TN-C, IT
◆ Protection modes:	L/N - PE
◆ Protective element:	MOV
◆ High surge discharge rating:	$I_{max} = 40kA$
◆ Safety:	Immunity against TOV
◆ Housing:	Modular design
◆ Complies with:	IEC-61643-1

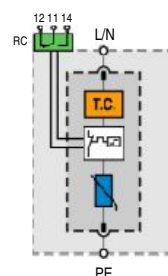
### Technical data

Type	SAFETEC C(R) 40/xxx		
	150	275	440
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC) $U_C$	150/200V	275/350V	440/580V
Nominal discharge current (8/20) $I_n$	20kA	20kA	20kA
Max. discharge current (8/20) $I_{max}$	40kA	40kA	40kA
Protection level $U_p$	< 1.0kV	< 1.6kV	< 2.2kV
Follow current $I_f$		NO	
Response time $t_A$		< 25ns	
Thermal protection		YES	
TOV withstand for 5 sec.		$1.32 \times U_{REF} (335V)$	
		$\sqrt{3} \times U_{REF} (400V)$	
Short-circuit withstand current		25kA/50Hz	
<b>Mechanical characteristics</b>			
Terminal screw torque		max. 3.5Nm	
Temperature range		- 40°C .... + 80°C	
Terminal cross section		35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)	
Mounting EN 60715		35mm top-hat rail	
Degree of protection		IP 20	
Housing material		thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		1TE	
Weight per unit			
Ordering code <b>SAFETEC C 40/xxx</b>	<b>516 001</b>	<b>516 003</b>	<b>516 005</b>
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm <sup>2</sup>	
Remote terminal torque		0.25Nm	
Weight per unit			
Ordering code <b>SAFETEC C(R) 40/xxx (with remote contacts)</b>	<b>516 002</b>	<b>516 004</b>	<b>516 006</b>
Packaging dimensions (single unit)		108 x 74 x 24mm	
Ordering code <b>Module SAFETEC C(R) 40/xxx</b>	<b>516 037</b>	<b>516 038</b>	<b>516 039</b>
Packaging dimensions (12 pcs.)		219 x 62 x 47mm	

### Dimensions



### Connection diagram



# SAFETEC C(R) 80 (2+0)

## Class II Multi-pole Surge Protective Device $I_{max} = 40kA$ per pole (8/20)

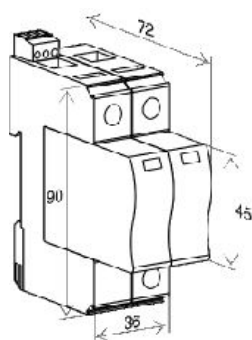


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S
- ◆ Protection modes: L/N - PE, L - PEN
- ◆ Protective element: MOV
- ◆ High surge discharge rating:  $I_{max} = 40kA$  per pole
- ◆ Safety: Immunity against TOV
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

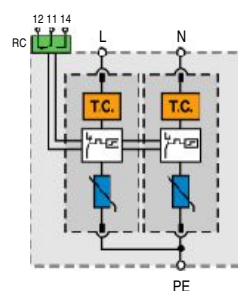
### Technical data

Type	SAFETEC C(R) 80/xxx (2+0)		
	150	275	440
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	440/580V
Nominal discharge current (8/20) $I_n$	20kA per pole	20kA per pole	20kA per pole
Max. discharge current (8/20) $I_{max}$	40kA per pole	40kA per pole	40kA per pole
Protection level $U_p$	< 1.0kV	< 1.6kV	< 2.2kV
Follow current $I_f$		NO	
Response time $t_A$		< 25ns	
Thermal protection		YES	
TOV withstand for 5 sec.		$1.32 \times U_{REF} (335V)$	
		$\sqrt{3} \times U_{REF} (400V)$	
Short-circuit withstand current		25kA/50Hz	
<b>Mechanical characteristics</b>			
Terminal screw torque		max. 3.5Nm	
Temperature range		- 40°C .... + 80°C	
Terminal cross section		35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)	
Mounting EN 60715		35mm top-hat rail	
Degree of protection		IP 20	
Housing material		thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		2TE	
Weight per unit			
Ordering code SAFETEC C 80/xxx (2+0)	516 007	516 009	516 011
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm <sup>2</sup>	
Remote terminal torque		0.25Nm	
Weight per unit			
Ordering code SAFETEC C(R) 80/xxx (2+0) (with remote contacts)	516 008	516 010	516 012
Packaging dimensions (single unit)		109 x 76.5 x 41.5mm	
Ordering code Module SAFETEC C(R) 40/xxx	516 037	516 038	516 039
Packaging dimensions (12 pcs.)		219 x 62 x 47mm	

### Dimensions



### Connection diagram



# SAFETEC C(R) 80 (1+1)

## Class II Multi-pole Surge Protective Device

$I_{max} = 40kA$  per pole (8/20)

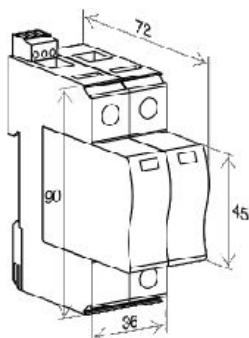


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N, N - PE
- ◆ Protective element: MOV and GDT
- ◆ High surge discharge rating:  $I_{max} = 40kA$  per pole
- ◆ Safety: Immunity against TOV
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

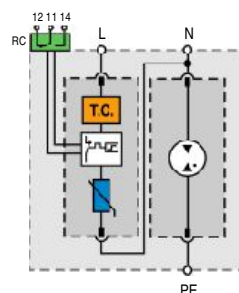
### Technical data

Type	SAFETEC C(R) 80/xxx (1+1)			
	150	275	440	
<b>Electrical characteristics</b>				
Max. continuous operating voltage (AC/DC)	$U_c$	150/200V	275/350V	440/580V
Nominal discharge current (8/20)	$I_n$ (L-N/N-PE)	20kA per pole	20kA per pole	20kA per pole
Max. discharge current (8/20)	$I_{max}$ (L-N/N-PE)	40kA per pole	40kA per pole	40kA per pole
Protection level	$U_p$ (L-N)	< 1.0kV	< 1.6kV	< 2.2kV
	$U_p$ (N-PE)		< 2.0kV	
Follow current	$I_f$ (N-PE)		> 100A <sub>RMS</sub>	
Response time	$t_A$ (L-N/N-PE)		< 25ns/100ns	
Thermal protection	(L-N/N-PE)		YES	
TOV withstand for 5 sec.			$1.32 \times U_{REF}$ (335V)	
			$\sqrt{3} \times U_{REF}$ (400V)	
Short-circuit withstand current	(L-N/N-PE)		25kA/50Hz/-	
<b>Mechanical characteristics</b>				
Terminal screw torque			max. 3.5Nm	
Temperature range			-40°C .... +80°C	
Terminal cross section			35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)	
Mounting EN 60715			35mm top-hat rail	
Degree of protection			IP 20	
Housing material			thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880			2TE	
Weight per unit				
Ordering code SAFETEC C 80/xxx (1+1)	516 013	516 015	516 017	
Remote contacts		YES		
Contact ratings		AC: 250V/0.5A; 125V/3A		
Terminal cross section		max. 1.5mm <sup>2</sup>		
Remote terminal torque		0.25Nm		
Weight per unit				
Ordering code SAFETEC C(R) 80/xxx (1+1) (with remote contacts)	516 014	516 016	516 018	
Packaging dimensions (single unit)		109 x 76.5 x 41.5mm		
Ordering code Module SAFETEC C(R) 40/xxx	516 037	516 038	516 039	
Ordering code Module SAFETUBE C 40/255		516 115		
Packaging dimensions (12 pcs.)		219 x 62 x 47mm		

### Dimensions



### Connection diagram



# SAFETEC C(R) 120 (3+0)

## Class II Multi-pole Surge Protective Device $I_{max} = 40kA$ per pole (8/20)

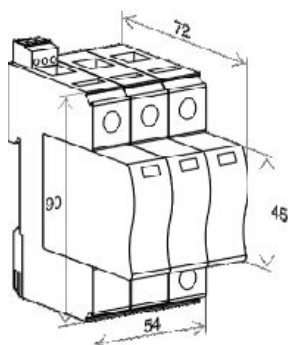


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-C
- ◆ Protection modes: L - PEN
- ◆ Protective element: MOV
- ◆ High surge discharge rating:  $I_{max} = 40kA$  per pole
- ◆ Safety: Immunity against TOV
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

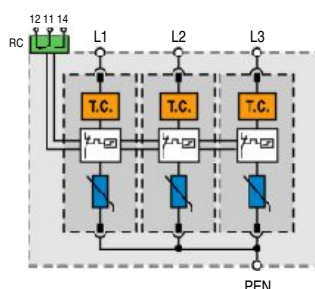
### Technical data

Type	SAFETEC C(R) 120/xxx (3+0)		
	150	275	440
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	440/580V
Nominal discharge current (8/20) $I_n$	20kA per pole	20kA per pole	20kA per pole
Max. discharge current (8/20) $I_{max}$	40kA per pole	40kA per pole	40kA per pole
Protection level $U_p$	< 1.0kV	< 1.6kV	< 2.2kV
Follow current $I_f$		NO	
Response time $t_A$		< 25ns	
Thermal protection		YES	
TOV withstand for 5 sec.		$1.32 \times U_{REF} (335V)$	
		$\sqrt{3} \times U_{REF} (400V)$	
Short-circuit withstand current		25kA/50Hz	
<b>Mechanical characteristics</b>			
Terminal screw torque		max. 3.5Nm	
Temperature range		- 40°C .... + 80°C	
Terminal cross section		35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)	
Mounting EN 60715		35mm top-hat rail	
Degree of protection		IP 20	
Housing material		thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		3TE	
Weight per unit			
Ordering code SAFETEC C 120/xxx (3+0)	516 019	516 021	516 023
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm <sup>2</sup>	
Remote terminal torque		0.25Nm	
Weight per unit			
Ordering code SAFETEC C(R) 120/xxx (3+0) (with remote contacts)	516 020	516 022	516 024
Packaging dimensions (single unit)		109 x 76.5 x 60mm	
Ordering code Module SAFETEC C(R) 40/xxx	516 037	516 038	516 039
Packaging dimensions (12 pcs.)		219 x 62 x 47mm	

### Dimensions



### Connection diagram



# SAFETEC C(R) 160 (4+0)

## Class II Multi-pole Surge Protective Device

$I_{max} = 40kA$  per pole (8/20)

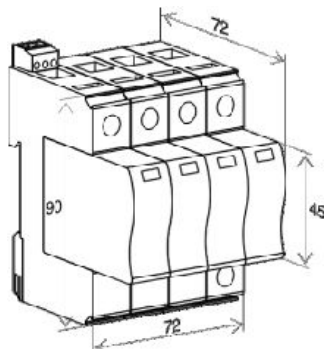


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S, IT
- ◆ Protection modes: L/N - PE
- ◆ Protective element: MOV
- ◆ High surge discharge rating:  $I_{max} = 40kA$  per pole
- ◆ Safety: Immunity against TOV
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

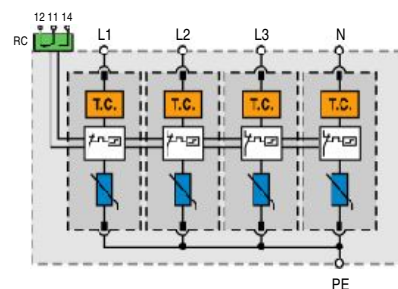
### Technical data

Type	SAFETEC C(R) 160/xxx (4+0)		
	150	275	440
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	440/580V
Nominal discharge current (8/20) $I_n$	20kA per pole	20kA per pole	20kA per pole
Max. discharge current (8/20) $I_{max}$	40kA per pole	40kA per pole	40kA per pole
Protection level $U_p$	< 1.0kV	< 1.6kV	< 2.2kV
Follow current $I_f$		NO	
Response time $t_A$		< 25ns	
Thermal protection		YES	
TOV withstand for 5 sec.		$1.32 \times U_{REF}$ (335V)	
		$\sqrt{3} \times U_{REF}$ (400V)	
Short-circuit withstand current		25kA/50Hz	
<b>Mechanical characteristics</b>			
Terminal screw torque		max. 3.5Nm	
Temperature range		- 40°C .... + 80°C	
Terminal cross section		35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)	
Mounting EN 60715		35mm top-hat rail	
Degree of protection		IP 20	
Housing material		thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		4TE	
Weight per unit			
Ordering code SAFETEC C 160/xxx (4+0)	516 025	516 027	516 029
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm <sup>2</sup>	
Remote terminal torque		0.25Nm	
Weight per unit			
Ordering code SAFETEC C(R) 160/xxx (4+0) (with remote contacts)	516 026	516 028	516 030
Packaging dimensions (single unit)		109 x 76.5 x 78mm	
Ordering code Module SAFETEC C(R) 40/xxx	516 037	516 038	516 039
Packaging dimensions (12 pcs.)		219 x 62 x 47mm	

### Dimensions



### Connection diagram



# SAFETEC C(R) 160 (3+1)

## Class II Multi-pole Surge Protective Device $I_{max} = 40kA$ per pole (8/20)

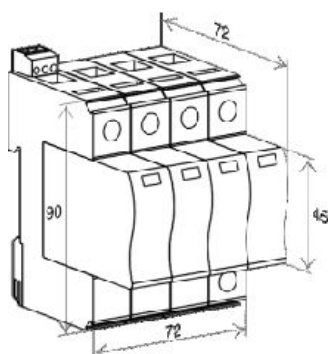


- ◆ Category IEC/EN/VDE: Class II/Type 2/C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N, N - PE
- ◆ Protective element: MOV and GDT
- ◆ High surge discharge rating:  $I_{max} = 40kA$  per pole
- ◆ Safety: Immunity against TOV
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

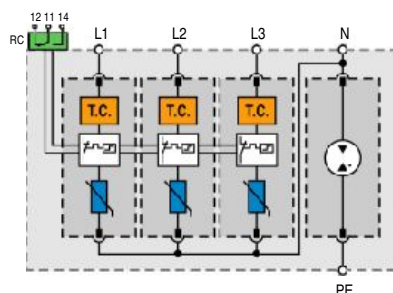
### Technical data

Type	SAFETEC C(R) 160/xxx (3+1)		
	150	275	440
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	440/580V
Nominal discharge current (8/20) $I_n$ (L-N/N-PE)	20kA per pole	20kA per pole	20kA per pole
Max. discharge current (8/20) $I_{max}$ (L-N/N-PE)	40kA per pole	40kA per pole	40kA per pole
Protection level	$U_p$ (L-N)	< 1.0kV	< 1.6kV
		$U_p$ (N-PE)	< 2.0kV
Follow current $I_f$ (N-PE)		> 100ARMS	
Response time $t_A$ (L-N/N-PE)		< 25ns/100ns	
Thermal protection (L-N/N-PE)		YES	
TOV withstand for 5 sec.		$1.32 \times U_{REF} (335V)$ $\sqrt{3} \times U_{REF} (400V)$	
Short-circuit withstand current (L-N/N-PE)		25kA/50Hz/-	
<b>Mechanical characteristics</b>			
Terminal screw torque		max. 3.5Nm	
Temperature range		- 40°C ... + 80°C	
Terminal cross section		35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)	
Mounting EN 60715		35mm top-hat rail	
Degree of protection		IP 20	
Housing material		thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		4TE	
Weight per unit			
Ordering code SAFETEC C 160/xxx (3+1)	516 031	516 033	516 035
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm <sup>2</sup>	
Remote terminal torque		0.25Nm	
Weight per unit			
Ordering code SAFETEC C(R) 160/xxx (3+1) (with remote contacts)	516 032	516 034	516 036
Packaging dimensions (single unit)		109 x 76.5 x 78mm	
Ordering code Module SAFETEC C(R) 40/xxx	516 037	516 038	516 039
Ordering code Module SAFETUBE C 40/255		516 115	
Packaging dimensions (12 pcs.)		219 x 62 x 47mm	

### Dimensions

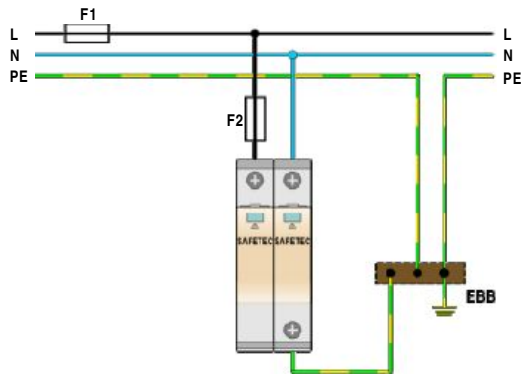


### Connection diagram

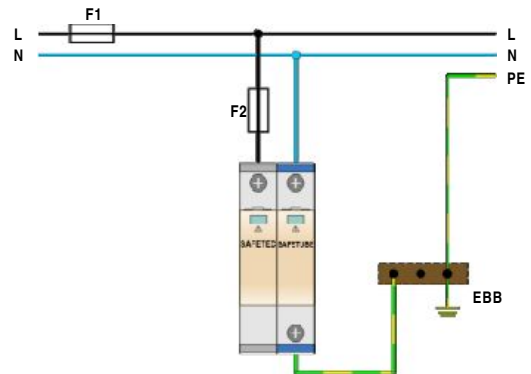


# SAFETEC C(R), SAFETUBE C - Connections

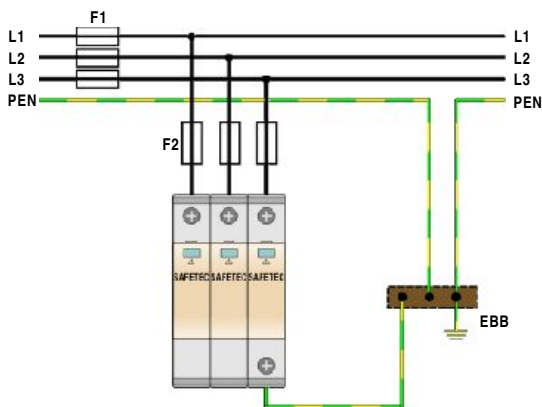
TN-S Network (Single-phase)



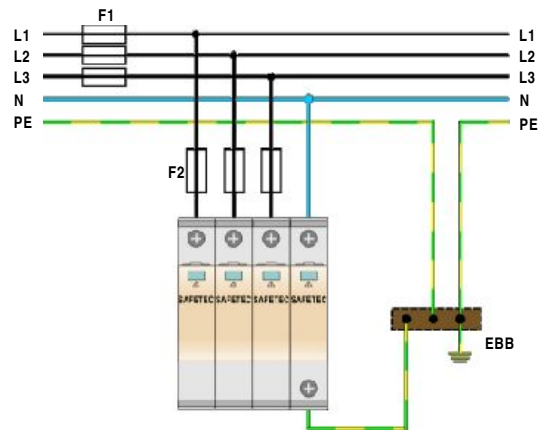
TT Network (Single-phase)



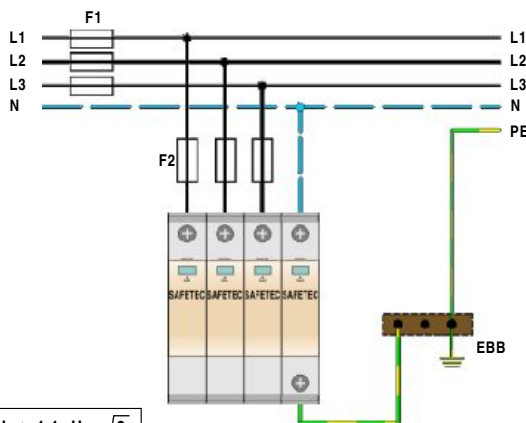
TN-C Network (Three-phase)



TN-S Network (Three-phase)

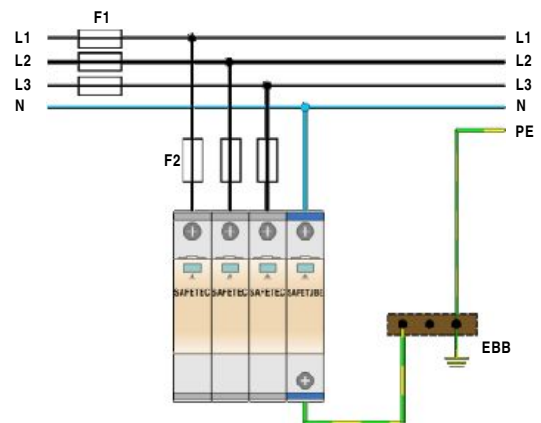


IT Network (Three-phase)



$$U_C \geq 1.1 \cdot U_N \cdot \sqrt{3}$$

TT Network (Three-phase)





# Modular SINGLE-POLE and MULTI-POLE Surge Protective Devices



<b>Category IEC / EN / VDE:</b>	<b>Class II / Type 2 / C</b>
<b>Location of use:</b>	<b>Branch Sub-distribution Boards</b>
<b>Protection modes:</b>	<b>L/N-PE, L-PEN, N-PE</b>
<b>Protective elements:</b>	<b>MOV and GDT</b>
<b>Surge discharge ratings:</b>	<b>I<sub>max</sub> = 40kA per pole</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnector for each MOV</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>1TE, 2TE, 3TE, 4TE</b>

**PROTEC C(R) 40**  
**PROTUBE C(R) 40**  
**PROTEC C(R) 80 (2+0)**  
**PROTEC C(R) 80 (1+1)**  
**PROTEC C(R) 120 (3+0)**  
**PROTEC C(R) 160 (4+0)**  
**PROTEC C(R) 160 (3+1)**  
**PROTEC C(R) 20**

**PROTEC CN(R) 40**  
**PROTEC CN(R) 20**  
**PROTUBE CN**

The PROTEC C 40 series of over-voltage surge protective devices has been developed to protect against the effects of indirect lightning discharges and induced voltages and is intended to provide protection in zones 1 - 2 per IEC 62305.

PROTEC C 40 consists of a high performance varistor block with thermal disconnection device.

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

PROTEC C 80 (2+0) series combines two PROTEC C 40 modules to provide protection for single phase TNS networks.

PROTEC C 80 (1+1) series combines a PROTEC C 40 and PROTUBE C to provide protection for TT single phase networks, where N to PE galvanic isolation is required.

PROTEC C 120 (3+0) series combines three PROTEC C 40 modules, to provide protection for TNC three phase networks with a combined PEN conductor.

The PROTEC C 160 (4+0) series combines four PROTEC C 40 modules, to provide protection for TNS three phase networks with separate PE and N conductors.

The PROTEC C 160 (3+1) series combines three PROTEC C 40 modules and a PROTUBE C, to provide protection for TT three phase networks, where N to PE galvanic isolation is required.

PROTEC CN 40 consists of a high performance varistor block with thermal disconnection device.

PROTUBE CN consists of an encapsulated air gap device, and is used as a galvanic separation between the N-PE conductors in a 1+1 or 3+1 power distribution system (TT networks).

# PROTEC C(R) 40

## Class II Single-pole Surge Protective Device

$I_{max} = 40kA (8/20)$

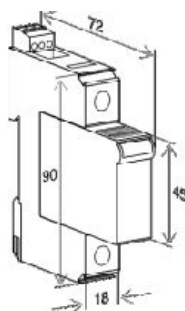


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S, TN-C, IT
- ◆ Protection modes: L/N - PE, L- PEN
- ◆ Protective element: MOV
- ◆ High surge discharge rating:  $I_{max} = 40kA$
- ◆ MOV max withstand capability 1 x 8/20: 60kA
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

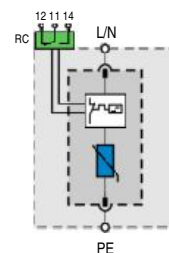
### Technical data

Type	PROTEC C(R) 40/xxx					
	75	150	275	320	385	440
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC) $U_c$	75/100V	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	20kA					
Max. discharge current (8/20) $I_{max}$	40kA					
Protection level $U_p$	< 0.6V	< 0.9kV	< 1.5kV	< 1.5kV	< 1.9kV	< 2.2kV
Follow current $I_f$	NO					
Response time $t_A$	< 25ns					
Thermal protection	YES					
Back-up fuse (if mains > 125A)	125A gL					
Short-circuit withstand current	25kA/50Hz					
<b>Mechanical characteristics</b>						
Temperature range	- 40°C ... + 80°C					
Terminal screw torque	max. 4.5Nm					
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)					
Mounting EN 60715	35mm top-hat rail					
Degree of protection	IP 20					
Housing material	Thermoplastic; extinguishing degree UL 94 V-0					
Dimensions DIN 43880	1TE					
Weight per unit	112g	122g	128g	128g	129g	130g
<b>Ordering code PROTEC C 40/xxx</b>	<b>500 001</b>	<b>500 003</b>	<b>500 005</b>	<b>500 007</b>	<b>500 171</b>	<b>500 009</b>
Remote contacts	YES					
Contact ratings	AC: 250V/0.5A; 125V/3A					
Terminal cross section	max. 1.5mm <sup>2</sup>					
Remote terminal torque	0.25Nm					
Weight per unit	117g	127g	133g	133g	134g	135g
<b>Ordering code PROTEC CR 40/xxx - with remote contacts</b>	<b>500 011</b>	<b>500 013</b>	<b>500 015</b>	<b>500 017</b>	<b>500 175</b>	<b>500 019</b>
Packaging dimensions (single unit)	108 x 74 x 24mm					
<b>Ordering code Module PROTEC C(R) 40/xxx</b>	<b>500 216</b>	<b>500 217</b>	<b>500 219</b>	<b>500 220</b>	<b>500 221</b>	<b>500 222</b>
Packaging dimensions (12 pcs.)	219 x 62 x 47mm					

### Dimensions



### Connection diagram



# PROTUBE C 40

## Class II Single-pole N-PE Surge Protective Device

$I_{max} = 40kA (8/20)$



- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TT
- ◆ Protection modes: N - PE
- ◆ Protective element: GDT
- ◆ High surge discharge rating:  $I_{max} = 40kA$
- ◆ GDT max withstand capability 1 x 8/20: 60kA
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

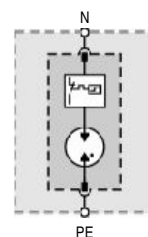
### Technical data

Type	PROTUBE C 40/255	
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC)	$U_c$	255V
Nominal discharge current (8/20)	$I_n$	20kA
Max. discharge current (8/20)	$I_{max}$	40kA
Protection level	$U_p$	< 2.0kV
Follow current	$I_f$	> 100ARMS
Response time	$t_A$	< 100ns
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ...+ 80°C
Terminal screw torque		max. 4.5Nm
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)
Mounting EN 60715		35mm top-hat rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		1TE
Weight per unit		118g
Ordering code <b>PROTUBE C 40</b>		<b>503 005</b>
Packaging dimensions (single unit)		108 x 74 x 24mm
Ordering code <b>Module PROTUBE C 40/255</b>		<b>500 234</b>
Packaging dimensions (12 pcs.)		219 x 62 x 47mm

### Dimensions



### Connection diagram



# PROTEC C(R) 80 (2+0)

## Class II Multi-pole Surge Protective Device $I_{max} = 40kA$ per pole (8/20)

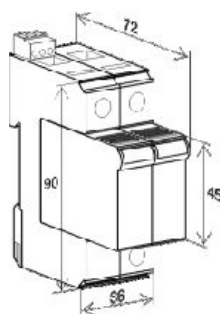


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S
- ◆ Protection modes: L/N - PE, L- PEN
- ◆ Protective element: MOV
- ◆ High surge discharge rating:  $I_{max} = 40kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20: 60kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

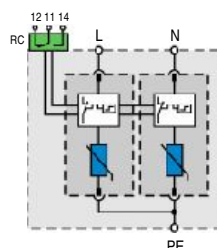
### Technical data

Type	PROTEC C(R) 80/xxx (2+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	20kA per pole				
Max. discharge current (8/20) $I_{max}$	40kA per pole				
Protection level $U_p$	< 0.9kV	< 1.5kV	< 1.5kV	< 1.9kV	< 2.2kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 125A)	125A gL				
Short-circuit withstand current	25kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ... + 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	2TE				
Weight per unit	234g	244g	244g	245g	247g
<b>Ordering code PROTEC C 80/xxx (2+0)</b>	<b>500 073</b>	<b>500 075</b>	<b>500 077</b>	<b>500 179</b>	<b>500 079</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	239g	249g	249g	250g	252g
<b>Ordering code PROTEC CR 80/xxx (2+0) - with remote contacts</b>	<b>500 081</b>	<b>500 083</b>	<b>500 085</b>	<b>500 183</b>	<b>500 087</b>
Packaging dimensions (single unit)	109 x 76.5 x 41.5				
<b>Ordering code Module PROTEC C(R) 40/xxx</b>	<b>500 217</b>	<b>500 219</b>	<b>500 220</b>	<b>500 221</b>	<b>500 222</b>
Packaging dimensions (12 pcs.)	219 x 62 x 47mm				

### Dimensions



### Connection diagram



# PROTEC C(R) 80 (1+1)

## Class II Multi-pole Surge Protective Device

$I_{max} = 40kA$  per pole (8/20)

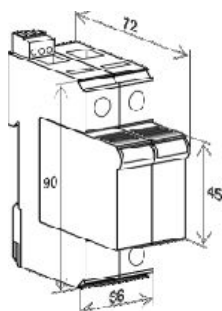


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N, N - PE
- ◆ Protective element: MOV & GDT
- ◆ High surge discharge rating:  $I_{max} = 40kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20: 60kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

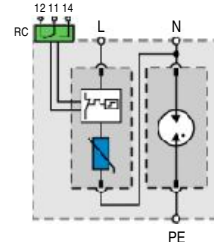
### Technical data

Type	PROTEC C(R) 80/xxx (1+1)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$ (L-N/N-PE)			20kA/20kA		
Max. discharge current (8/20) $I_{max}$ (L-N/N-PE)			40kA/40kA		
Protection level					
	$U_p$ (L-N)	< 0.9kV	< 1.5kV	< 1.5kV	< 1.9kV
	$U_p$ (N-PE)		< 2.0kV		< 2.2kV
Follow current $I_f$ (N-PE)			> 100ARMS		
Response time $t_A$ (L-N/N-PE)			< 25ns/100ns		
Thermal protection (L-N/N-PE)			YES		
Back-up fuse (if mains > 125A) (L-N/N-PE)			125A gL/-		
Short-circuit withstand current (L-N/N-PE)			25kA/50Hz/-		
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	2TE				
Weight per unit	221g	225g	225g	226g	227g
Ordering code <b>PROTEC C 80/xxx (1+1)</b>	<b>500 089</b>	<b>500 091</b>	<b>500 093</b>	<b>500 187</b>	<b>500 095</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	226g	230g	230g	231g	232g
Ordering code <b>PROTEC CR 80/xxx (1+1) - with remote contacts</b>	<b>500 097</b>	<b>500 099</b>	<b>500 101</b>	<b>500 191</b>	<b>500 103</b>
Packaging dimensions (single unit)	109 x 76.5 x 41.5mm				
Ordering code <b>Module PROTEC C(R) 40/xxx</b>	<b>500 217</b>	<b>500 219</b>	<b>500 220</b>	<b>500 221</b>	<b>500 222</b>
Ordering code <b>Module PROTUBE C 40/255</b>	<b>500 234</b>				
Packaging dimensions (12 pcs.)	219 x 62 x 47mm				

### Dimensions



### Connection diagram



# PROTEC C(R) 120 (3+0)

**Class II Multi-pole Surge Protective Device**  
 $I_{max} = 40kA$  per pole (8/20)

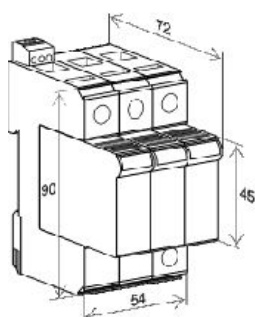


- ◆ **Category IEC / EN / VDE:** Class II / Type 2 / C
- ◆ **Location of use:** Branch sub-distribution boards
- ◆ **Connections:** TN-C
- ◆ **Protection modes:** L- PEN
- ◆ **Protective element:** MOV
- ◆ **High surge discharge rating:**  $I_{max} = 40kA$  per pole
- ◆ **MOV max withstand capability 1 x 8/20:** 60kA per pole
- ◆ **Housing:** Modular design
- ◆ **Complies with:** IEC-61643-1

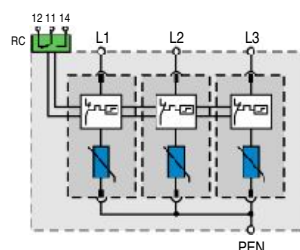
## Technical data

Type	PROTEC C(R) 120/xxx (3+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	20kA per pole				
Max. discharge current (8/20) $I_{max}$	40kA per pole				
Protection level $U_p$	< 0.9kV	< 1.5kV	< 1.5kV	< 1.9kV	< 2.2kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 125A)	125A gL				
Short-circuit withstand current	25kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ... + 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	3TE				
Weight per unit	330g	352g	352g	354g	356g
<b>Ordering code PROTEC C 120/xxx (3+0)</b>	<b>500 105</b>	<b>500 107</b>	<b>500 109</b>	<b>500 195</b>	<b>500 111</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	335g	357g	357g	359g	361g
<b>Ordering code PROTEC CR 120/xxx (3+0) - with remote contacts</b>	<b>500 113</b>	<b>500 115</b>	<b>500 117</b>	<b>500 199</b>	<b>500 119</b>
Packaging dimensions (single unit)	109 x 76.5 x 60mm				
<b>Ordering code Module PROTEC C(R) 40/xxx</b>	<b>500 217</b>	<b>500 219</b>	<b>500 220</b>	<b>500 221</b>	<b>500 222</b>
Packaging dimensions (12 pcs.)	219 x 62 x 47mm				

## Dimensions



## Connection diagram



# PROTEC C(R) 160 (4+0)

## Class II Multi-pole Surge Protective Device

$I_{max} = 40kA$  per pole (8/20)

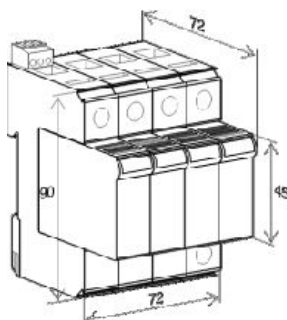


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S, IT
- ◆ Protection modes: L/N - PE
- ◆ Protective element: MOV
- ◆ High surge discharge rating:  $I_{max} = 40kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20: 60kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

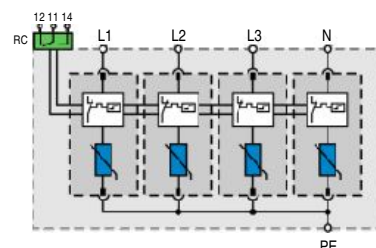
### Technical data

Type	PROTEC C(R) 160/xxx (4+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	20kA per pole				
Max. discharge current (8/20) $I_{max}$	40kA per pole				
Protection level $U_p$	< 0.9kV	< 1.5kV	< 1.5kV	< 1.9kV	< 2.2kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 125A)	125A gL				
Short-circuit withstand current	25kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C .... + 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	4TE				
Weight per unit	432g	456g	456g	460g	466g
Ordering code PROTEC C 160/xxx (4+0)	500 121	500 123	500 125	500 203	500 127
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	437g	461g	461g	465g	471g
Ordering code PROTEC CR 160/xxx (4+0) - with remote contacts	500 129	500 131	500 133	500 207	500 135
Packaging dimensions (single unit)	109 x 76.5 x 78mm				
Ordering code Module PROTEC C(R) 40/xxx	500 217	500 219	500 220	500 221	500 222
Packaging dimensions (12 pcs.)	219 x 62 x 47mm				

### Dimensions



### Connection diagram



# PROTEC C(R) 160 (3+1)

## Class II Multi-pole Surge Protective Device $I_{max} = 40kA$ per pole (8/20)

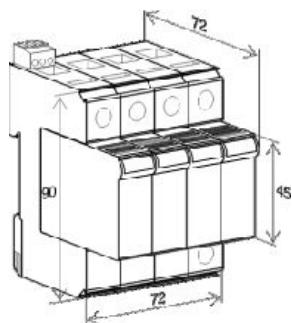


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N, N - PE
- ◆ Protective element: MOV & GDT
- ◆ High surge discharge rating:  $I_{max} = 40kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20: 60kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

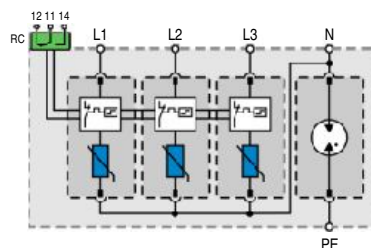
### Technical data

Type	PROTEC C(R) 160/xxx (3+1)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$ (L-N/N-PE)			20kA/20kA		
Max. discharge current (8/20) $I_{max}$ (L-N/N-PE)			40kA/40kA		
Protection level $U_p$ (L-N)	< 0.9kV	< 1.5kV	< 1.5kV	< 1.9kV	< 2.2kV
$U_p$ (N-PE)			< 2.0kV		
Follow current $I_f$ (N-PE)			> 100ARMS		
Response time $t_A$ (L-N/N-PE)			< 25ns/100ns		
Thermal protection (L-N/N-PE)			YES		
Back-up fuse (if mains > 125A) (L-N/N-PE)			125A gL/-		
Short-circuit withstand current (L-N/N-PE)			25kA/50Hz/-		
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ... + 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	4TE				
Weight per unit	423g	441g	441g	445g	447g
Ordering code PROTEC C 160/xxx (3+1)	500 137	500 139	500 141	500 211	500 143
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	428g	446g	446g	450g	452g
Ordering code PROTEC CR 160/xxx (3+1) - with remote contacts	500 145	500 147	500 149	500 215	500 151
Packaging dimensions (single unit)	109 x 76.5 x 78mm				
Ordering code Module PROTEC C(R) 40/xxx	500 217	500 219	500 220	500 221	500 222
Ordering code Module PROTUBE C 40/255	500 234				
Packaging dimensions (12 pcs.)	219 x 62 x 47mm				

### Dimensions



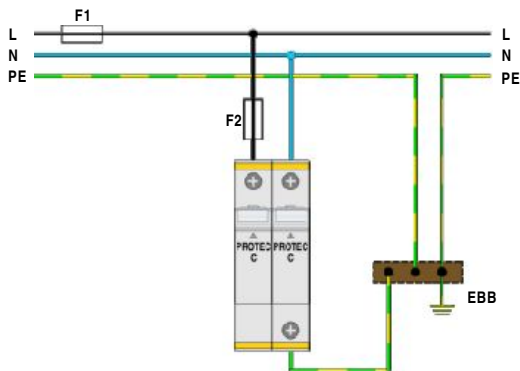
### Connection diagram



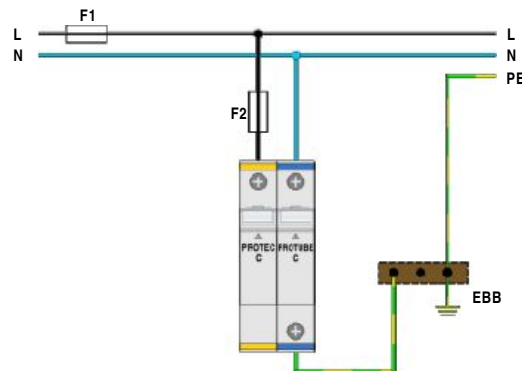


# PROTEC C(R), PROTUBE C - Connections

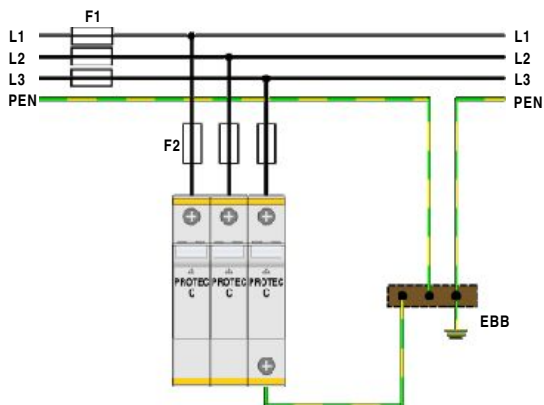
TN-S Network (Single-phase)



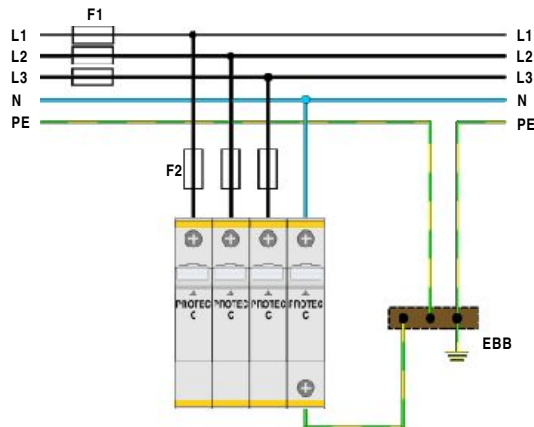
TT Network (Single-phase)



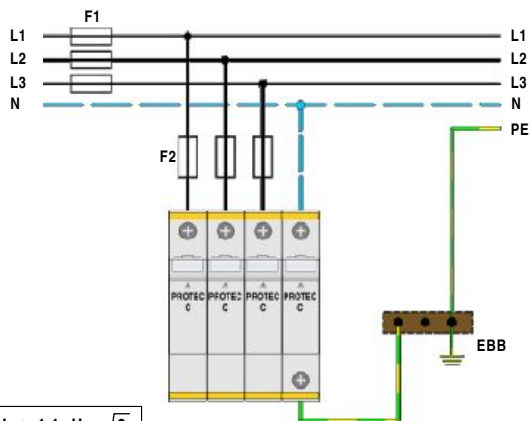
TN-C Network (Three-phase)



TN-S Network (Three-phase)

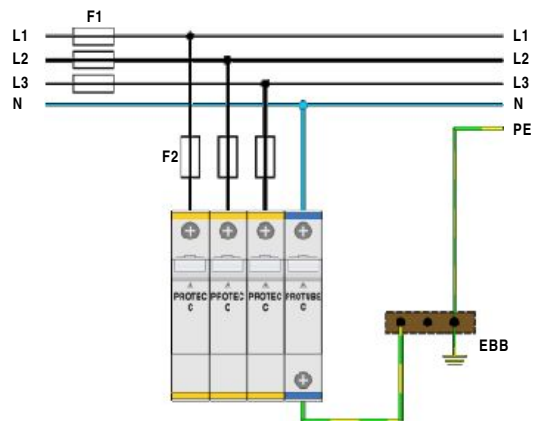


IT Network (Three-phase)



$$U_c \geq 1.1 \cdot U_n \cdot \sqrt{3}$$

TT Network (Three-phase)



# PROTEC C(R) 20

## Class II Single-pole Surge Protective Device $I_{max} = 20kA (8/20)$

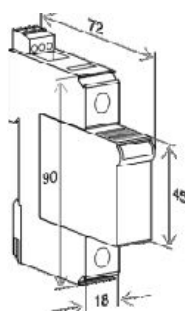


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S, TN-C, IT
- ◆ Protection modes: L/N - PE, L- PEN
- ◆ Protective element: MOV
- ◆ High surge discharge rating:  $I_{max} = 20kA$
- ◆ MOV max withstand capability 1 x 8/20: 40kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

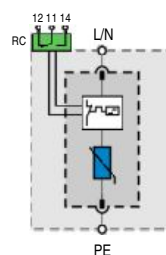
### Technical data

Type	PROTEC C(R) 20/xxx				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			10kA		
Max. discharge current (8/20) $I_{max}$			20kA		
Protection level $U_p$	< 0.7kV	< 1.2kV	< 1.2kV	< 1.6kV	< 1.8kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 125A)			100A gL		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range			- 40°C ... + 80°C		
Terminal screw torque			max. 4.5Nm		
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715			35mm top-hat rail		
Degree of protection			IP 20		
Housing material			Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880			1TE		
Weight per unit	119g	125g	125g	126g	127g
<b>Ordering code PROTEC C 20/xxx</b>	<b>500 037</b>	<b>500 039</b>	<b>500 041</b>	<b>500 315</b>	<b>500 043</b>
Remote contacts			YES		
Contact ratings			AC: 250V/0.5A; 125V/3A		
Terminal cross section			max. 1.5mm <sup>2</sup>		
Remote terminal torque			0.25Nm		
Weight per unit	124g	130g	130g	131g	132g
<b>Ordering code PROTEC CR 20/xxx - with remote contacts</b>	<b>500 045</b>	<b>500 047</b>	<b>500 049</b>	<b>500 317</b>	<b>500 051</b>
Packaging dimensions (single unit)			108 x 74 x 24mm		
<b>Ordering code Module PROTEC C(R) 20/xxx</b>	<b>500 479</b>	<b>500 480</b>	<b>500 481</b>	<b>500 482</b>	<b>500 483</b>
Packaging dimensions (12 pcs.)			219 x 62 x 47mm		

### Dimensions



### Connection diagram



# PROTEC CN(R) 40

## Class II Single-pole Surge Protective Device I<sub>max</sub> = 40kA (8/20)

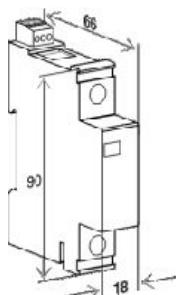


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S, TN-C, IT
- ◆ Protection modes: L/N - PE, L- PEN
- ◆ Protective element: MOV
- ◆ High surge discharge rating: I<sub>max</sub> = 40kA
- ◆ MOV max withstand capability 1 x 8/20: 50kA per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

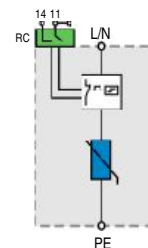
### Technical data

Type	PROTEC CN(R) 40/xxx					
	75	150	275	320	385	440
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC) U <sub>C</sub>	75/100V	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) I <sub>n</sub>	20kA					
Max. discharge current (8/20) I <sub>max</sub>	40kA					
Protection level U <sub>p</sub>	< 0.6V	< 0.9kV	< 1.5kV	< 1.5kV	< 1.9kV	< 2.2kV
Follow current I <sub>f</sub>	NO					
Response time t <sub>A</sub>	< 25ns					
Thermal protection	YES					
Back-up fuse (if mains > 125A)	125A gL					
Short-circuit withstand current	25kA/50Hz					
<b>Mechanical characteristics</b>						
Temperature range	- 40°C ... + 80°C					
Terminal screw torque	max. 4.5Nm					
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)					
Mounting EN 60715	35mm top-hat rail					
Degree of protection	IP 20					
Housing material	Thermoplastic; extinguishing degree UL 94 V-0					
Dimensions DIN 43880	1TE					
Weight per unit	127g	134g	112g	112g	139g	140g
<b>Ordering code PROTEC CN 40/xxx</b>						
Remote contacts	YES					
Contact ratings	AC: 250V/0.5A; 125V/3A					
Terminal cross section	max. 1.5mm <sup>2</sup>					
Remote terminal torque	0.25Nm					
Weight per unit	132g	139g	117g	117g	144g	145g
<b>Ordering code PROTEC CNR 40/xxx - with remote contacts</b>						
Packaging dimensions (single unit)	108 x 74 x 24mm					

### Dimensions



### Connection diagram



# PROTEC CN(R) 20

## Class II Single-pole Surge Protective Device $I_{max} = 20\text{kA} (8/20)$

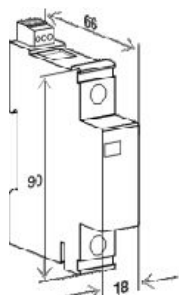


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S, TN-C, IT
- ◆ Protection modes: L/N - PE, L- PEN
- ◆ Protective element: MOV
- ◆ High surge discharge rating:  $I_{max} = 20\text{kA}$
- ◆ MOV max withstand capability 1 x 8/20: 35kA per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

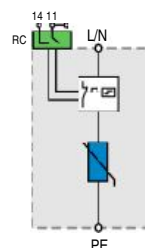
### Technical data

Type	PROTEC CN(R) 20/xxx				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			10kA		
Max. discharge current (8/20) $I_{max}$			20kA		
Protection level $U_p$	< 0.7kV	< 1.2kV	< 1.2kV	< 1.6kV	< 1.8kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse (if mains > 125A)			100A gL		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ... + 80°C				
Terminal screw torque	max. 3.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	1TE				
Weight per unit	131g	109g	109g	136g	137g
<b>Ordering code PROTEC CN 20/xxx</b>	<b>507 253</b>	<b>507 254</b>	<b>507 255</b>	<b>507 256</b>	<b>507 257</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	136g	114g	114g	141g	142g
<b>Ordering code PROTEC CNR 20/xxx - with remote contacts</b>	<b>507 258</b>	<b>507 259</b>	<b>507 260</b>	<b>507 261</b>	<b>507 262</b>
Packaging dimensions (single unit)	108 x 74 x 24mm				

### Dimensions



### Connection diagram



# PROTUBE CN 40

## Class II Single-pole N-PE Surge Protective Device

$I_{max} = 40kA (8/20)$

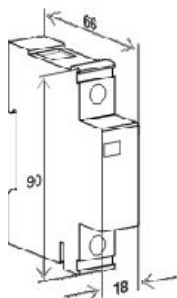


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TT
- ◆ Protection modes: N - PE
- ◆ Protective element: GDT
- ◆ High surge discharge rating:  $I_{max} = 40kA$
- ◆ MOV max withstand capability 1 x 8/20: 50kA per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

### Technical data

Type		PROTUBE CN 40/255
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC)	$U_c$	255V
Nominal discharge current (8/20)	$I_n$	20kA
Max. discharge current (8/20)	$I_{max}$	40kA
Protection level	$U_p$	< 1.2kV
Follow current	$I_f$	> 100ARMS
Response time	$t_A$	< 100ns
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ...+ 80°C
Terminal screw torque		max. 3.5Nm
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)
Mounting EN 60715		35mm top-hat rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		1TE
Weight per unit		122g
Ordering code <b>PROTUBE CN 40/255</b>		<b>507 574</b>
Packaging dimensions (single unit)		108 x 74 x 24mm

### Dimensions

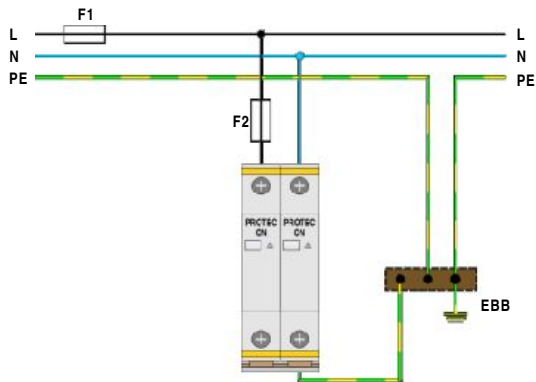


### Connection diagram

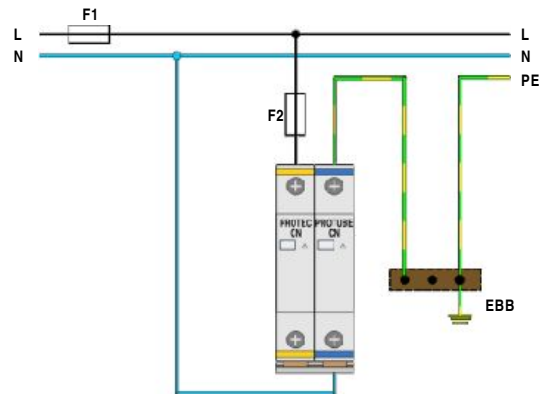


# PROTEC CN(R), PROTUBE CN - Connections

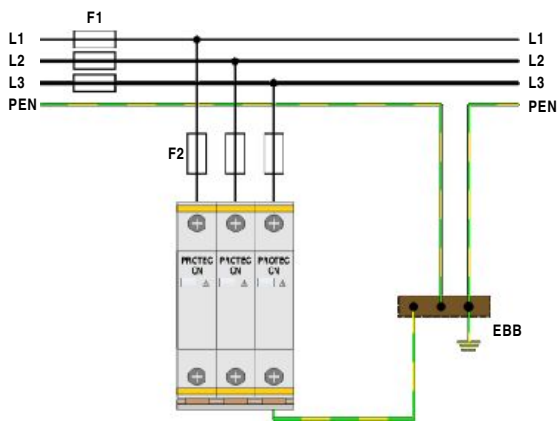
TN-S Network (Single-phase)



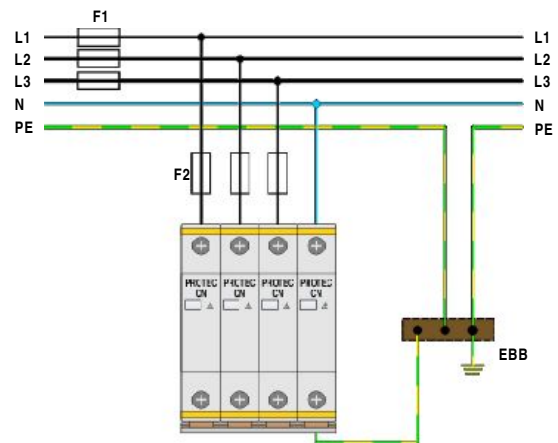
TT Network (Single-phase)



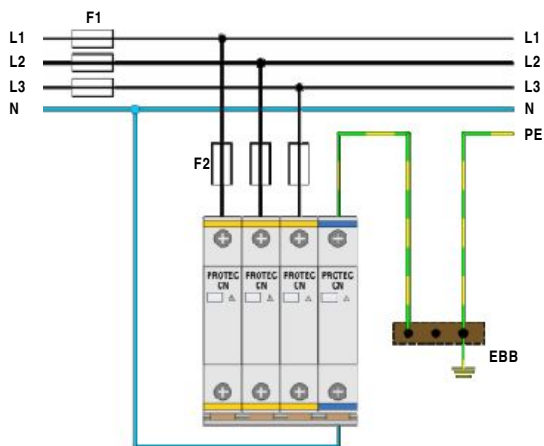
TN-C Network (Three-phase)



TN-S Network (Three-phase)



TT Network (Three-phase)



# Modular MULTI-POLE Surge Protective Devices



**PROTEC CM 80 (2+0)**  
**PROTEC CM 80 (1+1)**  
**PROTEC CM 80A (1+1)**

<b>Category IEC / EN / VDE:</b>	<b>Class II / Type 2 / C</b>
<b>Location of use:</b>	<b>Branch Sub-distribution Boards</b>
<b>Protection modes:</b>	<b>L/N-PE, L-PEN, N-PE</b>
<b>Protective elements:</b>	<b>MOV and GDT</b>
<b>Surge discharge ratings:</b>	<b><math>I_{max} = 40kA</math> per pole</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnecter for each MOV</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>1TE</b>

The PROTEC CM 80 series of over-voltage surge protective devices has been developed to protect against the effects of indirect lightning discharges and induced voltages and is intended to provide protection in zones 1 - 2 per IEC 62305.

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

PROTEC CM 80 (2+0) consists of two high performance varistor blocks with thermal disconnection devices providing both L-PE and N-PE protection modes.

PROTEC CM 80 (1+1) consists of high performance varistor blocks with thermal disconnection and encapsulated air gap device providing both L-N and N-PE protection modes.

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

# PROTEC CM(R) 80 (2+0)

**Class II Multi-pole Surge Protective Device**  
 $I_{max} = 40kA$  per pole (8/20)

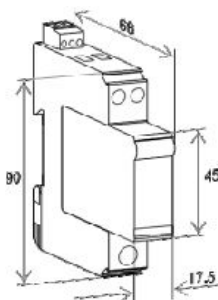


- ◆ **Category IEC / EN / VDE:** Class II / Type 2 / C
- ◆ **Location of use:** Branch sub-distribution boards
- ◆ **Connections:** TN-S
- ◆ **Protection modes:** L/N - PE
- ◆ **Protective element:** MOV
- ◆ **High surge discharge rating:**  $I_{max} = 40kA$  per pole
- ◆ **Housing:** Modular design
- ◆ **Complies with:** IEC-61643-1

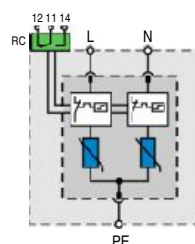
## Technical data

Type	PROTEC CM(R) 80/xxx (2+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$	15kA per pole				
Max. discharge current (8/20) $I_{max}$	40kA per pole				
Protection level $U_p$	< 0.8kV	< 1.4kV	< 1.4kV	< 1.8kV	< 2.0kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 125A)	100A gL				
Short-circuit withstand current	25kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ... + 80°C				
Terminal screw torque	Upper terminal	max. 2Nm			
	Lower terminal	max. 3.5Nm			
Terminal cross section	Upper terminal	6mm <sup>2</sup> (solid)/4mm <sup>2</sup> (stranded)			
	Lower terminal	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)			
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	1TE				
Weight per unit	134g	144g	144g	150g	152g
Ordering code <b>PROTEC CM 80/xxx (2+0)</b>	<b>508 001</b>	<b>508 003</b>	<b>508 005</b>	<b>508 109</b>	<b>508 007</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	139g	149g	149g	155g	157g
Ordering code <b>PROTEC CMR 80/xxx (2+0) - with remote contacts</b>	<b>508 009</b>	<b>508 011</b>	<b>508 013</b>	<b>508 111</b>	<b>508 015</b>
Packaging dimensions (single unit)	108 x 74 x 24mm				
Ordering code <b>Module PROTEC CM(R) 80/xxx (2+0)</b>	<b>508 174</b>	<b>508 164</b>	<b>508 175</b>	<b>508 146</b>	<b>508 147</b>
Packaging dimensions (12 pcs.)	219 x 62 x 47mm				

## Dimensions



## Connection diagram





# PROTEC CM(R) 80 (1+1)

## Class II Multi-pole Surge Protective Device

$I_{max} = 40kA$  per pole (8/20)

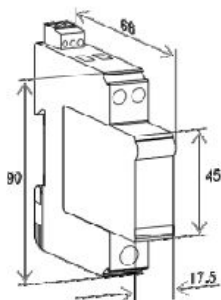


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TT
- ◆ Protection modes: L - N, N - PE
- ◆ Protective element: MOV and GDT
- ◆ High surge discharge rating:  $I_{max} = 40kA/40kA$  (MOV/GDT)
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

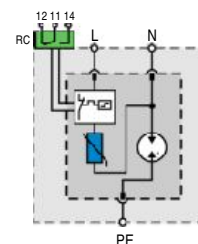
### Technical data

Type	PROTEC CM(R) 80/xxx (1+1)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$ (L-N/N-PE)			15kA/20kA		
Max. discharge current (8/20) $I_{max}$ (L-N/N-PE)			40kA/40kA		
Protection level $U_p$ (L-N)	< 0.8kV	< 1.4kV	< 1.4kV	< 1.8kV	< 2.0kV
$U_p$ (N-PE)			< 1.5kV		
Follow current $I_f$ (N-PE)			100ARMS		
Response time $t_A$ (L-N/N-PE)			< 25ns/<100ns		
Thermal protection			YES		
Back-up fuse (if mains > 125A)			100A gL		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	Upper terminal	max. 2Nm			
	Lower terminal	max. 3.5Nm			
Terminal cross section	Upper terminal	6mm <sup>2</sup> (solid)/4mm <sup>2</sup> (stranded)			
	Lower terminal	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)			
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	1TE				
Weight per unit	124g	126g	126g	129g	130g
Ordering code <b>PROTEC CM 80/xxx (1+1)</b>	<b>508 045</b>	<b>508 047</b>	<b>508 049</b>	<b>508 117</b>	<b>508 051</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	129g	131g	131g	134g	135g
Ordering code <b>PROTEC CMR 80/xxx (1+1) - with remote contacts</b>	<b>508 053</b>	<b>508 055</b>	<b>508 057</b>	<b>508 119</b>	<b>508 059</b>
Packaging dimensions (single unit)	108 x 74 x 24mm				
Ordering code <b>Module PROTEC CM(R) 80/xxx (1+1)</b>	<b>508 186</b>	<b>508 187</b>	<b>508 188</b>	<b>508 189</b>	<b>508 190</b>
Packaging dimensions (12 pcs.)	219 x 62 x 47mm				

### Dimensions



### Connection diagram



# PROTEC CM(R) 80A (1+1)

**Class II Multi-pole Surge Protective Device**  
 $I_{max} = 40kA$  per pole (8/20)

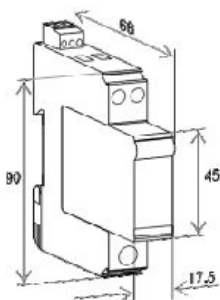


- ◆ **Category IEC / EN / VDE:** Class II / Type 2 / C
- ◆ **Location of use:** Branch sub-distribution boards
- ◆ **Connections:** TT
- ◆ **Protection modes:** L - N, N - PE
- ◆ **Protective element:** MOV and GDT
- ◆ **High surge discharge rating:**  $I_{max} = 40kA/40kA$  (MOV/GDT)
- ◆ **Housing:** Modular design
- ◆ **Complies with:** IEC-61643-1

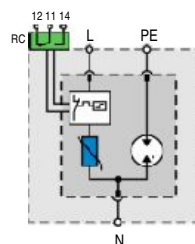
## Technical data

Type	PROTEC CM(R) 80A/xxx (1+1)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$ (L-N/N-PE)	15kA/20kA				
Max. discharge current (8/20) $I_{max}$ (L-N/N-PE)	40kA/40kA				
Protection level $U_p$ (L-N)	< 0.8kV	< 1.4kV	< 1.4kV	< 1.8kV	< 2.0kV
$U_p$ (N-PE)	< 1.5kV				
Follow current $I_f$ (N-PE)	100A <sub>RMS</sub>				
Response time $t_A$ (L-N/N-PE)	< 25ns/<100ns				
Thermal protection	YES				
Back-up fuse (if mains > 125A)	100A gL				
Short-circuit withstand current	25kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	Upper terminal	max. 2Nm			
	Lower terminal	max. 3.5Nm			
Terminal cross section	Upper terminal	6mm <sup>2</sup> (solid)/4mm <sup>2</sup> (stranded)			
	Lower terminal	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)			
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	1TE				
Weight per unit	124g	126g	126g	129g	130g
Ordering code <b>PROTEC CM 80A/xxx (1+1)</b>	<b>508 120</b>	<b>508 122</b>	<b>508 124</b>	<b>508 126</b>	<b>508 128</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	129g	131g	131g	134g	135g
Ordering code <b>PROTEC CMR 80A/xxx (1+1) - with remote contacts</b>	<b>508 130</b>	<b>508 132</b>	<b>508 134</b>	<b>508 136</b>	<b>508 138</b>
Packaging dimensions (single unit)	108 x 74 x 24mm				
Ordering code <b>Module PROTEC CM(R) 80A/xxx (1+1)</b>	<b>508 176</b>	<b>508 143</b>	<b>508 177</b>	<b>508 144</b>	<b>508 145</b>
Packaging dimensions (12 pcs.)	219 x 62 x 47mm				

## Dimensions



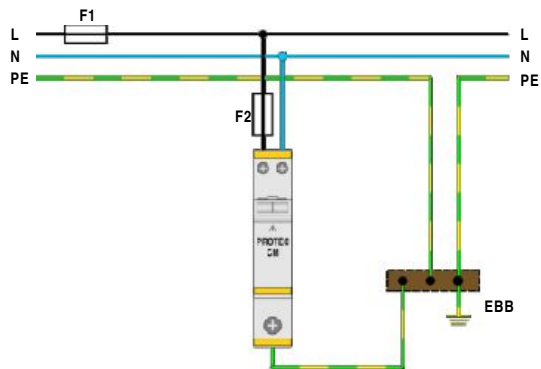
## Connection diagram



# PROTEC CM(R) - Connections

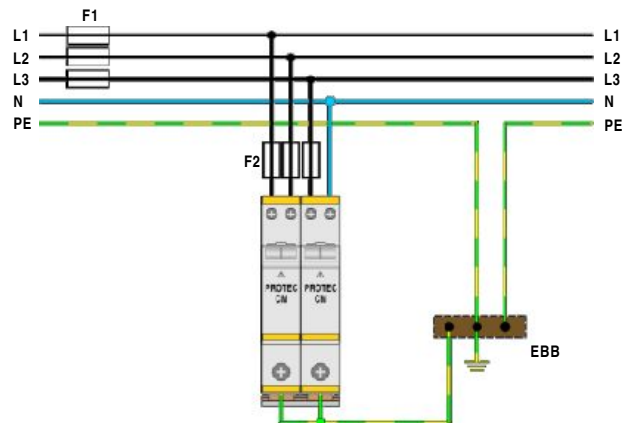
## TN-S Network (Single-phase)

PROTEC CM 80 (2+0)



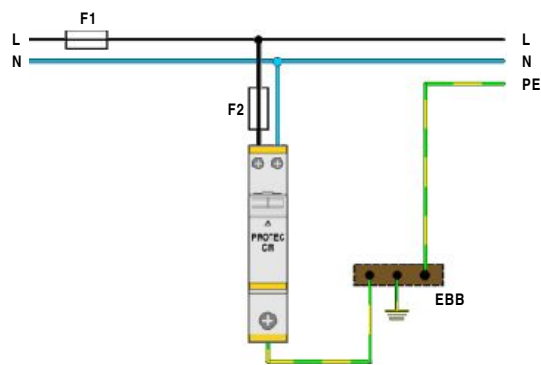
## TN-S Network (Three-phase)

2x PROTEC CM 80 (2+0)



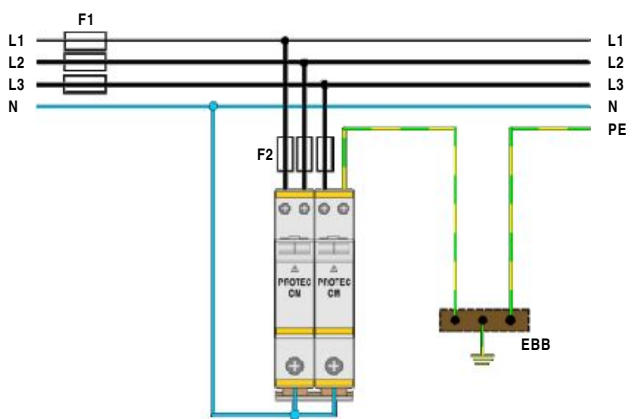
## TT Network (Single-phase)

PROTEC CM 80 (1+1)



## TT Network (Three-phase)

PROTEC CM 80 (2+0) + PROTEC CM 80A (1+1)





# Modular SINGLE-POLE and MULTI-POLE Surge Protective Devices



<b>Category IEC / EN / VDE:</b>	<b>Class II / Type 2 / C</b>
<b>Location of use:</b>	<b>Branch Sub-distribution Boards</b>
<b>Protection modes:</b>	<b>L-PE, N-PE</b>
<b>Protective elements:</b>	<b>MOV and GDT</b>
<b>Surge discharge ratings:</b>	<b>I<sub>max</sub> = up to 40kA per pole</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnecter for each MOV</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>1TE</b>

## **PROTEC CG(R) 40 PROTEC CG(R) 20**

The PROTEC CG series of over-voltage surge protective devices has been developed to protect against indirect lightning discharges and induced voltages and is intended to provide protection in zones 1 - 2 per IEC 62305.

PROTEC CG consists of a high performance varistor blocks with thermal disconnection device in series with an encapsulated air gap to limit leakage current.

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

## **PROTEC CMG(R) 40 (2+0)**

The PROTEC CMG series of over voltage surge protective devices has been developed to protect against indirect lightning discharges and induced voltages and is intended to provide protection in zones 1/2 as per IEC 62305.

It consists of a two high performance varistor blocks with thermal disconnection devices in series with an encapsulated air gap to limit leakage current. It provides both L-PE and N-PE protection modes.

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

# PROTEC CG(R) 40

## Class II Single-pole Surge Protective Device $I_{max} = 40kA (8/20)$

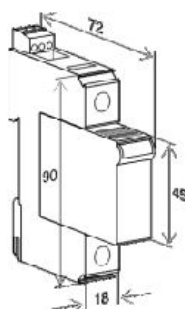


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S, TN-C, IT, TT
- ◆ Protection modes: L/N - PE, L - PEN
- ◆ Protective element: MOV and GDT
- ◆ High surge discharge rating:  $I_{max} = 40kA$
- ◆ MOV max withstand capability 1 x 8/20: 60kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

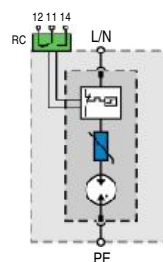
### Technical data

Type	PROTEC CG(R) 40/xxx		
	150	275	385
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	385/500V
Nominal discharge current (8/20) $I_n$		20kA	
Max. discharge current (8/20) $I_{max}$		40kA	
Protection level $U_p$	< 0.9kV	< 1.3kV	< 1.8kV
Follow current $I_f$		NO	
Response time $t_A$		< 100ns	
Thermal protection		YES	
Back-up fuse (if mains > 125A)		125A gL	
Short-circuit withstand current		25kA/50Hz	
<b>Mechanical characteristics</b>			
Temperature range	- 40°C ... + 80°C		
Terminal screw torque	max. 4.5Nm		
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715	35mm top-hat rail		
Degree of protection	IP 20		
Housing material	Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880	1TE		
Weight per unit	112g	130g	132g
<b>Ordering code PROTEC CG 40/xxx</b>	<b>500 323</b>	<b>500 325</b>	<b>500 327</b>
Remote contacts	YES		
Contact ratings	AC: 250V/0.5A; 125V/3A		
Terminal cross section	max. 1.5mm <sup>2</sup>		
Remote terminal torque	0.25Nm		
Weight per unit	117g	135g	137g
<b>Ordering code PROTEC CGR 40/xxx - with remote contacts</b>	<b>500 329</b>	<b>500 331</b>	<b>500 333</b>
Packaging dimensions (single unit)	108 x 74 x 24mm		
<b>Ordering code Module PROTEC CG(R) 40/xxx</b>	<b>500 484</b>	<b>500 485</b>	<b>500 486</b>
Packaging dimensions (12 pcs.)	219 x 62 x 47mm		

### Dimensions



### Connection diagram



# PROTEC CG(R) 20

## Class II Single-pole Surge Protective Device $I_{max} = 20kA (8/20)$



- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S, TN-C, TT, IT
- ◆ Protection modes: L/N - PE, L - PEN
- ◆ Protective element: MOV and GDT
- ◆ High surge discharge rating:  $I_{max} = 20kA$
- ◆ MOV max withstand capability 1 x 8/20: 60kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

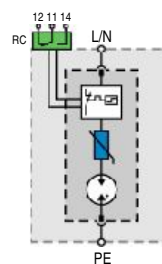
### Technical data

Type	PROTEC CG(R) 20/xxx		
	150	275	385
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	385/500V
Nominal discharge current (8/20) $I_n$		10kA	
Max. discharge current (8/20) $I_{max}$		20kA	
Protection level $U_p$	< 0.8kV	< 1.2kV	< 1.7kV
Follow current $I_f$		NO	
Response time $t_A$		< 100ns	
Thermal protection		YES	
Back-up fuse (if mains > 125A)		125A gL	
Short-circuit withstand current		25kA/50Hz	
<b>Mechanical characteristics</b>			
Temperature range	- 40°C ... + 80°C		
Terminal screw torque	max. 4.5Nm		
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715	35mm top-hat rail		
Degree of protection	IP 20		
Housing material	Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880	1TE		
Weight per unit	112g	128g	130g
Ordering code <b>PROTEC CG 20/xxx</b>	<b>500 239</b>	<b>500 241</b>	<b>500 243</b>
Remote contacts	YES		
Contact ratings	AC: 250V/0.5A; 125V/3A		
Terminal cross section	max. 1.5mm <sup>2</sup>		
Remote terminal torque	0.25Nm		
Weight per unit	115g	133g	135g
Ordering code <b>PROTEC CGR 20/xxx - with remote contacts</b>	<b>500 245</b>	<b>500 247</b>	<b>500 249</b>
Packaging dimensions (single unit)	108 x 74 x 24mm		
Ordering code <b>Module PROTEC CG(R) 20/xxx</b>	<b>500 487</b>	<b>500 488</b>	<b>500 489</b>
Packaging dimensions (12 pcs.)	219 x 62 x 47mm		

### Dimensions

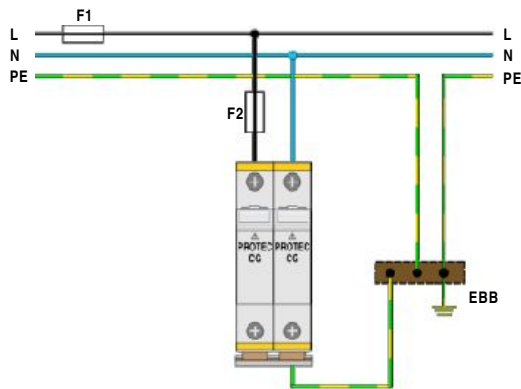


### Connection diagram

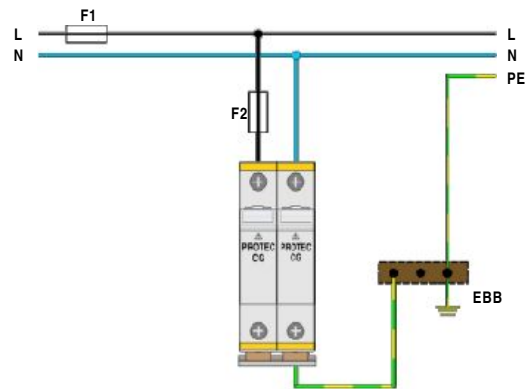


# PROTEC CG(R) - Connections

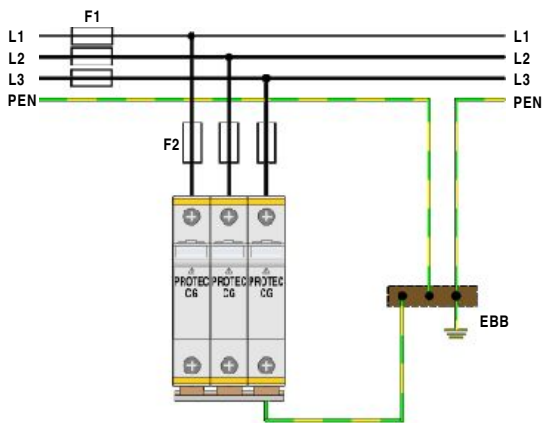
TN-S Network (Single-phase)



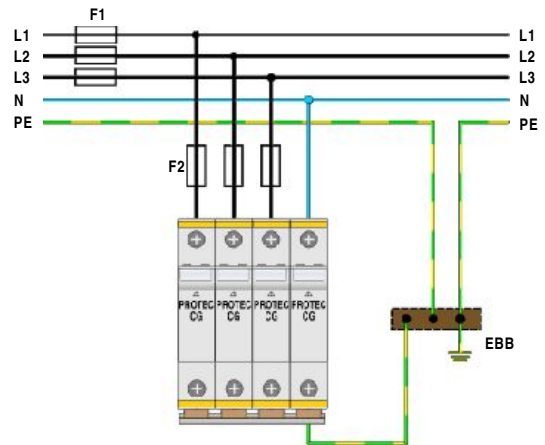
TT Network (Single-phase)



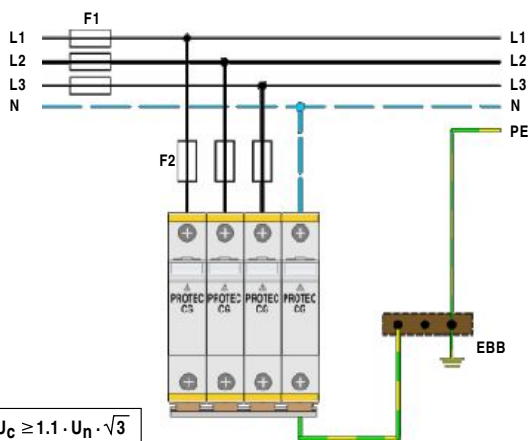
TN-C Network (Three-phase)



TN-S Network (Three-phase)

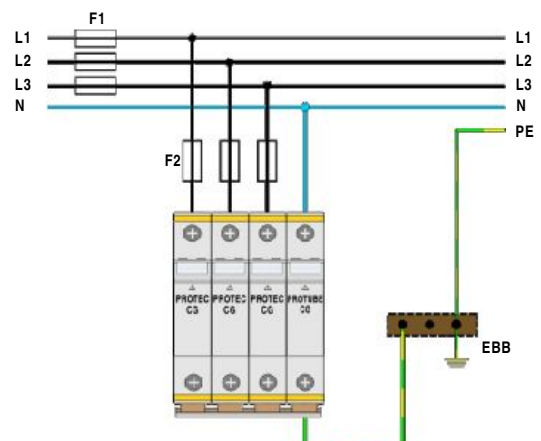


IT Network (Three-phase)



$$U_C \geq 1.1 \cdot U_N \cdot \sqrt{3}$$

TT Network (Three-phase)





# PROTEC CMG(R) 40 (2+0)

## Class II Multi-pole Surge Protective Device

$I_{max} = 20kA$  per pole (8/20)

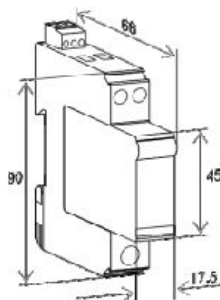


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S, TT, IT
- ◆ Protection modes: L/N - PE, L - N
- ◆ Protective element: MOV and GDT
- ◆ High surge discharge rating:  $I_{max} = 20kA$  per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

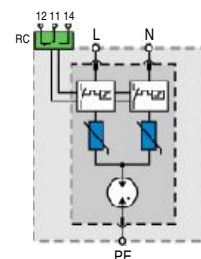
### Technical data

Type	PROTEC CMG(R) 40/xxx (2+0)		
	150	275	
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC)	$U_c$	150/200V	275/350V
Nominal discharge current (8/20)	$I_n$ (L/N-PE, L-N)	10kA per pole	
Max. discharge current (8/20)	$I_{max}$ (L/N-PE, L-N)	20kA per pole	
Protection level	$U_p$ (L/N-PE)	< 0.7kV	< 1.1kV
	$U_p$ (L-N)	< 1.2kV	< 1.9kV
Residual voltage at 3kA (8/20)	$U_{res}$ (L/N-PE)	< 0.5kV	< 0.8kV
	$U_{res}$ (L-N)	< 0.8kV	< 1.4kV
Follow current	$I_f$	NO	
Response time	$t_A$ (L/N-PE, L-N)	< 100ns / < 25ns	
Thermal protection		YES	
Back-up fuse (if mains > 125A)		125A gL	
Short-circuit withstand current		25kA/50Hz	
<b>Mechanical characteristics</b>			
Temperature range		- 40°C ... + 80°C	
Terminal screw torque	Upper terminals	max. 2Nm	
	Lower terminal	max. 3.5Nm	
Terminal cross section	Upper terminals	6mm <sup>2</sup> (solid)/4mm <sup>2</sup> (stranded)	
	Lower terminal	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)	
Mounting EN 60715		35mm top-hat rail	
Degree of protection		IP 20	
Housing material		Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		1TE	
Weight per unit		130g	146g
Ordering code <b>PROTEC CMG 40/xxx (2+0)</b>		<b>508 197</b>	<b>508 198</b>
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm <sup>2</sup>	
Remote terminal torque		0.25Nm	
Weight per unit		135g	151g
Ordering code <b>PROTEC CMGR 40/xxx (2+0) - with remote contacts</b>		<b>508 199</b>	<b>508 200</b>
Packaging dimensions (single unit)		108 x 74 x 24mm	
Ordering code <b>Module PROTEC CMG(R) 40/xxx (2+0)</b>		<b>508 201</b>	<b>508 202</b>
Packaging dimensions (12 pcs.)		219 x 62 x 47mm	

### Dimensions



### Connection diagram





# Modular and Compact SINGLE and MULTI-POLE Surge Protective Devices



<b>Category IEC / EN / VDE:</b>	<b>Class III / Type 3 / D</b>
<b>Location of use:</b>	<b>Branch Sub-distribution Boards</b>
<b>Protection modes:</b>	<b>L/N-PE</b>
<b>Protective elements:</b>	<b>MOV and GDT</b>
<b>Surge discharge ratings:</b>	<b><math>U_{OC}/I_{SC} = 10kV/5kA</math> per pole (1.2/50, 8/20)</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnectors for each MOV</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>1TE</b>

## PROTEC D(R) 10

The PROTEC D series of overvoltage surge protective devices has been developed to protect against indirect lightning discharges and induced voltages. It is intended to provide protection in zones 2 - 3 as per IEC 62305. The plug-in module / base design facilitate replacement of a failed module without the need to remove system wiring etc.

PROTEC D consists of a high performance varistor block with thermal disconnection device.

## PROTEC DM(R) 20 (2+0)

PROTEC DM consists of two performance varistor blocks with thermal disconnection devices configured to provide multi-pole protection to L-PE and N-PE in one enclosure.

## PROTEC DMG(R) 20 (2+0)

PROTEC DMG consists of two performance varistor blocks with thermal disconnection devices and galvanic isolation N to PE for TT single phase networks.

## MPE-ZE50

MPE-ZE50 is similar in internal construction to the PROTEC DMG and is intended for inclusion in cable duct raceways. An LED indicator is provided for external visual indication of operating status.

## MPE-MINI

MPE-MINI is designed to protect sensitive electronic equipment against surges. It is developed for installation into electrical installation systems, cable ducts and wiring sockets.

## ZE 200 PS VTC 10

VTC Series are designed to protect sensitive electronic equipment against surges. It is developed for mounting on printed circuit boards. VTC is protective element MOV with thermal protection and decoupling device for remote signalisation of arrester failure.

## PROFILT D

PROFILT series contains surge arresters and filter, which are serially connected. It consists of two VTCs, gas discharge tube (GDT) and filter. It is suitable for protection for sensitive electronic appliances.

# PROTEC D(R) 10

## Class III Single-pole Surge Protective Device $U_{oc}/I_{sc} = 10kV/5kA (1.2/50, 8/20)$

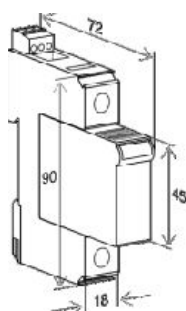


◆ Category IEC / EN / VDE:	Class III / Type 3 / D
◆ Location of use:	Branch sub-distribution boards
◆ Connections:	TN-S, TN-C, IT
◆ Protection modes:	L/N - PE
◆ Protective element:	MOV
◆ Surge discharge rating:	$U_{oc}/I_{sc} = 10kV/5kA$
◆ MOV max withstand capability 1 x 8/20:	20kA
◆ Housing:	Modular design
◆ Complies with:	IEC-61643-1

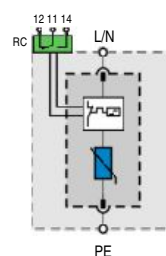
### Technical data

Type	PROTEC D(R) 10/xxx					
	150	275	320	385	440	
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V	
Combination wave (1.2/50, 8/20) $U_{oc}/I_{sc}$			10kV/5kA			
Max. discharge current (8/20) $I_{max}$			10kA			
Protection level at $U_{oc}/I_{sc}$ $U_p$	< 0.8kV	< 1.2kV	< 1.2kV	< 1.6kV	< 2.0kV	
Follow current $I_f$			NO			
Response time $t_A$			< 25ns			
Thermal protection			YES			
Back-up fuse (if mains > 63A)			125A gL			
Short-circuit withstand current			10kA/50Hz			
<b>Mechanical characteristics</b>						
Temperature range			- 40°C ... + 80°C			
Terminal screw torque			max. 4.5Nm			
Terminal cross section			35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)			
Mounting EN 60715			35mm top-hat rail			
Degree of protection			IP 20			
Housing material			Thermoplastic; extinguishing degree UL 94 V-0			
Dimensions DIN 43880			1TE			
Weight per unit	124g	130g	130g	131g	132g	
<b>Ordering code PROTEC D 10/xxx</b>	<b>508 601</b>	<b>508 603</b>	<b>508 605</b>	<b>508 617</b>	<b>508 607</b>	
Remote contacts			YES			
Contact ratings			AC: 250V/0.5A; 125V/3A			
Terminal cross section			max. 1.5mm <sup>2</sup>			
Remote terminal torque			0.25Nm			
Weight per unit	129g	135g	135g	136g	137g	
<b>Ordering code PROTEC DR 10/xxx - with remote contacts</b>	<b>508 609</b>	<b>508 611</b>	<b>508 613</b>	<b>508 619</b>	<b>508 615</b>	
Packaging dimensions (single unit)			108 x 74 x 24mm			
<b>Ordering code Module PROTEC D(R) 10/xxx</b>	<b>508 620</b>	<b>508 621</b>	<b>508 622</b>	<b>508 623</b>	<b>508 624</b>	
Packaging dimensions (12 pcs.)			219 x 62 x 47mm			

### Dimensions



### Connection diagram



# PROTEC DM(R) 20 (2+0)

**Class III Multi-pole Surge Protective Device**  
 $U_{oc}/I_{sc} = 10kV/5kA$  per pole (1.2/50, 8/20)

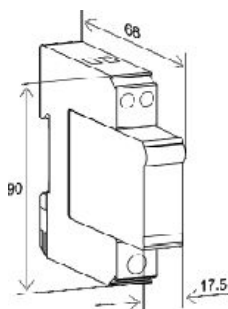


- ◆ Category IEC / EN / VDE: Class III / Type 3 / D
- ◆ Location of use: Branch sub-distribution boards
- ◆ Connections: TN-S, IT
- ◆ Protection modes: L/N - PE
- ◆ Protective element: MOV
- ◆ Surge discharge rating:  $U_{oc}/I_{sc} = 10kV/5kA$  per pole
- ◆ MOV max withstand capability 1 x 8/20: 20kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1

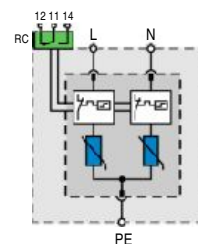
## Technical data

Type	PROTEC DM(R) 20/xxx (2+0)				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Combination wave (1.2/50, 8/20) $U_{oc}/I_{sc}$	10kV/5kA per pole				
Max. discharge current (8/20) $I_{max}$	10kA per pole				
Protection level at $U_{oc}/I_{sc}$ $U_p$	< 0.8kV	< 1.2kV	< 1.2kV	< 1.6kV	< 2.0kV
Follow current $I_f$	NO				
Response time $t_A$	< 25ns				
Thermal protection	YES				
Back-up fuse (if mains > 63A)	63A gL				
Short-circuit withstand current	10kA/50Hz				
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	Upper terminals	max. 2Nm			
	Lower terminal	max. 3.5Nm			
Terminal cross section	Upper terminals	6mm <sup>2</sup> (solid)/4mm <sup>2</sup> (stranded)			
	Lower terminal	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)			
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	1TE				
Weight per unit	136g	140g	150g	153g	155g
<b>Ordering code PROTEC DM 20/xxx (2+0)</b>	<b>508 029</b>	<b>508 031</b>	<b>508 033</b>	<b>508 113</b>	<b>508 035</b>
Remote contacts	YES				
Contact ratings	AC: 250V/0.5A; 125V/3A				
Terminal cross section	max. 1.5mm <sup>2</sup>				
Remote terminal torque	0.25Nm				
Weight per unit	141g	145g	155g	158g	160g
<b>Ordering code PROTEC DMR 20/xxx (2+0) - with remote contacts</b>	<b>508 037</b>	<b>508 039</b>	<b>508 041</b>	<b>508 115</b>	<b>508 043</b>
Packaging dimensions (single unit)	108 x 74 x 24mm				
<b>Ordering code Module PROTEC DM(R) 20/xxx (2+0)</b>	<b>508 191</b>	<b>508 192</b>	<b>508 193</b>	<b>508 194</b>	<b>508 195</b>
Packaging dimensions (12 pcs.)	219 x 62 x 47mm				

## Dimensions



## Connection diagram



# PROTEC DMG(R) 20 (2+0)

**Class III Multi-pole Surge Protective Device**  
 $U_{oc}/I_{sc} = 10kV/5kA$  per pole (1.2/50, 8/20)

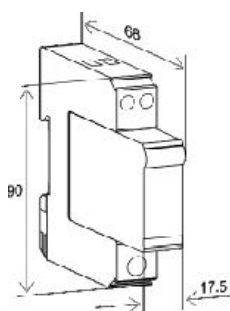


- ◆ **Category IEC / EN / VDE:** Class III / Type 3 / D
- ◆ **Location of use:** Branch sub-distribution boards
- ◆ **Connections:** TN - S, TT, IT
- ◆ **Protection modes:** L/N - PE
- ◆ **Protective element:** MOV and GDT
- ◆ **Surge discharge rating:**  $U_{oc}/I_{sc} = 10kV/5kA$  per pole
- ◆ **MOV max withstand capability 1 x 8/20:** 20kA per pole
- ◆ **Housing:** Modular design
- ◆ **Complies with:** IEC-61643-1

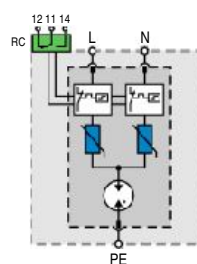
## Technical data

Type		PROTEC DMG(R) 20/xxx (2+0) 320
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC)	$U_c$	320/420V
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$	10kV/5kA per pole
Max. discharge current (8/20)	$I_{max}$	10kA per pole
Protection level at $U_{oc}/I_{sc}$	$U_p$	< 1.0kV
Follow current	$I_f$	NO
Response time	$t_A$	< 100ns
Thermal protection		YES
Back-up fuse (if mains > 63A)		63A gL
Short-circuit withstand current		10kA/50Hz
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ....+ 80°C
Terminal screw torque	Upper terminals	max. 2Nm
	Lower terminal	max. 3.5Nm
Terminal cross section	Upper terminals	6mm <sup>2</sup> (solid)/4mm <sup>2</sup> (stranded)
	Lower terminal	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)
Mounting EN 60715		35mm top-hat rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		1TE
Weight per unit		118g
<b>Ordering code PROTEC DMG 20/xxx (2+0)</b>		<b>508 021</b>
Remote contacts		YES
Contact ratings		AC: 250V/0.5A; 125V/3A
Terminal cross section		max. 1.5mm <sup>2</sup>
Remote terminal torque		0.25Nm
Weight per unit		123g
<b>Ordering code PROTEC DMGR 20/xxx (2+0) - with remote contacts</b>		<b>508 027</b>
Packaging dimensions (single unit)		108 x 74 x 24mm
<b>Ordering code Module PROTEC DMG(R) 20/xxx (2+0)</b>		<b>508 196</b>
Packaging dimensions (12 pcs.)		219 x 62 x 47mm

## Dimensions



## Connection diagram



# MPE-ZE 50

## Class III Multi-pole Surge Protective Device $U_{oc}/I_{sc} = 5kV/2.5kA$ per pole (1.2/50, 8/20)



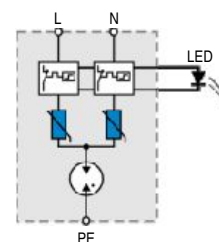
- ◆ Category IEC / EN / VDE: Class III / Type 3 / D
- ◆ Location of use: Cable ducts
- ◆ Connections: TN - S, TT, IT
- ◆ Protection modes: L/N - PE
- ◆ Protective element: MOV and GDT
- ◆ Surge discharge rating:  $U_{oc}/I_{sc} = 5kV/2.5kA$  per pole
- ◆ Fault indication: LED
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

### Technical data

Type		MPE-ZE 50
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC)	$U_c$	320/420V
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$	5kV/2.5kA per pole
Max. discharge current (8/20)	$I_{max}$	5kA
Protection level at $U_{oc}/I_{sc}$	$U_p$	< 1.5kV
Follow current	$I_f$	NO
Response time	$t_A$	< 100ns
Thermal protection		YES
Back-up fuse (if mains > 35A)		25A gL
Short-circuit withstand current		10kA/50Hz
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ....+ 80°C
Terminal cross section		2.5mm <sup>2</sup> (stranded)
Mounting		Cable ducts
Degree of protection		IP 20
Housing material		Thin plate (metal)
Dimensions		/
Weight per unit		52g
Ordering code MPE-ZE 50		121 207
Packaging dimensions (single unit)		

### Dimensions

### Connection diagram



# MPE-MINI

## Class III Multi-pole Surge Protective Device $U_{oc}/I_{sc} = 6kV/3kA$ per pole (1.2/50, 8/20)

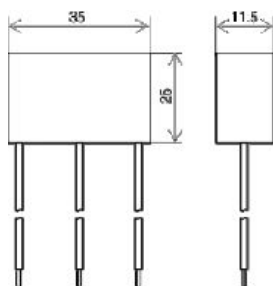


- ◆ Category IEC / EN / VDE: Class III / Type 3 / D
- ◆ Location of use: Cable ducts, wiring sockets
- ◆ Connections: TN - S, TT, IT
- ◆ Protection modes: L/N - PE
- ◆ Protective element: MOV and GDT
- ◆ Surge discharge rating:  $U_{oc}/I_{sc} = 6kV/3kA$  per pole
- ◆ Fault indication: Buzzer
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

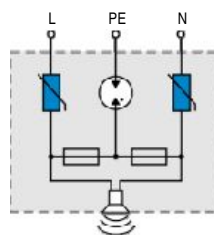
### Technical data

Type		MPE-MINI
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC)	$U_c$	275V/50Hz
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$	6kV/3kA per pole
Protection level at $U_{oc}/I_{sc}$	$U_p$	< 0.8kV
Follow current	$I_f$	NO
Response time	$t_A$	< 100ns
Thermal protection		YES
Back-up fuse (if mains > 16A)		16A gL
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ....+ 80°C
Terminal cross section		1.5mm <sup>2</sup> (stranded)
Mounting		Cable ducts
Degree of protection		IP 20
Housing material		Thermoplastic
Dimensions		/
Weight per unit		52g
<b>Ordering code MPE-ZE 50</b>		<b>121 501</b>
Packaging dimensions (single unit)		

### Dimensions



### Connection diagram





# ZE 200 PS

## Class III Multi-pole Surge Protective Device $U_{oc}/I_{sc} = 6kV/3kA$ per pole (1.2/50, 8/20)

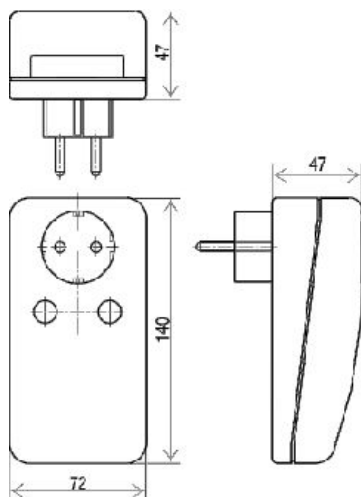


- ◆ Category IEC / EN / VDE: Class III / Type 3 / D
- ◆ Location of use: Power socket
- ◆ Connections: TN-S, IT, TT
- ◆ Protection modes: L(N) - PE, L - N
- ◆ Protective element: MOV and GDT
- ◆ Surge discharge rating:  $U_{oc}/I_{sc} = 6kV/3kA$  per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

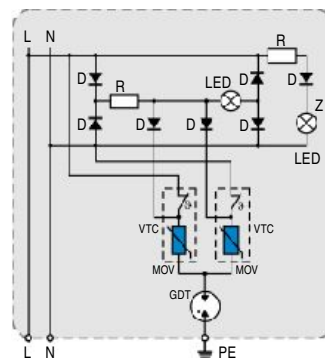
### Technical data

Type		ZE 200 PS
<b>Electrical characteristics</b>		
Max. permitted voltage	$U_c$	275V/50Hz
Rated voltage	$U_n$	230V/50Hz
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$	6kV/3kA
Protection level at $U_{oc}/I_{sc}$	$U_p$	< 1000V (L - N) < 1500V (L(N) - PE)
Response time	$t_A$	< 25ns (L - N) < 100ns (L(N) - PE)
Back-up fuse (if mains /)		16A gL, C 16A
<b>Mechanical characteristics</b>		
Temperature range		- 25°C ....+ 60°C
Connection		DIN 49 440-CE(7)III DIN 49 441-CEE(7)IV Grounding contact
Controlling device		Green and red light
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Weight per unit		/
Ordering code ZE 200 PS		121 532
Packaging dimensions		95 x 150 x 80mm

### Dimensions

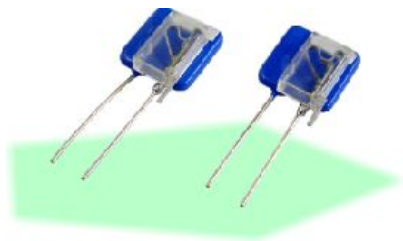


### Connection diagram



# VTC 10

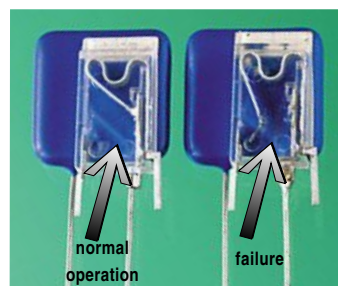
## Class III Single-pole Surge Protective Device $U_{oc}/I_{sc} = 10kV/5kA (1.2/50, 8/20)$



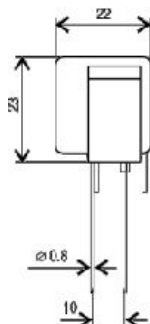
- ◆ Category IEC / EN / VDE: Class III / Type 3 / D
- ◆ Location of use: PCB
- ◆ Connections: TN-S, TN-C, IT
- ◆ Protection modes: L/N - PE
- ◆ Protective element: MOV
- ◆ Surge discharge rating:  $U_{oc}/I_{sc} = 10kV/5kA$
- ◆ MOV max withstand capability 1 x 8/20: 15kA
- ◆ Complies with: IEC-61643-1

### Technical data

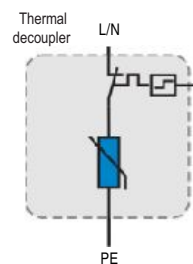
Type	VTC 10				
	150	275	320	440	
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC)	$U_c$	150V	275V	320V	440V
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$	10kV/5kA			
Max. discharge current (8/20)	$I_{max}$	10kA			
Protection level at $U_{oc}/I_{sc}$	$U_p$	< 0.9kV	< 1.4kV	< 1.6kV	< 1.8kV
Follow current	$I_f$	NO			
Response time	$t_A$	< 25ns			
Thermal protection		YES			
<b>Mechanical characteristics</b>					
Temperature range		- 40°C ....+ 80°C			
Mounting		On printed circuit board			
Degree of protection		IP 20			
Housing material		Thermoplastic, extinguishing degree UI94 V-O			
Weight per unit		6g	8g	12g	16g
<b>Ordering code VTC 10</b>		<b>122 646</b>	<b>122 636</b>	<b>509 313</b>	<b>122 808</b>
Packaging dimensions (single unit)					



### Dimensions



### Connection diagram



# PROFIL D

## Class III Multi-pole Surge Protective Device $U_{oc}/I_{sc} = 6kV/3kA (1.2/50, 8/20)$

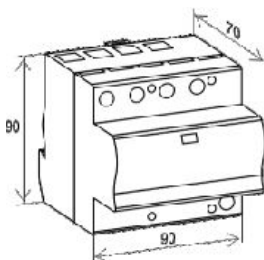


- |                            |                           |
|----------------------------|---------------------------|
| ◆ Category IEC / EN / VDE: | Class III / Type 3 / D    |
| ◆ Location of use:         | Sub-distribution boards   |
| ◆ Connections:             | TN-S, TT, IT              |
| ◆ Protection modes:        | L/N - PE                  |
| ◆ Protective element:      | MOV, GDT and filter       |
| ◆ Surge discharge rating:  | $U_{oc}/I_{sc} = 6kV/3kA$ |
| ◆ Fault indication:        | Red light                 |
| ◆ Housing:                 | Compact design            |
| ◆ Complies with:           | IEC-61643-1               |

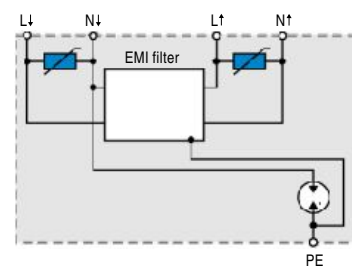
### Technical data

Type	PROFIL D				
	10A	16A	25A	30A	
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC)	$U_c$		275V/50 (60) Hz		
Nominal voltage	$U_n$		230V/50 (60) Hz		
Max. load current	$I_L$	10A	16A	25A	30A
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$		6kV/3kA		
Voltage protection level at $U_{oc}/I_{sc}$	$U_p$ (L-N)		< 0.85kV		
	$U_p$ (L-PE)		< 1.4kV		
Residual voltage at $I_n$	$U_{res}$ (L-N)		< 0.83kV		
	$U_{res}$ (L-PE)		< 1.38kV		
Follow current	$I_f$		NO		
Thermal protection	YES				
Filter	Cx		2 x 0.47 $\mu$ F		
	Cy		2 x 2.2nF		
	L		2 x 0.8mF		
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ....+ 80°C				
Terminal screw torque	max. 4.5Nm				
Terminal cross section	35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)				
Mounting EN 60715	35mm top-hat rail				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions DIN 43880	5TE				
Weight per unit	420g				
<b>Ordering code PROFILT D</b>	<b>130 051</b>	<b>130 052</b>	<b>130 053</b>	<b>130 050</b>	
Packaging dimensions (single unit)	108 x 76.5 x 96mm				

### Dimensions

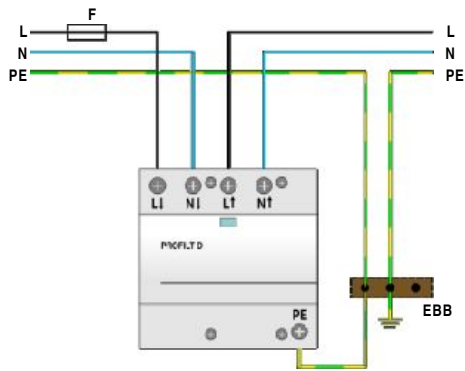


### Connection diagram

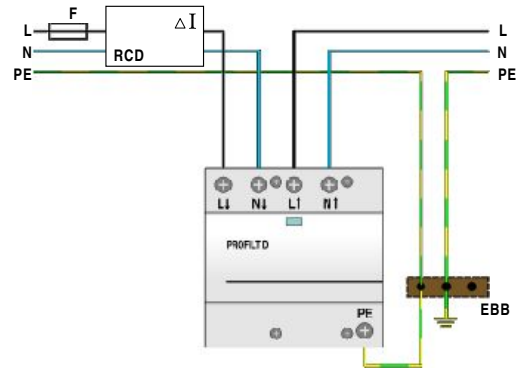


# PROFILT D - Connections

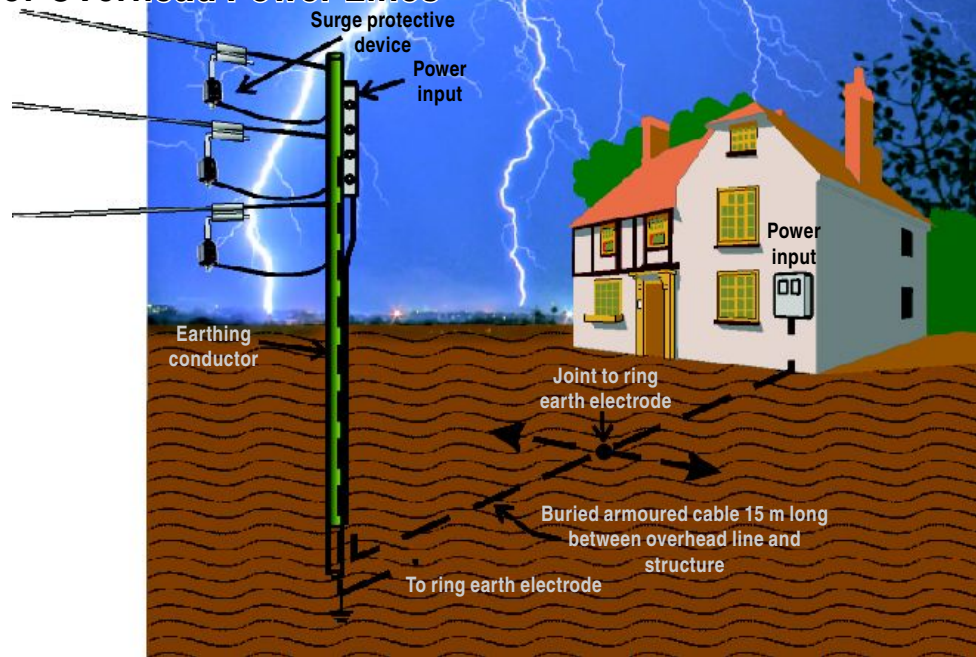
TN-S Network



TT Network



## Surge Protective Devices for Overhead Power Lines



**Category IEC / EN / VDE:**

**Location of use:**

**Protection modes:**

**Protective elements:**

**Surge discharge ratings:**

**Internal protection and safety:**

**Class II / Type 2 / A**

**Overhead power lines**

**L/N-PE**

**MOV**

**$I_{max} = 40kA$**

**Thermal disconnecter for MOV**

**PROTEC AQ 40**  
**PROTEC AQS 40**  
**PROTEC A 30**  
**PROTEC AQ 25**

The PROTEC A series of overvoltage surge protective devices has been developed to protect against indirect lightning discharges on overhead power lines. It consists of a high performance varistor block with disconnection device which protects against short circuit conditions.

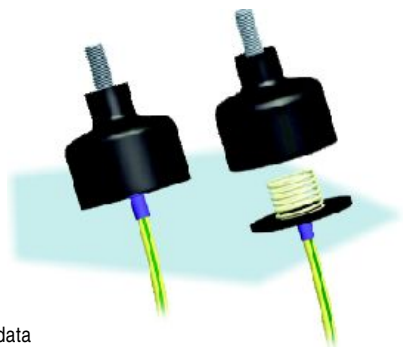
PROTEC A - provides visual status indication via a bright RED pop-out flag in the event of failure which can easily be seen from beneath the line.

PROTEC AQ - provides a more compact design.

PROTEC AQS - provides the same compactness as the AQ but with a silicon jacket for greater hermetic sealing properties.

# PROTEC AQ 40

## Class II Single-pole Surge Protective Device $I_{max} = 40kA (8/20)$

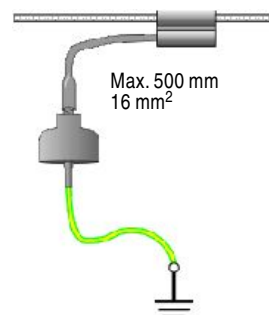


◆ Category IEC / EN / VDE:	Class II / Type 2 / A
◆ Location of use:	Overhead power lines
◆ Connections:	TN-C, TN-S, IT
◆ Protection modes:	L/N - PE
◆ Protective element:	MOV
◆ High surge discharge rating:	$I_{max} = 40kA$
◆ Housing:	Compact design
◆ Complies with:	IEC-61643-1

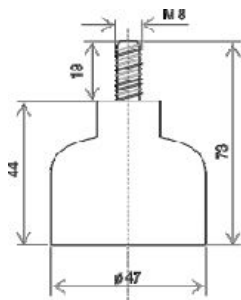
### Technical data

Type	PROTEC AQ 40/xxx				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			20kA		
Max. discharge current (8/20) $I_{max}$			40kA		
Protection level $U_p$	< 1.2kV	< 1.7kV	< 1.8kV	< 2.1kV	< 2.3kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse			NO		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ... + 80°C				
Terminal screw torque	max. 3.5Nm				
Terminal cross section	L/N	M8			
	PE	6mm <sup>2</sup> (stranded)			
Mounting	Outdoors				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions	/				
Weight per unit	144g	146g	149g	154g	157g
Ordering code <b>PROTEC AQ 40/xxx</b>	<b>509 029</b>	<b>509 031</b>	<b>509 033</b>	<b>509 047</b>	<b>509 035</b>
Packaging dimensions (60 pcs.)	290 x 250 x 210mm				

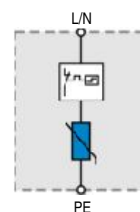
### Mounting



### Dimensions



### Connection diagram



# PROTEC AQS 40

## Class II Single-pole Surge Protective Device I<sub>max</sub> = 40kA (8/20)

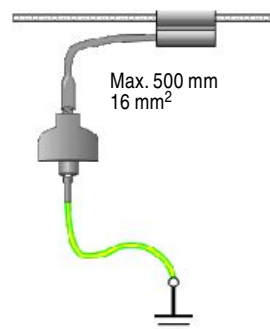


- ◆ Category IEC / EN / VDE: Class II / Type 2 / A
- ◆ Location of use: Overhead power lines
- ◆ Connections: TN-C, TN-S, IT
- ◆ Protection modes: L/N - PE
- ◆ Protective element: MOV
- ◆ High surge discharge rating: I<sub>max</sub> = 40kA
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

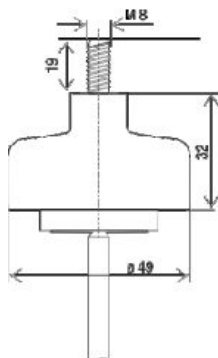
### Technical data

Type		150	275	320	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC)	U <sub>c</sub>	150/200V	275/350V	320/420V	440/580V
Nominal discharge current (8/20)	I <sub>n</sub>			20kA	
Max. discharge current (8/20)	I <sub>max</sub>			40kA	
Protection level	U <sub>p</sub>	< 0.9kV	< 1.4kV	< 1.4kV	< 2.0kV
Follow current	I <sub>f</sub>			NO	
Response time	t <sub>A</sub>			< 25ns	
Thermal protection				YES	
Back-up fuse				NO	
Short-circuit withstand current				25kA/50Hz	
<b>Mechanical characteristics</b>					
Temperature range				- 40°C ... + 80°C	
Terminal screw torque				max. 3.5Nm	
Terminal cross section	L/N PE			M8 6mm <sup>2</sup> (stranded)	
Mounting				Outdoors	
Degree of protection				IP 67	
Housing material				Silicon	
Dimensions				/	
Weight per unit		122g	126g	130g	134g
Ordering code <b>PROTEC AQS 40/xxx</b>		<b>509 049</b>	<b>509 051</b>	<b>509 053</b>	<b>509 055</b>
Packaging dimensions (100 pcs.)				382 x 349 x 250mm	

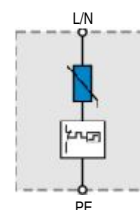
### Mounting



### Dimensions



### Connection diagram



# PROTEC A 30

## Class II Single-pole Surge Protective Device $I_{max} = 30kA (8/20)$

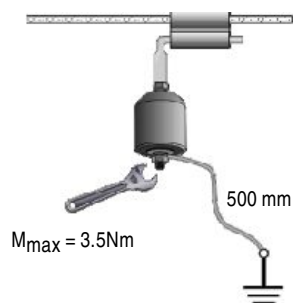


◆ Category IEC / EN / VDE:	Class II / Type 2 / A
◆ Location of use:	Overhead power lines
◆ Connections:	TN-C, TN-S, IT
◆ Protection modes:	L/N - PE
◆ Protective element:	MOV
◆ High surge discharge rating:	$I_{max} = 30kA$
◆ Housing:	Compact design
◆ Complies with:	IEC-61643-1

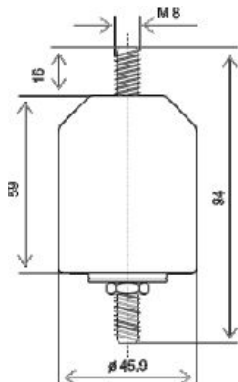
### Technical data

Type	PROTEC A 30/xxx				
	150	275	320	385	440
<b>Electrical characteristics</b>					
Max. continuous operating voltage (AC/DC) $U_c$	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20) $I_n$			15kA		
Max. discharge current (8/20) $I_{max}$			30kA		
Protection level $U_p$	< 1.0kV	< 1.3kV	< 1.5kV	< 1.6kV	< 1.8kV
Follow current $I_f$			NO		
Response time $t_A$			< 25ns		
Thermal protection			YES		
Back-up fuse			NO		
Short-circuit withstand current			25kA/50Hz		
<b>Mechanical characteristics</b>					
Temperature range	- 40°C ... + 80°C				
Terminal screw torque	max. 3.5Nm				
Terminal cross section	L/N	M8			
	PE	6mm <sup>2</sup> (stranded)			
Mounting	Outdoors				
Degree of protection	IP 20				
Housing material	Thermoplastic; extinguishing degree UL 94 V-0				
Dimensions	/				
Weight per unit	132g	134g	137g	142g	145g
Ordering code <b>PROTEC A 30/xxx</b>	<b>509 009</b>	<b>509 011</b>	<b>509 013</b>	<b>509 043</b>	<b>509 015</b>
Packaging dimensions (single unit)	105 x 54 x 50mm				

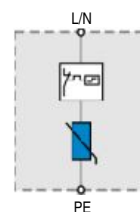
### Mounting



### Dimensions



### Connection diagram





# PROTEC AQ 25

## Class II Single-pole Surge Protective Device I<sub>max</sub> = 25kA (8/20)

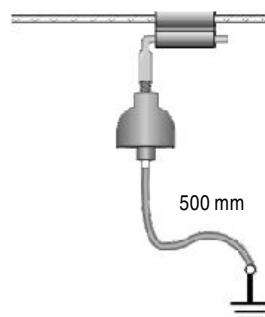


- ◆ Category IEC / EN / VDE: Class II / Type 2 / A
- ◆ Location of use: Overhead power lines
- ◆ Connections: TN-C, TN-S, IT
- ◆ Protection modes: L/N - PE
- ◆ Protective element: MOV
- ◆ High surge discharge rating: I<sub>max</sub>= 25kA
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

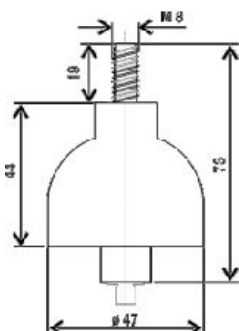
### Technical data

Type		150	275	PROTEC AQ 25/xxx 320	385	440
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC)	U <sub>c</sub>	150/200V	275/350V	320/420V	385/500V	440/580V
Nominal discharge current (8/20)	I <sub>n</sub>			10kA		
Max. discharge current (8/20)	I <sub>max</sub>			25kA		
Protection level	U <sub>p</sub>	< 0.9kV	< 1.3kV	< 1.4kV	< 1.7kV	< 1.9kV
Follow current	I <sub>f</sub>			NO		
Response time	t <sub>A</sub>			< 25ns		
Thermal protection				YES		
Back-up fuse				NO		
Short-circuit withstand current				25kA/50Hz		
<b>Mechanical characteristics</b>						
Temperature range				- 40°C ....+ 80°C		
Terminal screw torque				max. 3.5Nm		
Terminal cross section	L/N PE			M8 6mm <sup>2</sup> (stranded)		
Mounting				Outdoors		
Degree of protection				IP 20		
Housing material				Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions				/		
Weight per unit		104g	106g	108g	110g	112g
Ordering code PROTEC AQ 25/xxx		509 017	509 019	509 021	509 045	509 023
Packaging dimensions (60 pcs.)				295 x 245 x 210mm		

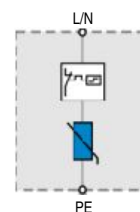
### Mounting



### Dimensions

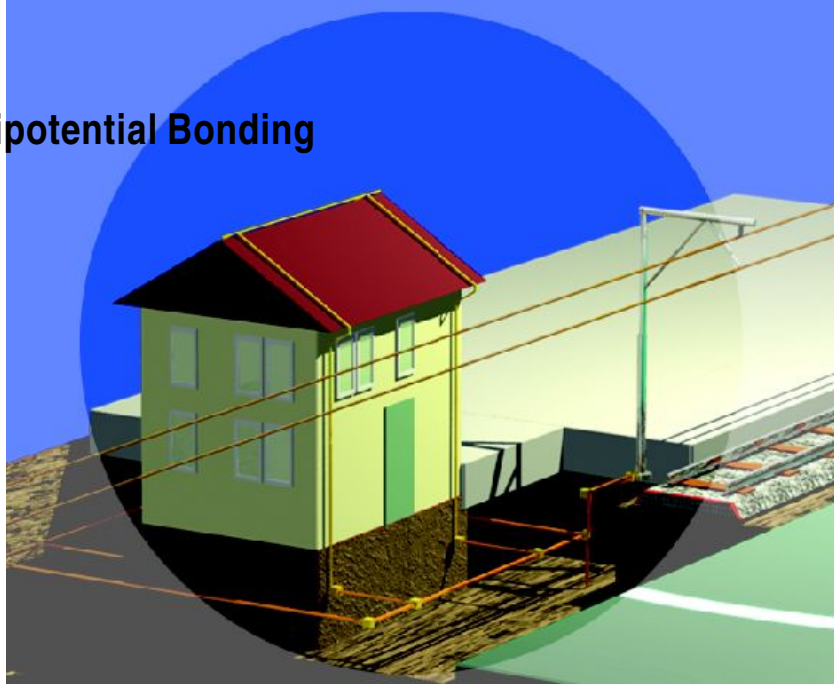


### Connection diagram





## Isolating Spark Gaps (ISG) for Equipotential Bonding



<b>Location of use:</b>	<b>Exposed environments or direct burial</b>
<b>Protective element:</b>	<b>GDT</b>
<b>High surge discharge rating:</b>	<b><math>I_{max} = 100kA</math></b>
<b>Housing:</b>	<b>Corrosion resistant enclosure with hermetic environmental seal and flying leads for ease of connection</b>
<b>Complies with:</b>	<b>IEC-61643-1</b>

**EPZ 100**  
**EPZ 100 Ex**

The EPZ series of isolating spark gaps have been developed to prevent unsafe potential gradients from establishing between adjacent metallic structures or surfaces during lightning discharges. This is achieved by an internal voltage switching component which operates to establish equipotential equalisation when its predetermined spark-over voltage is reached, thereby preventing damage to equipment or eliminating unsafe conditions to personnel.

The EPZ has been developed for use in applications such as: lightning protection grounding, where for instance circumstances may dictate that a “clean” signal ground can not be directly connected to a “dirty” power system ground. It has also found wide application in the petrochemical industry in the protection of oil and gas pipeline insulating flanges from flash-overs during direct or nearby lightning discharges or when ground faults of nearby power transmission lines can cause large potential gradients across these flanges. The EPZ is available in a hermetically sealed version for direct burial applications. It is also available with Baseefa Ex approval certificate for use in hazardous locations.

These devices have been developed to meet the requirements EN 50164-3 Lightning Protection Components (LPC) - Requirements for Isolating Spark Gaps, and the soon to be released standard IEC 62561-3 Ed. 1.0 - Requirements for Lightning Protection Components (LPC) - Part 3: Requirements for isolating spark gaps.

# EPZ 100

## Equipotential bonding

$I_{max} = 100kA (8/20)$

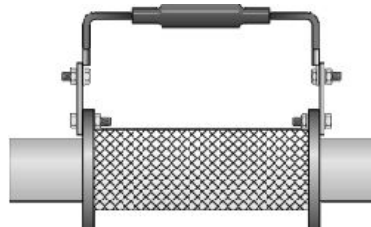
- ◆ Location of use: Exposed environments or direct burial
- ◆ Protective element: GDT
- ◆ High surge discharge rating:  $I_{max} = 100kA$
- ◆ Housing: Corrosion resistant enclosure with hermetic environmental seal and flying leads for ease of connection
- ◆ Complies with: IEC-61643-1



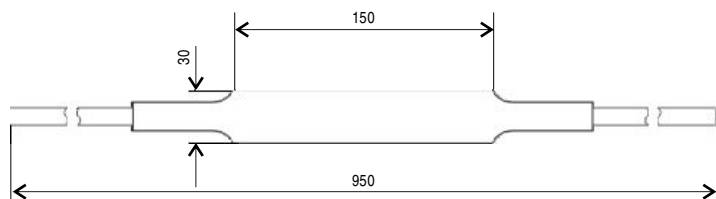
### Technical data

Type		350	EPZ 100/xxx	500
<b>Electrical Characteristics</b>				
DC sparkover voltage (100V/s)	$U_{ss}$	350V		500V
Impulse sparkover voltage (1 kV/ $\mu$ s)	$U_{sd}$	1000V		1500V
Max. Discharge current (8/20 $\mu$ s)	$I_{max}$	100kA		100kA
Capacitance at 1MHz	$C$		< 10pf	
Insulation resistance at 100V <sub>DC</sub>	$R$		> 1G $\Omega$	
<b>Dimensions</b>				
Nom. outer diameter			28mm	
Nom. length			140mm	
Length with cables			1m approx.	
<b>Cable</b>				
Cross sectional area			16mm <sup>2</sup>	
Length			450mm approx.	
Number of conductors			$\geq 462/0.21$	
Insulation			Double insulated	
Environmental protection			UV stabilised, flame retardant	
Resistant			Acids, solvents and oils	
Connection			Suitable for screw or lug termination	
<b>Physicals</b>				
Housing			IP 67	
Application			Below / above grade	
Weight			0.5kg approx.	
Operating temperature			- 40°C ... + 80°C	
<b>LIMITATIONS</b>				
Connections		Electrical connections must be terminated in a suitably certified enclosure or safe area		
Service temperature range		- 30°C ... + 70°C		
Ordering code		509 509		509 511

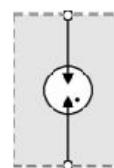
### Mounting



### Dimensions



### Connection diagram



# EPZ 100 Ex

## Equipotential bonding

$I_{max} = 100kA (8/20)$

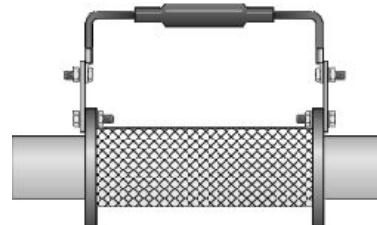


- ◆ Location of use: Exposed environments or direct burial
- ◆ Protective element: GDT
- ◆ High surge discharge rating:  $I_{max} = 100kA$
- ◆ Housing: Corrosion resistant enclosure with hermetic environmental seal and flying leads for ease of connection
- ◆ Complies with: IEC-61643-1

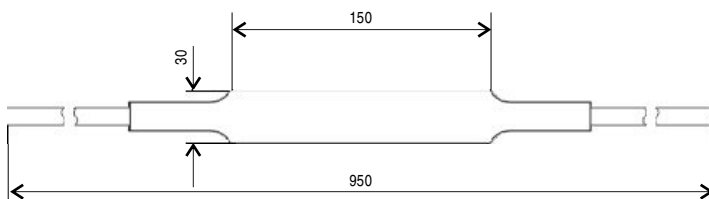
### Technical data

Type	EPZ 100 Ex/xx x		
	350	500	
<b>Electrical Characteristics</b>			
DC sparkover voltage (100V/s)	$U_{ss}$	350V	500V
Impulse sparkover voltage (1 kV/ $\mu$ s)	$U_{sd}$	1000V	1500V
Max. Discharge current (8/20 $\mu$ s)	$I_{max}$	100kA	100kA
Capacitance at 1MHz	$C$	< 10pf	
Insulation resistance at 100V <sub>DC</sub>	$R$	> 1G $\Omega$	
<b>Dimensions</b>			
Nom. outer diameter	28mm		
Nom. length	140mm		
Length with cables	1m approx.		
<b>Cable</b>			
Cross sectional area	16mm <sup>2</sup>		
Length	450mm approx.		
Number of conductors	$\geq 462/0.21$		
Insulation	Double insulated		
Environmental protection	UV stabilised, flame retardant		
Resistant	Acids, solvents and oils		
Connection	Suitable for screw or lug termination		
<b>Physicals</b>			
Housing	IP 67		
Application	Below / above grade		
Weight	0.5kg approx.		
Operating temperature	- 40°C ... + 80°C		
<b>LIMITATIONS</b>			
Connections	Electrical connections must be terminated in a suitably certified enclosure or safe area		
Service temperature range	- 30°C ... + 70°C		
Ordering code	322 973	322 975	

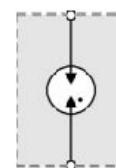
### Mounting



### Dimensions



### Connection diagram





# MULTI-POLE Surge Protective Devices for PHOTOVOLTAIC SYSTEMS



<b>Category IEC / EN / VDE:</b>	<b>Class I; II / Type 1; 2 / B; C</b>
<b>Location of use:</b>	<b>Photovoltaic system - PV module side</b>
<b>Protection modes:</b>	<b>(+) - PE, (-) - PE</b>
<b>Protective elements:</b>	<b>High energy MOV</b>
<b>High surge discharge ratings:</b>	<b>Iimp = 12.5kA per pole; I<sub>max</sub> = 40kA per pole</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnecter for each MOV</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>4TE, 2TE, 3TE</b>

## PV PROTEC BS(R) 12.5

The PV PROTEC series of overvoltage surge protective devices has been developed to protect Photovoltaic systems against partial direct and indirect lightning discharges and is intended for installation between the photovoltaic panels and DC-AC inverter.

PV PROTEC BS 12.5 - Provides common mode protection and consists of two high performance varistor stages protected by thermal disconnection devices. A unique indicator monitors all disconnectors and brings up a common status flag if any one stage should fail. The use of parallel terminal connection allow both 'T' and 'V' type wiring connections to be made.

## SAFETEC C(R) 40 PV PV PROTEC C(R) 40

SAFETEC C PV and PV PROTEC C series are intended to provide protection in zones 1 - 2 per IEC 62305 for induced surges and is intended to be used in conjunction with the PV PROTEC BS series. Again, a unique indicator monitors all disconnectors and brings up a common status flag if any one stage should fail, while the plug-in module / base design facilitates replacement of a failed module in situ without the need to remove system wiring.

# PV PROTEC BS(R) 12.5

## Class I, II Surge Protective Device for PV System $I_{imp} = 12.5kA$ per pole (10/350)

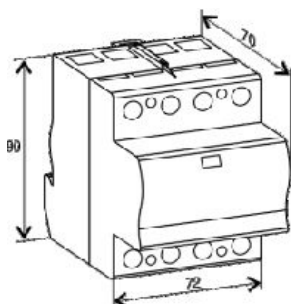


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B
- ◆ Location of use: Photovoltaic system - PV module side
- ◆ Protection modes: (+) - PE, (-) - PE
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 12.5kA$  per pole
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1, UTE C 61-740-51

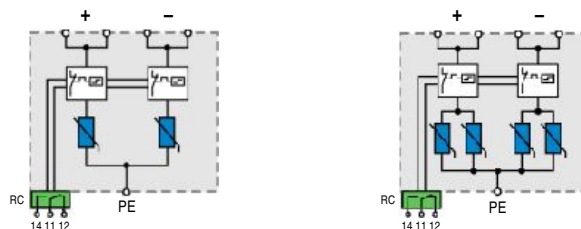
### Technical data

Type	PV PROTEC BS(R) 12.5/xxxx		
		550	1000
<b>Electrical characteristics</b>			
Max. continuous operating voltage (DC)	$U_c$	550V	1000V
Nominal discharge current (8/20)	$I_n$		20kA per pole
Max. discharge current (8/20)	$I_{max}$		40kA per pole
Impulse current (10/350)	$I_{imp}$		12.5kA per pole
Specific energy			39kJ/Ω
Charge			6.25As
Protection level	$U_p$	< 1.75kV	< 2.6kV
Residual voltage at $I_{imp}$	$U_{res}$	< 1.45kV	< 2.2kV
Follow current	$I_f$		NO
Response time	$t_A$		< 25ns
Thermal protection			YES
<b>Mechanical characteristics</b>			
Temperature range		- 40°C ... + 80°C	
Terminal screw torque		max. 4.5Nm	
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)	
Mounting EN 60715		35mm top-hat rail	
Degree of protection		IP 20	
Housing material		Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		4TE	
Weight per unit		370g	578g
Ordering code PV PROTEC BS 12.5/xxxx		501 507	501 541
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm <sup>2</sup>	
Remote terminal torque		0.25Nm	
Weight per unit		375g	583g
Ordering code PV PROTEC BSR 12.5/xxxx - with remote contacts		501 517	501 545
Packaging dimensions (single unit)		109 x 76.5 x 78mm	

### Dimensions



### Connection diagram





# SAFETEC C(R) 40 PV

Class II Multi-pole Surge Protective Device for PV System  
 $I_{max} = 40kA (8/20)$

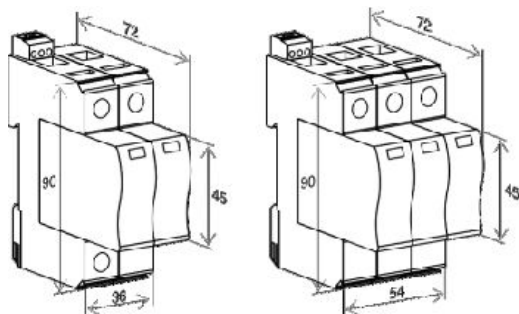


- ◆ Category IEC/EN/VDE: Class II/Type 2/C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Protection modes: ((+)(-)-PE, (+)-PE/(-)-PE
- ◆ Protective element: MOV
- ◆ High surge discharge rating:  $I_{max} = 40kA$
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1, UTEC 61-740-51

## Technical data

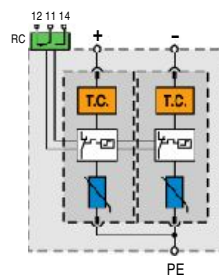
Type	SAFETEC C(R) 40/xxxx PV					
	75	300	600	1000	1200	
<b>Electrical characteristics</b>						
Max. continuous operating voltage (DC)	$U_c$	75V	300V	600V	1000V	1200V
Nominal discharge current (8/20)	$I_n (+) - PE(-) - PE$	20kA	20kA	20kA	12.5kA	20kA
	$I_n ((+)(-)-PE)$	40kA	40kA	40kA	25kA	20kA
Max. discharge current (8/20)	$I_{max} (+) - PE(-) - PE$	40kA	40kA	40kA	25kA	40kA
	$I_{max} ((+)(-)-PE)$	80kA	80kA	80kA	50kA	40kA
Protection level	$U_p$	< 0.6kV	< 1.6kV	< 2.2kV	< 2.8kV	< 4.4kV
Follow current	$I_f$			NO		
Response time	$t_A$			< 25ns		
Thermal protection				YES		
<b>Mechanical characteristics</b>						
Terminal screw torque						max. 3.5Nm
Temperature range						- 40°C .... + 80°C
Terminal cross section						35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)
Mounting EN 60715						35mm top-hat rail
Degree of protection						IP 20
Housing material						thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880	2TE	2TE	2TE	2TE	3TE	
Weight per unit						
Ordering code SAFETEC C 40/xxxx PV	516 040	516 042	516 044	516 046	516 048	
Remote contacts						YES
Contact ratings						AC: 250V/0.5A; 125V/3A
Terminal cross section						max. 1.5mm <sup>2</sup>
Remote terminal torque						0.25Nm
Weight per unit						
Ordering code SAFETEC C(R) 40/xxxx PV (with remote contacts)	516 041	516 043	516 045	516 047	516 049	
Packaging dimensions (single unit)						109 x 76,5 x 41.5mm / 109 x 76,5 x 60mm
Ordering code Module SAFETEC C(R) 40/xxxx PV	516 050	516 051	516 052	516 053	516 054	
Packaging dimensions (12 pcs.)						219 x 62 x 47mm

## Dimensions

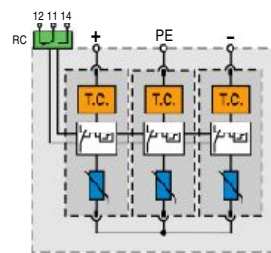


## Connection diagram

SAFETEC CR 40/75 - 1000 PV



SAFETEC CR 40/1200 PV



# PV PROTEC C(R) 40

## Class II Surge Protective Devices for PV System I<sub>max</sub> = 40kA per pole (8/20)

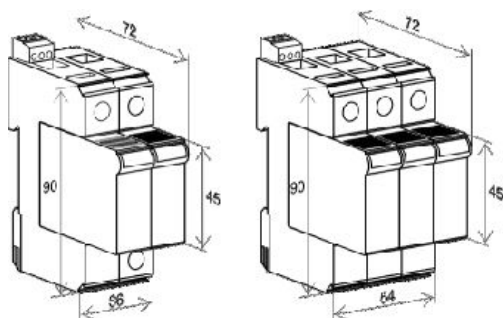


- ◆ Category IEC / EN / VDE: Class II / Type 2 / C
- ◆ Location of use: Branch sub-distribution boards
- ◆ Protection modes: (+) - PE, (-) - PE
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating: I<sub>max</sub>= 40kA per pole
- ◆ Housing: Modular design
- ◆ Complies with: IEC-61643-1, UTE C 61-740-51

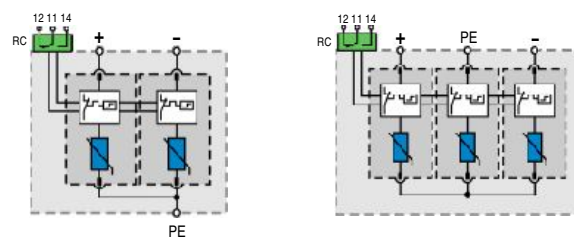
### Technical data

Type	PV PROTEC C(R) 40/xxxx			
	100	550	1000	
<b>Electrical characteristics</b>				
Max. continuous operating voltage (DC)	U <sub>c</sub>	100V	550V	1000V
Nominal discharge current (8/20)	I <sub>n</sub>		20kA per pole	
Max. discharge current (8/20)	I <sub>max</sub>		40kA per pole	
Protection level	U <sub>p</sub>	< 0.7kV	< 1.9kV	< 3.65kV
Follow current	I <sub>f</sub>		NO	
Response time	t <sub>A</sub>		< 25ns	
Thermal protection			YES	
<b>Mechanical characteristics</b>				
Temperature range		- 40°C ....+ 80°C		
Terminal screw torque		max. 4.5Nm		
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)		
Mounting EN 60715		35mm top-hat rail		
Degree of protection		IP 20		
Housing material		Thermoplastic; extinguishing degree UL 94 V-0		
Dimensions DIN 43880		2TE	2TE	3TE
Weight per unit		274g	302g	398g
Ordering code <b>PV PROTEC C 40/xxxx</b>		<b>501 521</b>	<b>501 527</b>	<b>501 543</b>
Remote contacts			YES	
Contact ratings		AC: 250V/0.5A; 125V/3A		
Terminal cross section		max. 1.5mm <sup>2</sup>		
Remote terminal torque		0.25Nm		
Weight per unit		279g	307g	403g
Ordering code <b>PV PROTEC CR 40/xxxx - with remote contacts</b>		<b>501 531</b>	<b>501 537</b>	<b>501 547</b>
Packaging dimensions (single unit)		109 x 76.5 x 41.5mm		109 x 76.5 x 60mm
Ordering code <b>Module PV PROTEC CR 40/xxxx - with remote contacts</b>		<b>500 496</b>	<b>500 497</b>	<b>500 498</b>
Packaging dimensions (12 pcs.)		219 x 62 x 47mm		

### Dimensions

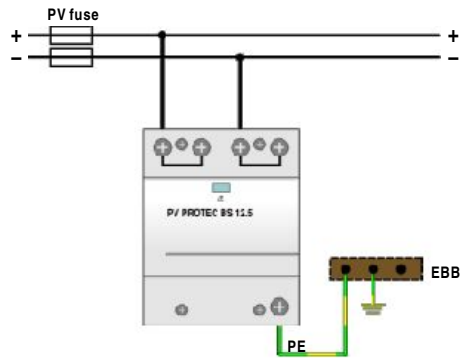


### Connection diagram

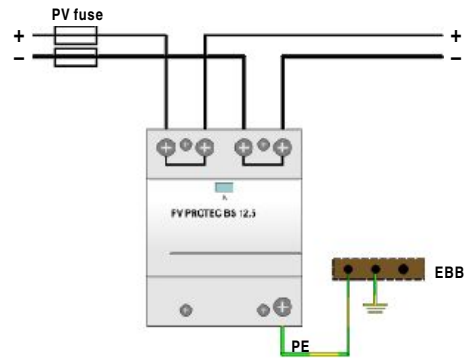


# PV PROTEC BS(R), PV PROTEC C(R), SAFETEC C(R) PV - Connections

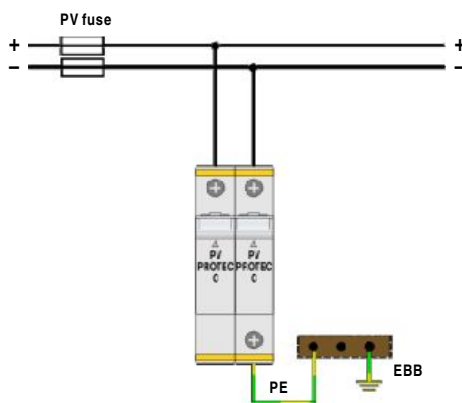
PV PROTEC BS(R) (T-connection)



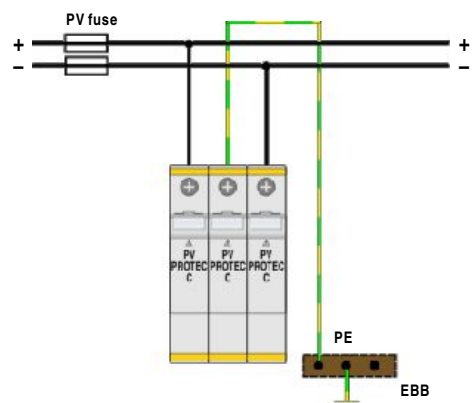
PV PROTEC BS(R) (V-connection)



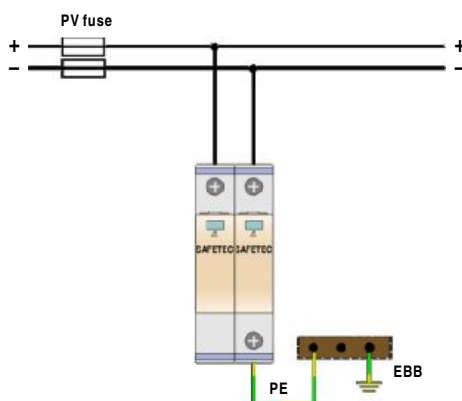
PV PROTEC C(R) 40/100, 40/550



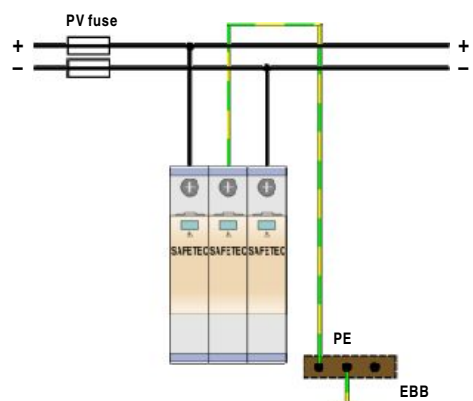
PV PROTEC C(R) 40/1000



SAFETEC C (R) 40/75 - 40/1000



SAFETEC C (R) 40/1200 PV



## PV fuse selection

String fuses of solar array are selected according to the nominal current of photovoltaic module, multiplied by 1.4. The closest, higher value of the fuse should be selected.

Voltage withstand of fuses should be higher than the open circuit voltage of the solar array, multiplied by 1.2.

We recommend to use the fuses, that were specially designed for photovoltaic systems.



# MULTI-POLE Surge Protective Devices for WIND GENERATION SYSTEMS



<b>Category IEC / EN / VDE:</b>	<b>Class I, II / Type 1, 2; 2 / B+C; C</b>
<b>Location of use:</b>	<b>Main distribution board</b>
<b>Protection modes:</b>	<b>L/N - PE</b>
<b>Protective elements:</b>	<b>MOV</b>
<b>Surge discharge ratings:</b>	<b>Iimp= up to 25kA; Imax= 40kA</b>
<b>Internal protection and safety:</b>	<b>Separate thermal disconnecter for each MOV</b>
<b>Status indication:</b>	<b>Mechanical flag + remote contacts (R)</b>
<b>Dimensions DIN 43880:</b>	<b>3TE, 4TE</b>

## **WT PROTEC BS(R) 25 WT PROTEC BS(R) 12.5**

The WT PROTEC series has been developed to meet the growing needs of wind generation facilities where exposure to direct and indirect lightning discharges is well known problem, primarily due to the often exposed location of such facilities e.g. on hill tops and open land topography.

Units are available in a range of surge ratings per recommendation in IEC 62305 such as Iimp 25kA and 12.5kA test class I, and Imax 40kA test class II.

## **SAFETEC C(R) 750 (3+0) WT**

SAFETEC C(R) WT - Is intended to provide protection in zones 1 - 2 per IEC 62305 for induced surges and is intended to be used in conjunction with the WT PROTEC BS(R) series.

**The new SAFETEC series of surge protective devices (SPDs) provide:**

- **Protection from overvoltages, surge and transients on the system network**
- **Protection against loss of neutral, or loose neutral connections, which are common to MEN (Multiple earthed neutral) systems**
- **Unstable or poorly regulated power networks where sustained overvoltages for some minutes or longer may exist**
- **Patented TC technology prevent catastrophic failures in case of TOV (temporary overvoltages)**

# WT PROTEC BS(R) 25

## Class I, II Single-pole Surge Protective Devices

$I_{imp} = 25kA (10/350)$

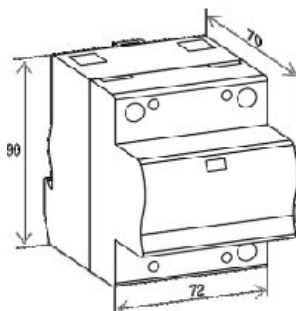


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Protection modes: L/N - PE
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating:  $I_{imp} = 25kA$
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

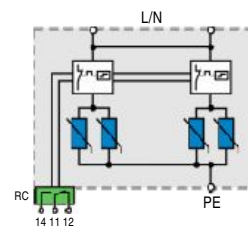
### Technical data

Type		WT PROTEC BS(R) 25/750
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC)	$U_c$	750/1000V
Nominal discharge current (8/20)	$I_n$	40kA
Max. discharge current (8/20)	$I_{max}$	80kA
Impulse current (10/350)	$I_{imp}$	25kA
Specific energy		156kJ/Ω
Charge		12.5As
Protection level	$U_p$	< 2.5kV
Residual voltage at $I_{imp}$	$U_{res}$	< 2.0kV
Follow current	$I_f$	NO
Response time	$t_A$	< 25ns
Thermal protection		YES
Back-up fuse (if mains > 250A)		250A gL
Short-circuit withstand current		25kA/50Hz
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ....+ 80°C
Terminal screw torque		max. 4.5Nm
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)
Mounting EN 60715		35mm top-hat rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		4TE
Weight per unit		494g
Ordering code WT PROTEC BS 25/750		<b>502 310</b>
Remote contacts		YES
Contact ratings		AC: 250V/0.5A; 125V/3A
Terminal cross section		max. 1.5mm <sup>2</sup>
Remote terminal torque		0.25Nm
Weight per unit		499g
Ordering code WT PROTEC BSR 25/750 - with remote contacts		<b>502 311</b>
Packaging dimensions (single unit)		109 x 76.5 x 78mm

### Dimensions



### Connection diagram



# WT PROTEC BS(R) 12.5

## Class I, II Single-pole Surge Protective Devices I<sub>imp</sub> = 12.5kA (10/350)

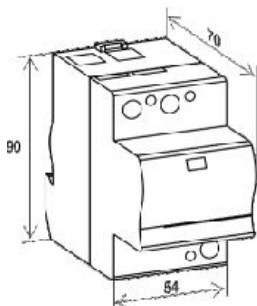


- ◆ Category IEC / EN / VDE: Class I, II / Type 1, 2 / B+C
- ◆ Location of use: Main distribution boards
- ◆ Protection modes: L/N - PE
- ◆ Protective element: High Energy MOV
- ◆ High surge discharge rating: I<sub>imp</sub> = 12.5kA
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

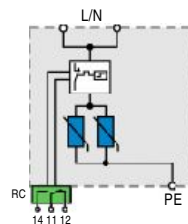
### Technical data

Type	WT PROTEC BS(R) 12.5/750	
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC)	<b>U<sub>C</sub></b>	750/1000V
Nominal discharge current (8/20)	<b>I<sub>n</sub></b>	20kA
Max. discharge current (8/20)	<b>I<sub>max</sub></b>	40kA
Impulse current (10/350)	<b>I<sub>imp</sub></b>	12.5kA
Specific energy		39kJ/Ω
Charge		6.25As
Protection level	<b>U<sub>p</sub></b>	< 2.5kV
Residual voltage at I <sub>imp</sub>	<b>U<sub>res</sub></b>	< 2.0kV
Follow current	<b>I<sub>f</sub></b>	NO
Response time	<b>t<sub>A</sub></b>	< 25ns
Thermal protection		YES
Back-up fuse (if mains > 250A)		250A gL
Short-circuit withstand current		25kA/50Hz
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ....+ 80°C
Terminal screw torque		max. 4.5Nm
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)
Mounting EN 60715		35mm top-hat rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		3TE
Weight per unit		319g
Ordering code <b>WT PROTEC BS 12.5/750</b>		<b>502 312</b>
Remote contacts		YES
Contact ratings		AC: 250V/0.5A; 125V/3A
Terminal cross section		max. 1.5mm <sup>2</sup>
Remote terminal torque		0.25Nm
Weight per unit		324g
Ordering code <b>WT PROTEC BSR 12.5/750 - with remote contacts</b>		<b>502 313</b>
Packaging dimensions (single unit)		109 x 76.5 x 60mm

### Dimensions



### Connection diagram



# SAFETEC C(R) 750 (3+0) WT

## Class II Multi-pole Surge Protective Devices

$I_{max} = 25kA$  per pole (8/20)

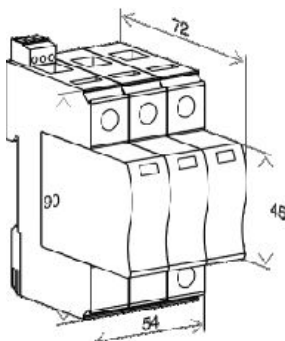


◆ Category IEC / EN / VDE:	Class II / Type 2 / C
◆ Location of use:	Branch sub-distribution boards
◆ Connections:	TN-C
◆ Protection modes:	L - PEN
◆ Protective element:	MOV
◆ High surge discharge rating:	$I_{max} = 25kA$ per pole
◆ Safety:	Immunity against TOV
◆ Housing:	Modular design
◆ Complies with:	IEC-61643-1

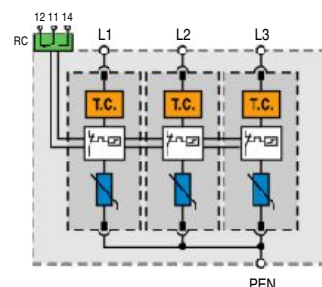
### Technical data

Type	SAFETEC C(R) 750 (3+0) WT	
<b>Electrical characteristics</b>		
Max. continuous operating voltage (AC/DC)	$U_C$	750/1000V
Nominal discharge current (8/20)	$I_n$ (L-PEN/L1+L2+L3-PEN)	12.5kA per pole/37.5kA
Max. discharge current (8/20)	$I_{max}$ (L-PEN/L1+L2+L3-PEN)	25kA per pole/75kA
Protection level	$U_p$	< 2.8kV
Follow current	$I_f$	NO
Response time	$t_A$	< 25ns
Thermal protection		YES
Short-circuit withstand current		25kA/50Hz
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ... + 80°C
Terminal screw torque		max. 4.5Nm
Terminal cross section		35mm <sup>2</sup> (solid)/25mm <sup>2</sup> (stranded)
Mounting EN 60715		35mm top-hat rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		3TE
Weight per unit		364g
Ordering code <b>SAFETEC C 750 (3+0) WT</b>		<b>516 055</b>
Remote contacts		YES
Contact ratings		AC: 250V/0.5A; 125V/3A
Terminal cross section		max. 1.5mm <sup>2</sup>
Remote terminal torque		0.25Nm
Weight per unit		369g
Ordering code <b>SAFETEC CR 750 (3+0) WT - with remote contacts</b>		<b>516 056</b>
Packaging dimensions (single unit)		109 x 76.5 x 60mm
Ordering code <b>Module SAFETEC C(R) 750 (3+0) WT - with remote contacts</b>		<b>516 057</b>
Packaging dimensions (12 pcs.)		219 x 62 x 47mm

### Dimensions



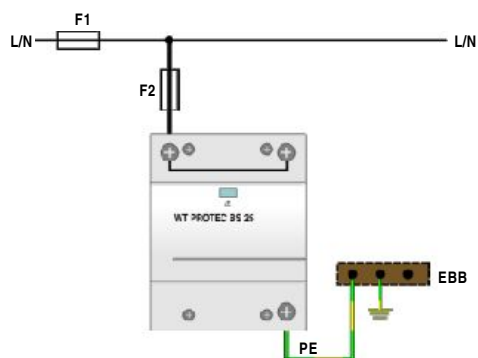
### Connection diagram



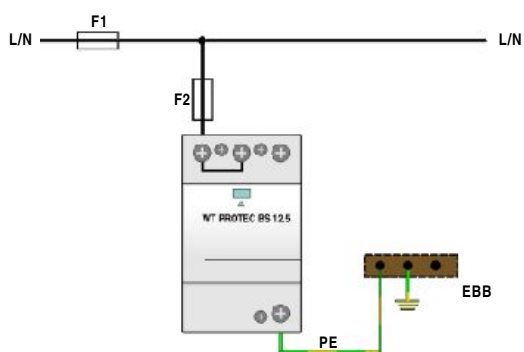


# WT PROTEC BS(R), SAFETEC C(R) 750 (3+0) WT - Connections

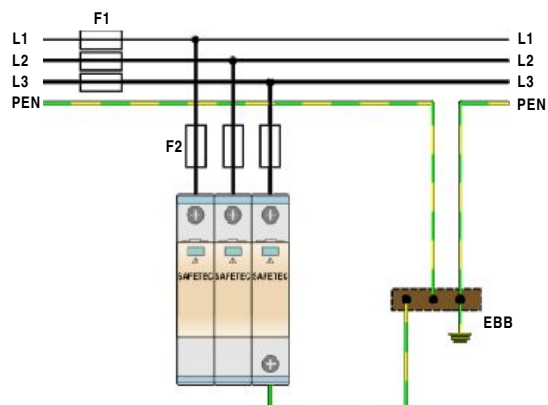
## WT PROTEC BS(R) 25



## WT PROTEC BS(R) 12.5



## SAFETEC C(R) 750 (3+0) WT





# Power Quality Surge Protection Solutions



## PROFILT PSF Series

Profil PSF contains overvoltage protection Class I and II, a special low-pass filter and overcurrent protection. In addition, Profil PSF will reduce the voltage rise rate  $dU/dt$  and thus contribute to a longer service life of electronic components of the protected device. Profil PSF is the right protection for extremely sensitive devices exposed to electric discharges and transient voltages.

## PBS Box Series PBL Box Series PB Box Series

Overvoltage protection devices PBS-D20, PBL-D40 or PB-D40 for electric appliances and equipment with sensitive electronic components. PBS-D20, PBL-D40 or PB-D40 are installed directly before the protected component, when Class I and II overvoltage protection is already provided in the building.

Overvoltage protection devices PBS-C80, PBL-C160 or PB-C160 for electrical appliances and equipment. If only overvoltage protection Class I is installed, and the supply leads to individual appliances or to the distribution board are very long, the voltage rises again. To protect the equipment, a unit PBS-C80, PBL-C160 or PB-C160 is installed before the protected device.

All multi-functional overvoltage protection solutions are integrated in moisture and water-resistant enclosures (IP 65).

## PCD Box

PCD Box is used to ensure safe operation and to provide greater flexibility and expandability in configuration of photovoltaic systems.

PCD Box offers complete solution for the protection of DC side of photovoltaic systems, as it is equipped with fuses and surge arrester. Another function of the product is to connect separate strings of photovoltaic array in parallel which enables easy setup of the photovoltaic system configuration.

To ensure safe maintenance of the inverter the product is equipped with disconnecting switch.

The polycarbonate enclosure with transparent cover is rated for outdoor installations and offers superb temperature and impact resistance.

The design solution minimizes the number of components, resulting in the most robust, easy to install and reliable product.

## ProAlyser

SPD Status Monitoring / Network Power Analysis

# PROFILT PSF

## Class I, II Multi-pole Surge and Transient Protective Device

$I_{imp} = 25kA (10/350)$

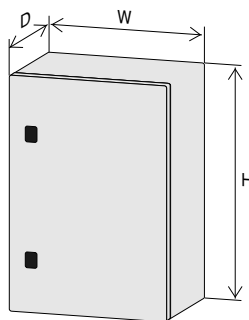


- ◆ **Category IEC / EN / VDE:** Class I, II / Type 1, 2 / B+C
- ◆ **Location of use:** The point of entry to the building, as close as possible to a protected device
- ◆ **Connections:** TT, TN
- ◆ **Protection modes:** L/N - PE
- ◆ **Protective element:** SPD Class I, Surge Filter, SPD Class II
- ◆ **High surge discharge rating:**  $I_{imp} = 25kA$
- ◆ **Housing:** Steel Enclosure
- ◆ **Complies with:** IEC-61643-1

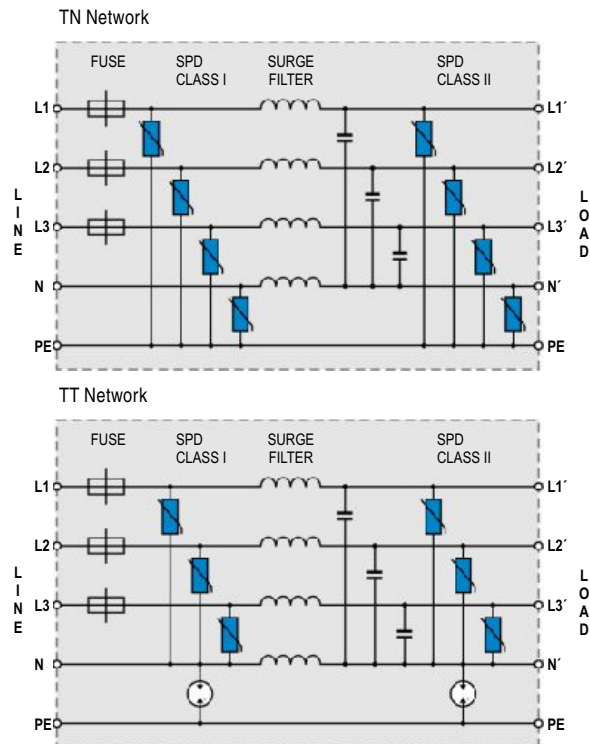
### Technical data

Type	PROFILT PSF					
	3/35TN	3/63TN	3/125TN	3/35TT	3/63TT	3/125TT
<b>Electrical characteristics</b>						
Max. continuous operating voltage (AC/DC) $U_c$	275V/50Hz					
Nominal voltage $U_o$	230V/50Hz					
Max. load current $I_L$	35A	63A	125A	35A	63A	125A
Nominal discharge current (8/20) $I_n (L-PE)$	25kA					
Max. discharge current (8/20) $I_{max} (L-PE)$	100kA					
Impulse current (10/350) $I_{imp} (L-PE)$	25kA					
Voltage protection level 25kA (8/20) $U_p (L-PE)$	< 1.08kV	< 1.08kV	< 1.08kV	< 0.72kV	< 0.72kV	< 0.72kV
Max. Voltage drop $\Delta U$	< 1%					
<b>Mechanical characteristics</b>						
Temperature range	- 20°C ... + 40°C					
Terminal cross section	6mm <sup>2</sup>	16mm <sup>2</sup>	35mm <sup>2</sup>	6mm <sup>2</sup>	16mm <sup>2</sup>	35mm <sup>2</sup>
Degree of protection	IP 65					
Housing material	Steel enclosure					
Housing dimensions (cm) W x H x D	40 x 50 x 21	40 x 60 x 21	60 x 80 x 21	40 x 50 x 21	40 x 60 x 21	60 x 80 x 21
Ordering code PROFILT PSF x/xxxxx	130 040	130 041	130 042	130 043	130 044	130 045

### Dimensions

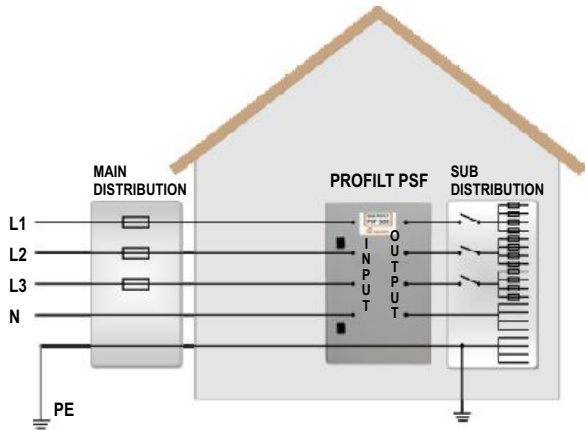


### Connection diagram

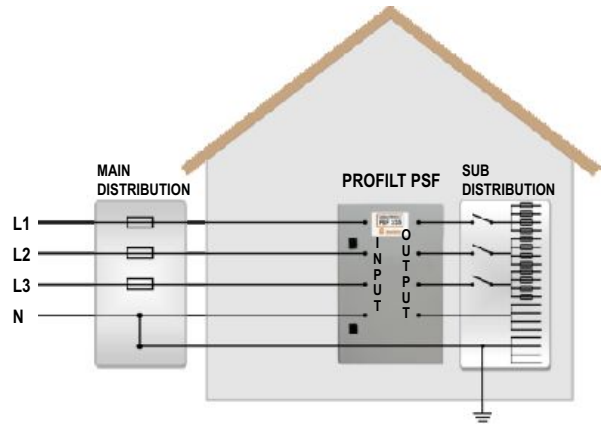


# PROFILT PSF - Connections

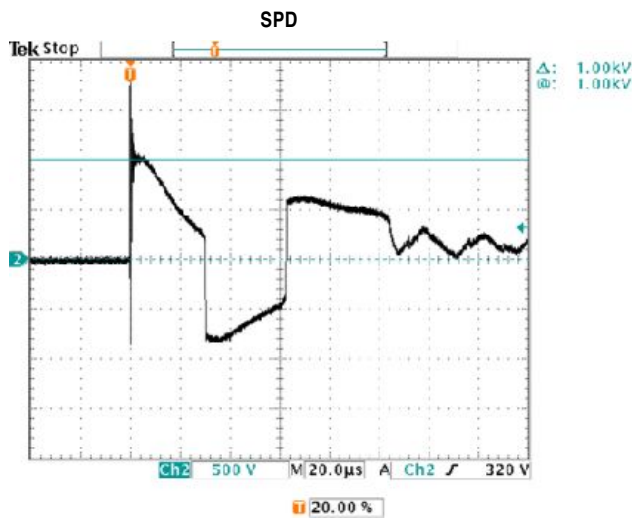
TT Network



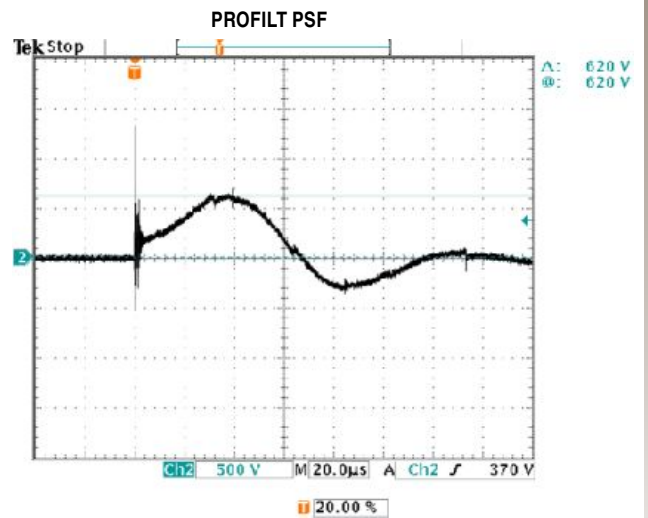
TN Network



## Difference between classic SPD and ProfilT PSF



- Discharge current (8/20) = 25kA
- Residual voltage = 1000V



- Discharge current (8/20) = 25kA
- Residual voltage = 620V

$\Delta U_{PSF} < \Delta U_{SPD}$   
 $U_{RES} (PSF) < U_{RES} (SPD)$

# PBS BOX Series

**Class II; III Multi-pole Surge Protective Device**  
 $I_{max} = 40kA$  per pole (8/20)

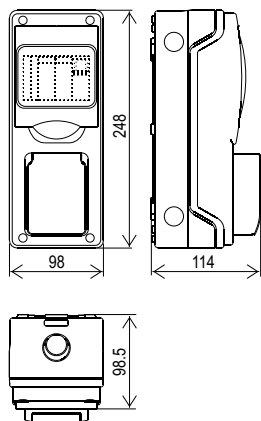


- ◆ **Category IEC / EN / VDE:** Class II; III / Type 2; 3 / C; D
- ◆ **Location of use:** As close as possible to a protected device
- ◆ **Connections:** TN, TT
- ◆ **Protection modes:** L/N - PE
- ◆ **Protective element:** MOV, GDT, circuit breaker
- ◆ **High surge discharge rating:**  $I_{max} = 40kA$  per pole
- ◆ **Housing:** Weatherproof Enclosure
- ◆ **Complies with:** IEC-61643-1

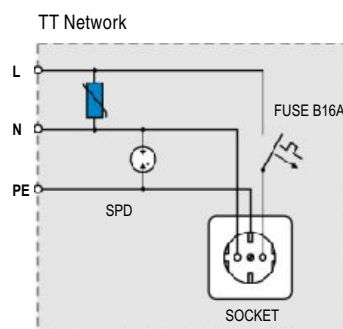
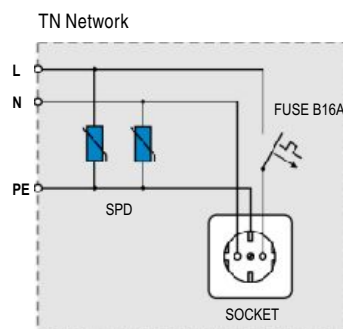
## Technical data

Type		PBS-C80 (2+0)-F16	PBS-C80 (1+1)-F16	PSS-D10 (2+0)-F16
<b>Electrical characteristics</b>				
Max. continuous operating voltage (AC/DC)	$U_c$	320V/50(60)Hz	320V/50(60)Hz	320V/50(60)Hz
Nominal voltage	$U_o$	230V/50(60)Hz	230V/50(60)Hz	230V/50(60)Hz
Max. load current	$I_L$	16A	16A	16A
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$			10kV/5kA
Nominal discharge current (8/20)	$I_n$	20kA per pole	20kA/20kA	/
Max. discharge current (8/20)	$I_{max}$	40kA per pole	40kA/40kA	/
Voltage protection level 25kA (8/20)	$U_p$	1.5kV	1.5kV	1.2kV
<b>Mechanical characteristics</b>				
Temperature range			-40°C ....+ 80°C	
Terminal cross section			2.5mm <sup>2</sup>	
Degree of protection			IP 65	
Housing material			Technical polymer	
Housing dimensions (cm) W x H x D			9.8 x 24.8 x 11.4	
Ordering code		130 021	130 022	130 023

## Dimensions



## Connection diagram



# PBL BOX Series



## Class II; III Multi-pole Surge Protective Device

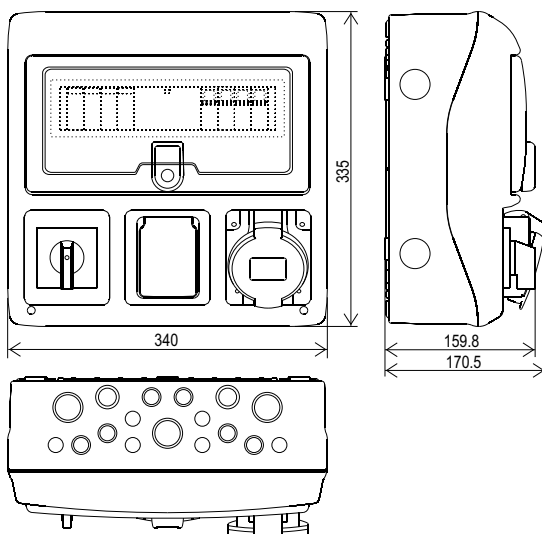
$I_{max} = 40kA$  per pole (8/20)

- ◆ Category IEC / EN / VDE: Class II; III / Type 2; 3 / C; D
- ◆ Location of use: As close as possible to a protected device
- ◆ Connections: TN, TT
- ◆ Protection modes: L/N - PE
- ◆ Protective element: MOV, GDT, circuit breaker
- ◆ High surge discharge rating:  $I_{max} = 40kA$  per pole
- ◆ Housing: Weatherproof Enclosure
- ◆ Complies with: IEC-61643-1

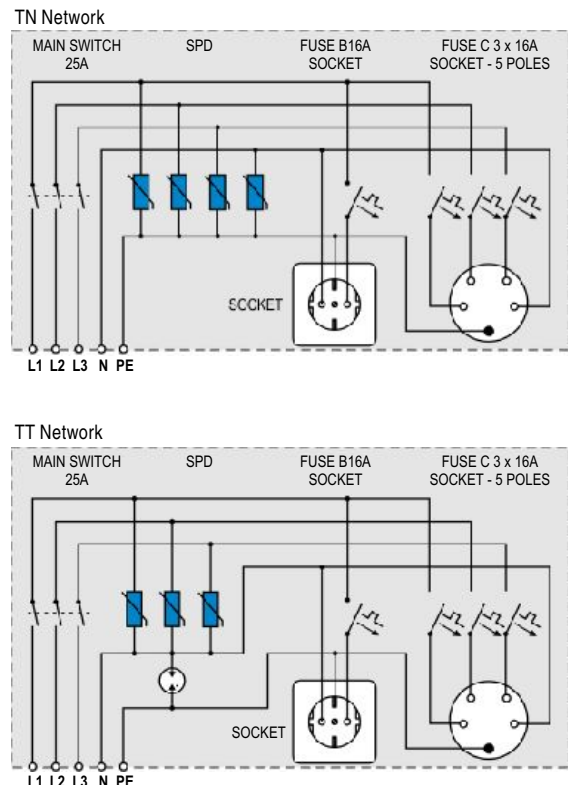
### Technical data

Type	PBL-C160 (4+0)-F16	PBL-C160 (3+1)-F16	PBL-D40 (4+0)-F16
<b>Electrical characteristics</b>			
Max. continuous operating voltage (AC/DC) $U_c$	320V/50(60)Hz	320V/50(60)Hz	320V/50(60)Hz
Nominal voltage $U_o$	230V/50(60)Hz	230V/50(60)Hz	230V/50(60)Hz
Max. load current $I_L$	16A	16A	16A
Combination wave (1.2/50, 8/20) $U_{oc}/I_{sc}$			10kV/5kA
Nominal discharge current (8/20) $I_n$	20kA per pole	20kA/20kA	/
Max. discharge current (8/20) $I_{max}$	40kA per pole	40kA/40kA	/
Voltage protection level 25kA (8/20) $U_p$	1.5kV	1.5kV	1.2kV
<b>Mechanical characteristics</b>			
Temperature range		- 40°C ...+ 80°C	
Terminal cross section		4mm <sup>2</sup>	
Degree of protection		IP 44	
Housing material		Technical polymer	
Housing dimensions (cm) W x H x D		34 x 33.5 x 17.5	
Ordering code	130 024	130 025	130 026

### Dimensions



### Connection diagram



# PB BOX Series

## Class II; III Multi-pole Surge Protective Device $I_{max} = 40kA$ per pole (8/20)

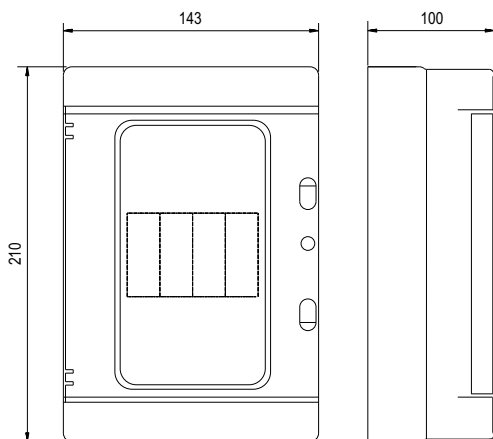


- ◆ **Category IEC / EN / VDE:** Class II; III / Type 2; 3 / C; D
- ◆ **Location of use:** As close as possible to a protected device
- ◆ **Connections:** TN, TT
- ◆ **Protection modes:** L/N - PE
- ◆ **Protective element:** MOV, GDT, circuit breaker
- ◆ **High surge discharge rating:**  $I_{max} = 40kA$  per pole
- ◆ **Housing:** Weatherproof Enclosure
- ◆ **Complies with:** IEC-61643-1

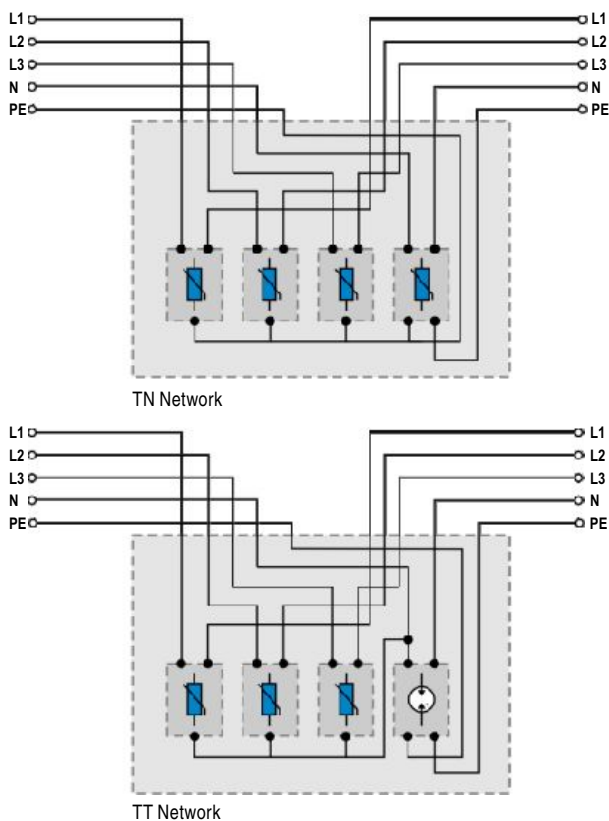
### Technical data

Type		PB-C160 (4+0)	PB-C160 (3+1)	PB-D40 (4+0)
<b>Electrical characteristics</b>				
Max. continuous operating voltage (AC/DC)	$U_c$	320V/50(60)Hz	320V/50(60)Hz	320V/50(60)Hz
Nominal voltage	$U_o$	230V/50(60)Hz	230V/50(60)Hz	230V/50(60)Hz
Max. load current	$I_L$	/	/	/
Combination wave (1.2/50, 8/20)	$U_{oc}/I_{sc}$			10kV/5kA
Nominal discharge current (8/20)	$I_n$	20kA per pole	20kA/20kA	/
Max. discharge current (8/20)	$I_{max}$	40kA per pole	40kA/40kA	/
Voltage protection level 25kA (8/20)	$U_p$	1.5kV	1.5kV	1.2kV
<b>Mechanical characteristics</b>				
Temperature range			-40°C ...+ 80°C	
Terminal cross section			6mm <sup>2</sup>	
Degree of protection			IP 65	
Housing material			Technical polymer	
Housing dimensions (cm) W x H x D			14.3 x 21 x 10	
Ordering code		130 033	130 031	130 032

### Dimensions



### Connection diagram





# PCD Box

## Class I; II Surge Protective Device for Photovoltaic System



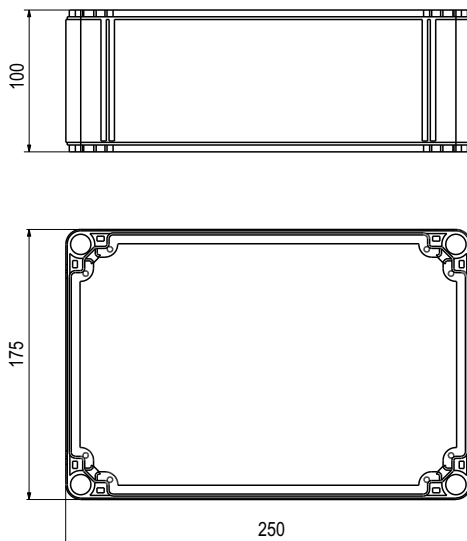
- ◆ Category IEC / EN / VDE: Class I; II / Type 1; 2 / B; C
- ◆ Location of use: As close as possible to a protected device
- ◆ Protection modes: (+) - PE, (-) - PE;
- ◆ Protective element: MOV
- ◆ High surge discharge rating:  $I_{imp} = 12.5kA$  per pole;  
 $I_{max} = 40kA$
- ◆ Housing: Weatherproof Enclosure (IP 67)
- ◆ Complies with: IEC-61643-1, UTE C 61-740-51

### Technical data

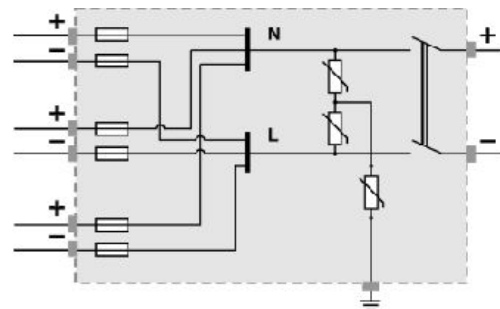
Type	PCD Box
<b>Electrical characteristics</b>	
Max. input voltage	800V
Max. number of strings	4
Max. current per string (DC)	15A
<b>Mechanical characteristics</b>	
Temperature range	- 50°C ....+ 120°C
Terminal cross section	4mm <sup>2</sup>
Degree of protection	IP 65
Housing material	Polycarbonate
Weight	2.6kg
Dimensions (cm) W x H x D	25 x 17.5 x 10

PCD Box is a product that needs to be configured according to the photovoltaic system configuration and to specific customer needs. Because of this, the product is always custom made.

### Dimensions

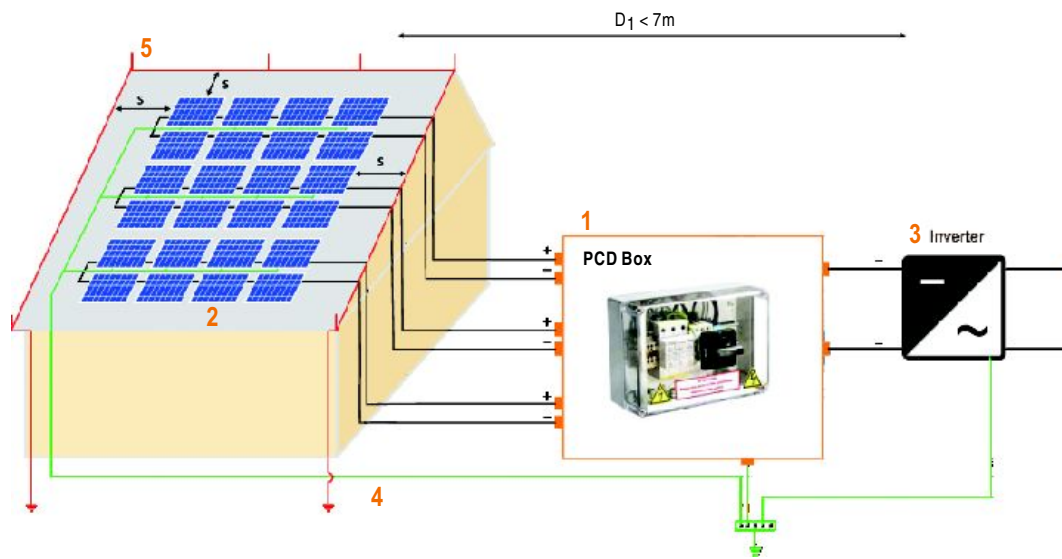


### Connection diagram



# PCD Box

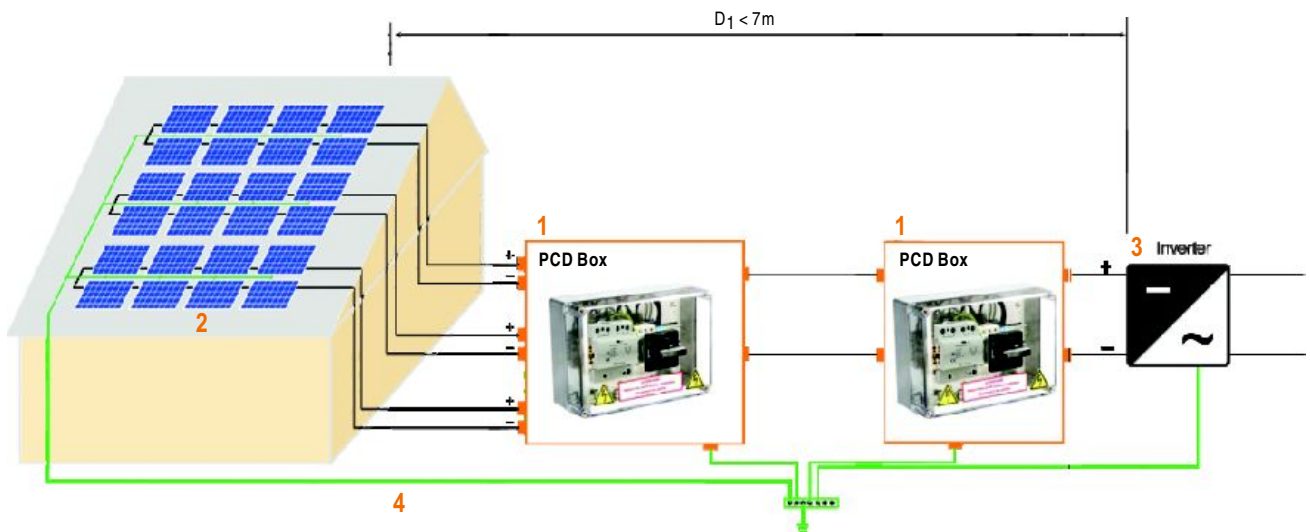
## Possible installation of SPDs in case of a building with LPS



1. PCD Box (Type 2 tested SPD for DC application)
  2. Array of photovoltaic modules
  3. Inverter (1 phase)
  4. Earth termination system
  5. Air termination system
- $S$  separation distance according to IEC 62305  
 $D_1$  distance between PV modules and inverter

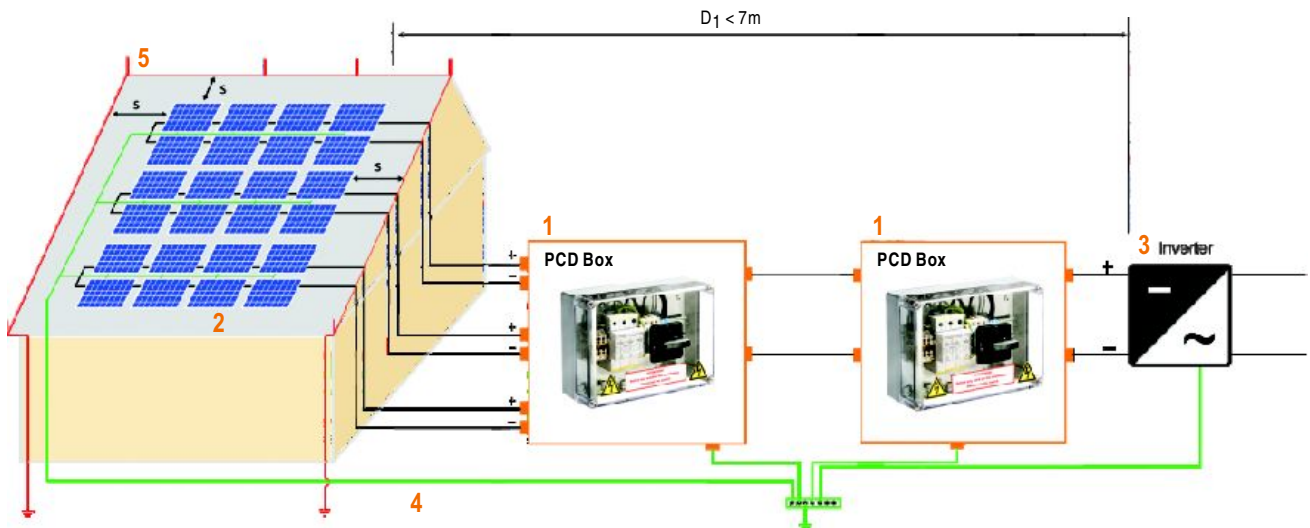
# PCD Box

## Possible installation of SPDs in case of a building without LPS



1. PCD Box (Type 1 tested SPD for DC application)
  2. Array of photovoltaic modules
  3. Inverter (1 phase)
  4. Earth termination system
- $D_1$  distance between PV modules and inverter

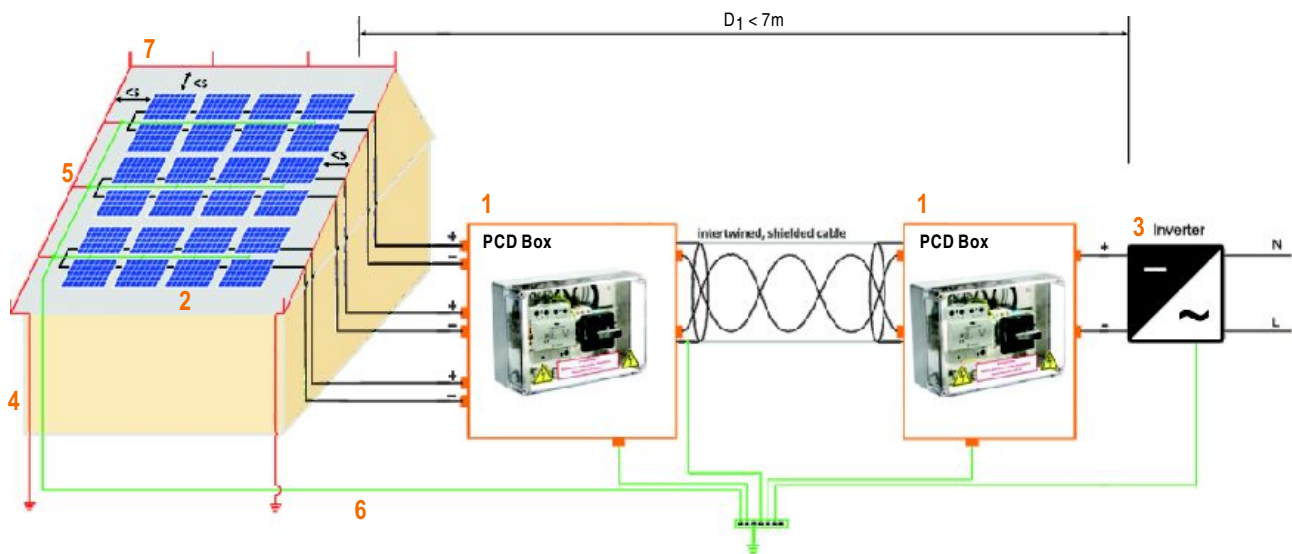
## Possible installation of SPDs in case of a building with LPS



1. PCD Box (Type 2 tested SPD for DC application)
  2. Array of photovoltaic modules
  3. Inverter (1 phase)
  4. Earth termination system
  5. Air termination system
- S separation distance according to IEC 62305  
 $D_1$  distance between PV modules and inverter

# PCD Box

Possible installation of SPDs in case of a building with LPS



1. PCD Box (Type 1 tested SPD for DC application)
  2. Array of photovoltaic modules
  3. Inverter (1 phase)
  4. Down conductor
  5. Connection between metal structure of PV system and LPS
  6. Earth termination system
  7. Air termination system
- S separation distance according to IEC 62305 is not being kept  
 $D_1$  distance between PV modules and inverter



- ◆ SPD Life Status      Measurement of MOV degradation in %
- ◆ SPD Failure        Indication of SPD disconnection or impending failure
- ◆ Surge Counter      Surge Recorder, Time/Date, Magnitude, Logging
- ◆ Power Quality      Logging of power disturbances on electrical network
- ◆ Power Monitor      Measuring basic electric supply parameters
- ◆ Remote Interface   RS232 serial link with PROPAC Software

### ProAlyser

#### SLS (SPD Life Status)

- Three phase SPD monitoring
- Percentage Residual SPD Life - 100% to 0%
- Warning each 10% degradation of Residual SPD Life
- Critical Visual and Audible alarm for permanent SPD disconnection, or when Life Status < 30%

#### SURGE COUNTER

- Visual notification that a surge event has occurred
- Records:
  - Date (dd:mm:yy)
  - Time (hh:mm:ss)
  - Surge amplitude (kA)

Logging of last 10 events in non-volatile memory

Running total of number of surges and highest surge recorded

#### POWER QUALITY INDICATOR

- Log of Temporary Overvoltages (Vn + 10%)
- Records:
  - Date (dd:mm:yy)
  - Time (hh:mm:ss)
  - Peak voltage (v)

Log of Voltage Sags (Brownouts)

- Records:
  - Date (dd:mm:yy)
  - Time (hh:mm:ss)
  - Peak voltage (v)

Log of Power Failures

- Records:
  - Date (dd:mm:yy)
  - Time (hh:mm:ss)

Log of Network parameters

- Records:
  - MIN/MAX values (V, I, W, Hz, PF) per phase

#### 3-PHASE POWER METER (PER PHASE)

- Voltage (VRMS)
- Current (IRMS)
- Frequency (Hz)
- Power Pactor (Cos Phi)
- Peak Voltage (Vpk)
- Energy Measurement (kWh, kVARh, kVAh)

#### REMOTE INTERFACE AND MONITORING APPLICATION (PROPAC Software)

- Real-time monitor
- Last five alarms and measurments
- Graphical data preview
- History log of alarms and measurments
- E-mail notification when alarm is triggered
- Data can be used for further analysis (Web page, Xml, data export...)

SPD	L1	L2	L3
R/C:	✓	✓	X
I mA:	23	16	0
Life%:	50	70	0

SURGE STATISTICS:	
# Surges:	7
Last:	18kA 04.02.10
Max:	27kA 15.01.10

SRG Event: #12	
Surge:	26.6kA
Time:	23:21:44
Date:	2 2.2010

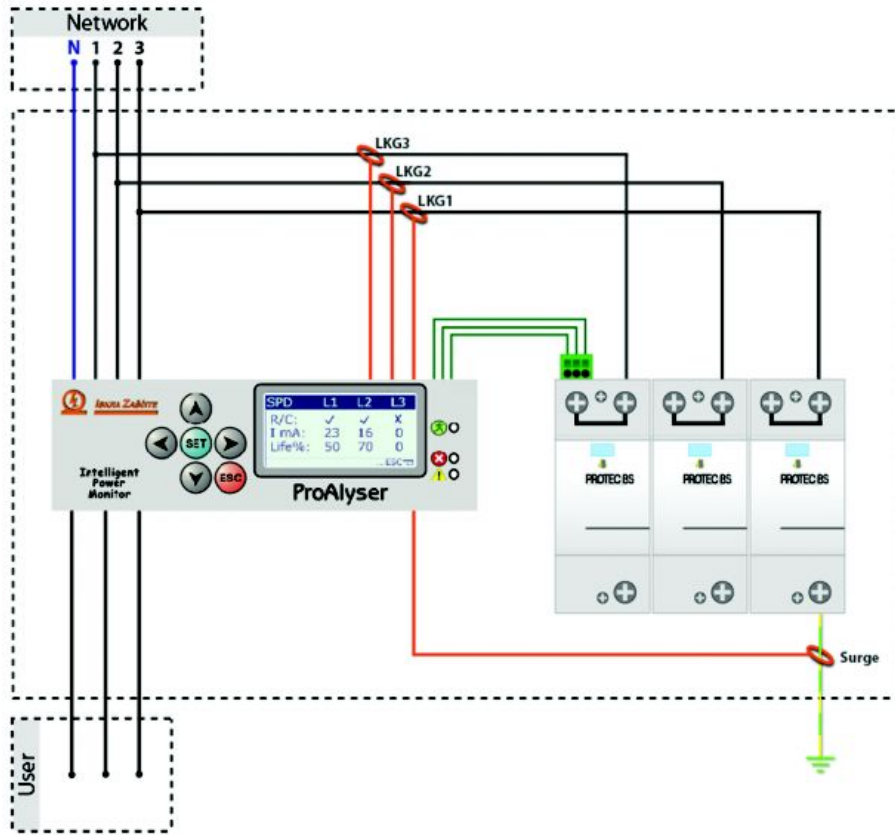
LOGGED Data:	
▶ SURGE Events	
OVER Voltages	
UNDER Voltages	
SPD Leakage	
SPD R/Cs	
PWR Failures	

TOV Event: #14	
Vpk:	388.9V
Time:	11:15:24
Date:	7.1.2010

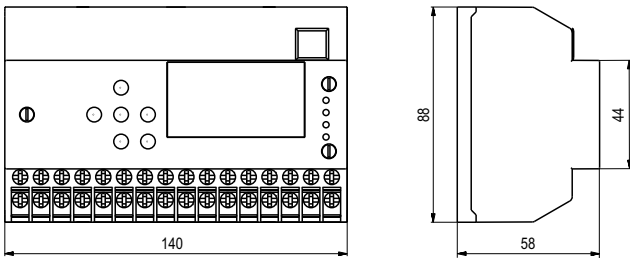
P/F Event: #8	
Power failure:	
Time:	17:48:22
Date:	11.1.2010

SYSTEM ANALYSIS	
uRMS :	224.4 V
iRMS :	9.8 A
Freq :	50.0 Hz
Pwr :	2199.1 W
Cos :	0.98 pf
Vpk :	325.6 V
P :	185.3 kWh
Q :	19.2 kVARh
S :	186.3 kVAh

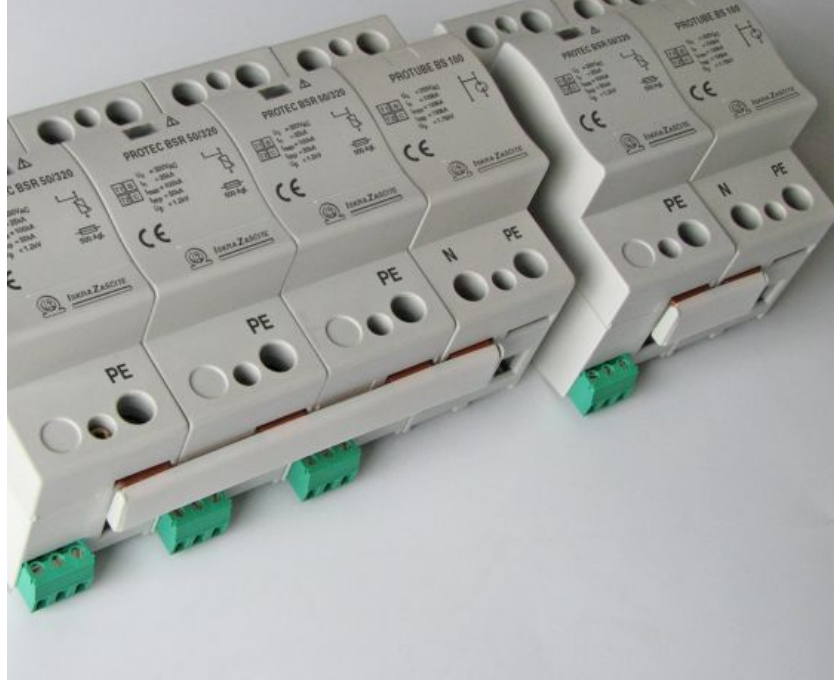
# ProAlyser Connection



## Dimensions



## Connection Accessories



### PROSHORT

The PROSHORT is an accessory used with the PROTEC family to provide simple through connections when needed to facilitate wiring installations.

### PROBAR Connection parts for PROTEC A, AQ, AQS

ISKRA is able to provide a large range of connection accessories, such as its PROBAR series of insulated busbar inter-connects for use with its PROTEC DIN rail family, as its fixing and fastening devices for use on overhead lines for its PROTEC A series.

### PRONET S

The PRONET S decoupling coil has been developed to establish coordination between spark-gap lightning arresters (requirement Class I) and varistor-based surge arresters (Class II).

It is only necessary to install the PRONET S if the distance between lightning arrester and surge arrester at the zone interfaces (total line length) is not more than 7 meters.

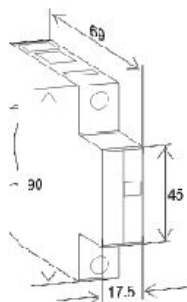


- ◆ Category IEC / EN / VDE: Class I; II; III / Type 1; 2; 3 / B; C; D
- ◆ Location of use: All kind of distribution boards
- ◆ Housing: Compact design
- ◆ Complies with: IEC-61643-1

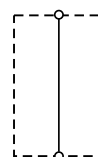
### Technical data

Type		PROSHORT
<b>Electrical characteristics</b>		
Nominal voltage	$U_0$	230V
Nominal discharge current (8/20)	$I_n$	100A
Max. discharge current (10/350)	$I_{imp}$	100kA
<b>Mechanical characteristics</b>		
Temperature range		- 40°C ... + 80°C
Terminal cross section		35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)
Mounting EN 60715		35mm top-hat rail
Degree of protection		IP 20
Housing material		Thermoplastic; extinguishing degree UL 94 V-0
Dimensions DIN 43880		1 TE
Weight per unit		72g
Ordering code		<b>501 101</b>
Packaging dimensions (single unit)		108 x 74 x 24mm

### Dimensions



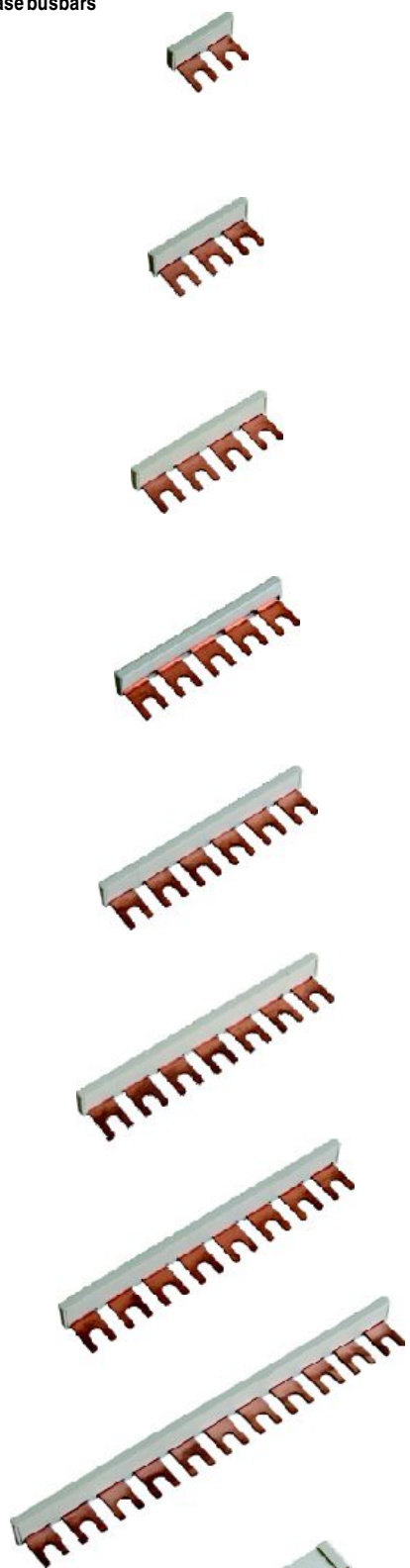
### Connection diagram





# PROBAR

## Single phase busbars



## Two phase busbars



## Connection Accessories BUSBARS - Modular wiring system

<b>Type</b>	<b>PROBAR 1-2</b>
No. of poles	2
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 301

<b>Type</b>	<b>PROBAR 1-3</b>
No. of poles	3
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 303

<b>Type</b>	<b>PROBAR 1-4</b>
No. of poles	4
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 305

<b>Type</b>	<b>PROBAR 1-5</b>
No. of poles	5
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 307

<b>Type</b>	<b>PROBAR 1-6</b>
No. of poles	6
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 309

<b>Type</b>	<b>PROBAR 1-7</b>
No. of poles	7
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 311

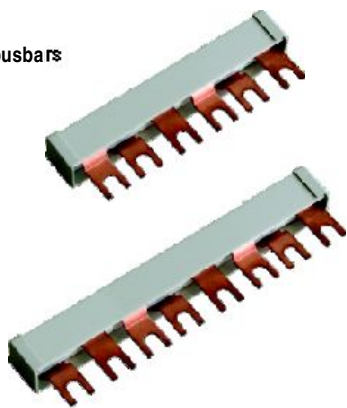
<b>Type</b>	<b>PROBAR 1-8</b>
No. of poles	8
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 313

<b>Type</b>	<b>PROBAR 1-11</b>
No. of poles	11
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 315

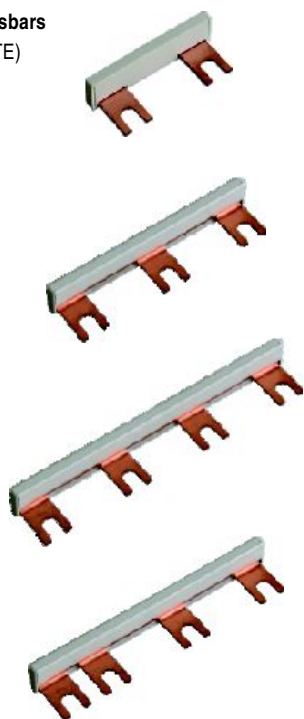
<b>Type</b>	<b>PROBAR 2-8</b>
No. of poles	8
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 317

# PROBAR

Three phase busbars



Single phase busbars  
(PROTECBS-2TE)



## Connection Accessories BUSBARS - Modular wiring system

Type	PROBAR 3-6
No. of poles	6
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 319

Type	PROBAR 3-8
No. of poles	8
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 321

Type	PB-1-(2+0)
No. of poles	2
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 331

Type	PB-1-(3+0)
No. of poles	3
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 332

Type	PB-1-(4+0)
No. of poles	4
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 335

Type	PB-1-(3+1)
No. of poles	4
Busbar cross section	16mm <sup>2</sup>
Ordering code	501 334

## Connection Accessories Connection parts for PROTEC A, AQ, AQS

Type	Fixing cable
Ordering code	509 507

Type	Fixing hook
Ordering code	509 501

Type	PSN (Connection clamp for non insulated conductor)
Ordering code	509 503

Type	PSI (Connection clamp for insulated conductor)
Ordering code	509 505

# PRONET S

## Connection Accessories

### Co-ordination between Class I and Class II

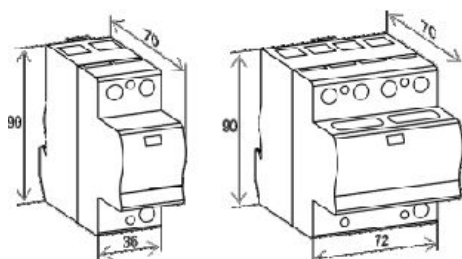


- ◆ Category IEC / EN / VDE: Class I / Type 1 / B
- ◆ Location of use: Main distribution boards
- ◆ Coordination element: Decoupling coil
- ◆ High nominal current:  $I_n = 35A; 63A$
- ◆ Housing: Compact housing
- ◆ Complies with: IEC-61643-1

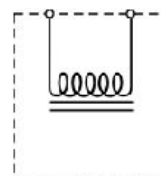
#### Technical data

Type	PRONET S		
	35		63
<b>Electrical characteristics</b>			
Nominal discharge current (8/20)	$I_n$	35A	63A
Nominal voltage	$U_n$	230V	
Inductance	L	15μH	
<b>Mechanical characteristics</b>			
Temperature range		- 40°C ... + 80°C	
Terminal screw torque		max. 4.5Nm	
Terminal cross section		35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)	
Mounting EN 60715		35mm top-hat rail	
Degree of protection		IP 20	
Housing material		Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		2 TE	4 TE
Weight per unit			
Ordering code		<b>501 001</b>	<b>501 003</b>
Packaging dimensions (single unit)		109 x 76.5 x 41.5mm	109 x 76.5 x 78mm

#### Dimensions









#### Connection diagram
















# Product Index

	Product Name	Ordering Code	Dimensions /mm					Min. packaging quantity	Page	
			1TE	2TE	3TE	4TE	5TE			8TE
PROTEC BS(R) Iimp= 50, 35, 25kA - Class I, II: SINGLE-pole, COMPACT HOUSING										
	PROTEC BS 50/150	502 314		36					7	8
	PROTEC BS 50/275	502 315		36					7	8
	PROTEC BS 50/320	502 316		36					7	8
	PROTEC BS 50/385	502 296				72			3	8
	PROTEC BS 50/440	502 297				72			3	8
	PROTEC BSR 50/150	502 317		36					7	8
	PROTEC BSR 50/275	502 318		36					7	8
	PROTEC BSR 50/320	502 319		36					7	8
	PROTEC BSR 50/385	502 298				72			3	8
	PROTEC BSR 50/440	502 299				72			3	8
	PROTEC BS 35/150	502 320		36					7	9
	PROTEC BS 35/275	502 321		36					7	9
	PROTEC BS 35/320	502 322		36					7	9
	PROTEC BS 35/385	502 306			54				5	9
	PROTEC BS 35/440	502 307			54				5	9
	PROTEC BSR 35/150	502 323		36					7	9
	PROTEC BSR 35/275	502 324		36					7	9
	PROTEC BSR 35/320	502 325		36					7	9
	PROTEC BSR 35/385	502 308			54				5	9
	PROTEC BSR 35/440	502 309			54				5	9
	PROTEC BS 25/150	502 326		36					7	10
	PROTEC BS 25/275	502 327		36					7	10
	PROTEC BS 25/320	502 328		36					7	10
	PROTEC BS 25/385	502 329		36					7	10
	PROTEC BS 25/440	502 330		36					7	10
	PROTEC BSR 25/150	502 331		36					7	10
	PROTEC BSR 25/275	502 332		36					7	10
	PROTEC BSR 25/320	502 333		36					7	10
	PROTEC BSR 25/385	502 334		36					7	10
	PROTEC BSR 25/440	502 335		36					7	10
PROTEC B2N(R) Iimp= 12.5kA - Class I, II: SINGLE-pole, COMPACT HOUSING										
	PROTEC B2N 12.5/150	507 501	17.5						12	11
	PROTEC B2N 12.5/275	507 503	17.5						12	11
	PROTEC B2N 12.5/320	507 505	17.5						12	11
	PROTEC B2N 12.5/385	507 535	17.5						12	11
	PROTEC B2N 12.5/440	507 507	17.5						12	11
	PROTEC B2NR 12.5/150	507 509	17.5						12	11
	PROTEC B2NR 12.5/275	507 511	17.5						12	11
	PROTEC B2NR 12.5/320	507 513	17.5						12	11
	PROTEC B2NR 12.5/385	507 537	17.5						12	11
	PROTEC B2NR 12.5/440	507 515	17.5						12	11
PROTUBE BS Iimp= 100, 50kA (N-PE); PROTUBE B2N(R) Iimp= 50kA (N-PE) - Class I, II: SINGLE-pole, COMPACT HOUSING										
	PROTUBE BS 100	503 017		36					7	12
	PROTUBE BS 50	503 042		36					7	12
	PROTUBE B2N 50	507 572	17.5						12	13
	PROTUBE B2NR 50	507 573	17.5						12	13
PROBLOC BS(R) Iimp= 50kA per pole - Class I, II: MULTI-pole, COMPACT HOUSING										
	PROBLOC BS 100/150 (1+1)	504 512				72			3	18
	PROBLOC BS 100/275 (1+1)	504 513				72			3	18
	PROBLOC BS 100/320 (1+1)	504 514				72			3	18
	PROBLOC BS 100/385 (1+1)	504 396						144	2	18
	PROBLOC BS 100/440 (1+1)	504 397						144	2	18
	PROBLOC BSR 100/150 (1+1)	504 515				72			3	18
	PROBLOC BSR 100/275 (1+1)	504 516				72			3	18
PROBLOC BSR 100/320 (1+1)	504 517				72			3	18	










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PROBLOC BS(R) Iimp= 50kA per pole - Class I, II: MULTI-pole, COMPACT HOUSING										
	PROBLOC BSR 100/385 (1+1)	504 398						144	2	18
	PROBLOC BSR 100/440 (1+1)	504 399						144	2	18
PROBLOC BS(R) Iimp= 25kA per pole - Class I, II, III: MULTI-pole, COMPACT HOUSING										
	PROBLOC BS 50/150 (2+0)	504 435		36					7	19
	PROBLOC BS 50/275 (2+0)	504 436		36					7	19
	PROBLOC BS 50/320 (2+0)	504 437		36					7	19
	PROBLOC BS 50/385 (2+0)	504 438				72			3	19
	PROBLOC BS 50/440 (2+0)	504 439				72			3	19
	PROBLOC BSR 50/150 (2+0)	504 445		36					7	19
	PROBLOC BSR 50/275 (2+0)	504 446		36					7	19
	PROBLOC BSR 50/320 (2+0)	504 447		36					7	19
	PROBLOC BSR 50/385 (2+0)	504 448				72			3	19
	PROBLOC BSR 50/440 (2+0)	504 449				72			3	19
	PROBLOC BS 50/150 (1+1)	504 454			54				5	20
	PROBLOC BS 50/275 (1+1)	504 455			54				5	20
	PROBLOC BS 50/320 (1+1)	504 456			54				5	20
	PROBLOC BS 50/385 (1+1)	504 457			54				5	20
	PROBLOC BS 50/440 (1+1)	504 458			54				5	20
	PROBLOC BSR 50/150 (1+1)	504 459			54				5	20
	PROBLOC BSR 50/275 (1+1)	504 460			54				5	20
	PROBLOC BSR 50/320 (1+1)	504 461			54				5	20
	PROBLOC BSR 50/385 (1+1)	504 462			54				5	20
	PROBLOC BSR 50/440 (1+1)	504 463			54				5	20
	PROBLOC BS 75/150 (3+0)	504 518			54				5	21
	PROBLOC BS 75/275 (3+0)	504 519			54				5	21
	PROBLOC BS 75/320 (3+0)	504 520			54				5	21
	PROBLOC BS 75/385 (3+0)	504 464					144		2	21
	PROBLOC BS 75/440 (3+0)	504 465					144		2	21
	PROBLOC BSR 75/150 (3+0)	504 521			54				5	21
	PROBLOC BSR 75/275 (3+0)	504 522			54				5	21
	PROBLOC BSR 75/320 (3+0)	504 523			54				5	21
	PROBLOC BSR 75/385 (3+0)	504 466					144		2	21
	PROBLOC BSR 75/440 (3+0)	504 467					144		2	21
	PROBLOC BS 100/150 (4+0)	504 524				72			3	22
	PROBLOC BS 100/275 (4+0)	504 525				72			3	22
	PROBLOC BS 100/320 (4+0)	504 526				72			3	22
	PROBLOC BS 100/385 (4+0)	504 468					144		2	22
	PROBLOC BS 100/440 (4+0)	504 469					144		2	22
	PROBLOC BSR 100/150 (4+0)	504 527				72			3	22
	PROBLOC BSR 100/275 (4+0)	504 528				72			3	22
	PROBLOC BSR 100/320 (4+0)	504 529				72			3	22
	PROBLOC BSR 100/385 (4+0)	504 470					144		2	22
	PROBLOC BSR 100/440 (4+0)	504 471					144		2	22
	PROBLOC BS 100/150 (3+1)	504 530					90		3	23
	PROBLOC BS 100/275 (3+1)	504 531					90		3	23
	PROBLOC BS 100/320 (3+1)	504 532					90		3	23
	PROBLOC BS 100/385 (3+1)	504 472					144		2	23
	PROBLOC BS 100/440 (3+1)	504 473					144		2	23
	PROBLOC BSR 100/150 (3+1)	504 533					90		3	23
	PROBLOC BSR 100/275 (3+1)	504 534					90		3	23
	PROBLOC BSR 100/320 (3+1)	504 535					90		3	23
	PROBLOC BSR 100/385 (3+1)	504 474					144		2	23
	PROBLOC BSR 100/440 (3+1)	504 475					144		2	23

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PROBLOC BS(R) Iimp= 12.5kA per pole - Class I, II, III: MULTI-pole, COMPACT HOUSING									
	PROBLOC BS 25/150 (2+0)	504 405		36				7	28
	PROBLOC BS 25/275 (2+0)	504 406		36				7	28
	PROBLOC BS 25/320 (2+0)	504 407		36				7	28
	PROBLOC BS 25/385 (2+0)	504 408		36				7	28
	PROBLOC BS 25/440 (2+0)	504 409		36				7	28
	PROBLOC BSR 25/150 (2+0)	504 420		36				7	28
	PROBLOC BSR 25/275 (2+0)	504 421		36				7	28
	PROBLOC BSR 25/320 (2+0)	504 422		36				7	28
	PROBLOC BSR 25/385 (2+0)	504 423		36				7	28
	PROBLOC BSR 25/440 (2+0)	504 424		36				7	28
	PROBLOC BS 25/150 (1+1)	504 410		36				7	29
	PROBLOC BS 25/275 (1+1)	504 411		36				7	29
	PROBLOC BS 25/320 (1+1)	504 412		36				7	29
	PROBLOC BS 25/385 (1+1)	504 413		36				7	29
	PROBLOC BS 25/440 (1+1)	504 414		36				7	29
	PROBLOC BS 37.5/150 (3+0)	504 049			54			5	29
	PROBLOC BS 37.5/275 (3+0)	504 051			54			5	29
	PROBLOC BS 37.5/320 (3+0)	504 053			54			5	29
	PROBLOC BS 37.5/385 (3+0)	504 267			54			5	29
	PROBLOC BS 37.5/440 (3+0)	504 055			54			5	29
	PROBLOC BSR 37.5/150 (3+0)	504 057			54			5	30
	PROBLOC BSR 37.5/275 (3+0)	504 059			54			5	30
	PROBLOC BSR 37.5/320 (3+0)	504 061			54			5	30
	PROBLOC BSR 37.5/385 (3+0)	504 269			54			5	30
	PROBLOC BSR 37.5/440 (3+0)	504 063			54			5	30
	PROBLOC BS 50/150 (4+0)	504 065				72		3	31
	PROBLOC BS 50/275 (4+0)	504 067				72		3	31
	PROBLOC BS 50/320 (4+0)	504 069				72		3	31
	PROBLOC BS 50/385 (4+0)	504 271				72		3	31
	PROBLOC BS 50/440 (4+0)	504 071				72		3	31
	PROBLOC BSR 50/150 (4+0)	504 073				72		3	31
	PROBLOC BSR 50/275 (4+0)	504 075				72		3	31
	PROBLOC BSR 50/320 (4+0)	504 077				72		3	31
	PROBLOC BSR 50/385 (4+0)	504 273				72		3	31
	PROBLOC BSR 50/440 (4+0)	504 079				72		3	31
	PROBLOC BS 50/150 (3+1)	504 480				72		3	32
	PROBLOC BS 50/275 (3+1)	504 481				72		3	32
	PROBLOC BS 50/320 (3+1)	504 482				72		3	32
	PROBLOC BS 50/385 (3+1)	504 483				72		3	32
	PROBLOC BS 50/440 (3+1)	504 484				72		3	32
	PROBLOC BSR 50/150 (3+1)	504 485				72		3	32
	PROBLOC BSR 50/275 (3+1)	504 486				72		3	32
	PROBLOC BSR 50/320 (3+1)	504 487				72		3	32
	PROBLOC BSR 50/385 (3+1)	504 488				72		3	32
	PROBLOC BSR 50/440 (3+1)	504 489				72		3	32
INPROTEC Iimp= 12.5kA per pole - Class I, II: MULTI-pole, COMPACT HOUSING									
	INPROTEC VV 150 (2+0)	505 017		36				7	36
	INPROTEC VV 275 (2+0)	505 019		36				7	36
	INPROTEC VV 320 (2+0)	505 021		36				7	36
	INPROTEC VV 385 (2+0)	505 061		36				7	36
	INPROTEC VV 440 (2+0)	505 023		36				7	36
	INPROTEC VVR 150 (2+0)	505 025		36				7	36
	INPROTEC VVR 275 (2+0)	505 027		36				7	36
	INPROTEC VVR 320 (2+0)	505 029		36				7	36
	INPROTEC VVR 385 (2+0)	505 063		36				7	36

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INPROTEC Iimp= 12.5kA per pole - Class I, II: MULTI-pole, COMPACT HOUSING										
	INPROTEC VVR 440 (2+0)	505 031		36					7	36
	INPROTEC VG 150 (1+1)	505 033		36					7	37
	INPROTEC VG 275 (1+1)	505 035		36					7	37
	INPROTEC VG 320 (1+1)	505 037		36					7	37
	INPROTEC VG 385 (1+1)	505 065		36					7	37
	INPROTEC VG 440 (1+1)	505 039		36					7	37
	INPROTEC VGR 150 (1+1)	505 041		36					7	37
	INPROTEC VGR 275 (1+1)	505 043		36					7	37
	INPROTEC VGR 320 (1+1)	505 045		36					7	37
	INPROTEC VGR 385 (1+1)	505 067		36					7	37
	INPROTEC VGR 440 (1+1)	505 047		36					7	37
	INPROTEC VS 150 (1+0)	505 001		36					7	38
	INPROTEC VS 275 (1+0)	505 003		36					7	38
	INPROTEC VS 320 (1+0)	505 005		36					7	38
	INPROTEC VS 385 (1+0)	505 057		36					7	38
	INPROTEC VS 440 (1+0)	505 007		36					7	38
	INPROTEC VSR 150 (1+0)	505 009		36					7	38
	INPROTEC VSR 275 (1+0)	505 011		36					7	38
	INPROTEC VSR 320 (1+0)	505 013		36					7	38
	INPROTEC VSR 385 (1+0)	505 059		36					7	38
	INPROTEC VSR 440 (1+0)	505 015		36					7	38
	PROBLOC BSG(R) Iimp= 25kA per pole - Class I, II: MULTI-pole, COMPACT HOUSING									
	PROBLOC BSG 100/150 (4+0)	513 034						90	3	42
	PROBLOC BSG 100/320 (4+0)	513 036						90	3	42
	PROBLOC BSGR 100/150 (4+0)	513 035						90	3	42
	PROBLOC BSGR 100/320 (4+0)	513 037						90	3	42
	PROBLOC BSG 100/150 (3+1)	513 011						90	3	43
	PROBLOC BSG 100/320 (3+1)	513 005						90	3	43
	PROBLOC BSGR 100/150 (3+1)	513 012						90	3	43
	PROBLOC BSGR 100/320 (3+1)	513 006						90	3	43
	PROBLOC BSG 100N/150 (3+1)	513 015						90	3	44
	PROBLOC BSG 100N/320 (3+1)	513 003						90	3	44
	PROBLOC BSGR 100N/150 (3+1)	513 016						90	3	44
	PROBLOC BSGR 100N/320 (3+1)	513 004						90	3	44
	PROBLOC BSG 25/150	513 026		36					7	45
	PROBLOC BSG 25/320	513 028		36					7	45
	PROBLOC BSGR 25/150	513 027		36					7	45
	PROBLOC BSGR 25/320	513 029		36					7	45
PROBLOC BSG(R) Iimp= 12.5kA per pole - Class I, II: MULTI-pole, COMPACT HOUSING										
	PROBLOC BSG 50/150 (4+0)	513 030						90	3	46
	PROBLOC BSG 50/320 (4+0)	513 032						90	3	46
	PROBLOC BSGR 50/150 (4+0)	513 031						90	3	46
	PROBLOC BSGR 50/320 (4+0)	513 033						90	3	46
	PROBLOC BSG 50/150 (3+1)	513 007						90	3	47
	PROBLOC BSG 50/320 (3+1)	513 001						90	3	47
	PROBLOC BSGR 50/150 (3+1)	513 008						90	3	47
	PROBLOC BSGR 50/320 (3+1)	513 002						90	3	47
	PROBLOC BSG 12.5/150	513 022		36					7	48
	PROBLOC BSG 12.5/320	513 024		36					7	48
	PROBLOC BSGR 12.5/150	513 023		36					7	48
	PROBLOC BSGR 12.5/320	513 025		36					7	48









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			1TE	2TE	3TE	4TE	5TE		
PROTEC B2S(R) Iimp= 12.5kA - Class I, II, III: SINGLE-pole, MODULAR HOUSING									
	PROTEC B2S 12.5/150	506 017	17.5					12	52
	PROTEC B2S 12.5/275	506 018	17.5					12	52
	PROTEC B2S 12.5/320	506 019	17.5					12	52
	PROTEC B2S 12.5/385	506 020	17.5					12	52
	PROTEC B2S 12.5/440	506 021	17.5					12	52
	PROTEC B2SR 12.5/150	506 022	17.5					12	52
	PROTEC B2SR 12.5/275	506 023	17.5					12	52
	PROTEC B2SR 12.5/320	506 024	17.5					12	52
	PROTEC B2SR 12.5/385	506 025	17.5					12	52
PROTEC B2SR 12.5/440	506 026	17.5					12	52	
PROTEC B2S(R) Iimp= 12.5kA per pole - Class I, II, III: MULTI-pole, MODULAR HOUSING									
	PROTEC B2S 25/150 (2+0)	506 027		36				7	53
	PROTEC B2S 25/275 (2+0)	506 028		36				7	53
	PROTEC B2S 25/320 (2+0)	506 029		36				7	53
	PROTEC B2S 25/385 (2+0)	506 030		36				7	53
	PROTEC B2S 25/440 (2+0)	506 031		36				7	53
	PROTEC B2SR 25/150 (2+0)	506 032		36				7	53
	PROTEC B2SR 25/275 (2+0)	506 033		36				7	53
	PROTEC B2SR 25/320 (2+0)	506 034		36				7	53
	PROTEC B2SR 25/385 (2+0)	506 035		36				7	53
PROTEC B2SR 25/440 (2+0)	506 036		36				7	53	
	PROTEC B2S 25/150 (1+1)	506 037		36				7	54
	PROTEC B2S 25/275 (1+1)	506 038		36				7	54
	PROTEC B2S 25/320 (1+1)	506 039		36				7	54
	PROTEC B2S 25/385 (1+1)	506 040		36				7	54
	PROTEC B2S 25/440 (1+1)	506 041		36				7	54
	PROTEC B2SR 25/150 (1+1)	506 042		36				7	54
	PROTEC B2SR 25/275 (1+1)	506 043		36				7	54
	PROTEC B2SR 25/320 (1+1)	506 044		36				7	54
	PROTEC B2SR 25/385 (1+1)	506 045		36				7	54
PROTEC B2SR 25/440 (1+1)	506 046		36				7	54	
	PROTEC B2S 37.5/150 (3+0)	506 047			54			5	55
	PROTEC B2S 37.5/275 (3+0)	506 048			54			5	55
	PROTEC B2S 37.5/320 (3+0)	506 049			54			5	55
	PROTEC B2S 37.5/385 (3+0)	506 050			54			5	55
	PROTEC B2S 37.5/440 (3+0)	506 051			54			5	55
	PROTEC B2SR 37.5/150 (3+0)	506 052			54			5	55
	PROTEC B2SR 37.5/275 (3+0)	506 053			54			5	55
	PROTEC B2SR 37.5/320 (3+0)	506 054			54			5	55
	PROTEC B2SR 37.5/385 (3+0)	506 055			54			5	55
PROTEC B2SR 37.5/440 (3+0)	506 056			54			5	55	
	PROTEC B2S 50/150 (4+0)	506 057				72		3	56
	PROTEC B2S 50/275 (4+0)	506 058				72		3	56
	PROTEC B2S 50/320 (4+0)	506 059				72		3	56
	PROTEC B2S 50/385 (4+0)	506 060				72		3	56
	PROTEC B2S 50/440 (4+0)	506 061				72		3	56
	PROTEC B2SR 50/150 (4+0)	506 062				72		3	56
	PROTEC B2SR 50/275 (4+0)	506 063				72		3	56
	PROTEC B2SR 50/320 (4+0)	506 064				72		3	56
	PROTEC B2SR 50/385 (4+0)	506 065				72		3	56
PROTEC B2SR 50/440 (4+0)	506 066				72		3	56	
	PROTEC B2S 50/150 (3+1)	506 067				72		3	57
	PROTEC B2S 50/275 (3+1)	506 068				72		3	57
	PROTEC B2S 50/320 (3+1)	506 069				72		3	57
	PROTEC B2S 50/385 (3+1)	506 070				72		3	57






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PROTEC B2S(R) Iimp= 12.5kA per pole - Class I, II, III: MULTI-pole, MODULAR HOUSING									
PROTEC B2S 50/440 (3+1)	506 071				72			3	57
PROTEC B2SR 50/150 (3+1)	506 072				72			3	57
PROTEC B2SR 50/275 (3+1)	506 073				72			3	57
PROTEC B2SR 50/320 (3+1)	506 074				72			3	57
PROTEC B2SR 50/385 (3+1)	506 075				72			3	57
PROTEC B2SR 50/440 (3+1)	506 076				72			3	57
Module PROTEC B2S(R) Iimp= 12.5kA; Module PROTUBE B2S Iimp= 50kA (N-PE) - Class I, II, III									
Module PROTEC B2S(R) 12.5/150	506 001	17.5						12	52, 53, 54, 55, 56, 57
Module PROTEC B2S(R) 12.5/275	506 002	17.5						12	52, 53, 54, 55, 56, 57
Module PROTEC B2S(R) 12.5/320	506 003	17.5						12	52, 53, 54, 55, 56, 57
Module PROTEC B2S(R) 12.5/385	506 004	17.5						12	52, 53, 54, 55, 56, 57
Module PROTEC B2S(R) 12.5/440	506 005	17.5						12	52, 53, 54, 55, 56, 57
Module PROTUBE B2S 50/255	506 006	17.5						12	54, 57
SAFETEC C(R) I <sub>max</sub> = 40kA - Class II: SINGLE-pole, MODULAR HOUSING									
 SAFETEC C 40/150	516 001	18						12	60
SAFETEC C 40/275	516 003	18						12	60
SAFETEC C 40/440	516 005	18						12	60
SAFETEC CR 40/150	516 002	18						12	60
SAFETEC CR 40/275	516 004	18						12	60
SAFETEC CR 40/440	516 006	18						12	60
SAFETEC C(R) I <sub>max</sub> = 40kA per pole - Class II: MULTI-pole, MODULAR HOUSING									
 SAFETEC C 80/150 (2+0)	516 007		36					7	61
SAFETEC C 80/275 (2+0)	516 009		36					7	61
SAFETEC C 80/440 (2+0)	516 011		36					7	61
SAFETEC CR 80/150 (2+0)	516 008		36					7	61
SAFETEC CR 80/275 (2+0)	516 010		36					7	61
SAFETEC CR 80/440 (2+0)	516 012		36					7	61
 SAFETEC C 80/150 (1+1)	516 013		36					7	62
SAFETEC C 80/275 (1+1)	516 015		36					7	62
SAFETEC C 80/440 (1+1)	516 017		36					7	62
SAFETEC CR 80/150 (1+1)	516 014		36					7	62
SAFETEC CR 80/275 (1+1)	516 016		36					7	62
SAFETEC CR 80/440 (1+1)	516 018		36					7	62
 SAFETEC C 120/150 (3+0)	516 019			54				5	63
SAFETEC C 120/275 (3+0)	516 021			54				5	63
SAFETEC C 120/440 (3+0)	516 023			54				5	63
SAFETEC CR 120/150 (3+0)	516 020			54				5	63
SAFETEC CR 120/275 (3+0)	516 022			54				5	63
SAFETEC CR 120/440 (3+0)	516 024			54				5	63
 SAFETEC C 160/150 (4+0)	516 025				72			3	64
SAFETEC C 160/275 (4+0)	516 027				72			3	64
SAFETEC C 160/440 (4+0)	516 029				72			3	64
SAFETEC CR 160/150 (4+0)	516 026				72			3	64
SAFETEC CR 160/275 (4+0)	516 028				72			3	64
SAFETEC CR 160/440 (4+0)	516 030				72			3	64
 SAFETEC C 160/150 (3+1)	516 031				72			3	65
SAFETEC C 160/275 (3+1)	516 033				72			3	65
SAFETEC C 160/440 (3+1)	516 035				72			3	65
SAFETEC CR 160/150 (3+1)	516 032				72			3	65
SAFETEC CR 160/275 (3+1)	516 034				72			3	65
SAFETEC CR 160/440 (3+1)	516 036				72			3	65
Module SAFETEC C(R) I <sub>max</sub> = 40kA; Module SAFETUBE C I <sub>max</sub> = 40kA (N-PE) - Class II									
Module SAFETEC C(R) 40/150	516 037	18						12	60, 61, 62, 63, 64, 65
Module SAFETEC C(R) 40/275	516 038	18						12	60, 61, 62, 63, 64, 65
Module SAFETEC C(R) 40/440	516 039	18						12	60, 61, 62, 63, 64, 65
Module SAFETUBE C 40/255	516 115	18						12	62, 65





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PROTEC C(R) I <sub>max</sub> = 40kA; PROTUBE C 40/255 I <sub>max</sub> = 40kA (N-PE) - Class II: SINGLE-pole, MODULAR HOUSING									
	PROTEC C 40/150	500 003	18					12	68
	PROTEC C 40/275	500 005	18					12	68
	PROTEC C 40/320	500 007	18					12	68
	PROTEC C 40/385	500 171	18					12	68
	PROTEC C 40/440	500 009	18					12	68
	PROTEC CR 40/150	500 013	18					12	68
	PROTEC CR 40/275	500 015	18					12	68
	PROTEC CR 40/320	500 017	18					12	68
	PROTEC CR 40/385	500 175	18					12	68
	PROTEC CR 40/440	500 019	18					12	68
PROTUBE C 40/255	503 005	18					12	69	
PROTEC C(R) I <sub>max</sub> = 40kA per pole - Class II: MULTI-pole, MODULAR HOUSING									
	PROTEC C 80/150 (2+0)	500 073		36				7	70
	PROTEC C 80/275 (2+0)	500 075		36				7	70
	PROTEC C 80/320 (2+0)	500 077		36				7	70
	PROTEC C 80/385 (2+0)	500 179		36				7	70
	PROTEC C 80/440 (2+0)	500 079		36				7	70
	PROTEC CR 80/150 (2+0)	500 081		36				7	70
	PROTEC CR 80/275 (2+0)	500 083		36				7	70
	PROTEC CR 80/320 (2+0)	500 085		36				7	70
	PROTEC CR 80/385 (2+0)	500 183		36				7	70
	PROTEC CR 80/440 (2+0)	500 087		36				7	70
	PROTEC C 80/150 (1+1)	500 089		36				7	71
	PROTEC C 80/275 (1+1)	500 091		36				7	71
	PROTEC C 80/320 (1+1)	500 093		36				7	71
	PROTEC C 80/385 (1+1)	500 187		36				7	71
	PROTEC C 80/440 (1+1)	500 095		36				7	71
	PROTEC CR 80/150 (1+1)	500 097		36				7	71
	PROTEC CR 80/275 (1+1)	500 099		36				7	71
	PROTEC CR 80/320 (1+1)	500 101		36				7	71
	PROTEC CR 80/385 (1+1)	500 191		36				7	71
	PROTEC CR 80/440 (1+1)	500 103		36				7	71
	PROTEC C 120/150 (3+0)	500 105			54			5	72
	PROTEC C 120/275 (3+0)	500 107			54			5	72
	PROTEC C 120/320 (3+0)	500 109			54			5	72
	PROTEC C 120/385 (3+0)	500 195			54			5	72
	PROTEC C 120/440 (3+0)	500 111			54			5	72
	PROTEC CR 120/150 (3+0)	500 113			54			5	72
	PROTEC CR 120/275 (3+0)	500 115			54			5	72
	PROTEC CR 120/320 (3+0)	500 117			54			5	72
	PROTEC CR 120/385 (3+0)	500 199			54			5	72
	PROTEC CR 120/440 (3+0)	500 119			54			5	72
	PROTEC C 160/150 (4+0)	500 121				72		3	73
	PROTEC C 160/275 (4+0)	500 123				72		3	73
	PROTEC C 160/320 (4+0)	500 125				72		3	73
	PROTEC C 160/385 (4+0)	500 203				72		3	73
	PROTEC C 160/440 (4+0)	500 127				72		3	73
	PROTEC CR 160/150 (4+0)	500 129				72		3	73
	PROTEC CR 160/275 (4+0)	500 131				72		3	73
	PROTEC CR 160/320 (4+0)	500 133				72		3	73
	PROTEC CR 160/385 (4+0)	500 207				72		3	73
	PROTEC CR 160/440 (4+0)	500 135				72		3	73
	PROTEC C 160/150 (3+1)	500 137				72		3	74
	PROTEC C 160/275 (3+1)	500 139				72		3	74
	PROTEC C 160/320 (3+1)	500 141				72		3	74





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PROTEC C(R) I <sub>max</sub> = 40kA per pole - Class II: MULTI-pole, MODULAR HOUSING										
	PROTEC C 160/385 (3+1)	500 211				72			3	74
	PROTEC C 160/440 (3+1)	500 143				72			3	74
	PROTEC CR 160/150 (3+1)	500 145				72			3	74
	PROTEC CR 160/275 (3+1)	500 147				72			3	74
	PROTEC CR 160/320 (3+1)	500 149				72			3	74
	PROTEC CR 160/385 (3+1)	500 215				72			3	74
	PROTEC CR 160/440 (3+1)	500 151				72			3	74
Module PROTEC C(R) I <sub>max</sub> = 40kA; Module PROTUBE C I <sub>max</sub> = 40kA (N-PE) - Class II										
	Module PROTEC C 40/150	500 217	18						12	68, 70, 71, 72, 73, 74
	Module PROTEC C 40/275	500 219	18						12	68, 70, 71, 72, 73, 74
	Module PROTEC C 40/320	500 220	18						12	68, 70, 71, 72, 73, 74
	Module PROTEC C 40/385	500 221	18						12	68, 70, 71, 72, 73, 74
	Module PROTEC C 40/440	500 222	18						12	68, 70, 71, 72, 73, 74
	Module PROTUBE C 40/255	500 234	18						12	69
PROTEC C(R) I <sub>max</sub> = 20kA - Class II: SINGLE-pole, MODULAR HOUSING										
	PROTEC C 20/150	500 037	18						12	76
	PROTEC C 20/275	500 039	18						12	76
	PROTEC C 20/320	500 041	18						12	76
	PROTEC C 20/385	500 315	18						12	76
	PROTEC C 20/440	500 043	18						12	76
	PROTEC CR 20/150	500 045	18						12	76
	PROTEC CR 20/275	500 047	18						12	76
	PROTEC CR 20/320	500 049	18						12	76
	PROTEC CR 20/385	500 317	18						12	76
	PROTEC CR 20/440	500 051	18						12	76
Module PROTEC C(R) I <sub>max</sub> = 20kA - Class II										
	Module PROTEC C 20/150	500 479	18						12	76
	Module PROTEC C 20/275	500 480	18						12	76
	Module PROTEC C 20/320	500 481	18						12	76
	Module PROTEC C 20/385	500 482	18						12	76
	Module PROTEC C 20/440	500 483	18						12	76
PROTEC CN(R) I <sub>max</sub> = 40kA; I <sub>max</sub> = 20kA; PROTUBE CN 40 - Class II: SINGLE-pole, COMPACT HOUSING										
	PROTEC CN 40/75	507 001	18						12	77
	PROTEC CN 40/150	507 003	18						12	77
	PROTEC CN 40/275	507 005	18						12	77
	PROTEC CN 40/320	507 007	18						12	77
	PROTEC CN 40/385	507 021	18						12	77
	PROTEC CN 40/440	507 009	18						12	77
	PROTEC CNR 40/75	507 011	18						12	77
	PROTEC CNR 40/150	507 013	18						12	77
	PROTEC CNR 40/275	507 015	18						12	77
	PROTEC CNR 40/320	507 017	18						12	77
	PROTEC CNR 40/385	507 023	18						12	77
	PROTEC CNR 40/440	507 019	18						12	77
	PROTEC CN 20/150	507 253	18						12	78
	PROTEC CN 20/275	507 254	18						12	78
	PROTEC CN 20/320	507 255	18						12	78
	PROTEC CN 20/385	507 256	18						12	78
	PROTEC CN 20/440	507 257	18						12	78
	PROTEC CNR 20/150	507 258	18						12	78
	PROTEC CNR 20/275	507 259	18						12	78
	PROTEC CNR 20/320	507 260	18						12	78
	PROTEC CNR 20/385	507 261	18						12	78
	PROTEC CNR 20/440	507 262	18						12	78
	PROTUBE CN 40	507 574	18						12	79






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PROTEC CM(R) I <sub>max</sub> = 40kA per pole - Class II: MULTI-pole, MODULAR HOUSING									
	PROTEC CM 80/150 (2+0)	508 001	17.5					12	82
	PROTEC CM 80/275 (2+0)	508 003	17.5					12	82
	PROTEC CM 80/320 (2+0)	508 005	17.5					12	82
	PROTEC CM 80/385 (2+0)	508 109	17.5					12	82
	PROTEC CM 80/440 (2+0)	508 007	17.5					12	82
	PROTEC CMR 80/150 (2+0)	508 009	17.5					12	82
	PROTEC CMR 80/275 (2+0)	508 011	17.5					12	82
	PROTEC CMR 80/320 (2+0)	508 013	17.5					12	82
	PROTEC CMR 80/385 (2+0)	508 111	17.5					12	82
	PROTEC CMR 80/440 (2+0)	508 015	17.5					12	82
Module PROTEC CM(R) I <sub>max</sub> = 40kA per pole - Class II									
	Module PROTEC CM 80/150 (2+0)	508 174	17.5					12	82
	Module PROTEC CM 80/275 (2+0)	508 164	17.5					12	82
	Module PROTEC CM 80/320 (2+0)	508 175	17.5					12	82
	Module PROTEC CM 80/385 (2+0)	508 146	17.5					12	28
	Module PROTEC CM 80/440 (2+0)	508 147	17.5					12	82
PROTEC CM(R) I <sub>max</sub> = 40kA/40kA (L-N/N-PE) - Class II: MULTI-pole, MODULAR HOUSING									
	PROTEC CM 80/150 (1+1)	508 045	17.5					12	83
	PROTEC CM 80/275 (1+1)	508 047	17.5					12	83
	PROTEC CM 80/320 (1+1)	508 049	17.5					12	83
	PROTEC CM 80/385 (1+1)	508 117	17.5					12	83
	PROTEC CM 80/440 (1+1)	508 051	17.5					12	83
	PROTEC CMR 80/150 (1+1)	508 053	17.5					12	83
	PROTEC CMR 80/275 (1+1)	508 055	17.5					12	83
	PROTEC CMR 80/320 (1+1)	508 057	17.5					12	83
	PROTEC CMR 80/385 (1+1)	508 119	17.5					12	83
	PROTEC CMR 80/440 (1+1)	508 059	17.5					12	83
Module PROTEC CM(R) I <sub>max</sub> = 40kA/40kA (L-N/N-PE) - Class II									
	Module PROTEC CM 80/150 (1+1)	508 186	17.5					12	83
	Module PROTEC CM 80/275 (1+1)	508 187	17.5					12	83
	Module PROTEC CM 80/320 (1+1)	508 188	17.5					12	83
	Module PROTEC CM 80/385 (1+1)	508 189	17.5					12	83
	Module PROTEC CM 80/440 (1+1)	508 190	17.5					12	83
PROTEC CM(R) A - I <sub>max</sub> = 40kA/40kA (L-N/N-PE) - Class II: MULTI-pole, MODULAR HOUSING									
	PROTEC CM 80A/150 (1+1)	508 120	17.5					12	84
	PROTEC CM 80A/275 (1+1)	508 122	17.5					12	84
	PROTEC CM 80A/320 (1+1)	508 124	17.5					12	84
	PROTEC CM 80A/385 (1+1)	508 126	17.5					12	84
	PROTEC CM 80A/440 (1+1)	508 128	17.5					12	84
	PROTEC CMR 80A/150 (1+1)	508 130	17.5					12	84
	PROTEC CMR 80A/275 (1+1)	508 132	17.5					12	84
	PROTEC CMR 80A/320 (1+1)	508 134	17.5					12	84
	PROTEC CMR 80A/385 (1+1)	508 136	17.5					12	84
	PROTEC CMR 80A/440 (1+1)	508 138	17.5					12	84
Module PROTEC CM(R) A - I <sub>max</sub> = 40kA/40kA (L-N/N-PE) - Class II									
	Module PROTEC CM 80A/150 (1+1)	508 176	17.5					12	84
	Module PROTEC CM 80A/275 (1+1)	508 143	17.5					12	84
	Module PROTEC CM 80A/320 (1+1)	508 177	17.5					12	84
	Module PROTEC CM 80A/385 (1+1)	508 144	17.5					12	84
	Module PROTEC CM 80A/440 (1+1)	508 145	17.5					12	84
PROTEC CG(R) - I <sub>max</sub> = 40kA Class II: SINGLE-pole, MODULAR HOUSING, NO LEAF, AGE C JRRRENT									
	PROTEC CG 40/150	500 323	18					12	88
	PROTEC CG 40/275	500 325	18					12	88
	PROTEC CG 40/385	500 327	18					12	88
	PROTEC CGR 40/150	500 329	18					12	88


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PROTEC CG(R) I <sub>max</sub> = 40kA - Class II: SINGLE-pole, MODULAR HOUSING, NO LEAKAGE CURRENT									
	PROTEC CGR 40/275	500 331	18					12	88
	PROTEC CGR 40/385	500 333	18					12	88
Module PROTEC CG(R) I <sub>max</sub> = 40kA - Class II									
	Module PROTEC CG 40/150	500 484	18					12	88
	Module PROTEC CG 40/275	500 485	18					12	88
	Module PROTEC CG 40/385	500 486	18					12	88
PROTEC CG(R) I <sub>max</sub> = 40kA - Class II: SINGLE-pole, MODULAR HOUSING, NO LEAKAGE CURRENT									
	PROTEC CG 20/150	500 239	18					12	89
	PROTEC CG 20/275	500 241	18					12	89
	PROTEC CG 20/385	500 243	18					12	89
	PROTEC CGR 20/150	500 245	18					12	89
	PROTEC CGR 20/275	500 247	18					12	89
	PROTEC CGR 20/385	500 249	18					12	89
Module PROTEC CG(R) I <sub>max</sub> = 20kA - Class II									
	Module PROTEC CG 20/150	500 487	18					12	89
	Module PROTEC CG 20/275	500 488	18					12	89
	Module PROTEC CG 20/385	500 489	18					12	89
PROTEC CMG(R) (2+0) I <sub>max</sub> = 20kA per pole (L-N/PE) - Class II: MULTI-pole, MODULAR HOUSING									
	PROTEC CMG 40/150 (2+0)	508 197	17.5					12	91
	PROTEC CMG 40/275 (2+0)	508 198	17.5					12	91
	PROTEC CMGR 40/150 (2+0)	508 199	17.5					12	91
	PROTEC CMGR 40/275 (2+0)	508 200	17.5					12	91
Module PROTEC CMG(R) (2+0) I <sub>max</sub> = 20kA per pole - Class II									
	Module PROTEC CMG 40/150 (2+0)	508 201	17.5					12	91
	Module PROTEC CMG 40/275 (2+0)	508 202	17.5					12	91
PROTEC D(R) - U <sub>oc</sub> /I <sub>sc</sub> = 10kV/5kA - Class III: SINGLE-pole, MODULAR HOUSING									
	PROTEC D 10/150	508 601	18					12	94
	PROTEC D 10/275	508 603	18					12	94
	PROTEC D 10/320	508 605	18					12	94
	PROTEC D 10/385	508 617	18					12	94
	PROTEC D 10/440	508 607	18					12	94
	PROTEC DR 10/150	508 609	18					12	94
	PROTEC DR 10/275	508 611	18					12	94
	PROTEC DR 10/320	508 613	18					12	94
	PROTEC DR 10/385	508 619	18					12	94
	PROTEC DR 10/440	508 615	18					12	94
Module PROTEC D(R) - U <sub>oc</sub> /I <sub>sc</sub> = 10kV/5kA - Class III									
	Module PROTEC D 10/150	508 620	18					12	94
	Module PROTEC D 10/275	508 621	18					12	94
	Module PROTEC D 10/320	508 622	18					12	94
	Module PROTEC D 10/385	508 623	18					12	94
	Module PROTEC D 10/440	508 624	18					12	94
PROTEC DM(R) - U <sub>oc</sub> /I <sub>sc</sub> = 10kV/5kA per pole - Class III: MULTI-pole, MODULAR HOUSING									
	PROTEC DM 20/150 (2+0)	508 029	17.5					12	95
	PROTEC DM 20/275 (2+0)	508 031	17.5					12	95
	PROTEC DM 20/320 (2+0)	508 033	17.5					12	95
	PROTEC DM 20/385 (2+0)	508 113	17.5					12	95
	PROTEC DM 20/440 (2+0)	508 035	17.5					12	95
	PROTEC DMR 20/150 (2+0)	508 037	17.5					12	95
	PROTEC DMR 20/275 (2+0)	508 039	17.5					12	95
	PROTEC DMR 20/320 (2+0)	508 041	17.5					12	95
	PROTEC DMR 20/385 (2+0)	508 115	17.5					12	95
	PROTEC DMR 20/440 (2+0)	508 043	17.5					12	95
Module PROTEC DM(R) - U <sub>oc</sub> /I <sub>sc</sub> per pole= 10kV/5kA - Class III									
	Module PROTEC DM 20/150 (2+0)	508 191	17.5					12	95

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Module PROTEC DM(R) - Uoc/Isc= 10kV/5kA - Class III									
Module PROTEC DM 20/275 (2+0)	508 192	17.5						12	95
Module PROTEC DM 20/320 (2+0)	508 193	17.5						12	95
Module PROTEC DM 20/385 (2+0)	508 194	17.5						12	95
Module PROTEC DM 20/440 (2+0)	508 195	17.5						12	95
PROTEC DMG(R) - Uoc/Isc= 10kV/5kA per pole - Class III: MULTI-pole, MODULAR HOUSING									
PROTEC DMG 20 (2+0)	508 021	17.5						12	96
PROTEC DMGR 20 (2+0)	508 027	17.5						12	96
Module PROTEC DMG(R) (2+0) - Uoc/Isc= 10kV/5kA per pole - Class III									
Module PROTEC DMG 20 (2+0)	508 196	17.5						12	96
MPE-ZE 50 - Uoc/Isc= 5kV/2.5kA per pole - Class III: MULTI-pole, COMPACT HOUSING for cable duct									
MPE-ZE50	121 207								97
MPE-MINI - Uoc/Isc= 6kV/3kA per pole - Class III: MULTI-pole, COMPACT HOUSING for cable duct, wiring socket									
MPE-MINI	121 501								98
ZE 200 PS - Uoc/Isc= 6kV/3kA per pole - Class III: MULTI-pole, COMPACT HOUSING for power socket									
ZE 200 PS	121 532								99
VTC - Uoc/Isc= 6kV/3kA per pole - Class III: SINGLE-pole, for PCB									
 VTC 10/150	122 646								100
VTC 10/275	122 636								100
VTC 10/320	509 313								100
VTC 10/440	122 808								100
PROFILT D - Uoc/Isc= 6kV/3kA per pole - Class III: MULTI-pole, COMPACT HOUSING									
 PROFILT D 10A	130 051					90		3	101
PROFILT D 16A	130 052					90		3	101
PROFILT D 25A	130 053					90		3	101
PROFILT D 30A	130 050					90		3	101
PROTEC A - I <sub>max</sub> = up to 40kA - Class II: SINGLE-pole, COMPACT HOUSING									
 PROTEC AQ 40/150	509 029							60	104
PROTEC AQ 40/275	509 031							60	104
PROTEC AQ 40/320	509 033							60	104
PROTEC AQ 40/385	509 047							60	104
PROTEC AQ 40/440	509 035							60	104
 PROTEC AQS 40/150	509 049							100	105
PROTEC AQS 40/275	509 051							100	105
PROTEC AQS 40/320	509 053							100	105
PROTEC AQS 40/440	509 055							100	105
 PROTEC A 30/150	509 009							50	106
PROTEC A 30/275	509 011							50	106
PROTEC A 30/320	509 013							50	106
PROTEC A 30/385	509 043							50	106
PROTEC A 30/440	509 015							50	106
 PROTEC AQ 25/150	509 017							60	107
PROTEC AQ 25/275	509 019							60	107
PROTEC AQ 25/320	509 021							60	107
PROTEC AQ 25/385	509 045							60	107
PROTEC AQ 25/440	509 023							60	107
EPZ - ISG Equipotential Bonding									
 EPZ-100/350	509 509							20	110
EPZ-100/500	509 511							20	110
EPZ-100/350 Ex	322 973							20	111
EPZ-100/500 Ex	322 975							20	111
PV PROTEC BS(R) Iimp= 12.5kA per pole - Class I, II: COMPACT HOUSING for PHOTOVOLTAIC SYSTEMS									
 PV PROTEC BS 12.5/550	501 507				72			3	114
PV PROTEC BS 12.5/1000	501 541				72			3	114
PV PROTEC BSR 12.5/550	501 517				72			3	114
PV PROTEC BSR 12.5/1000	501 545				72			3	114

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<b>SAFETEC C(R) PV - I<sub>max</sub>= 40kA - Class II: MULTI-pole, MODULAR HOUSING for PHOTOVOLTAIC SYSTEMS</b>									
	SAFETEC C 40/75 PV	516 040		36				7	115
	SAFETEC C 40/300 PV	516 042		36				7	115
	SAFETEC C 40/600 PV	516 044		36				7	115
	SAFETEC C 40/1000 PV	516 046		36				7	115
	SAFETEC C 40/1200 PV	516 048			54			5	115
	SAFETEC CR 40/75 PV	516 041		36				7	115
	SAFETEC CR 40/300 PV	516 043		36				7	115
	SAFETEC CR 40/600 PV	516 045		36				7	115
	SAFETEC CR 40/1000 PV	516 047		36				7	115
	SAFETEC CR 40/1200 PV	516 049			54			5	115
<b>Module SAFETEC C(R) PV - I<sub>max</sub>= 40kA - Class II</b>									
	Module SAFETEC C(R) 40/75 PV	516 050	18					12	115
	Module SAFETEC C(R) 40/300 PV	516 051	18					12	115
	Module SAFETEC C(R) 40/600 PV	516 052	18					12	115
	Module SAFETEC C(R) 40/1000 PV	516 053	18					12	115
	Module SAFETEC C(R) 40/1200 PV	516 054	18					12	115
<b>PV PROTEC C(R) - I<sub>max</sub>= 40kA - Class II: MULTI-pole, MODULAR HOUSING for PHOTOVOLTAIC SYSTEMS</b>									
	PV PROTEC C 40/100	501 521		36				7	116
	PV PROTEC C 40/550	501 527		36				7	116
	PV PROTEC C 40/1000	501 543			54			5	116
	PV PROTEC CR 40/100	501 531		36				7	116
	PV PROTEC CR 40/550	501 537		36				7	116
	PV PROTEC CR 40/1000	501 547			54			5	116
<b>Module PV PROTEC C(R) - I<sub>max</sub>= 40kA - Class II</b>									
	Module PV PROTEC C(R) 40/100	500 496	18					12	116
	Module PV PROTEC C(R) 40/550	500 497	18					12	116
	Module PV PROTEC C(R) 40/1000	500 498	18					12	116
<b>WT PROTEC BS(R) - I<sub>limp</sub>= 25kA; I<sub>limp</sub>= 12.5kA - Class I, II: SINGLE-pole, COMPACT HOUSING for WIND GENERATION SYSTEMS</b>									
	WT PROTEC BS 25/690	502 310				72		3	120
	WT PROTEC BSR 25/690	502 311				72		3	120
	WT PROTEC BS 12.5/690	502 312			54			5	121
	WT PROTEC BSR 12.5/690	502 313			54			5	121
<b>SAFETEC C(R) WT - I<sub>max</sub>= 25kA per pole - Class II: MULTI-pole, MODULAR HOUSING for WIND GENERATION SYSTEMS</b>									
	SAFETEC C 750 (3+0) WT	516 055			54			5	122
	SAFETEC CR 750 (3+0) WT	516 056			54			5	122
<b>Module SAFETEC C(R) WT - I<sub>max</sub>= 25kA - Class II</b>									
	Module SAFETEC C(R) 750 (3+0) WT	516 057	18					12	122
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	PROFILT PSF 3/63TN	130 041							126
	PROFILT PSF 3/125TN	130 042							126
	PROFILT PSF 3/35TT	130 043							126
	PROFILT PSF 3/63TT	130 044							126
	PROFILT PSF 3/125TT	130 045							126
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Poland	P
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Serbia	B
Spain	D
Taiwan	D
Thailand	D
Ukraine	D
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Uruguay	D

Legend: B - Branch D - Distributer P - Partner



d.o.o., Surge Voltage Protection Systems,  
Engineering and Cooperation  
Stegne 35, 1521 Ljubljana, Slovenia, EU  
Phone: 00386(1)5003 100  
Fax: 00386(1)5003 236  
e-mail: [sales@iskrazascite.si](mailto:sales@iskrazascite.si)  
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# Surge Protection for Data/Signal Lines



**ISKRA ZAŠČITE**

BE ON THE SAFE SIDE

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

There are several contributors to this problem:

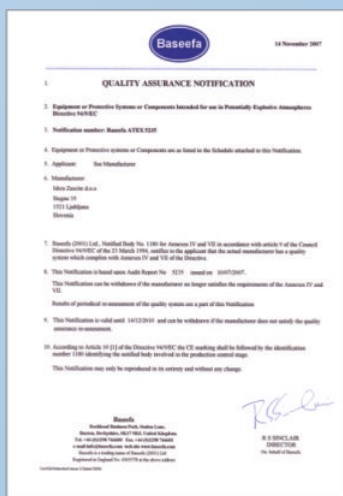
- The high level of integration of electronic components in today's equipment makes it particularly susceptible to damage from over-voltages.
- Interruptions of service and operational downtime are one of the biggest contributors to loss in revenue.
- Data transmission networks cover large areas and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

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

The following catalog provides guidance on such selection.

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

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



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Product Group	Description	Product Name	Page	Product Photo	Connection/Signal
Data/Signal Lines	<ul style="list-style-type: none"> <li>• Universal Single-pair Data SPD for Shielded Cables</li> <li>• Coarse and Fine Protection</li> </ul>	SMH-SH	13	 <b>NEW</b>	<ul style="list-style-type: none"> <li>- 20 mA current loop</li> <li>- Analogue tel. line</li> <li>- RS 232, - RS 422, - V.11, - RS 485</li> <li>- Thermal probe PT 100, - TTL</li> </ul>
	<ul style="list-style-type: none"> <li>• Universal Single-pair Data SPD for Shielded Cables</li> <li>• Coarse and Fine Protection</li> </ul>	SMH-RC	14	 <b>NEW</b>	<ul style="list-style-type: none"> <li>- 20 mA current loop</li> <li>- Analogue tel. line</li> <li>- RS 232, - RS 422, - V.11, - RS 485</li> <li>- Thermal probe PT 100, - TTL</li> </ul>
	<ul style="list-style-type: none"> <li>• Single-pair SPD; 2-pair SPD</li> <li>• Coarse and Fine Protection</li> <li>• Iimp= 5kA/per pair</li> </ul>	SMI, SMI2	15	 <b>NEW</b>	<ul style="list-style-type: none"> <li>- 20 mA current loop</li> <li>- Analogue tel. line</li> <li>- RS 232, - RS 422, - V.11, - RS 485</li> <li>- Thermal probe PT 100, - TTL</li> </ul>
	<ul style="list-style-type: none"> <li>• Universal Single-pair Data SPD</li> <li>• Coarse and Fine Protection</li> <li>• Over-current Protection</li> </ul>	SMH-TC	16		<ul style="list-style-type: none"> <li>- 20 mA current loop</li> <li>- Analogue tel. line</li> <li>- RS 232, - RS 422, - V.11, - RS 485</li> <li>- Thermal probe PT 100, - TTL</li> </ul>
	<ul style="list-style-type: none"> <li>• Universal 2-pair Data SPD</li> <li>• Coarse and Fine Protection</li> <li>• Over-current Protection</li> </ul>	SMH2-TC	17		<ul style="list-style-type: none"> <li>- 20 mA current loop</li> <li>- Analogue tel. line</li> <li>- RS 232, - RS 422, - V.11, - RS 485</li> <li>- Thermal probe PT 100, - TTL</li> </ul>
	<ul style="list-style-type: none"> <li>• Compact Universal Single-pair Data SPD</li> <li>• Coarse and Fine Protection</li> </ul>	NMH-TC	18		<ul style="list-style-type: none"> <li>- 20 mA current loop</li> <li>- Analogue tel. line</li> <li>- RS 232, - RS 422, - V.11, - RS 485</li> <li>- Thermal probe PT 100, - TTL</li> </ul>
	<ul style="list-style-type: none"> <li>• Compact Universal 2-pair Data SPD</li> <li>• Coarse and Fine Protection</li> </ul>	NMH2-TC	19		<ul style="list-style-type: none"> <li>- 20 mA current loop</li> <li>- Analogue tel. line</li> <li>- RS 232, - RS 422, - V.11, - RS 485</li> <li>- Thermal probe PT 100, - TTL</li> </ul>
	<ul style="list-style-type: none"> <li>• Single-pair SPD, 2-pair SPD</li> <li>• Coarse and Fine Protection</li> <li>• Over-current Protection</li> </ul>	IM-TD	20		<ul style="list-style-type: none"> <li>- 20 mA current loop</li> <li>- Analogue tel. line</li> <li>- RS 232, - RS 422, - V.11, - RS 485</li> <li>- Thermal probe PT 100, - TTL</li> </ul>
	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• Coarse and Fine Protection</li> </ul>	IMH-TC	22		<ul style="list-style-type: none"> <li>- 20 mA current loop</li> <li>- Analogue tel. line</li> <li>- RS 232, - RS 422, - V.11, - RS 485</li> <li>- Thermal probe PT 100, - TTL</li> </ul>
	<ul style="list-style-type: none"> <li>• Single-pair Data SPD</li> <li>• Coarse and Fine Protection</li> <li>• Insulation Resistance to Earth</li> <li>• Separated signal ground (RS232)</li> </ul>	SMH-SG	24		<ul style="list-style-type: none"> <li>- Analogue tel. line</li> <li>- RS 232, - RS 485</li> <li>- Thermal probe PT 100</li> </ul>
	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• Coarse and Fine Protection</li> <li>• Insulation Resistance to Earth</li> </ul>	VMS-TC	25		<ul style="list-style-type: none"> <li>- Analogue tel. line</li> <li>- RS 485</li> <li>- Thermal probe PT 100</li> </ul>
	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• Coarse and Fine Protection</li> </ul>	VMO	27		<ul style="list-style-type: none"> <li>- 20 mA current loop</li> <li>- Analogue tel. line</li> <li>- RS 232, - RS 422, - V.11, - RS 485</li> <li>- Thermal probe PT 100, - TTL</li> </ul>
	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• Coarse Protection Only</li> <li>• Coordination Elements</li> </ul>	SMH-TDR	29		<ul style="list-style-type: none"> <li>- Analogue tel. line</li> </ul>
	<ul style="list-style-type: none"> <li>• 2-pair SPD</li> <li>• Coarse Protection only</li> <li>• Coordination Elements</li> </ul>	SMH2-TDR	30		<ul style="list-style-type: none"> <li>- Analogue tel. Line</li> </ul>
	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• Coarse Protection only</li> <li>• Coordination Elements</li> </ul>	VM-TDR	31		<ul style="list-style-type: none"> <li>- Analogue tel. Line</li> </ul>

## TECHNICAL CHARACTERISTICS

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



Product Group	Description	Product Name	Page	Product Photo	Connection/Signal
Data/Signal Lines	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• Fine Protection only</li> </ul>	SMH2-DF	32	 <b>NEW</b>	- 20 mA current loop
	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• Fine Protection only</li> </ul>	IM-VF	33	 <b>NEW</b>	- 20 mA current loop
	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• Fine Protection only</li> </ul>	IM-DF	34		- 20 mA current loop
	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• Coarse and Fine Protection</li> <li>• Increased Sparkover Voltage</li> <li>• Overcurrent Protection</li> </ul>	SMH-20K	35		- Analogue tel. Line - 20 mA current loop - Thermal probe PT 100
	<ul style="list-style-type: none"> <li>• 2-pair SPD</li> <li>• Coarse and Fine Protection</li> <li>• Increased Sparkover Voltage</li> <li>• Overcurrent Protection</li> </ul>	SMH2-20K SMH2-20D	36	 	- Analogue tel. Line - 20 mA current loop - Thermal probe PT 100
	<ul style="list-style-type: none"> <li>• SPD for DC power supplies and data lines (CAN bus)</li> <li>• Coarse and Fine Protection</li> <li>• Over-current Protection</li> </ul>	SMH-TC+PS	37		- DC power supply + 1 data line - CAN bus
	<ul style="list-style-type: none"> <li>• Single-pair SPD, PCB assembly</li> <li>• Coarse and Fine Protection</li> <li>• Over-current Protection</li> </ul>	LZ-SMH	38		- 20 mA current loop - Analogue tel. line - RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100, - TTL
xDSL Technologies	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• For xDSL Transmission</li> <li>• Coarse and Fine Protection</li> </ul>	IM-xDSL	39		- Analogue tel. line - xDSL (VDSL class 1 only)
DC Power Supplies	<ul style="list-style-type: none"> <li>• Single-pair SPD for xDSL transmission</li> <li>• For DC Power Supplies</li> <li>• Coarse and Fine Protection</li> </ul>	SMH-PS	41		- DC power system
	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• For DC Power Supplies</li> <li>• Coarse and Fine Protection</li> </ul>	VM-DC	42		- DC power system
	<ul style="list-style-type: none"> <li>• SPD for DC Power Supplies</li> <li>• Class I/Type 1/B</li> <li>• I<sub>imp</sub>= 10kA</li> <li>• Mechanical Flag + Remote Contacts (R)</li> </ul>	DC PROTEC B(R) 10	43		- DC power system
	<ul style="list-style-type: none"> <li>• SPD for DC Power Supplies</li> <li>• Class II/Type 2/C</li> <li>• Mechanical Flag + Remote Contacts (R)</li> </ul>	DC PROTEC C(R) 40	44		- DC power system
	<ul style="list-style-type: none"> <li>• DC and AC Power Supplies</li> <li>• Class III / Type 3 / D</li> <li>• U<sub>OC</sub>/I<sub>SC</sub> (1.2/50, 8/20)= 4kV/2kA, 6kV/3kA</li> <li>• Remote contacts + LED</li> </ul>	PROTEC DMDR 20	45	 <b>NEW</b>	- DC and AC power system
	<ul style="list-style-type: none"> <li>• Single-pole SPD</li> <li>• Class II/Type 2/C</li> <li>• Mechanical Flag + Remote Contacts (R)</li> </ul>	PROTEC C(R) 40	46		- DC and AC power system
	<ul style="list-style-type: none"> <li>• Single-pole SPD</li> <li>• Class II/Type 2/C</li> <li>• Mechanical Flag + Remote Contacts (R)</li> </ul>	PROTEC CN(R) 40	47		- DC and AC power system

## TECHNICAL CHARACTERISTICS

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

Product Group	Description	Product Name	Page	Product Photo	Connection/Signal
<b>Data Protocol</b>	<ul style="list-style-type: none"> <li>• 4-wire (2 lines) Data SPD designed for RS-485</li> <li>• Coarse and Fine Protection</li> </ul>	<b>VM-RS</b>	48		<ul style="list-style-type: none"> <li>- RS 422</li> <li>- V.11</li> <li>- RS 485</li> </ul>
	<ul style="list-style-type: none"> <li>• D-SUB, 9-pole SPD</li> <li>• All Pins Protected</li> </ul>	<b>IM-DB 9</b>	50		<ul style="list-style-type: none"> <li>- RS 232</li> </ul>
	<ul style="list-style-type: none"> <li>• D-SUB, 15-pole SPD</li> <li>• Coarse and Fine Protection</li> </ul>	<b>IM-DB 15RS</b>	51		<ul style="list-style-type: none"> <li>- RS 422</li> <li>- V.11</li> <li>- X.21</li> </ul>
<b>Local Area Networks</b>	<ul style="list-style-type: none"> <li>• LAN Protector (1 way)</li> <li>• All 4 Pairs Protected</li> <li>• Freq. &lt; 100MHz, Cat. 5 Capable</li> <li>• Termination: RJ45, <b>Cat 5</b> Connectors</li> </ul>	<b>LZ-NET</b> <b>LZ-NET PoE</b> <b>LZ-NET STP</b>	52		<ul style="list-style-type: none"> <li>- LAN (up to Cat. 5)</li> </ul>
	<ul style="list-style-type: none"> <li>• LAN Protector (1 way)</li> <li>• All 4 Pairs Protected</li> <li>• Freq. &lt; 250MHz, <b>Cat 6</b> Capable</li> <li>• Termination: RJ45, Shielded</li> </ul>	<b>LZ-NET 6</b>	53		<ul style="list-style-type: none"> <li>- LAN (up to Cat. 6)</li> </ul>
	<ul style="list-style-type: none"> <li>• LAN Protector</li> <li>• 19" Rack Patch Panel up to 24 way</li> <li>• All 4 Pairs Protected</li> <li>• Freq. &lt; 100MHz, Cat. 5 Capable</li> <li>• Termination: RJ45, <b>Cat 5</b> Connectors</li> </ul>	<b>LZ-24NET 19</b> <b>LZ-24NET 19 PoE</b>	54		<ul style="list-style-type: none"> <li>- LAN (up to Cat. 5)</li> </ul>
	<ul style="list-style-type: none"> <li>• Combined POWER/LAN Protector</li> <li>• All 4 Pairs in the UTB Protected</li> <li>• Freq. &lt; 100MHz, Cat. 5 Capable</li> <li>• Termination: RJ45, <b>Cat 5</b> Connectors</li> </ul>	<b>ZE 200 NET</b>	55		<ul style="list-style-type: none"> <li>- LAN (up to Cat. 5)</li> </ul>
<b>Combined Plug-in Surge Protection</b>	<ul style="list-style-type: none"> <li>• Combined POWER/LAN Protector</li> <li>• All 4 Pairs in the UTB Protected</li> <li>• Freq. &lt; 100MHz, Cat. 5 Capable</li> <li>• Termination: RJ45, Cat. 5 Connectors</li> <li>• Compact, Ergonomic Packaging</li> </ul>	<b>ZES-76 TEL-TV</b>	56		<ul style="list-style-type: none"> <li>- TV, telephone line</li> </ul>
	<ul style="list-style-type: none"> <li>• Combined POWER/DATA Protector</li> <li>• Coax Protected</li> <li>• Tel. Protected</li> <li>• Termination: RJ11, IEC Connector</li> <li>• Compact, Ergonomic Packaging</li> </ul>	<b>ZES-7 TEL-TV</b>	57		<ul style="list-style-type: none"> <li>- TV, telephone line</li> </ul>
	<ul style="list-style-type: none"> <li>• Combined POWER/DATA Protector</li> <li>• Coax Protected</li> <li>• Tel. Protected</li> <li>• Termination: RJ11, IEC Connector</li> <li>• Master-slave Function</li> </ul>	<b>ZES 1M+5S</b>	58		<ul style="list-style-type: none"> <li>- TV, telephone line</li> </ul>
	<ul style="list-style-type: none"> <li>• Combined POWER/DATA Protector</li> <li>• Coax Protected</li> <li>• Tel. Protected</li> <li>• Termination: RJ11, IEC Connector</li> <li>• Master-slave Function (USB, Hub)</li> </ul>	<b>ZES 1M+4S</b> <b>TEL-NET USB Hub</b>	59		<ul style="list-style-type: none"> <li>- TV, telephone line</li> <li>- LAN (up to Cat. 5)</li> </ul>
	<ul style="list-style-type: none"> <li>• POWER Protector</li> <li>• Uoc = 3kV</li> <li>• Compact, Ergonomic Packaging</li> </ul>	<b>ZES 6</b>	60		






## TECHNICAL CHARACTERISTICS

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

Product Group	Description	Product Name	Page	Product Photo	Connection/Signal
Coaxial/RF	<ul style="list-style-type: none"> <li>• Coaxial BNC Protector</li> <li>• For CCTV and Arcnet</li> <li>• Coarse and Fine Protection</li> <li>• Indirect Shield Earthing</li> </ul>	ZV-BNC	61		- Arcnet
	<ul style="list-style-type: none"> <li>• Coaxial Protector</li> <li>• For TV and Cable TV</li> <li>• Direct Shield Earthing</li> </ul>	ZV-1 ZV1-F	62		- TV - Cable TV
	<ul style="list-style-type: none"> <li>• Coaxial Protector</li> <li>• For RF Antenna System</li> <li>• Freq.: DC to 2.4GHz</li> <li>• GDT</li> </ul>	CCP-BNC	63		- Analog video
	<ul style="list-style-type: none"> <li>• Coaxial Protector</li> <li>• For Base Station RF Antenna System</li> <li>• Freq.: DC to 2.5GHz</li> <li>• GDT</li> </ul>	CCP-7/16	64		- GSM - GPS - Radio systems
	<ul style="list-style-type: none"> <li>• Coaxial Protector</li> <li>• For RF Antenna System</li> <li>• Freq.: DC to 2.4GHz</li> <li>• GDT</li> </ul>	CCP-N	65		- GSM - GPS - Radio systems
	<ul style="list-style-type: none"> <li>• Coaxial Protector</li> <li>• For RF Antenna System</li> <li>• Freq.: DC to <b>6.0GHz</b></li> <li>• GDT</li> </ul>	CCP-N-6G	66		- GSM - GPS - Radio systems
	<ul style="list-style-type: none"> <li>• Coaxial Protector</li> <li>• For RF Antenna System</li> <li>• Freq.: DC to 600MHz</li> <li>• GDT</li> </ul>	CCP-UHF	67		- Radio systems
	<ul style="list-style-type: none"> <li>• Coaxial Protector</li> <li>• For RF Antenna System (USA CCTV and CATV System)</li> <li>• Freq.: DC to 2.0GHz</li> <li>• GDT</li> </ul>	CCP-F	68		- Cable TV
	<ul style="list-style-type: none"> <li>• Coaxial Protector</li> <li>• For RF Antenna System (EU CCTV and CATV System)</li> <li>• Freq.: DC to 2.0GHz</li> <li>• GDT</li> </ul>	CCP-TV	69		- TV
	<ul style="list-style-type: none"> <li>• Coaxial Protector</li> <li>• For RF Antenna System</li> <li>• Freq.: DC to 865-965MHz, 1700-1950MHz</li> </ul>	CCP-L/4-7/16	70		- GSM
<ul style="list-style-type: none"> <li>• Coaxial Protector</li> <li>• For RF Antenna System</li> <li>• Freq.: DC to 865-965MHz, 1700-1950MHz</li> </ul>	CCP-L/4-N	71		- GSM	

## TECHNICAL CHARACTERISTICS

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

Product Group	Description	Product Name	Page	Product Photo	Connection/Signal
<b>Ex</b>	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• For Hazardous Areas (Ex)</li> <li>• Coarse and Fine Protection</li> <li>• Insulation Resistance to Earth</li> </ul> <p>⚡ II 1 G EEx ia IIC T4 Baseefa 04 ATEX 0209X</p>	<b>IM-15Ex</b> <b>IM-30Ex</b>	72		- Hazardous Areas 
<b>Line Fitting</b>	<ul style="list-style-type: none"> <li>• Single-pair SPD</li> <li>• For 3/4" Pipe Installations</li> <li>• Coarse and Fine Protection</li> <li>• tA &lt; 1ns</li> </ul>	<b>PLP</b>	73		- 20mA current loop
<b>Terminal Connection</b>	<ul style="list-style-type: none"> <li>• OEM PCB module</li> <li>• Single-pair SPD</li> <li>• Coarse Protection Only</li> <li>• PCB Hybrid</li> <li>• Flying Leads or Screw Terminals</li> </ul>	<b>IM-GD</b>	74		- Analogue tel. line - xDSL (VDSL class 1 only) - EIB
<b>PCB Mounting</b>	<ul style="list-style-type: none"> <li>• OEM PCB module</li> <li>• Single-pair SPD</li> <li>• Coarse and Fine Protection</li> <li>• PCB Hybrid</li> <li>• PCB Pins</li> </ul>	<b>IM-NF</b>	75		- RS 232, - RS 422, - V.11, - RS 485 - Thermal probe PT 100 - TTL

## TECHNICAL CHARACTERISTICS

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







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

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

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

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

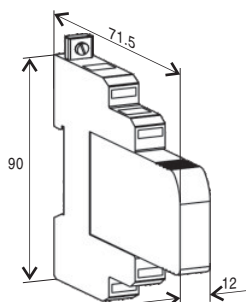
Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault. Both common (longitudinal) mode and differential (transverse) mode protection is provided.

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

### Technical characteristics

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

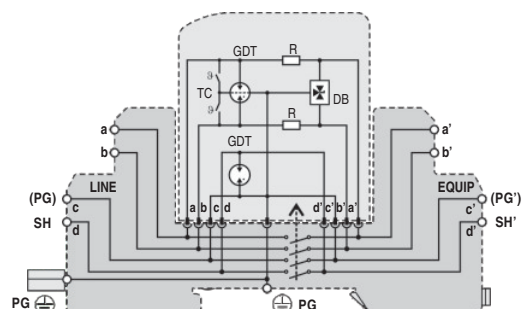
### Dimensional drawing



### Connection diagram

Legend:

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





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

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

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

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

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

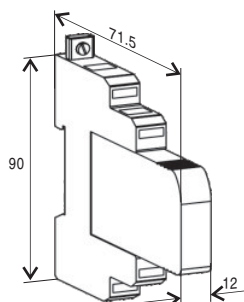
The plug-in module/base design facilitates replacement of a failed module without the need to remove system wiring.

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

### Technical characteristics

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

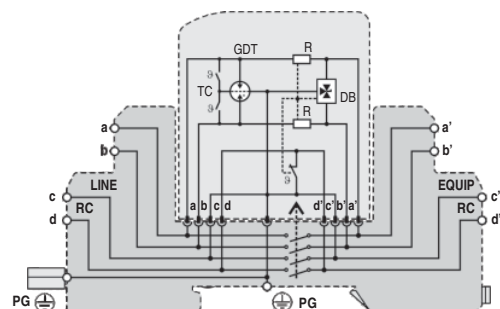
### Dimensional drawings



### Connection diagram

Legend:

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





<b>IEC category / EN type:</b>	<b>C1/C2/C3 (IEC 60643-21)</b>
<b>Design:</b>	<b>Replaceable plug-in module 12 mm</b>
<b>Available voltages:</b>	<b>5, 12, 15, 24, 30, 48, 60, 110VDC</b>
<b>Freq:</b>	<b>30MHz</b>
<b>Surge Discharge Ratings:</b>	<b>I<sub>n</sub>: 20kA 8/20μs; I<sub>max</sub>: 30kA 8/20μs; I<sub>imp</sub>: 10kA 10/350μs</b>
<b>Load current:</b>	<b>1A</b>
<b>Enclosure:</b>	<b>DIN 43880 2/3TE, DIN rail mount</b>
<b>Terminal:</b>	<b>Multi-strand to 4mm<sup>2</sup></b>

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

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

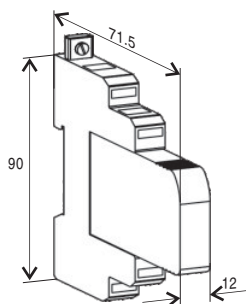
The plug-in module/base design facilitates replacement of a failed module without the need to remove system wiring.

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

### Technical characteristics

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

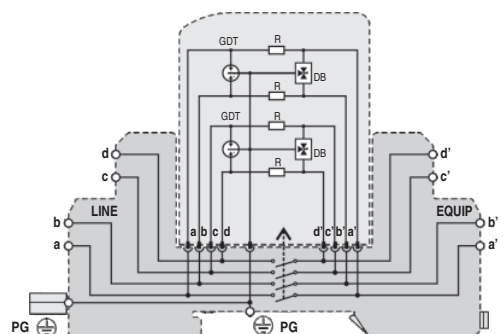
### Dimensional drawings



### Connection diagram

Legend:

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





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

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.

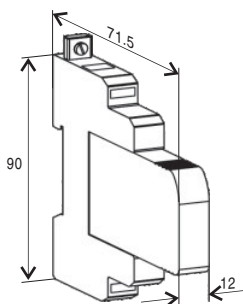
The plug-in module/base design facilitates replacement of a failed module without the need to remove system wiring.

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

### Technical characteristics

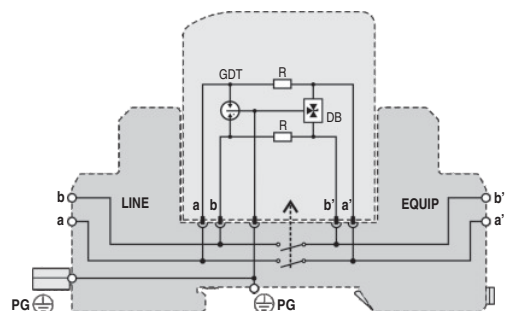
Type	SMH-TC									
	5V	12V	15V	24V	30V	48V	60V	110V		
Protection construction	Two parts: base and extractable insert									
Number of protected pairs	1 (2 conductors)									
Nominal operating voltage	<b>U<sub>n</sub></b>	5V <sub>DC</sub>	12V <sub>DC</sub>	15V <sub>DC</sub>	24V <sub>DC</sub>	30V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

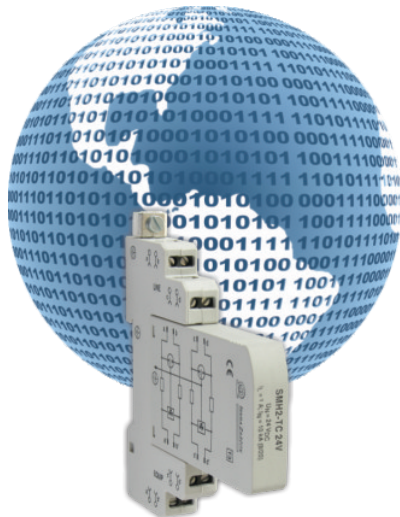
### Dimensional drawings



### Connection diagram

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





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

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

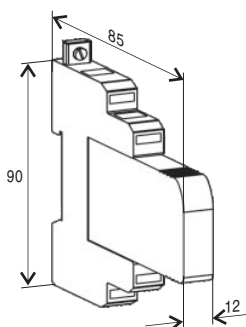
The plug-in module/base design facilitates replacement of a failed module without the need to remove system wiring.

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

### Technical characteristics

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

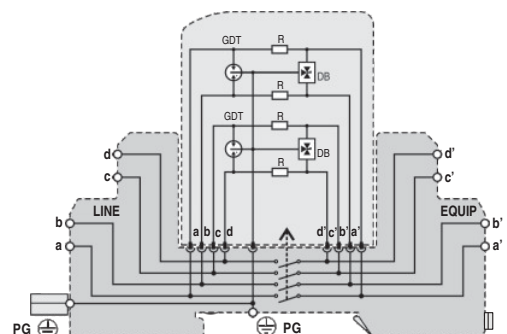
### Dimensional drawings

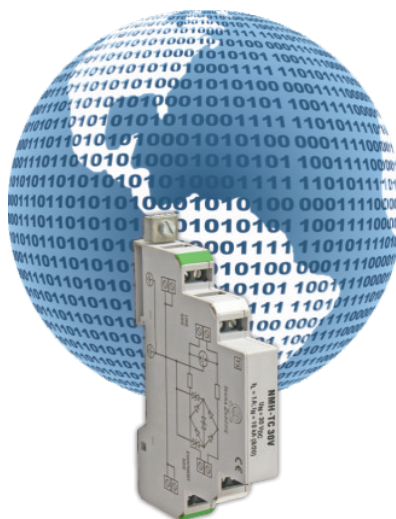


### Connection diagram

Legend:

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





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

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

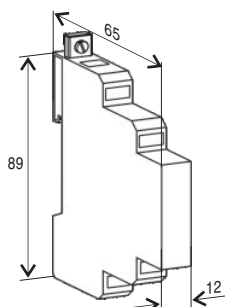
The initial protection stage comprises a three-pole gas discharge tube and is designed to divert the primary surge energy. The subsequent fine protection stage is carried out using multiple metal-oxide varistors or with fast bi-directional silicon avalanche diodes. Care is taken in the design of this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

Care is taken to ensure energy co-ordination between the coarse and a fine protection stages at all levels of the insident surge. To protect against the hazards of electric shock and fire which often results when power frequency contact 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.

## Technical characteristics

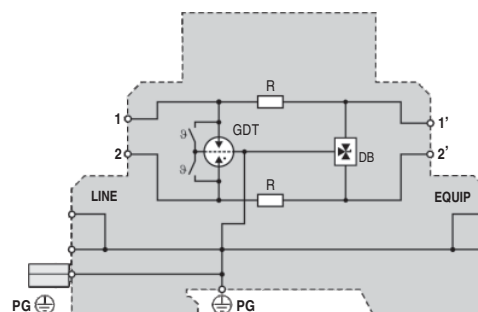
Type	NMH-TC								
	5V	12V	15V	24V	30V	48V	60V	110V	
Protection construction	Protective module								
Number of protected pairs	1 (2 conductors)								
Nominal operating voltage	<b>U<sub>n</sub></b>	5V <sub>DC</sub>	12V <sub>DC</sub>	15V <sub>DC</sub>	24V <sub>DC</sub>	30V <sub>DC</sub>	48V <sub>DC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

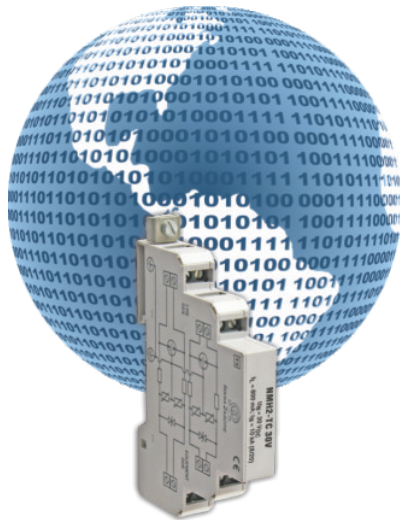
## Dimensional drawings



## Connection diagram

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





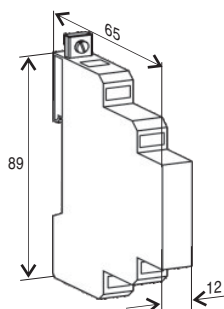
IEC category / EN type:	C1/C2/C3 (IEC 60643-21)
Design:	Compact housing 12 mm
Mode of protection:	Longitudinal, Transverse
Coarse Protection:	3 terminal GDT
Available voltages:	5, 12, 15, 24, 30, 48, 60, 110V <sub>DC</sub>
Freq:	3-5 MHz (see specification sheet)
Surge Discharge Ratings:	I <sub>n</sub>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

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

### Technical characteristics

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

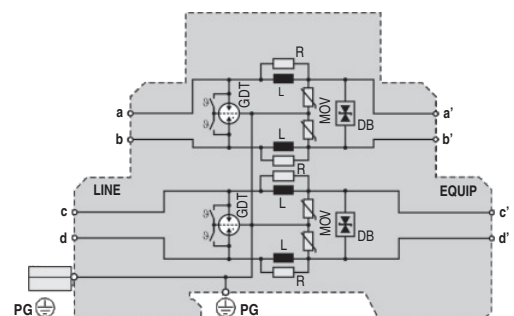
### Dimensional drawings



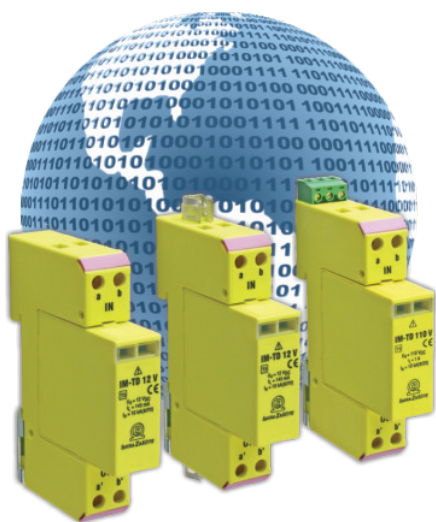
### Connection diagram

Legend:

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







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

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

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

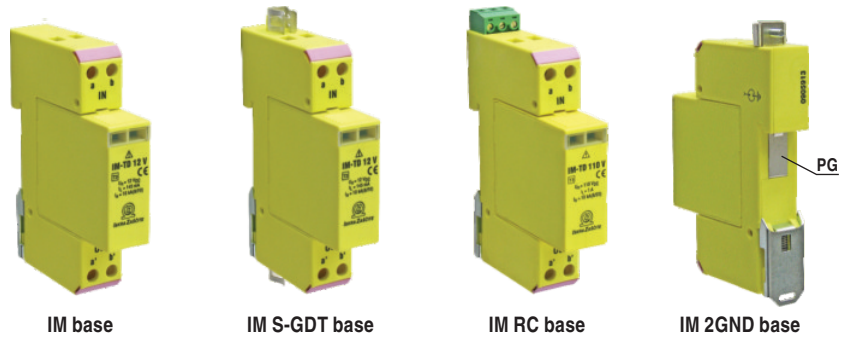
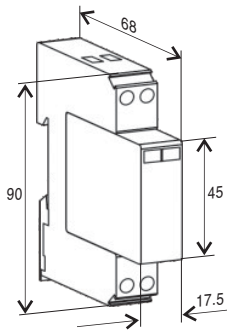
Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon avalanche diodes or metal oxide varistor stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

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

### Technical characteristics

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

## Dimensional drawings



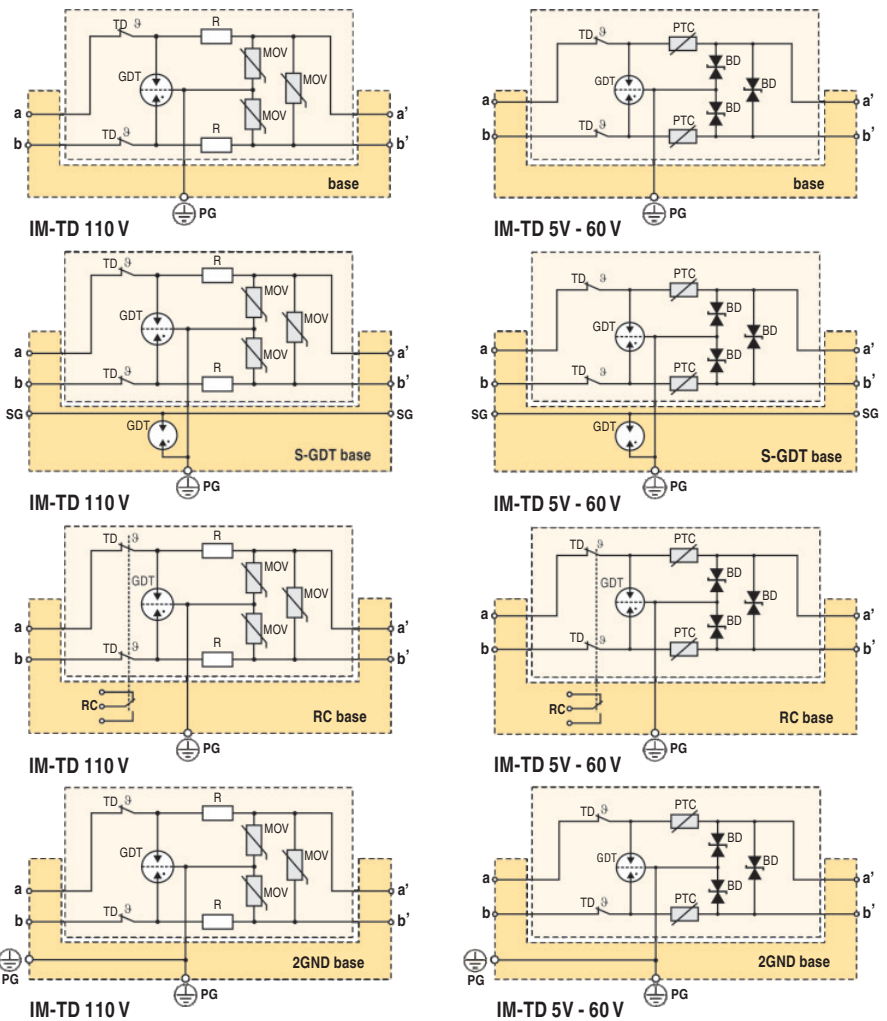
## Connection diagram

Various options for the base unit exist including:

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

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

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



### Legend:

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

## Accessory Part for IM-TD

### Testing module IM TEST

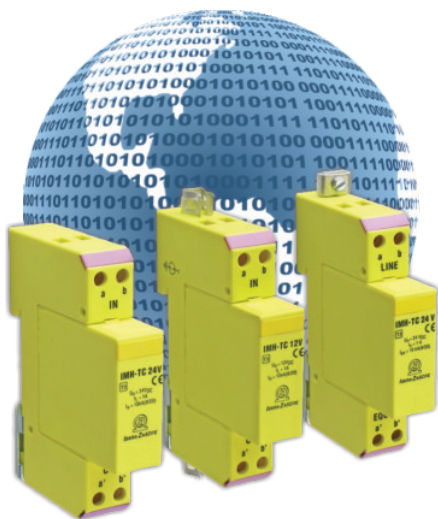
A testing module IM TEST is intended for performing measurements on the IM bases.

A module enables performing of the measurements on both input and output sides.

It is equipped with five banana sockets with D = 2 mm. Red terminals are connected to the module's output, blue ones are connected to the module's input, whereas yellow one is connected to the grounding contact.



Type	IMTest
Ordering code	127 145



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

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

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

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

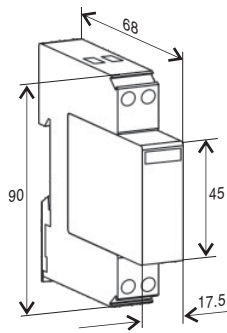
Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon avalanche diodes or metal oxide varistor stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

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

### Technical characteristics

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

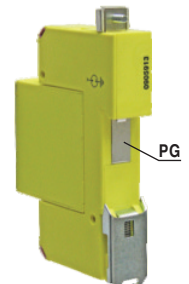
### Dimensional drawings



IM base



IM S-GDT base



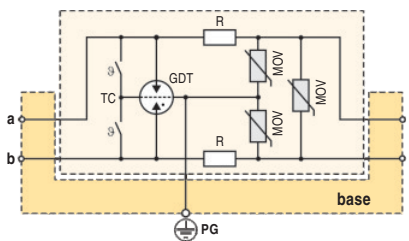
IM 2GND base

### Connection diagram

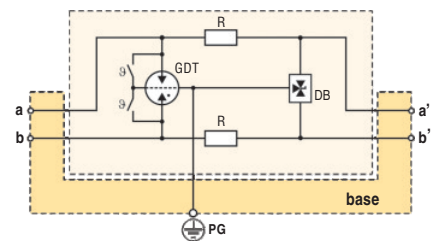
Various options for the base unit exist including:

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

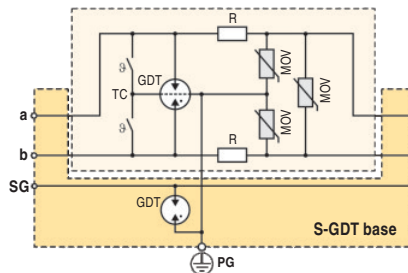
**2 GND base:** where a second ground terminal (in addition to the DIN rail ground strip) is provided for installations not utilizing DIN rail.



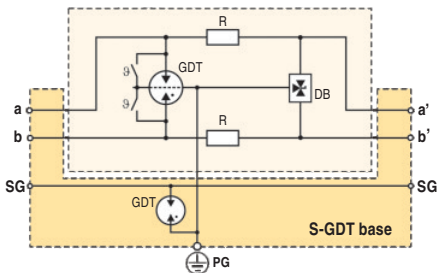
IMH-TC 110 V



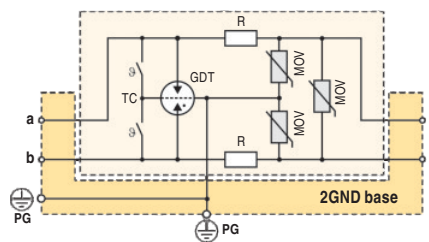
IMH-TC 5V - 60 V



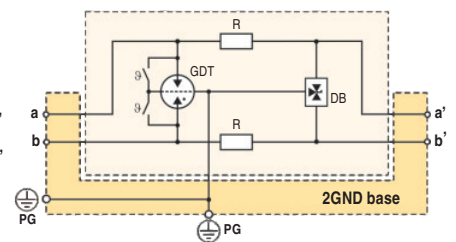
IMH-TC 110 V



IMH-TC 5V - 60 V



IMH-TC 110 V



IMH-TC 5V - 60 V

### Legend:

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

### Accessory Part for IMH-TC

#### Testing module IM TEST

A testing module IM TEST is intended for performing measurements on the IM bases.

A module enables performing of the measurements on both input and output sides.

It is equipped with five banana sockets with D = 2 mm. Red terminals are connected to the module's output, blue ones are connected to the module's input, whereas yellow one is connected to the grounding contact.



Type	IMTest
Ordering code	127 145



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

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

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

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

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

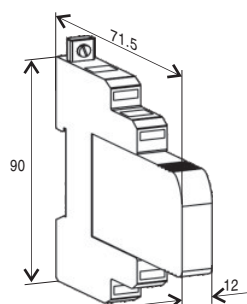
Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault. Both common (longitudinal) mode and differential (transverse) mode protection is provided.

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

### Technical characteristics

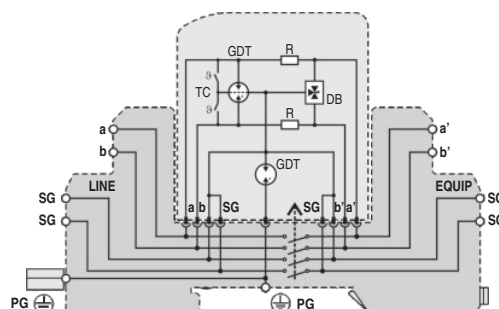
Type	SMH-SG								
	5V	12V	15V	24V	30V	48V	60V	110V	
Protection construction	Two parts: base + replaceable plug-in module								
Number of protected pairs	1 (2 conductors)								
Nominal operating voltage	<b>U<sub>n</sub></b>	5V <sub>DC</sub>	12V <sub>DC</sub>	15V <sub>DC</sub>	24V <sub>DC</sub>	30V <sub>DC</sub>	48V <sub>DC</sub>	60V <sub>DC</sub>	110V <sub>DC</sub>
Max. continuous operating voltage	<b>U<sub>c</sub></b>	6V <sub>DC</sub>	15V <sub>DC</sub>	18V <sub>DC</sub>	28V <sub>DC</sub>	33V <sub>DC</sub>	52V <sub>DC</sub>	64V <sub>DC</sub>	170V <sub>DC</sub>
Rated spark overvoltage	(SG-PG) (a-b), (a, b-SG)	280 - 420V	280 - 420V	280 - 420V	280 - 420V	280 - 420V	280 - 420V	280 - 420V	280 - 420V
Rated operating current at 25°C	<b>I<sub>L</sub></b>	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20µs)	<b>I<sub>n</sub></b>	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20µs)	<b>I<sub>max</sub></b>	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5 kA (8/20µs)	(line-line)	< 22V	< 42V	< 48V	< 70V	< 80V	< 140V	< 160V	< 450V
Response time of overvoltage protection	<b>t<sub>A</sub></b> (a, b-SG)	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 25ns
Response time of overvoltage protection	<b>t<sub>A</sub></b> (SG-PG)	100ns	100ns	100ns	100ns	100ns	100ns	100ns	100ns
Insulation resistance of the protection	(a-b) (SG-PG)	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial resistance	<b>R</b>	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω	1.6 - 2.0Ω
Transverse capacitance	<b>C</b> (a, b-SG) (SG-PG)	50pF 5pF	50pF 5pF	50pF 5pF	50pF 5pF	50pF 5pF	50pF 5pF	50pF 5pF	50pF 5pF
Limit frequency	<b>f<sub>G</sub></b>	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz	30Mhz
Terminal cross section	Multi-strand to 4 mm <sup>2</sup>								
Operating temperature	- 40°C ... + 80°C								
Degree of protection	IP 20								
Housing material	Thermoplastic; gray, extinguishing degree V-0								
Dimensions DIN 43880	2/3TE								
Mounting EN 60715	On a 35mm DIN rail								
Ordering code	Base + Replaceable plug-in module	708 142	708 143	708 144	708 145	708146	708 147	708 148	708 141
	Replaceable plug-in module	708 132	708 133	708 134	708 135	708 136	708 137	708 138	708 131

### Dimensional drawing



### Connection diagram

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





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

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

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

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

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

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

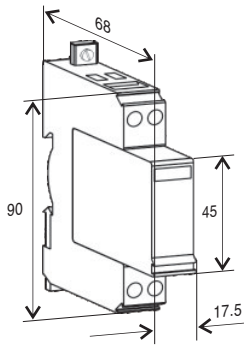
Both common (longitudinal) mode and differential (transverse) mode protection is provided.

## Technical characteristics

Type	VMS-TC								
	5V	12V	15V	24V	30V	48V	60V	110V	
Protection construction	Two parts: base + replaceable plug-in module								
Number of protected pairs	1 (2 conductors)								
Nominal operating voltage	<b>U<sub>n</sub></b>	5V <sub>DC</sub>	12V <sub>DC</sub>	15V <sub>DC</sub>	24V <sub>DC</sub>	30V <sub>DC</sub>	48V <sub>DC</sub>	60V <sub>DC</sub>	110V <sub>DC</sub>
Max. continuous operating voltage	<b>U<sub>c</sub></b>	7V <sub>DC</sub>	15V <sub>DC</sub>	18V <sub>DC</sub>	28V <sub>DC</sub>	33V <sub>DC</sub>	52V <sub>DC</sub>	64V <sub>DC</sub>	170V <sub>DC</sub>
Rated spark overvoltage	(a/b-PG)	280 - 500V	280 - 500V	280 - 500V	280 - 500V	280 - 500V	280 - 500V	280 - 500V	400 - 680V
	(a-b)	6.5 - 9V	6.5 - 9V	6.5 - 9V	6.5 - 9V	6.5 - 9V	6.5 - 9V	6.5 - 9V	16 - 20V
Rated operating current at 25°C	<b>I<sub>L</sub></b>	1A	1A	1A	1A	1A	1A	1A	1A
Nominal discharge current (8/20μs)	<b>I<sub>n</sub></b>	10kA	10kA	10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge current (8/20μs)	<b>I<sub>max</sub></b>	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA
Residual voltage at 5 kA (8/20μs)	(line-line)	< 20V	< 39V	< 45V	< 65V	< 77V	< 135V	< 150V	< 450V
Response time of overvoltage protection	<b>t<sub>A</sub></b> (a-b)	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 1ns	< 25ns
Response time of overvoltage protection	<b>t<sub>A</sub></b> (a/b-PG)	100ns	100ns	100ns	100ns	100ns	100ns	100ns	100ns
Insulation resistance of the protection	(a-b)	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
	(a/b-PG)	> 1GΩ / 100V							
Serial resistance	<b>R</b>	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω	ca 1Ω
Transverse capacitance	<b>C</b> (a-b)	5nF	3nF	2.2nF	1.9nF	1.4nF	0.82nF	0.7nF	90pF
	(a/b-PG)	8pF	8pF	8pF	8pF	8pF	8pF	8pF	8pF
Limit frequency	<b>f<sub>G</sub></b>	0.6MHz	0.9MHz	1.1MHz	1.4MHz	1.8MHz	2.2MHz	3.0MHz	10Mhz
Terminal cross section	Multi-strand to 6 mm <sup>2</sup>								
Operating temperature	- 40°C ... + 80°C								
Degree of protection	IP 20								
Housing material	Thermoplastic; yellow, extinguishing degree V-0								
Dimensions DIN 43880	1TE								
Mounting EN 60715	on a 35mm DIN rail								
Ordering code	Base + Replaceable plug-in module	<b>702 005</b>	<b>702 008</b>	<b>702 011</b>	<b>702 014</b>	<b>702 017</b>	<b>702 020</b>	<b>702 023</b>	<b>702 002</b>
	Replaceable plug-in module	<b>702 004</b>	<b>702 007</b>	<b>702 010</b>	<b>702 013</b>	<b>702 016</b>	<b>702 019</b>	<b>702 022</b>	<b>702 001</b>



### Dimensional drawings

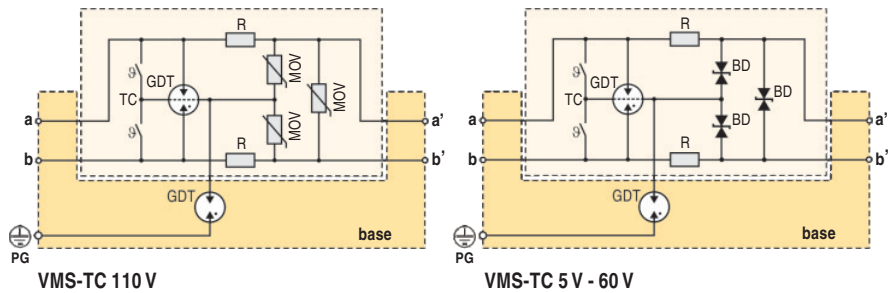


VM Base

### Connection diagram

Legend:

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



VMS-TC 110 V

VMS-TC 5 V - 60 V

### Accessory Part for VMS-TC

#### Testing module VMTEST



A testing module VMTEST is intended for performing measurements on the VM-TD, VMS-TC, VMO bases.

A module enables performing of the measurements on both input and output sides.

It is equipped with five banana sockets with D = 2 mm. Red terminals are connected to the module's output, blue ones are connected to the module's input, whereas yellow one is connected to the grounding contact.

Type	VMTest
Ordering code	127 144



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

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

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

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

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

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

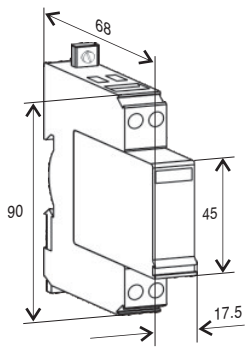
## Technical characteristics

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





### Dimensional drawings

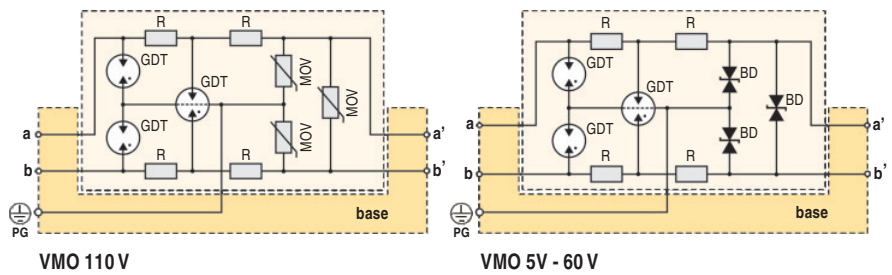


VM Base

### Connection diagram

Legend:

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



VMO 110 V

VMO 5V - 60 V



### Accessory Part for VMO

#### Testing module VM TEST

A testing module VM TEST is intended for performing measurements on the VM-TD, VMS-TC, VMO bases.

A module enables performing of the measurements on both input and output sides.

It is equipped with five banana sockets with  $D = 2$  mm. Red terminals are connected to the module's output, blue ones are connected to the module's input, whereas yellow one is connected to the grounding contact.

Type	VMTest
Ordering code	127 144



IEC category / EN type:	C1/C2/C3 (IEC 60643-21)
Design:	Replaceable plug-in module
Number of protected pairs:	1 (2 lines)
Coarse Protection:	3 terminal GDT
Nom. Operating Voltage $U_N$ :	110V <sub>DC</sub>
Max. Operating Voltage $U_C$ :	170V <sub>DC</sub>
Series Resistance:	9 - 11 $\Omega$
Freq:	< 16MHz
Surge Discharge Ratings:	$I_n$ : 10kA 8/20 $\mu$ s, $I_{max}$ : 20kA 8/20 $\mu$ s
Series load current:	300mA
Enclosure:	DIN 43880 1TE, DIN rail mount
Terminals:	Multi-strand to 4 mm <sup>2</sup>

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.

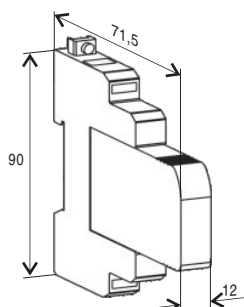
To protect against the hazards of electric shock and fire which often results when power frequency contact occurs between power and communication lines (often called mains incursion), a thermo-clip is included on the primary protection stage to divert the power frequency current to ground.

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

### Technical characteristics

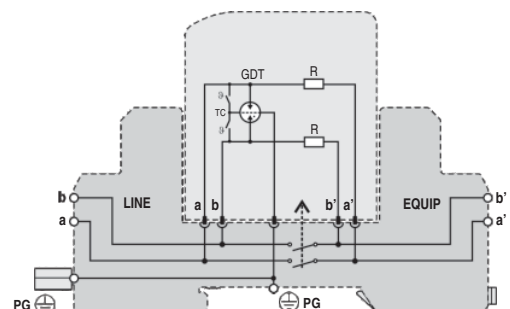
Type	SMH-TDR 110V	
Protection construction	Two parts: base + replaceable plug-in module	
Number of protected pairs	1 (2 conductors)	
Nominal operating voltage	$U_N$	110V <sub>DC</sub>
Max. continuous operating voltage	$U_C$	170V <sub>DC</sub>
Rated spark overvoltage	(a/b-PG)	184V - 276V
	(a-b)	184V -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

### Dimensional drawings



### Connection diagram

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





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

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.

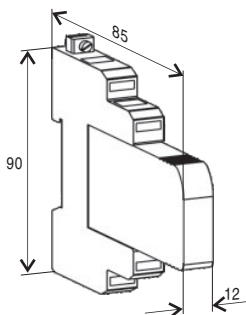
To protect against the hazards of electric shock and fire which often results when power frequency contact occurs between power and communication lines (often called mains incursion), a thermo-clip is included on the primary protection stage to divert the power frequency current to ground.

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

### Technical characteristics

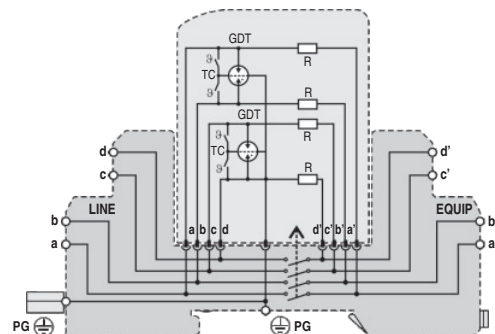
Type	SMH2-TDR 110V	
Protection construction	Two parts: base + replaceable plug-in module	
Number of protected pairs	2 (4 conductors)	
Nominal operating voltage	$U_n$	110V <sub>DC</sub>
Max. continuous operating voltage	$U_c$	170V <sub>DC</sub>
Rated spark overvoltage	(a/b-PG)	184V - 276V
	(a-b)	184V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

### Dimensional drawings



### Connection diagram

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





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

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

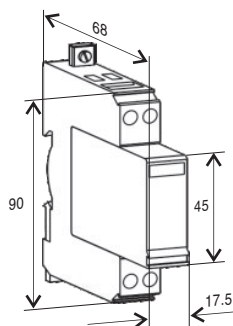
Coarse protection is provided by a three terminal gas discharge tube.

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

### Technical characteristics

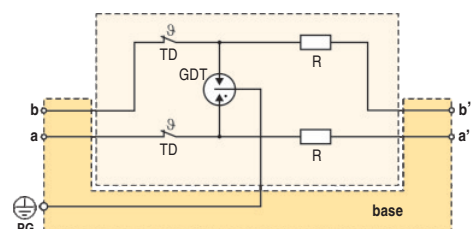
Type	VM-TDR 110V	
Protection construction	Two parts: base + replaceable plug-in module	
Number of protected pairs	1 (2 conductors)	
Nominal operating voltage	$U_n$	110V <sub>DC</sub>
Max. continuous operating voltage	$U_c$	170V <sub>DC</sub>
Rated spark overvoltage	(a/b-PG)	184V - 276V
	(a-b)	184V -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

### Dimensional drawings



### Connection diagram

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





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

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.

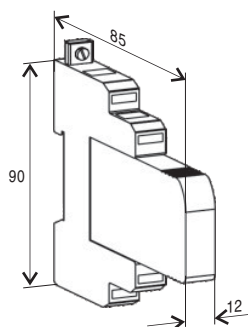
The plug-in module/base design facilitates replacement of a failure module without the need to remove system wiring.

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

### Technical characteristics

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

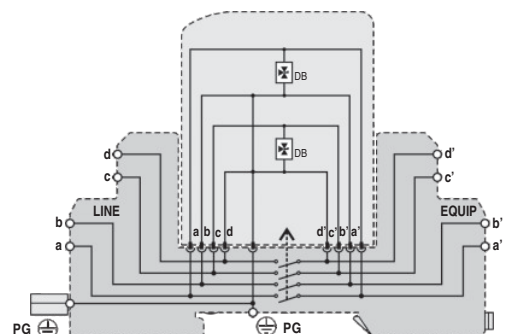
### Dimensional drawings



### Connection diagram

Legend:

DB	diode block
PG	protective grounding





IEC category / EN type:	C1/C2/C3 (IEC 60643-21)
Design:	Compact module
Number of protected pairs:	1 line
Fine Protection:	MOV
Nom. Operating Voltage $U_n$ :	15, 30V <sub>DC</sub>
Max. Operating Voltage $U_c$ :	22, 38V <sub>DC</sub> respectively
Freq:	< 0.5MHz
Surge Discharge Ratings:	$I_n$ : 500A respectively
Series load current:	10A
Enclosure:	DIN 43880 6mm DIN rail mount
Terminals:	Multi-strand to 2.5mm <sup>2</sup>

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

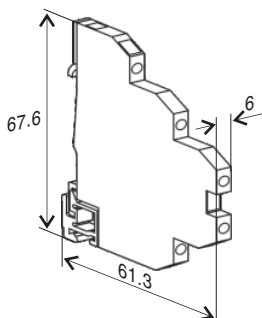
They only provide fine protection using a MOV.

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

### Technical characteristics

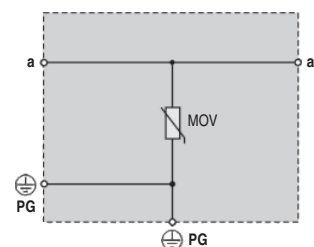
Type	IM-VF	
	15V	30V
Protection construction	Protective module	
Number of protected pairs	(1 conductor)	
Nominal operating voltage $U_n$	15V <sub>DC</sub>	30V <sub>DC</sub>
Max. continuous operating voltage $U_c$	22V <sub>DC</sub>	38V <sub>DC</sub>
Rated spark overvoltage	24V - 30V	42V - 52V
Rated operating current at 25°C $I_L$	10A	10A
Nominal discharge current (8/20µs) $I_n$	500A	500A
Residual voltage at $I_n$ (8/20µs)	< 53V	< 93V
Response time of overvoltage protection $t_A$	< 25ns	< 25ns
Insulation resistance of the protection	≥ 1.5MΩ	≥ 3MΩ
Serial resistance $R$	< 0.1Ω	< 0.1Ω
Transverse capacitance $C$	< 10nF	< 6nF
Terminal cross section	Multi-strand to 6 mm <sup>2</sup>	
Operating temperature	-40°C ... +80°C	
Degree of protection	IP 20	
Housing material	Thermoplastic; brown (beige), extinguishing degree V-O	
Dimensions DIN 43880	6mm	
Mounting EN 60715	on a 35mm DIN rail	
Ordering code	704 550	704 551

### Dimensional drawings



### Connection diagram

Legend:	
MOV	varistor
PG	protective grounding





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

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

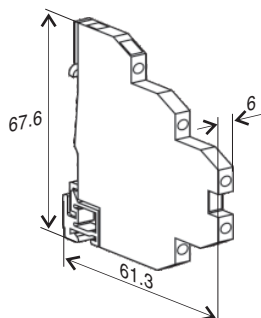
They only provide fine protection using a high speed, bi-directional, silicon stage.

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

### Technical characteristics

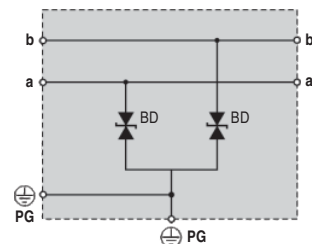
Type	IM-DF				
	5V	12V	24V	60V	
Protection construction	Protective module				
Number of protected pairs	1 (2 conductors)				
Nominal operating voltage	$U_n$ 5V <sub>DC</sub>	12V <sub>DC</sub>	24V <sub>DC</sub>	60V <sub>DC</sub>	
Max. continuous operating voltage	$U_c$ 6V <sub>DC</sub>	15V <sub>DC</sub>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

### Dimensional drawings



### Connection diagram

Legend:	
BD	bi-directional TVS diode
PG	protective grounding





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

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

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

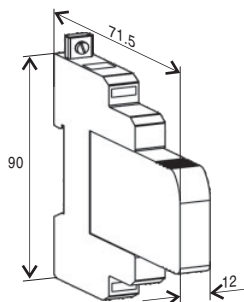
Over current protection is provided using a PTC element, which provides a level of protection against short circuit fault conditions.

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

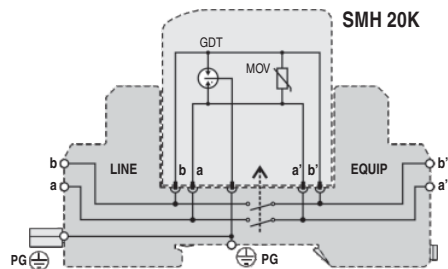
### Technical characteristics

Type	SMH-20K 230V	SMH-20D 24V	SMH-20D 48V
Protection construction	Two parts: base + replaceable plug-in module		
Number of protected pairs	1 (2 conductors)		
Nominal operating voltage	$U_N$ 230V <sub>DC</sub>	24V <sub>DC</sub>	60V <sub>DC</sub>
Max. continuous operating voltage	$U_C$ 320V <sub>DC</sub>	28V <sub>DC</sub>	64V <sub>DC</sub>
Rated spark overvoltage	(a/b-PG) 350V - 504V	350V - 504V	350V - 504V
	(a-b) 351V - 429V	30V - 36V	67V - 85V
Rated operating current at 25°C	$I_L$ 5A	145mA	145mA
Nominal discharge current (8/20 $\mu$ s)	$I_N$ 10kA	10kA	10kA
Max. discharge current (8/20 $\mu$ s)	$I_{max}$ 20kA	20kA	20kA
Residual voltage at 5 kA (8/20 $\mu$ s)	(line-line) < 450V	< 65V	< 135V
Response time of overvoltage protection	$t_A$ < 25ns	< 1ns	< 1ns
Overcurrent protection	/	PTC resistors at $I > 0.3A$	PTC resistors at $I > 0.3A$
Insulation resistance of the protection	$\geq 320M\Omega$	$\geq 28M\Omega$	$\geq 64M\Omega$
Serial resistance	$R$ < 0.1 $\Omega$	9-11 $\Omega$	9-11 $\Omega$
Transverse capacitance	$C$ < 1nF	< 3nF	< 1.2nF
Terminal cross section	Multi-strand to 4 mm <sup>2</sup>	Multi-strand to 4 mm <sup>2</sup>	Multi-strand to 4 mm <sup>2</sup>
Operating temperature	-40°C ... +80°C	-25°C ... +50°C	-25°C ... +50°C
Degree of protection	IP 20		
Housing material	Thermoplastic; gray, extinguishing degree V-0		
Dimensions DIN 43880	2/3TE		
Mounting EN 60715	on a 35mm DIN rail		
Ordering code	Base + Replaceable plug-in module	708 154	708 155
	Replaceable plug-in module	708 157	708 158
		708 158	708 159

### Dimensional drawings

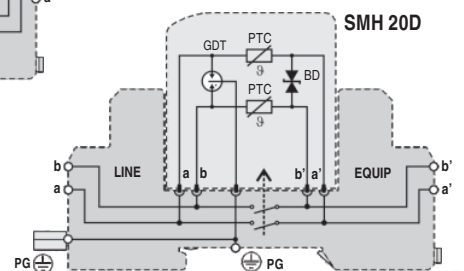


### Connection diagram

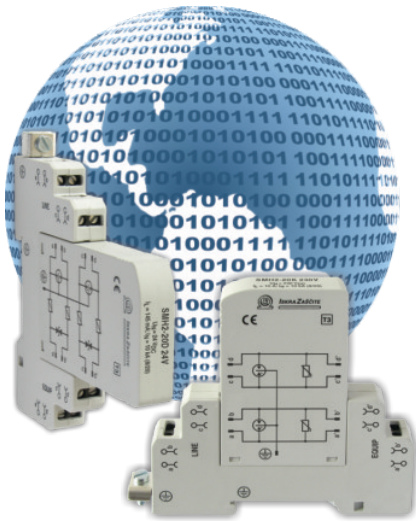


#### Legend:

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







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

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

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

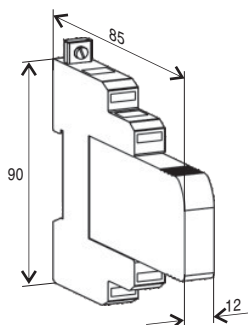
Over current protection is provided using a PTC element, which provides a level of protection against short circuit fault conditions.

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

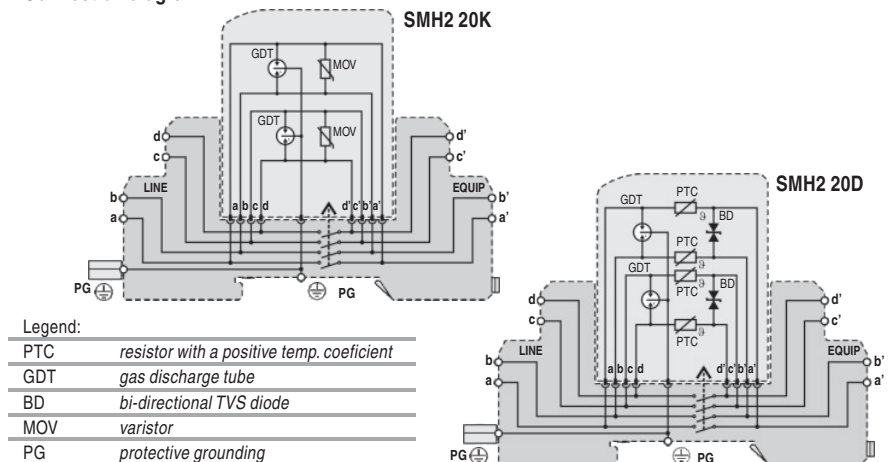
### Technical characteristics

Type		SMH2-20K 230V	SMH2-20D 24V	SMH2-20D 48V
Protection construction		Two parts: base + replaceable plug-in module		
Number of protected pairs		2 (4 conductors)		
Nominal operating voltage	$U_n$	230V <sub>DC</sub>	24V <sub>DC</sub>	60V <sub>DC</sub>
Max. continuous operating voltage	$U_c$	320V <sub>DC</sub>	28V <sub>DC</sub>	64V <sub>DC</sub>
Rated spark overvoltage	(a/b-PG)	350V - 504V	350V - 504V	350V - 504V
	(a-b)	351V - 429V	30V - 36V	67V - 85V
Rated operating current at 25°C	$I_L$	5A	145mA	145mA
Nominal discharge current (8/20 $\mu$ s)	$I_n$	10kA	10kA	10kA
Max. discharge current (8/20 $\mu$ s)	$I_{max}$	20kA	20kA	20kA
Residual voltage at 5 kA (8/20 $\mu$ s)	(line-line)	< 450V	< 65V	< 135V
Response time of overvoltage protection	$t_A$	< 25ns	< 1ns	< 1ns
Overcurrent protection		/	PTC resistors at $I > 0.3A$	PTC resistors at $I > 0.3A$
Insulation resistance of the protection		$\geq 320M\Omega$	$\geq 28M\Omega$	$\geq 64M\Omega$
Serial resistance	R	< 0.1 $\Omega$	9-11 $\Omega$	9-11 $\Omega$
Transverse capacitance	C	< 1nF	< 3nF	< 1.2nF
Terminal cross section		Multi-strand to 4 mm <sup>2</sup>	Multi-strand to 4 mm <sup>2</sup>	Multi-strand to 4 mm <sup>2</sup>
Operating temperature		-40°C ... +80°C	-25°C ... +50°C	-25°C ... +50°C
Degree of protection		IP 20		
Housing material		Thermoplastic; gray extinguishing degree V-0		
Dimensions DIN 43880		2/3TE		
Mounting EN 60715		on a 35mm DIN rail		
Ordering code	Base + Replaceable plug-in module	<b>708 160</b>	<b>708 161</b>	<b>708 162</b>
	Replaceable plug-in module	<b>708 163</b>	<b>708 164</b>	<b>708 165</b>

### Dimensional drawings



### Connection diagram





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

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

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

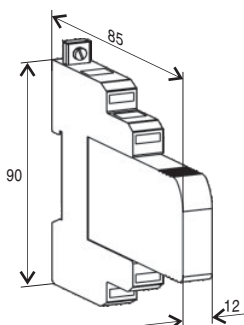
The signal line circuit is designed to minimize intercapacitance, and shunt capacitance, thereby maximizing the operating frequency to 35MHz.

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

### Technical characteristics

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

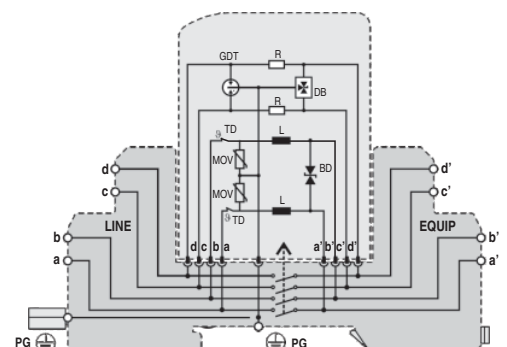
### Dimensional drawings

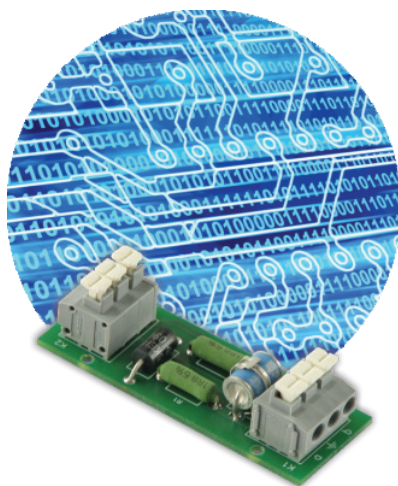


### Connection diagram

#### Legend:

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





<b>IEC category / EN type:</b>	<b>C1/C2/C3 (IEC 60643-21)</b>
<b>Design:</b>	<b>PCB assembly</b>
<b>Mode of protection:</b>	<b>Longitudinal, Transverse</b>
<b>Coarse Protection:</b>	<b>3 terminal GDT</b>
<b>Available voltages:</b>	<b>12, 24V<sub>DC</sub></b>
<b>Freq:</b>	<b>30MHz</b>
<b>Surge Discharge Ratings:</b>	<b>I<sub>n</sub>:10kA 8/20μs, I<sub>max</sub>: 20kA 8/20μs</b>
<b>Load current:</b>	<b>1A</b>
<b>Terminal:</b>	<b>Multi-strand to 1.5mm<sup>2</sup></b>

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

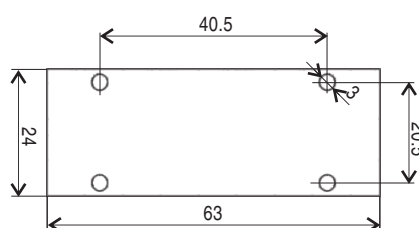
The initial protection stage comprises a three-pole gas discharge tube and is designed to divert the primary surge energy. The subsequent fine protection stage is carried out using fast bi-directional silicon avalanche diodes. Care is taken in the design of this fine protection stage to avoid capacitive 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.

### Technical characteristics

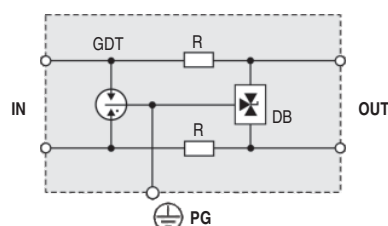
Type		LZ-SMH	
		12V	24V
Protection construction		PCB assembly	
Number of protected pairs		1 (2 conductors)	
Nominal operating voltage	<b>U<sub>n</sub></b>	12V <sub>DC</sub>	24V <sub>DC</sub>
Max. continuous operating voltage	<b>U<sub>c</sub></b>	15V <sub>DC</sub>	28V <sub>DC</sub>
Rated spark overvoltage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

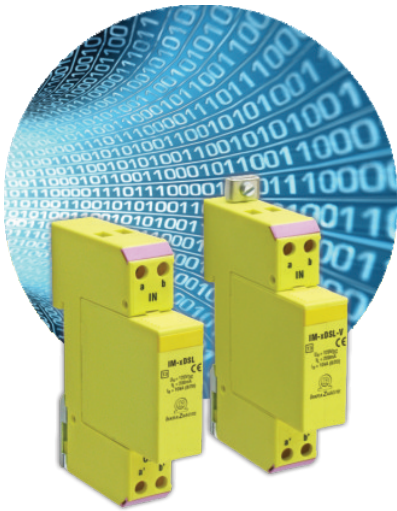
### Dimensional drawings



### Connection diagram

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





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

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

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

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

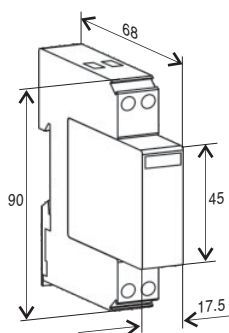
Thermal protection is provided to reduce the hazards of thermal runaway should there be an inadvertent mains incursion fault.

### Technical characteristics

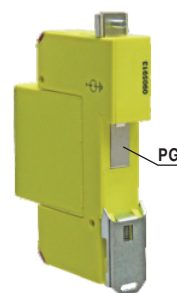
Type		IM-xDSL	IM-xDSL-V	IM-xDSL-T
Protection construction		Two parts: base and extractable insert		
Number of protected pairs		1 (2 conductors)		
Nominal operating voltage	$U_n$	120V <sub>DC</sub>	120V <sub>DC</sub>	120V <sub>DC</sub>
Max. continuous operating voltage	$U_c$	170V <sub>DC</sub>	170V <sub>DC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



## Dimensional drawings



IM base

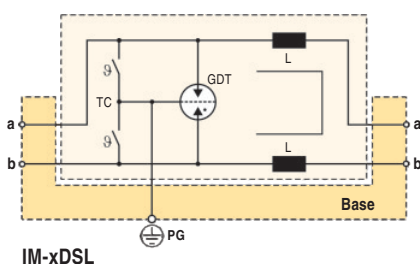


IM 2GND base

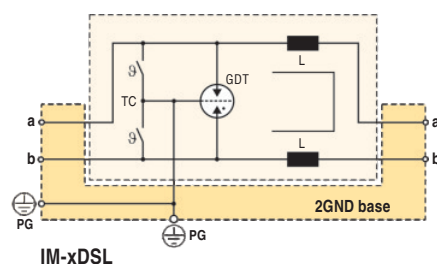
## Connection diagram

Various options for the base unit exist including:

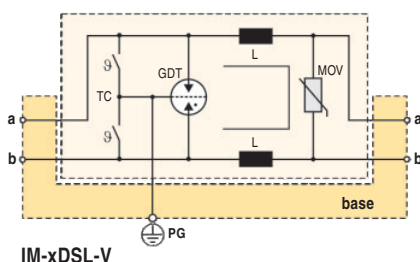
**2 GND base:** where a second ground terminal (in addition to the DIN rail ground strip) is provided for installations not utilizing DIN rail.



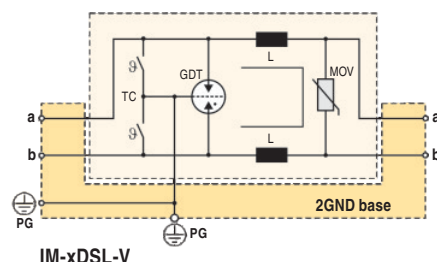
IM-xDSL



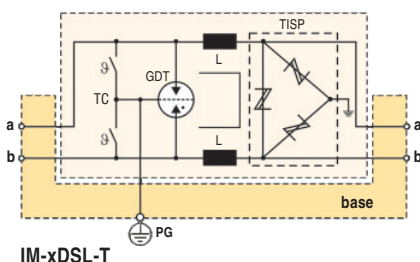
IM-xDSL



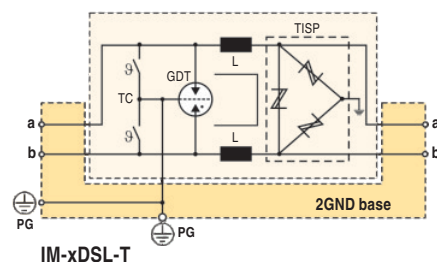
IM-xDSL-V



IM-xDSL-V



IM-xDSL-T



IM-xDSL-T

### Legend:

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

## Accessory Part for IM-xDSL

### Testing module IM TEST

A testing module IM TEST is intended for performing measurements on the IM bases.

A module enables performing of the measurements on both input and output sides.

It is equipped with five banana sockets with D = 2 mm. Red terminals are connected to the module's output, blue ones are connected to the module's input, whereas yellow one is connected to the grounding contact.



Type	IMTest
Ordering code	127 145



IEC category / EN type:	C1/C2/C3 (IEC 60643-21)
Design:	Replaceable plug-in module
Coarse Protection:	Varistors
Nom. Operating Voltage $U_n$ :	12V <sub>DC</sub> , 24V <sub>DC</sub> and 48V <sub>DC</sub>
Max. Operating Voltage $U_c$ :	15V <sub>DC</sub> , 28V <sub>DC</sub> and 52V <sub>DC</sub>
Series Inductivity:	10 - 14μH
Surge Discharge Ratings:	$I_n$ : 10kA 8/20μs, $I_{max}$ : 20kA 8/20μs
Series load current:	4A
Enclosure:	DIN 43880 12mm, DIN rail mount
Terminals:	Multi-strand to 4mm <sup>2</sup>

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

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

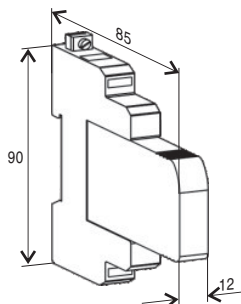
Internal thermal disconnectors are used to reduce the hazards of thermal runaway during fault conditions, or if mains incursion onto the low voltage data circuit, occurs.

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

## Technical characteristics

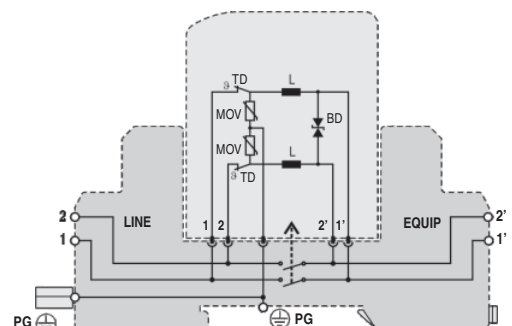
Type	SMH-PS			
	12V	24V	48V	
Protection construction	Two parts: base + replaceable plug-in module			
Number of protected pairs	1 (2 conductors)			
Nominal operating voltage	$U_n$ 12V <sub>DC</sub>	24V <sub>DC</sub>	48V <sub>DC</sub>	
Max. continuous operating voltage	$U_c$ 15V <sub>DC</sub>	28V <sub>DC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

## Dimensional drawings



## Connection diagram

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





IEC category / EN type:	C1/C2/C3 (IEC 60643-21)
Design:	Replaceable plug-in module
Coarse Protection:	3 terminal GDT
Nom. Operating Voltage $U_n$ :	12V <sub>DC</sub> and 24V <sub>DC</sub>
Max. Operating Voltage $U_c$ :	15V <sub>DC</sub> and 28V <sub>DC</sub>
Series Resistance:	0.1Ω
Freq:	DC
Surge Discharge Ratings:	$I_n$ : 10kA 8/20μs, $I_{max}$ : 20kA 8/20μs
Series load current:	10A
Enclosure:	DIN 43880 1TE, DIN rail mount
Terminals:	Multi-strand to 6mm <sup>2</sup>

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

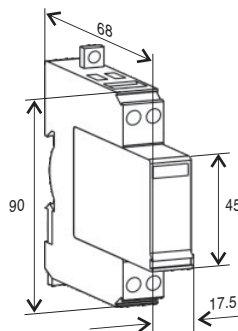
Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon stage.

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

## Technical characteristics

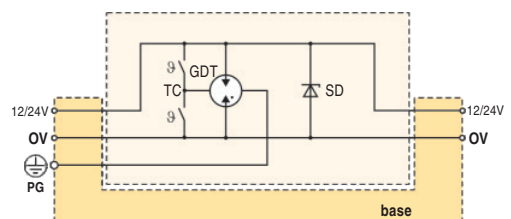
Type	VM-DC		
	12V		24V
Protection construction	Two parts: base + replaceable plug-in module		
Number of protected pairs	1 (2 conductors)		
Nominal operating voltage	$U_n$	12V <sub>DC</sub>	24V <sub>DC</sub>
Max. continuous operating voltage	$U_c$	15V <sub>DC</sub>	28V <sub>DC</sub>
Rated spark overvoltage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

## Dimensional drawings



## Connection diagram

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





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

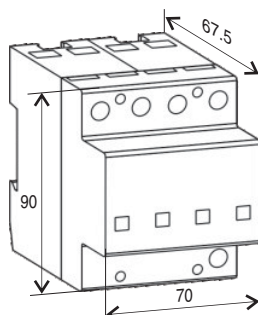
The DC PROTEC series has been designed to meet the unique requirements of protection of DC power systems found in telepower and railway applications.

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

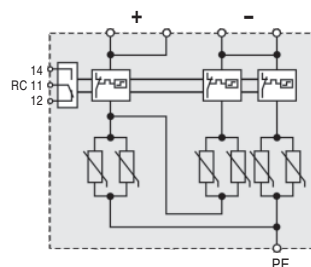
### Technical characteristics

Type		DC PROTEC B(R) 10	
		24	48
In accordance with		IEC-61643-1	IEC-61643-1
Max. continuous operating voltage (DC)	<b><math>U_C</math></b>	30V	60V
Nominal discharge current (8/20)	<b><math>I_n</math></b>	20kA	20kA
Max. discharge current (8/20)	<b><math>I_{max}</math></b>	60kA	60kA
Impulse current (10/350)	<b><math>I_{imp}</math></b>	10kA	10kA
Protection level	<b><math>U_p</math></b>	< 0.6kV	< 0.6kV
Residual voltage at $I_{imp}$	<b><math>U_{res}</math></b>	< 0.3kV	< 0.3kV
Follow current	<b><math>I_f</math></b>	NO	NO
Response time	<b><math>t_A</math></b>	< 25ns	< 25ns
Thermal protection		YES	YES
Terminal screw torque		max. 4.5Nm	max. 4.5Nm
Short-circuit withstand current		25kA / 50Hz	25kA / 50Hz
Temperature range		- 40°C .... + 80°C	
Terminal cross section		35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)	
Mounting EN 60715		on a 35mm DIN rail	
Degree of protection		IP 20	
Housing material		Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880		4TE	
Remote contacts		YES	
Contact ratings		AC: 250V/0.5A; 125V/3A	
Terminal cross section		max. 1.5mm <sup>2</sup>	
Remote terminal torque		0.25Nm	
Ordering code	Without remote contact	510 598	510 600
	With remote contact	510 599	510 601

### Dimensional drawings



### Connection diagram







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

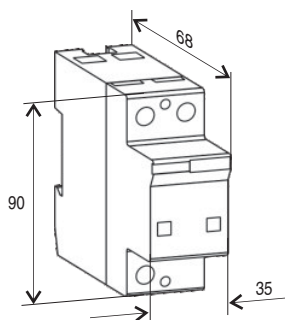
The DC PROTEC series has been designed to meet the unique requirements of protection of DC power systems found in telepower and railway applications.

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

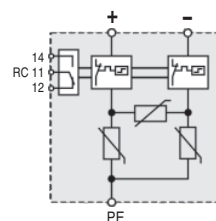
### Technical characteristics

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

### Dimensional drawings



### Connection diagram





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

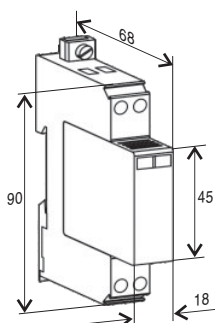
The PROTEC DMDR series has been designed to meet the unique requirements of protection of DC power systems found in telepower and railway applications.

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

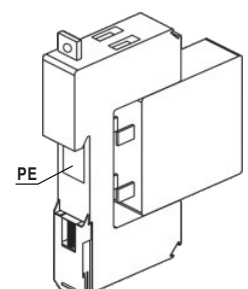
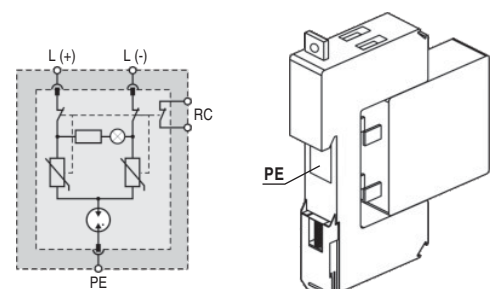
### Technical characteristics

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

### Dimensional drawings



### Connection diagram



# PROTEC C(R) 40

## DC POWER SUPPLY PROTECTION



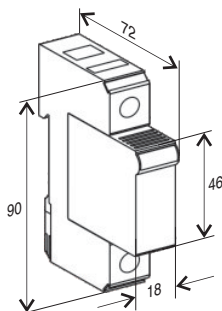
<b>Category IEC / EN / VDE:</b>	<b>Class II / Type 2 / C</b>
<b>Design:</b>	<b>Compact housing</b>
<b>Location of use:</b>	<b>Branch sub- distribution boards</b>
<b>Protection modes:</b>	<b>L/N - PE, L - PEN</b>
<b>Protective element:</b>	<b>MOV</b>
<b>Surge discharge ratings:</b>	<b><math>I_{max} =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

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

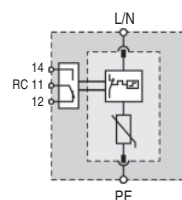
### Technical characteristics

Type	PROTEC C(R) 40 75	
In accordance with	IEC-61643-1	
Max. continuous operating voltage (AC/DC) $U_c$	75/100V	
Nominal discharge current (8/20) $I_n$	20kA	
Max. discharge current (8/20) $I_{max}$	40kA	
Protection level $U_p$	< 0.6kV	
Follow current $I_f$	NO	
Response time $t_A$	< 25ns	
Thermal protection	YES	
Terminal screw torque	max. 4.5Nm	
Short-circuit withstand current	25kA / 50Hz	
Temperature range	- 40°C .... + 80°C	
Terminal cross section	35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)	
Mounting EN 60715	on a35mm DIN rail	
Degree of protection	IP 20	
Housing material	Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880	1TE	
Remote contacts	YES	
Contact ratings	AC: 250V/0.5A; 125V/3A	
Terminal cross section	max. 1.5mm <sup>2</sup>	
Remote terminal torque	0.25Nm	
Ordering code	Without remote contact	<b>500 001</b>
	With remote contact	<b>500 011</b>
	Replaceable plug-in module	<b>500 216</b>

### Dimensional drawings



### Connection diagram



# PROTEC CN(R) 40

## DC POWER SUPPLY PROTECTION



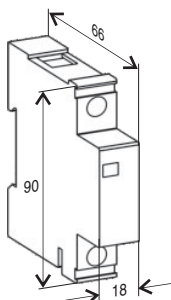
Category IEC / EN / VDE:	Class II / Type 2 / C
Design:	Compact housing
Location of use:	Branch sub-distribution boards
Protection modes:	L/N - PE, L - PEN
Protective element:	MOV
Surge discharge ratings:	$I_{max} = 40kA$
Internal protection and safety:	Thermal disconnecter for MOV
Status indication: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

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

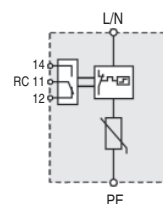
### Technical characteristics

Type	PROTEC CN(R) 40 75	
In accordance with	IEC-61643-1	
Max. continuous operating voltage (AC/DC) $U_C$	75/100V	
Nominal discharge current (8/20) $I_n$	20kA	
Max. discharge current (8/20) $I_{max}$	40kA	
Protection level $U_p$	< 0.6kV	
Follow current $I_f$	NO	
Response time $t_A$	< 25ns	
Thermal protection	YES	
Terminal screw torque	max. 3.5Nm	
Short-circuit withstand current	25kA / 50Hz	
Temperature range	- 40°C .... + 80°C	
Terminal cross section	35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)	
Mounting EN 60715	on a 35mm DIN rail	
Degree of protection	IP 20	
Housing material	Thermoplastic; extinguishing degree UL 94 V-0	
Dimensions DIN 43880	1TE	
Remote contacts	YES	
Contact ratings	AC: 250V/0.5A; 125V/3A	
Terminal cross section	max. 1.5mm <sup>2</sup>	
Remote terminal torque	0.25Nm	
Ordering code	Without remote contact	507 001
	With remote contact	507 011

### Dimensional drawings



### Connection diagram





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

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

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

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

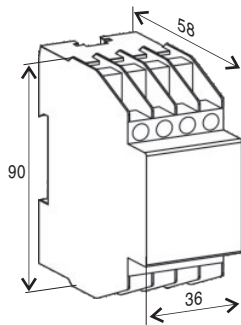
Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

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

#### Technical characteristics

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

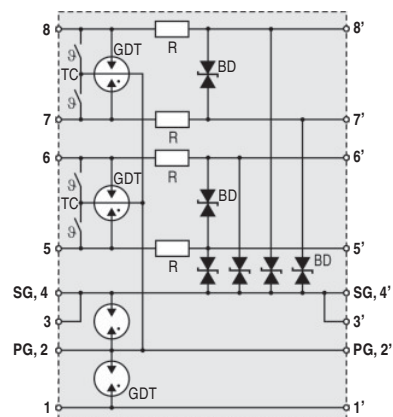
## Dimensional drawings

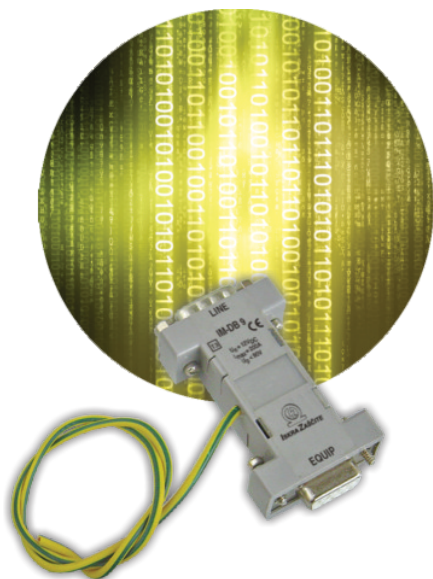


## Connection diagram

### Legend:

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





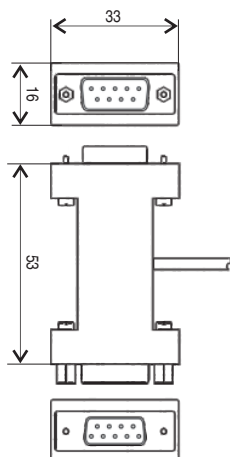
IEC category / EN type:	C1/C2/C3 (IEC 60643-21)
Design:	In-line module
Number of protected pairs:	8 lines
Nom. Operating Voltage $U_n$ :	12V <sub>DC</sub>
Max. Operating Voltage $U_c$ :	15V <sub>DC</sub>
Freq:	< 1MHz
Surge Discharge Ratings:	$I_n$ : 100A 8/20 $\mu$ s/line, $I_{max}$ : 200A 8/20 $\mu$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

The IM-DB9 series has been developed to protect transmission circuits using the RS 232 protocol. Protection is achieved via a DB9, in-line package, comprises a combination of MOV and fast silicon suppressor diodes. All eight lines are protected.

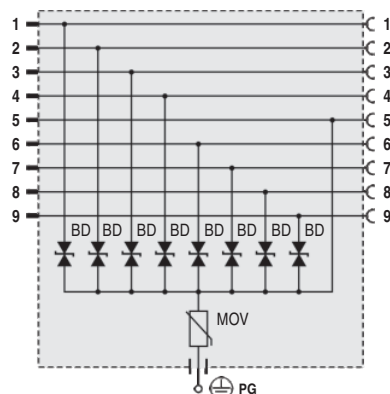
### Technical characteristics

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

### Dimensional drawings



### Connection diagram



Legend:

BD	bi-directional TVS diode
MOV	varistor
PG	protective grounding



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

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

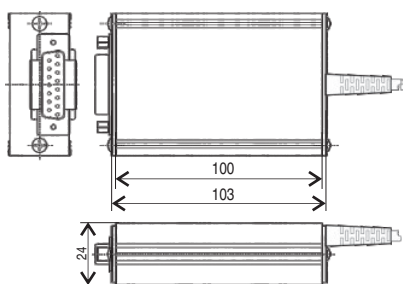
The DB15, in-line package, comprises a circuit of two balanced pairs with equipotential equalization between them. Equipotential equalization is also provided between signal ground and protective ground to avoid equipment damage from ground potential rises during surge activity.

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

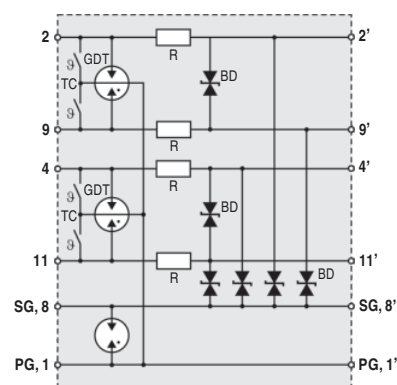
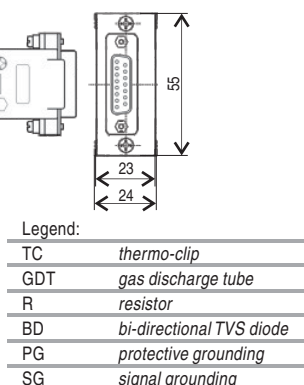
### Technical characteristics

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

### Dimensional drawings



### Connection diagram







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

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

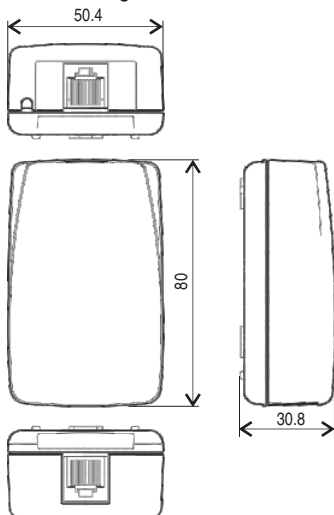
It provides protection to all 8 lines in the UTP, and is Cat 5 capable.

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

### Technical characteristics

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

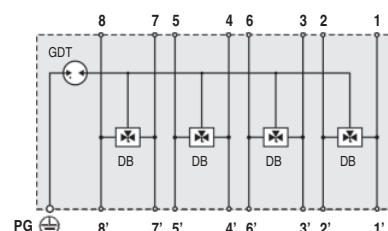
### Dimensional drawings



### Connection diagram

Legend:

GDT	gas discharge tube
DB	diode block
PG	protective grounding





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

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

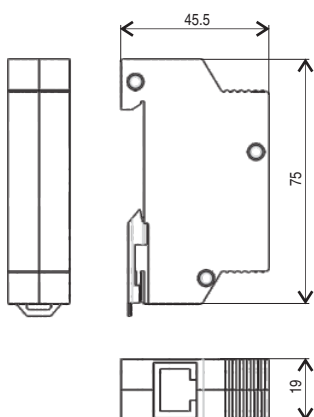
It provides protection to all 8 lines in the UTP, STP and is **Cat 6 capable**.

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

### Technical characteristics

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

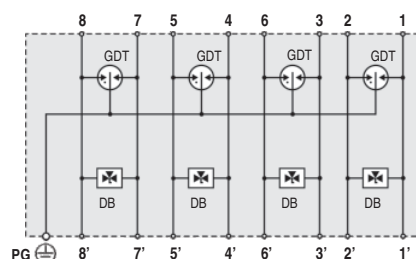
### Dimensional drawings



### Connection diagram

Legend:

GDT	gas discharge tube
DB	diode block
PG	protective grounding





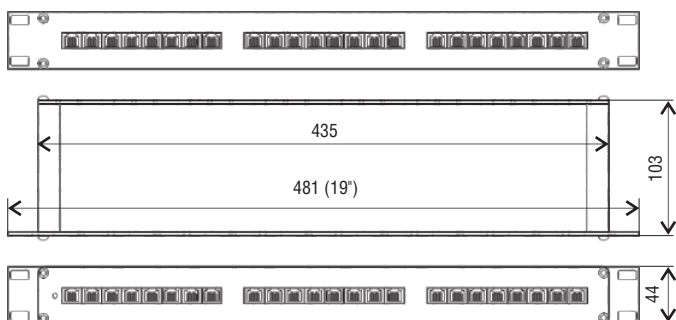
<b>IEC category / EN type:</b>	<b>C1/C2/C3 (IEC 60643-21)</b>
<b>Design:</b>	<b>19" rack patch panel up to 24 way</b>
<b>Protection:</b>	<b>All 4 pairs protected</b>
<b>Nom. Operating Voltage <math>U_n</math>:</b>	<b><math>\pm 5V_{DC}</math></b>
<b>Max. Operating Voltage <math>U_c</math>:</b>	<b><math>\pm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

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

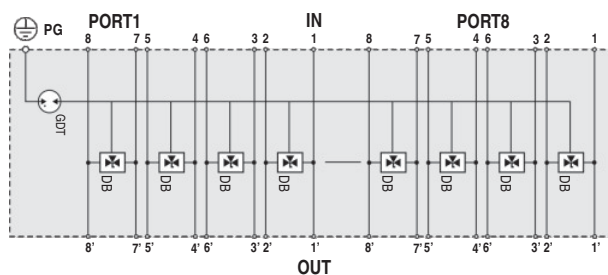
### Technical characteristics

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

### Dimensional drawings



### Connection diagram



#### Legend:

GDT	gas discharge tube
DB	diode block
PG	protective grounding



<b>IEC category / EN type:</b>	<b>III (IEC 60643-1) and C1/C2/C3 (IEC 60643-21)</b>
<b>Design:</b>	<b>Compact, ergonomic packaging</b>
<b>Protection:</b>	<b>Power and Data port</b>
<b>Data port:</b>	<b>Nom. Operating Voltage <math>U_N</math>: <math>\pm 5V_{DC}</math> Max. Operating Voltage <math>U_C</math>: <math>\pm 5V_{DC}</math></b>
<b>Power port:</b>	<b>Nom. Operating Voltage <math>U_N</math>: 230V<sub>AC</sub> Max. Operating Voltage <math>U_C</math>: 275V<sub>AC</sub></b>
<b>Freq:</b>	<b>&lt; 100MHz, Cat 5 capable</b>
<b>Surge Discharge Ratings:</b>	<b>Data Port <math>I_n</math>: 300A 8/20<math>\mu</math>s per line Power Port <math>I_n</math>: 3kA 8/20<math>\mu</math>s L-N / L-PE</b>
<b>Enclosure:</b>	<b>UTB in-line patch, AC power outlet</b>
<b>Termination:</b>	<b>Data: RJ45, Cat. 5 connectors Power: DIN 49 440-CE(7) III, DIN 49 441-CEE(7) IV</b>

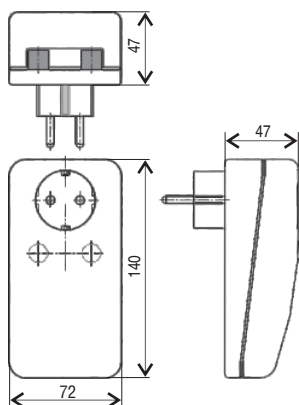
The ZE 200-NET series is intended to protect Local Area Networks (LAN) from over voltage surges and electrostatic discharges created by switching transients in buildings. LAN systems are particularly prone to such disturbances because of the often long cable lengths involved which behave like antennas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

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

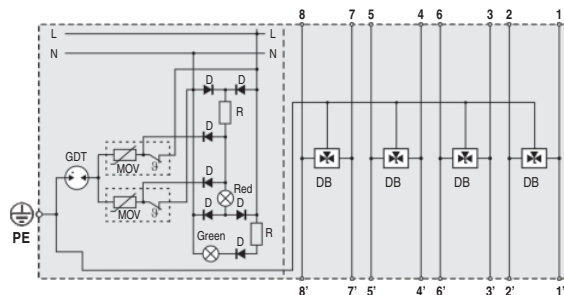
### Technical characteristics

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

### Dimensional drawings

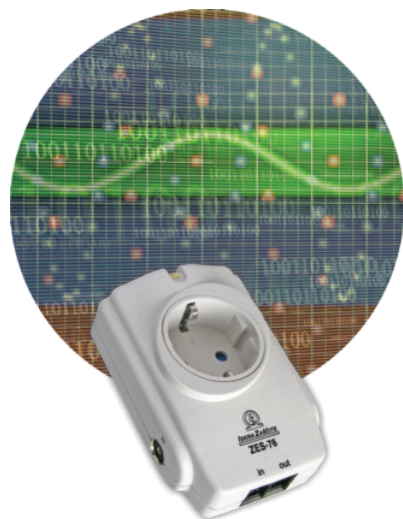


### Connection diagram



#### Legend:

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



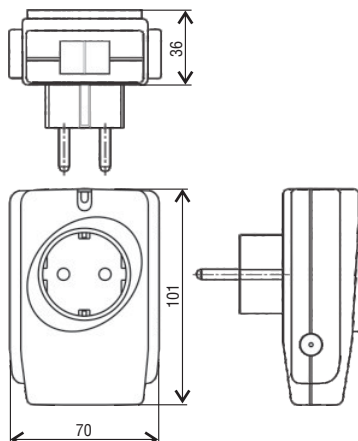
<b>IEC category / EN type:</b>	III (IEC 60643-1) and C1/C2/C3 (IEC 60643-21)
<b>Design:</b>	Compact, ergonomic packaging
<b>Protection:</b>	Power, telecommunication and TV
<b>Telecommunication port:</b>	Max. Operating Voltage $U_C$ : 170V <sub>DC</sub>
<b>TV port:</b>	Max. Operating Voltage $U_C$ : 70V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

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

### Technical characteristics

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

### Dimensional drawings





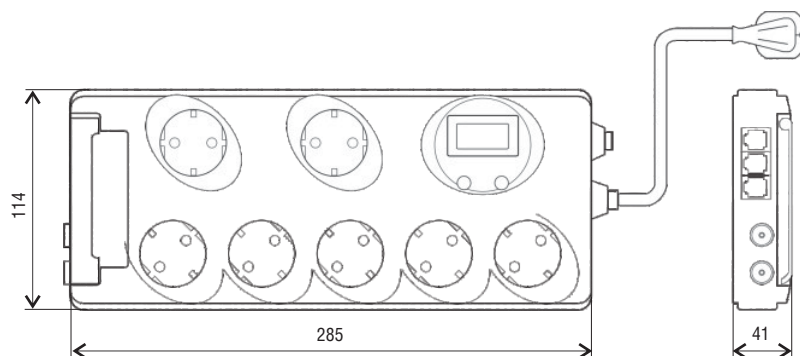
<b>IEC category / EN type:</b>	III (IEC 60643-1) and C1/C2/C3 (IEC 60643-21)
<b>Design:</b>	Compact, ergonomic packaging, extension cord, 7 power socket
<b>Protection:</b>	Power, telecommunication and TV
<b>Telecommunication port:</b>	Max. Operating Voltage $U_C$ : 170V <sub>DC</sub>
<b>TV port:</b>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

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

## Technical characteristics

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

## Dimensional drawings





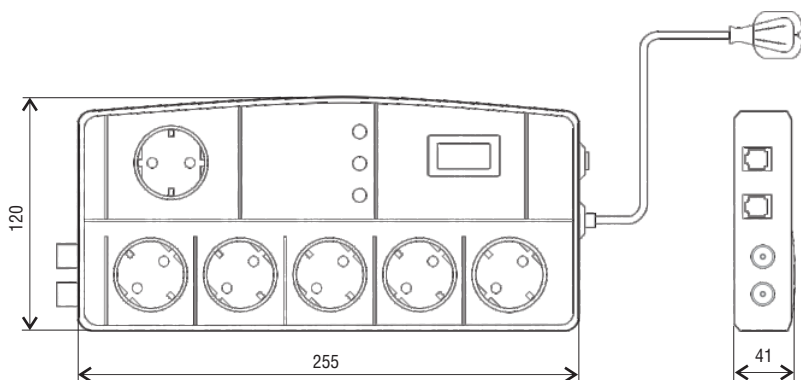
<b>IEC category / EN type:</b>	III (IEC 60643-1) and C1/C2/C3 (IEC 60643-21)
<b>Design:</b>	Compact, ergonomic packaging, extension cord, 6 power socket
<b>Protection:</b>	Power, telecommunication and TV
<b>Telecommunication port:</b>	Max. Operating Voltage $U_C$ : 170V <sub>DC</sub>
<b>TV port:</b>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

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

### Technical characteristics

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

### Dimensional drawings





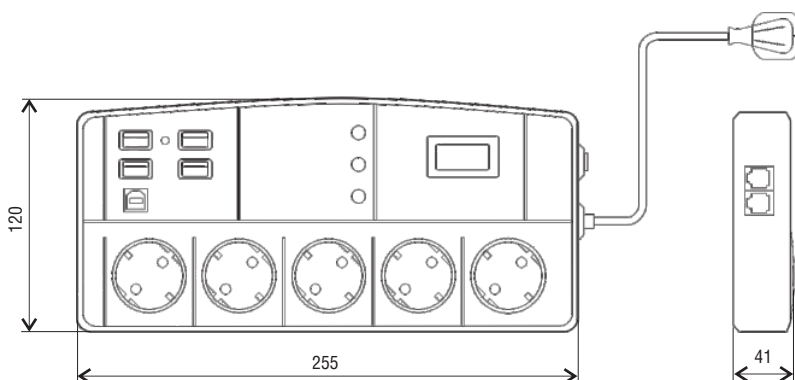
<b>IEC category / EN type:</b>	<b>III (IEC 60643-1) and C1/C2/C3 (IEC 60643-21)</b>
<b>Design:</b>	<b>Compact, ergonomic packaging, extension cord, 5 power socket</b>
<b>Protection:</b>	<b>Power, telephone/Ethernet Cat5 protection</b>
<b>Data port:</b>	<b>Max. Operating Voltage <math>U_C</math>: 170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

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

### Technical characteristics

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

### Dimensional drawings







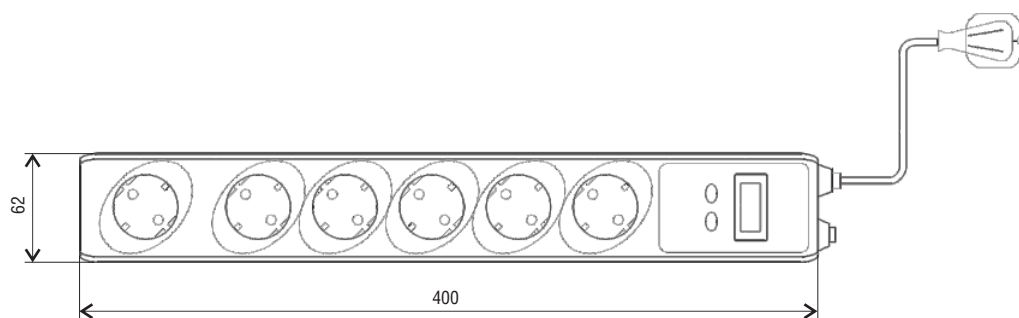
<b>IEC category / EN type:</b>	<b>III (IEC 60643-1)</b>
<b>Design:</b>	<b>Compact, ergonomic packaging, extension cord, 5 power socket</b>
<b>Protection:</b>	<b>Nom. Operating Voltage <math>U_n</math>: 230V<sub>AC</sub> Max. Operating Voltage <math>U_c</math>: 250V<sub>AC</sub></b>
<b>Surge Discharge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

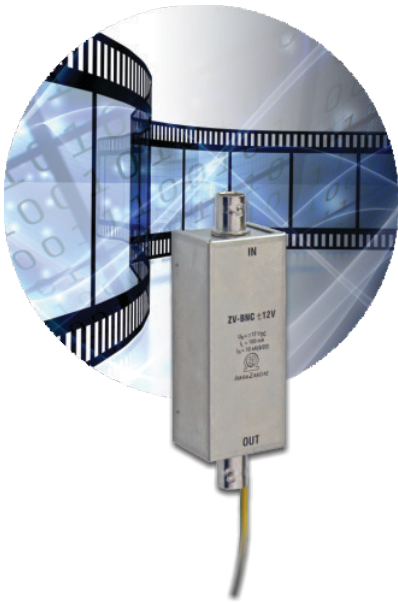
The plug-in surge protection ZES-6 is intended for the protection of household appliances. There is also an overload protection fitted. The ZES-6 protects electronic devices against surges caused by lightning strikes, switching operations at larger electrical consumers, induction and other sources of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

### Technical characteristics

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

### Dimensional drawings





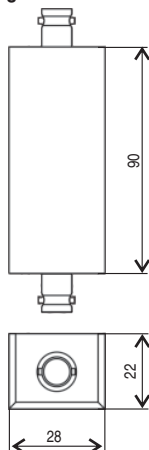
<b>IEC category / EN type:</b>	<b>C1/C2/C3 (IEC 60643-21)</b>
<b>Design:</b>	<b>Impedance matched</b>
<b>Nom. Operating Voltage <math>U_n</math>:</b>	<b><math>\pm 5, \pm 12V_{DC}</math></b>
<b>Max. Operating Voltage <math>U_c</math>:</b>	<b><math>\pm 6, \pm 14V_{DC}</math></b>
<b>Freq:</b>	<b>&lt; 100MHz</b>
<b>Surge Discharge Ratings:</b>	<b><math>I_n: 10kA 8/20\mu s, I_{max}: 20kA 8/20\mu s</math></b>
<b>Series load current:</b>	<b>100mA</b>
<b>Enclosure:</b>	<b>Shielded enclosure, in-line installation</b>
<b>Termination:</b>	<b>BNC connectors</b>

The ZV-BNC series is intended to protect Arcnet computer networks and CCTV coaxial video signals. Both coarse and fine protection is provided in a shielded, impedance matched, compact in-line enclosure. Protection is provided core-shield, and shield-protective ground. The design ensures minimum of capacitance loading thereby ensuring a high operating bandwidth while providing efficient clamping against transient voltages.

### Technical characteristics

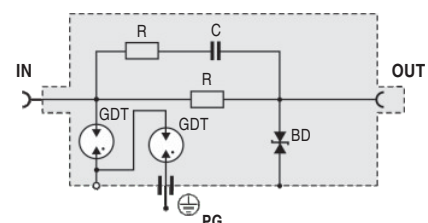
Type		ZV-BNC $\pm 5V$	ZV-BNC $\pm 12V$
Protection construction		Protective module	
Nominal operating voltage	$U_n$	$\pm 5V_{DC}$	$\pm 12V_{DC}$
Max. operating voltage	$U_c$	$\pm 6V_{DC}$	$\pm 14V_{DC}$
Rated spark overvoltage	(wire-shield)	13.5V - 16.5V	30V - 36V
	(shield-PG)	72V - 108V	72V - 108V
Rated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

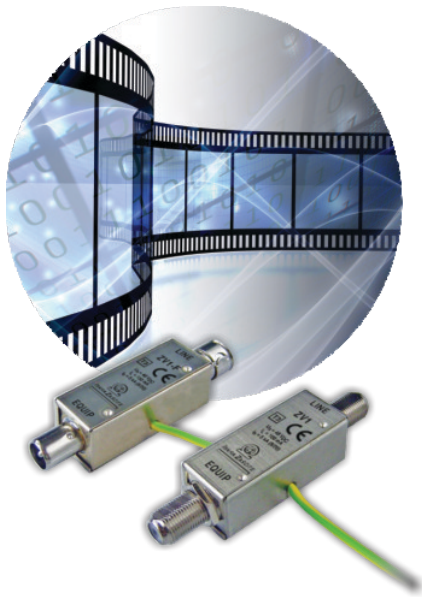
### Dimensional drawings



### Connection diagram

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





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

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

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

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

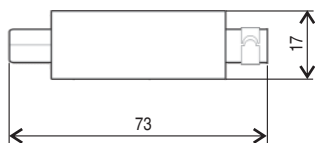
The aerial adapter is not suitable for outdoor installation or installation in very damp places.

### Technical characteristics

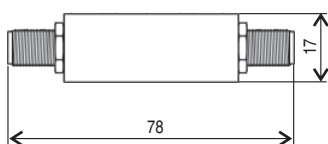
Type	ZV-1	ZV1-F
Protection construction	Protective module	
Nominal operating voltage	$U_n$ 48V <sub>DC</sub>	48V <sub>DC</sub>
Max. operating voltage	$U_c$ 60V <sub>DC</sub>	60V <sub>DC</sub>
Rated spark overvoltage (wire-shield)	90V - 110V	90V - 110V
Rated operating current at 25°C	$I_L$ 100mA	100mA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

### Dimensional drawings

ZV1-F

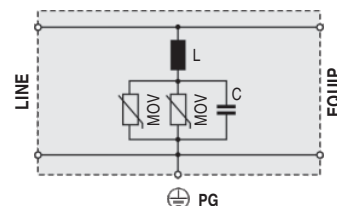


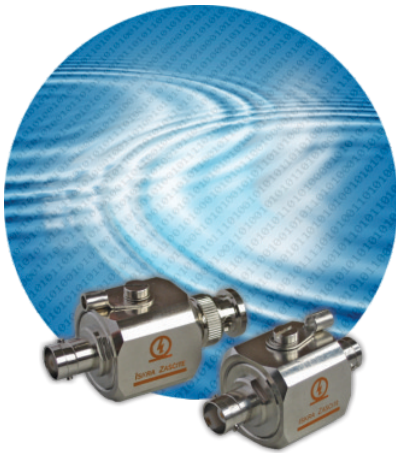
Zv1



### Connection diagram

Legend:	
MOV	varistor
L	coil
C	capacitor
PG	protective grounding





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

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

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

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

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

- IEC 61643-21:2000

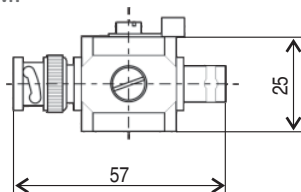
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

### Technical characteristics

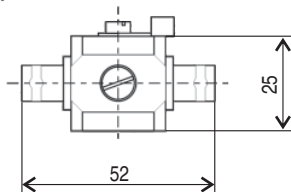
Type		CCP70	CCP180	CCP280	CCP70	CCP180	CCP280
		-BNC-FF	-BNC-FF	-BNC-FF	-BNC-MF	-BNC-MF	-BNC-MF
Max. Continuous operating voltage	$U_C$	70V	180V	280V	70V	180V	280V
Max. peak power		40W	125W	300W	40W	125W	300W
Impedance		50Ω					
Frequency range		0 - 2600 MHz					
Insertion losses		< 0.4dB					
Return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

### Dimensional drawings

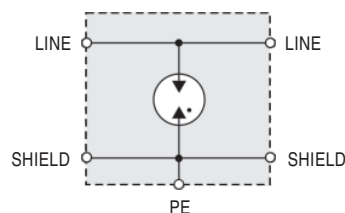
CCP-BNC-MF

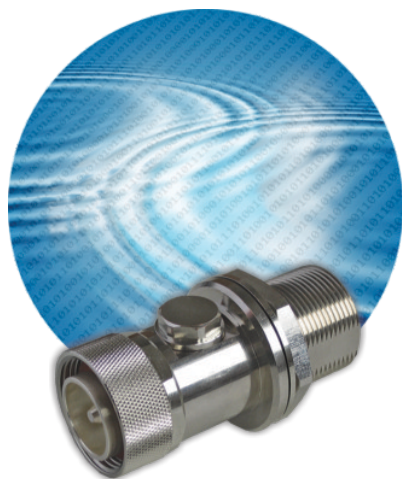


CCP-BNC-FF



### Connection diagram





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

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

It is designed for bulkhead or in-line installation. The careful design, low capacitance gas discharge arresters and high quality 7/16-type termination connectors ensure a minimum of insertion loss throughout the frequency band. Transfer power is 40W to 300W continuous (depending on CCP voltage).

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

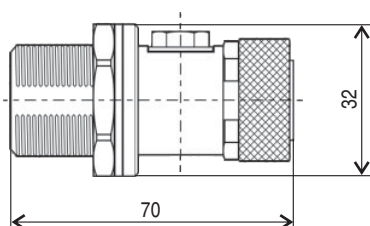
- IEC 61643-21:2000

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

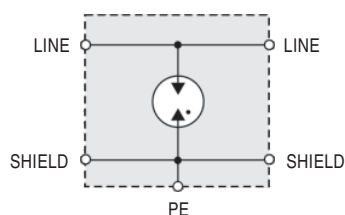
### Technical characteristics

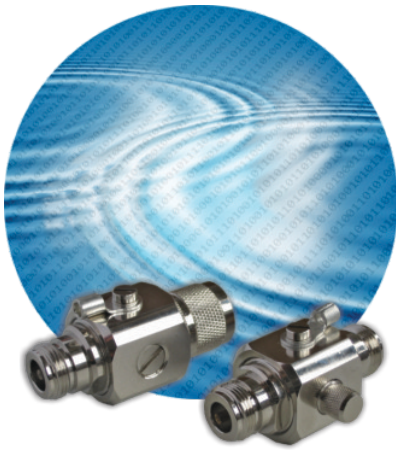
Type		CCP70 -7/16-MF	CCP180 -7/16-MF	CCP280 -7/16-MF
Max. Continuous operating voltage	$U_C$	70V	180V	280V
Max. peak power		40W	125W	300W
Impedance		50Ω		
Frequency range		0 - 2500MHz		
Insertion losses		< 0.2dB		
Return losses		> 20dB		
Nom. discharge current (8/20μs)	$I_N$	10kA		
Max. discharge current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

### Dimensional drawings



### Connection diagram





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

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

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

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

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

- IEC 61643-21:2000

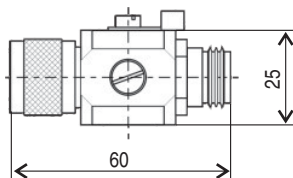
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

### Technical characteristics

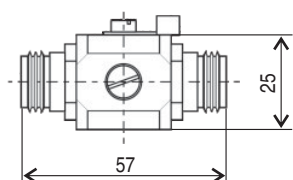
Type		CCP70	CCP180	CCP280	CCP70	CCP180	CCP280
		-N-FF	-N-FF	-N-FF	-N-MF	-N-MF	-N-MF
Max. Continuous operating voltage	$U_C$	70V	180V	280V	70V	180V	280V
Max. peak power		40W	125W	300W	40W	125 W	300 W
Impedance		50Ω					
Frequency range		0 - 2600MHz					
Insertion losses		< 0.4dB					
Return losses		>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

### Dimensional drawings

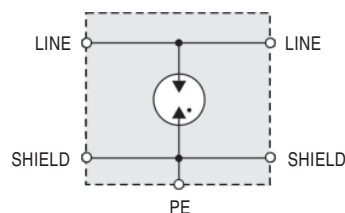
CCP-N-MF



CCP-N-FF



### Connection diagram





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

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

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

Transfer power is 125W continuous.

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

- IEC 61643-21:2000

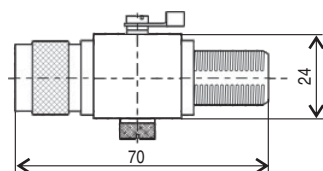
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

### Technical characteristics

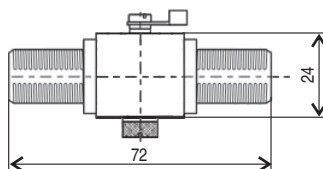
Type		CCP180 -N-FF	CCP180 -N-MF
Max. Continuous operating voltage	$U_C$	180V	180V
Max. peak power		125W	125 W
Impedance			50Ω
Frequency range			0 - 6.0GHz
Insertion losses			< 0.4dB
Return losses			> 20dB
Nom. discharge current (8/20μs)	$I_N$		10kA
Max. discharge current (8/20μs)	$I_{max}$		20kA
Residual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

### Dimensional drawings

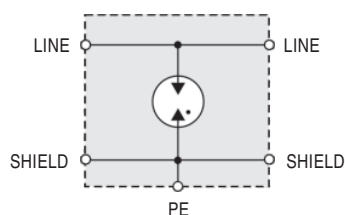
CCP-N-6G-MF

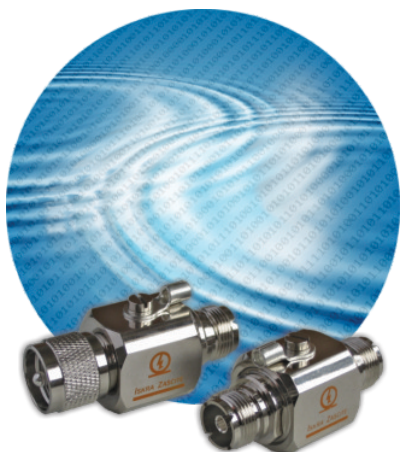


CCP-N-6G-FF



### Connection diagram





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

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

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

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

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

- IEC 61643-21:2000

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

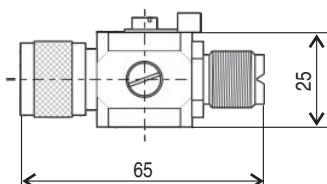
### Technical characteristics

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

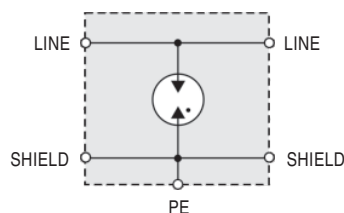
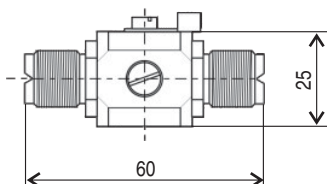
### Dimensional drawings

### Connection diagram

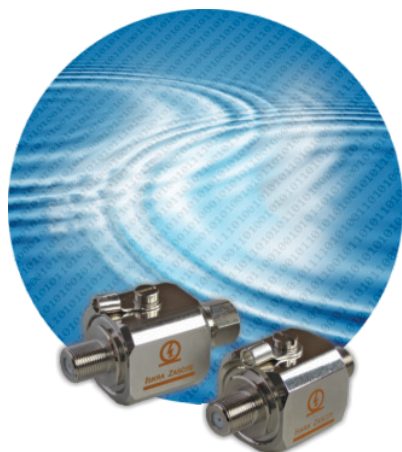
#### CCP-UHF-MF



#### CCP-UHF-FF







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

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

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

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

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

- IEC 61643-21:2000

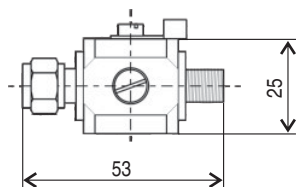
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

### Technical characteristics

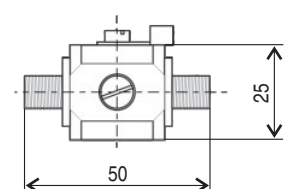
Type	CCP70	CCP180	CCP70	CCP180
	-F75-FF	-F75-FF	-F75-MF	-F75-MF
Max. continuous operating voltage $U_C$	70V	180V	70V	180V
Max. peak power	40W	125W	40W	125W
Impedance	75Ω			
Frequency range	0 - 2000MHz			
Insertion losses	< 0.4dB			
Return losses	> 20dB			
Nom. discharge current (8/20μs) $I_N$	10kA		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

### Dimensional drawings

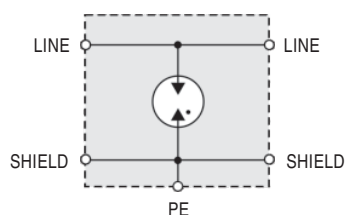
CCP-F-MF

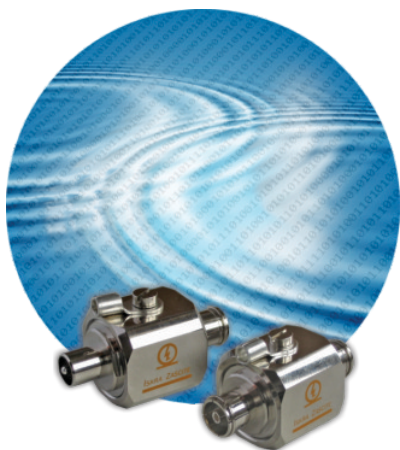


CCP-F-FF



### Connection diagram





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

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

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

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

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

- IEC 61643-21:2000

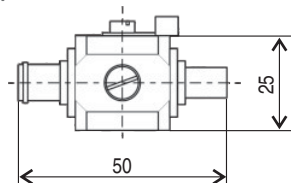
A grounding stud is provided which should be connected to the system ground, or coaxial feed-through bulkhead, as directly as possible.

### Technical characteristics

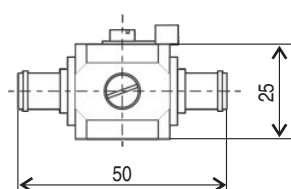
Type		CCP70 -TV75-FF	CCP180 -TV75-FF	CCP70 -TV75-MF	CCP180 -TV75-MF
Max. continuous operating voltage	$U_C$	70V	180V	70V	180V
Max. peak power		40W	125W	40W	125W
Impedance				75Ω	
Frequency range				0 - 2000MHz	
Insertion losses				< 0.4dB	
Return losses				> 20dB	
Nom. discharge current (8/20μs)	$I_N$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

### Dimensional drawings

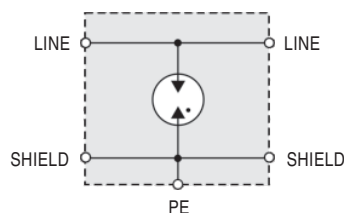
CCP-TV-MF



CCP-TV-FF



### Connection diagram





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

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

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

Transfer power is 500W.

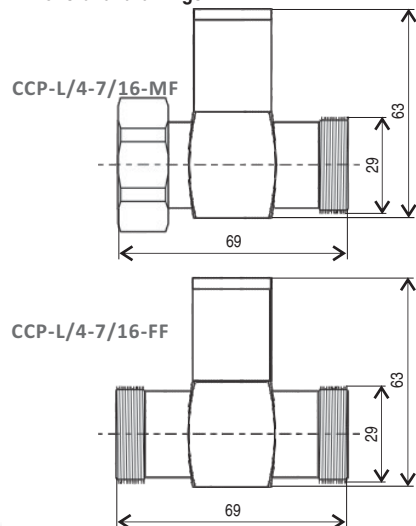
The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

- IEC 61643-21:2000

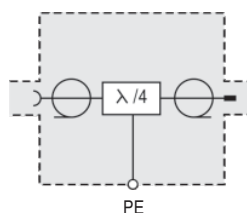
### Technical characteristics

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

### Dimensional drawings

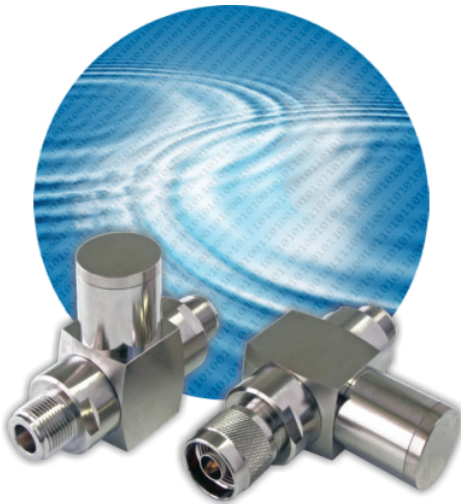


### Connection diagram



# CCP-L/4-N Series

## COAXIAL/RF PROTECTION



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

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

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

Transfer power is 500W.

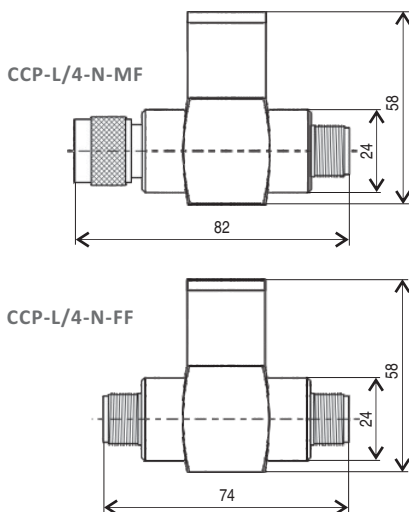
The CCP coaxial cable protector is designed in accordance with the following standards and regulations:

- IEC 61643-21:2000

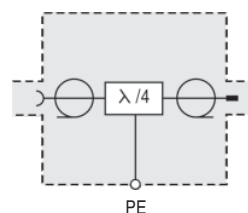
### Technical characteristics

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

### Dimensional drawings



### Connection diagram





<b>IEC category / EN type:</b>	<b>C1/C2/C3 (IEC 60643-21)</b>
<b>Design:</b>	<b>Replaceable plug-in module, inherently safe design</b>
<b>Mode of protection:</b>	<b>Longitudinal, Transverse</b>
<b>Coarse Protection:</b>	<b>3 terminal GDT</b>
<b>Nom. Operating Voltage <math>U_n</math>:</b>	<b>15, 30V<sub>DC</sub></b>
<b>Max. Operating Voltage <math>U_c</math>:</b>	<b>18, 33V<sub>DC</sub> respectively</b>
<b>Series Resistance:</b>	<b>0.1 - 0.4Ω per line</b>
<b>Freq:</b>	<b>&lt; 3 Mhz</b>
<b>Surge Discharge Ratings:</b>	<b><math>I_n</math>: 10kA 8/20μs, <math>I_{max}</math>: 20kA 8/20μs</b>
<b>Series load current:</b>	<b>500mA</b>
<b>Enclosure:</b>	<b>DIN 43880 1TE, DIN rail mount</b>
<b>Terminals:</b>	<b>Multi-strand to 6mm<sup>2</sup></b>

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

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

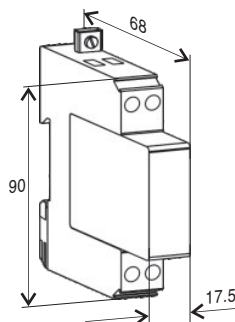
The circuit consists of a multi-stage protector providing both common (longitudinal) mode and differential (transverse) mode protection.

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

### Technical characteristics

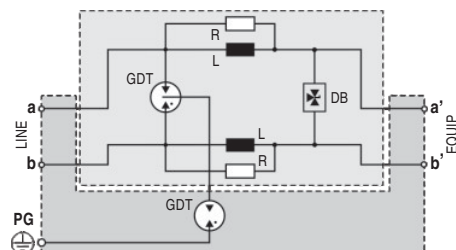
Type		IM-15Ex	IM-30Ex
Explosion protected		II 1G EEx ia II CT4	
IEC Type Examination Certificate No.		Baseefa 04 ATEX0209X	
Number of protected pairs		1(2) conductors	
Nominal operating voltage	$U_n$	15V <sub>DC</sub>	30V <sub>DC</sub>
Max. operating voltage	$U_c$	18V <sub>DC</sub>	33V <sub>DC</sub>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

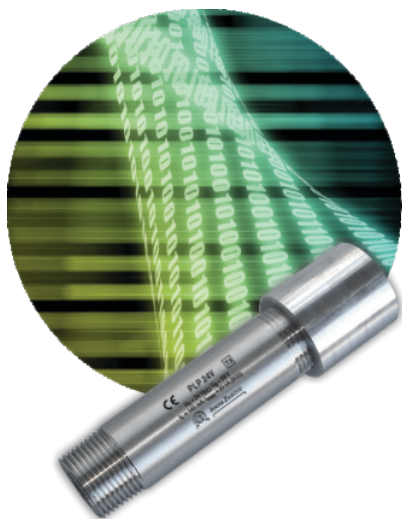
### Dimensional drawings



### Connection diagram

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





IEC category / EN type:	C1/C2/C3 (IEC 60643-21)
Design:	in-line, 3/4" conduit fitting
Mode of protection:	Longitudinal, Transverse
Coarse Protection:	3 terminal GDT
Nom. Operating Voltage $U_N$ :	24 V <sub>DC</sub>
Max. Operating Voltage $U_C$ :	28 V <sub>DC</sub>
Series Resistance:	< 3 $\Omega$ per line
Freq:	< 3 MHz (see specification sheet)
Surge Discharge Ratings:	$I_N$ : 10kA 8/20 $\mu$ s, $I_{max}$ : 20kA 8/20 $\mu$ s
Series load current:	145 mA
Enclosure:	3/4" stainless steel fitting conduit
Terminals:	Multi-strand to 2.5 mm <sup>2</sup>

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

The 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.

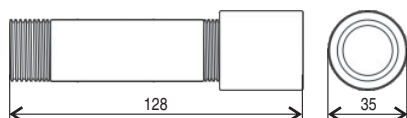
Coarse protection is provided by a three terminal gas discharge tube while fine protection is provided using a high speed silicon avalanche diode or metal oxide varistor stage. Care is taken to ensure coordination between these two stages without voltage or surge current blind spots occurring.

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

### Technical characteristics

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

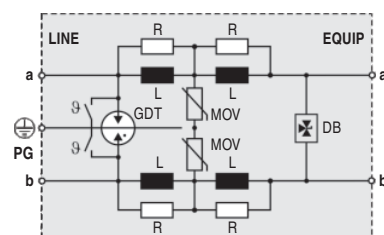
### Dimensional drawings

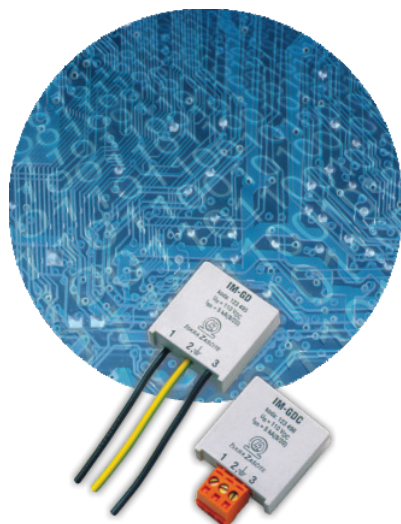


### Connection diagram

Legend:

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





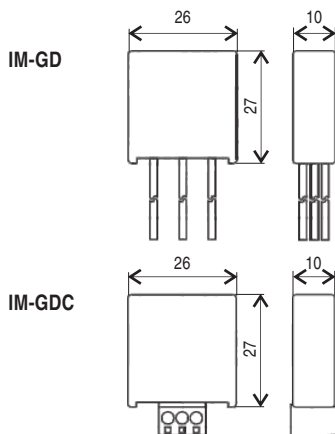
IEC category / EN type:	C1/C2/C3 (IEC 60643-21)
Design:	OEM PCB module
Mode of protection:	Transverse, Differential
Number of protected lines:	1 pair (2 lines)
Nom. Operating Voltage $U_n$ :	110V <sub>DC</sub>
Max. Operating Voltage $U_c$ :	120V <sub>DC</sub>
Surge Discharge Ratings:	$I_n$ : 5kA 8/20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

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

### Technical characteristics

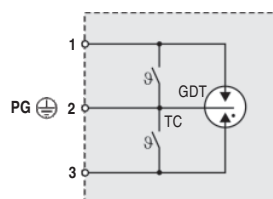
Type	IM-GD	IM-GDC
Protection construction	Protective module	
Number of protected pairs	1 (2 conductors)	
Nominal operating voltage	$U_n$ 110V <sub>DC</sub>	110V <sub>DC</sub>
Max. continuous operating voltage	$U_c$ 120V <sub>DC</sub>	120V <sub>DC</sub>
Rated spark overvoltage	(a/b-PG) 184V - 312V	184V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

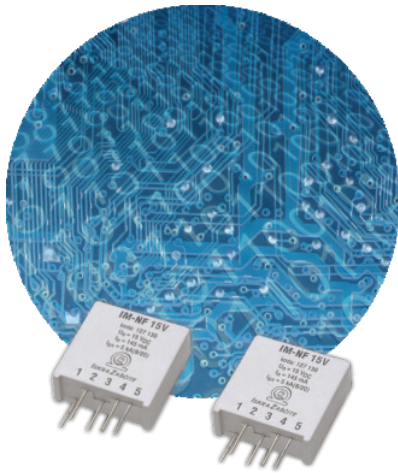
### Dimensional drawings



### Connection diagram

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





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

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

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

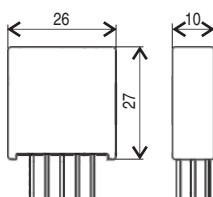
Over current protection is provided by a PTC element, which provides a level of protection against short circuit or mains incursion. Internal thermal disconnectors are also employed to reduce the hazards of thermal runaway during fault conditions.

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

### Technical characteristics

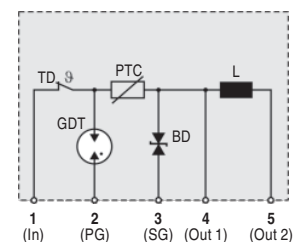
Type		5V	IM-NF 15V	24V
Protection construction			Protective module	
Number of protected pairs			1 (2 conductors)	
Nominal operating voltage	$U_n$	5 V <sub>DC</sub>	15 V <sub>DC</sub>	24 V <sub>DC</sub>
Max. continuous operating voltage	$U_c$	6 V <sub>DC</sub>	18 V <sub>DC</sub>	28 V <sub>DC</sub>
Rated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

### Dimensional drawings



### Connection diagram

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





# SELECTION GUIDE

## Signal / Data transmission

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0-20mA, 4-20mA Current loops	SMH-SG 24V	24
	NMH-TC 24V	18
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	SMH2-TC 5V - 60V	17
	SMH-SG 5V - 60V	24
	SMH-SH 5V - 60V	13
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## Signal / Data transmission

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	SMH2-TC 5V	17
	SMH-SG 5V	24
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## Signal / Data transmission

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	SMH-SG 5V	24
	SMH-SH 5V	13
SINEC L2	SMH-TC 5V	16
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# Typical applications

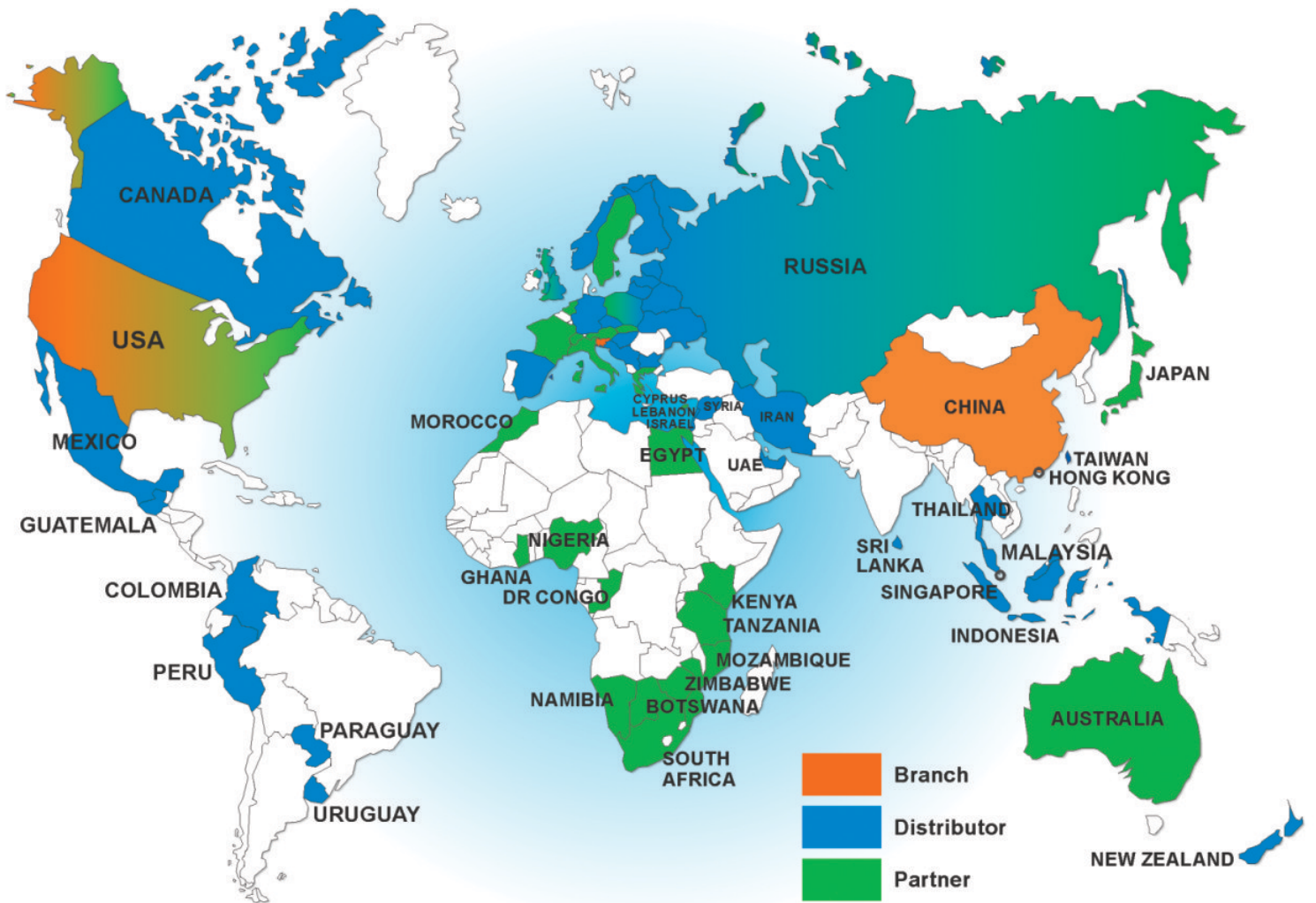
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# Typical applications

Industry	Applications	Products	Page
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		VMO 24V	27
		SMI2 24V	15
	Data transmission / RS 485	SMH-SH 24V	13
		SMH2-TC 12V	17
	POTS/ISDN/DSL line	NMH2-TC 12V	19
		SMI2-TC 12V	15
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IM-xDSL-T		39	

A large grid of graph paper for taking notes, consisting of 20 columns and 40 rows of small squares.





**ISKRA ZAŠČITE**

ISKRA ZAŠČITE d.o.o., Surge Voltage Protection Systems,  
 Engineering and Cooperation  
 Stegne 35, 1521 Ljubljana, Slovenia, EU  
 P: 00386(1)5003 100; F: 00386(1)5003 236  
 E: sales@iskrazascite.si;  
[www.iskrazascite.si](http://www.iskrazascite.si)



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This publication replaces the previous edition

# Surge Protection for Telecommunication Networks, Terminals and Equipment



**ISKRA ZAŠČITE**

BE ON THE SAFE SIDE



# Standards, Regulations

Our products are tested in accordance with the following standards and regulations:

## Telecommunications and signalling networks

IEC 61643-21

ITU-T K.20, K.21, K.44

## Low voltage power distribution systems

IEC 61643-1

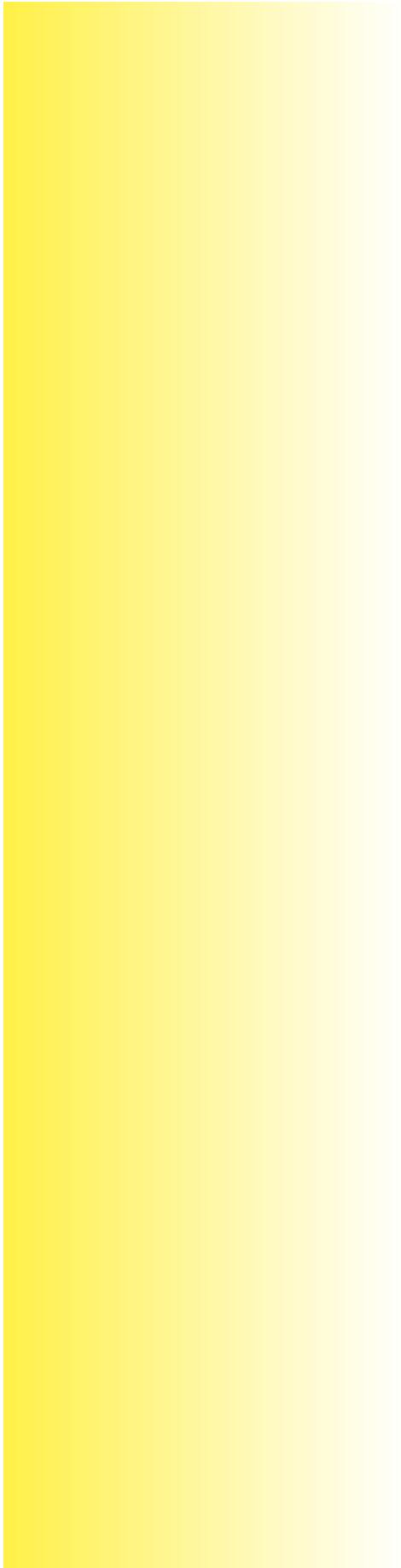


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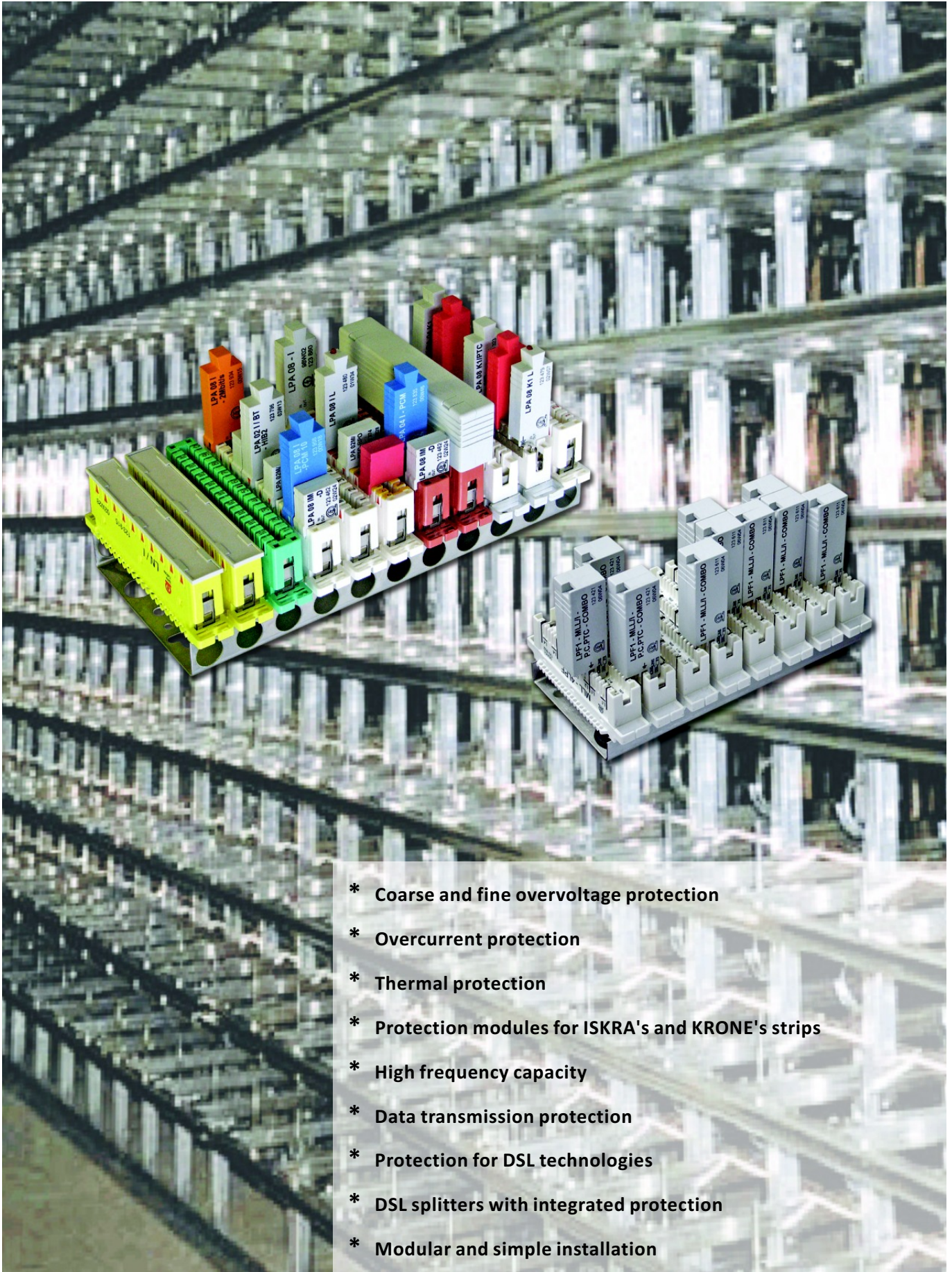
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MLL/I 4LPF Complex protection modules  
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 ISO 9001:2008 Main Distribution Frames  
 DSL Modem analog Independent Line Overvoltage Protection  
 DSL Low-pass filter for POTS & ISDN  
 Adapters LPA 08 Ethernet  
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 Mounting  
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 Longitudinal and transversal  
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 Terminals and equipment  
 Fast response time  
 Disconnecting strip  
 Solutions  
 xDSL  
 Thermal protection



# Surge Protection Solutions for Telephone Exchanges



- \* Coarse and fine overvoltage protection
- \* Overcurrent protection
- \* Thermal protection
- \* Protection modules for ISKRA's and KRONE's strips
- \* High frequency capacity
- \* Data transmission protection
- \* Protection for DSL technologies
- \* DSL splitters with integrated protection
- \* Modular and simple installation

# Surge Protection Solutions for Telephone Exchanges

## Different type of overvoltage protection modules

### A. Basic protection modules - LPA 02

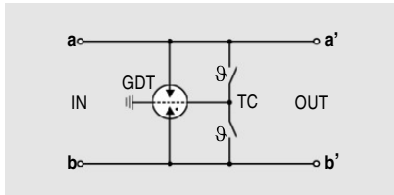
(3-pole gas arrester protection)

**Advantage:**

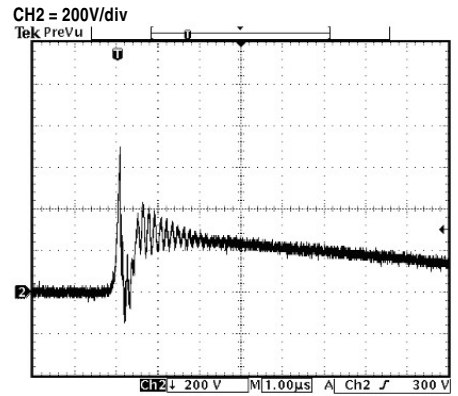
+ High limit frequency (xDSL)

**Disadvantage:**

- Low protection level
- Slow response time (100 ns)



**Protection Level:**  
 $U_p(a-L) = 850 V_{pp}$   
 $U_p(b-L) = 850 V_{pp}$   
 $U_p(a-b) = 850 V_{pp}$



Protection Level: a-L, b-L, a-b

### B. Complex overvoltage protection modules - LPA 04

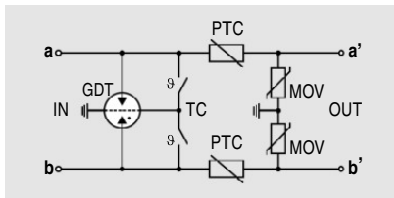
(Integrated circuit with metal oxide varistors protection)

**Advantage:**

- + Higher protection level
- + Fast response time (25 ns)

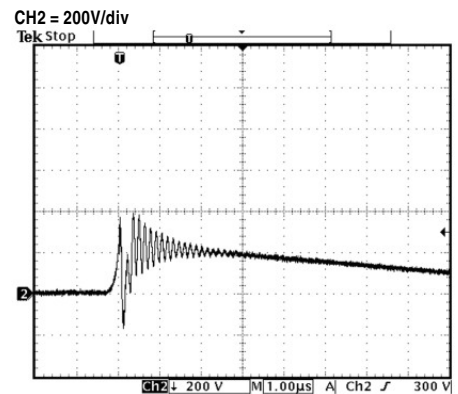
**Disadvantage:**

- Low limit frequency (POTS)

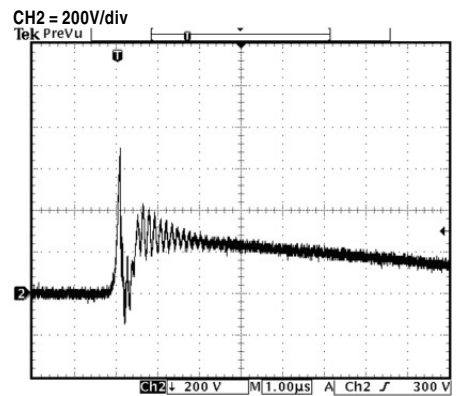


**Protection Level:**  
 $U_p(a-L) = 560 V_{pp}$   
 $U_p(b-L) = 560 V_{pp}$

**Protection Level:**  
 $U_p(a-b) = 850 V_{pp}$   
 The protection level is equal to 3-pole gas arrester.



Protection Level: a-L, b-L



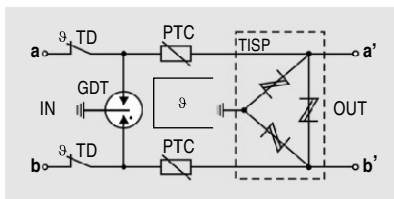
Protection Level: a-b

### C. Complex overvoltage protection modules - LPA 08

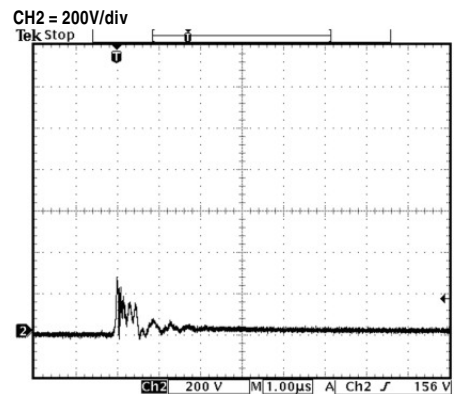
(Integrated circuit with transient voltage suppressor or diodes protection)

**Advantage:**

- + High protection level
- + Fast response time (5 ns)
- + High limit frequency (xDSL)



**Protection Level:**  
 $U_p(a-L) = 290 V_{pp}$   
 $U_p(b-L) = 290 V_{pp}$   
 $U_p(a-b) = 290 V_{pp}$

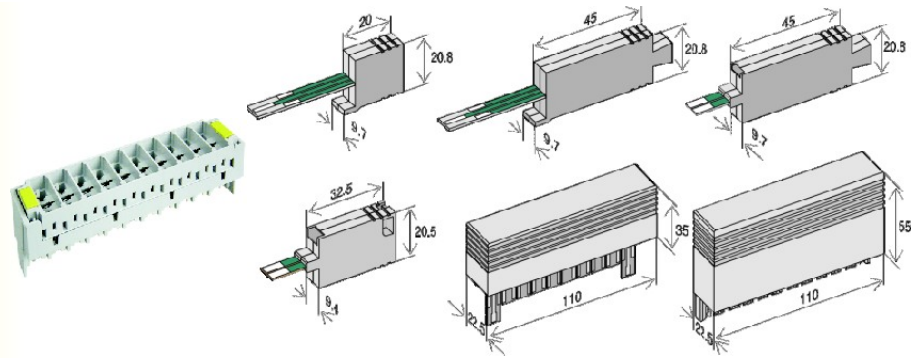


Protection Level: a-L, b-L, a-b

# Protection Modules on the Telecommunication side

<p><b>LPA 02</b></p> <ul style="list-style-type: none"> <li>- Simple protection modules</li> <li>- Single-pair or 10-pair</li> <li>- Overvoltage and overcurrent protection</li> <li>- Coarse protection - longitudinal and transversal direction</li> <li>- Thermal protection</li> <li>- Response time: 100ns</li> <li>- Protection level: &lt; 900V</li> </ul>		<p><b>Telecommunicaton</b></p> <ul style="list-style-type: none"> <li>- POTS</li> <li>- ADSL</li> <li>- xDSL</li> <li>- ISDN S0, S2M, U</li> <li>- P-MUX</li> <li>- PCM-E1</li> <li>- PCM 100V</li> <li>- Modem Analogue</li> </ul> <p><b>Data Transmission</b></p> <ul style="list-style-type: none"> <li>- Modem DatexP</li> <li>- RS 232</li> <li>- RS 485</li> <li>- Ethernet</li> <li>- Token Ring</li> </ul> <p><b>Measuring Technology</b></p> <ul style="list-style-type: none"> <li>- TTL</li> <li>- TTY 24V</li> </ul>
<p><b>LPA 04</b></p> <ul style="list-style-type: none"> <li>- Complex protection modules</li> <li>- Single-pair</li> <li>- Overvoltage and overcurrent protection</li> <li>- Coarse protection - longitudinal and transversal direction</li> <li>- Fine protection - longitudinal and transversal direction</li> <li>- Thermal protection</li> <li>- High protection level: 15 - 600V</li> <li>- Response time: 5 - 25ns</li> <li>- Operating voltage: 5 - 110V<sub>DC</sub></li> </ul>		<p><b>Telecommunicaton</b></p> <ul style="list-style-type: none"> <li>- POTS</li> <li>- ADSL</li> <li>- xDSL</li> <li>- ISDN S0, S2M, U</li> <li>- P-MUX</li> <li>- PCM-E1</li> <li>- PCM 100V</li> <li>- Modem Analogue</li> </ul> <p><b>Data Transmission</b></p> <ul style="list-style-type: none"> <li>- Modem DatexP</li> <li>- RS 232</li> <li>- RS 485</li> <li>- Ethernet</li> <li>- Token Ring</li> </ul> <p><b>Measuring Technology</b></p> <ul style="list-style-type: none"> <li>- TTL</li> <li>- TTY 24V</li> </ul>
<p><b>LPA 08</b></p> <ul style="list-style-type: none"> <li>- Complex protection modules</li> <li>- Single-pair or 10-pair</li> <li>- Overvoltage and overcurrent protection</li> <li>- Coarse protection - longitudinal and transversal direction</li> <li>- Fine protection - longitudinal and transversal direction</li> <li>- Thermal protection</li> <li>- Protection level: &lt; 450V</li> <li>- Fast response time: 5ns</li> </ul>		<p><b>Telecommunicaton</b></p> <ul style="list-style-type: none"> <li>- POTS</li> <li>- ADSL</li> <li>- xDSL</li> <li>- ISDN S0, S2M, U</li> <li>- P-MUX</li> <li>- PCM-E1</li> <li>- PCM 100V</li> <li>- Modem Analogue</li> </ul> <p><b>Data Transmission</b></p> <ul style="list-style-type: none"> <li>- Modem DatexP</li> <li>- RS 232</li> <li>- RS 485</li> </ul> <p><b>Measuring Technology</b></p> <ul style="list-style-type: none"> <li>- TTL</li> <li>- TTY 24V</li> </ul>
<p><b>LPA2 02</b></p> <ul style="list-style-type: none"> <li>- Complex protection modules</li> </ul> <p><b>LPA2 08</b></p> <ul style="list-style-type: none"> <li>- 2-pairs</li> <li>- Overvoltage and overcurrent protection</li> <li>- Coarse protection - longitudinal and transversal direction</li> <li>- Fine protection in longitudinal and transversal direction</li> <li>- Thermal protection</li> <li>- High protection level: 300V</li> <li>- Fast response time: 5ns</li> </ul>		<p><b>Telecommunicaton</b></p> <ul style="list-style-type: none"> <li>- POTS</li> <li>- ADSL</li> <li>- xDSL</li> <li>- ISDN S0, S2M, U</li> <li>- P-MUX</li> <li>- PCM-E1</li> <li>- PCM 100V</li> <li>- Modem Analogue</li> </ul> <p><b>Data Transmission</b></p> <ul style="list-style-type: none"> <li>- Modem DatexP</li> <li>- RS 232</li> <li>- RS 485</li> <li>- Ethernet</li> <li>- Token Ring</li> </ul> <p><b>Measuring Technology</b></p> <ul style="list-style-type: none"> <li>- TTL</li> <li>- TTY 24V</li> </ul>
<p><b>LPF</b></p> <ul style="list-style-type: none"> <li>- Low pass filter for POTS and ISDN</li> <li>- COMBO version for ISDN &amp; POTS</li> <li>- ISDN : 135 Ω (2B1Q)</li> <li>- POTS : 600 Ω</li> <li>- Single pair</li> <li>- Overvoltage and overcurrent protection (optional)</li> <li>- Coarse protection - longitudinal and transversal direction (optional)</li> <li>- Thermal protection (optional)</li> <li>- Loop current: I &gt; 80mA</li> </ul>		<p><b>Telecommunicaton</b></p> <ul style="list-style-type: none"> <li>- POTS</li> <li>- ISDN</li> <li>- ADSL</li> <li>- ADSL2</li> <li>- VDSL</li> <li>- VDSL2</li> </ul>

# LPA 02 Series



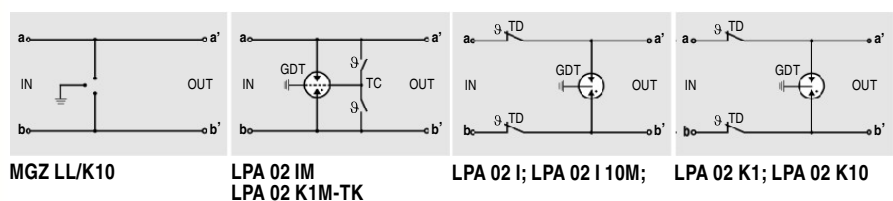
## Technical characteristics

Module type	MGZ LL/K10	LPA 02 IM LPA 02 K1M-TK	LPA 02 I LPA 02 I 10M	LPA 02 K1 LPA 02 K10
No. of protected pairs		1	1 or 10	1 or 10
<b>Electrical characteristics</b>				
Max. operating voltage	$U_c$	180 V	180 V	180 V
Max. operating current at 20°C	$I_L$	/	300 mA	300 mA
Rated DC spark-overvoltage	(a/b-e)	184 - 276 V	184 - 276 V	184 - 276 V
	(a-b)	184 - 550 V	184 - 550 V	184 - 550 V
Protection level at $I_n$ (a,b-e/a-b)	$U_p$	< 900 V	< 900 V	< 900 V
Thermal protection		None/thermal clip	Thermal clip	Thermal decoupler
Actuating of thermal protection		None/*	*	**
Rated surge current (8/20 $\mu$ s)	$I_n$	/	5 kA	5 kA
Max. surge current (8/20 $\mu$ s)	$I_{max}$	10 kA	10 kA	10 kA
Transverse capacitance	C	< 5 pF	< 5 pF	< 5 pF
Serial inductance	L	/	/	/
Serial resistance at 20°C	R	< 0.1 $\Omega$	< 0.1 $\Omega$	< 0.1 $\Omega$
Frequency range	f	> 30 MHz	> 30 MHz	> 30 MHz
Response time of overvoltage protection		< 100 ns	< 100 ns	< 100 ns
<b>Mechanical characteristics</b>				
Operating temperature		- 25°C .... + 80°C	- 25°C .... + 60°C	- 25°C .... + 60°C
Housing colour		Grey	Grey	Grey
Housing material		Thermoplastic, extinguishing degree V-0		
Ordering code		123 931	123 845 123 252	123 852 123 703
	GDT with fail safe	698 011		123 220 123 320
	GDT without fail safe	698 057		

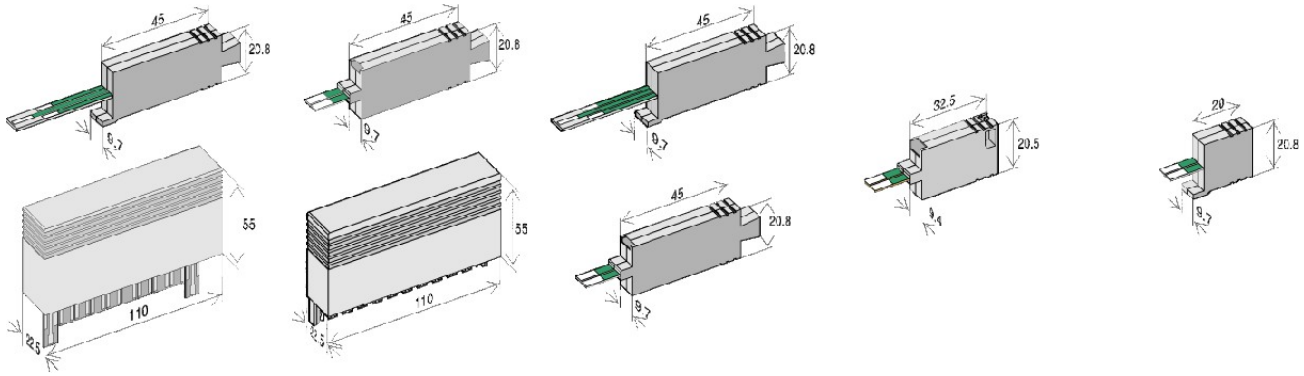
## Connection schemes of modules

Legend:

TD	thermal decoupler
TC	thermal clip
GDT	gas discharge tube
PTC	resistor with a positive temperature coefficient
$\vartheta$	thermal connection



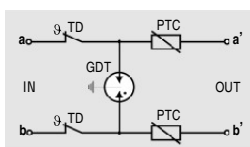
# Protection Modules on the Telecommunication side



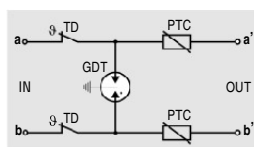
LPA 02 I-PTC LPA 02 I10-PTC	LPA 02 K1-PTC LPA 02 K10-PTC	LPA 02 I/BT-HIB2 LPA 02 K1/BT-HIB2	LPA 02 K1M-TK-PTC	LPA 02 M/PTC-BPO
1 or 10	1 or 10	1	1	1
180 V	180 V	180 V	180 V	245V
150 mA	150 mA	60 mA	150 mA	60mA
184 - 276 V	184 - 276 V	184 - 276 V	184 - 276 V	/
184 - 550 V	184 - 550 V	184 - 550 V	184 - 550 V	/
< 900 V	< 900 V	< 900 V	< 900 V	/
Thermal decoupler + PTC	Thermal decoupler + PTC	Thermal decoupler + PTC	Thermal clip + PTC	PTC
***	***	***	*****	****
5 kA	5 kA	5 kA	5 kA	/
10 kA	10 kA	10 kA	10 kA	/
< 10 pF	< 10 pF	< 10 pF	< 10 pF	< 10 pF
/	/	/	/	/
9 - 11 Ω	9 - 11 Ω	20 - 24 Ω	9 - 11 Ω	20 - 24Ω
> 30 MHz	> 30 MHz	> 30 MHz	> 30 MHz	> 30 Mhz
< 100 ns	< 100 ns	< 100 ns	< 100 ns	/
- 25°C .... + 60°C	- 25°C .... + 60°C	- 25°C .... + 50°C	- 25°C .... + 60°C	- 25°C .... + 50°C
Grey	Grey	Grey	Grey	Grey
Thermoplastic, extinguishing degree V-0				
<b>123 942</b>	<b>123 207</b>	<b>123 796</b>	<b>123 253</b>	<b>123 374</b>
<b>123 483</b>	<b>123 319</b>	<b>123 427</b>		

## Actuating of thermal protection

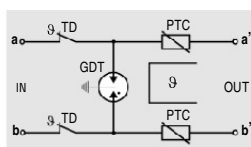
- \* Short circuit connection between line and ground
- \*\* Disconnection of the line to the exchange
- \*\*\* Limitation of current into the exchange and disconnection of the line to the exchange
- \*\*\*\* Limitation of current into the exchange
- \*\*\*\*\* Limitation of current into the exchange and short circuit connection between line and ground



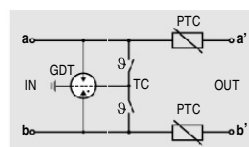
LPA 02 I-PTC;  
LPA 02 I10-PTC



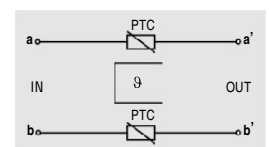
LPA 02 K1-PTC;  
LPA 02 K10-PTC;



LPA 02 I/BT-HIB2;  
LPA 02 K1/BT-HIB2



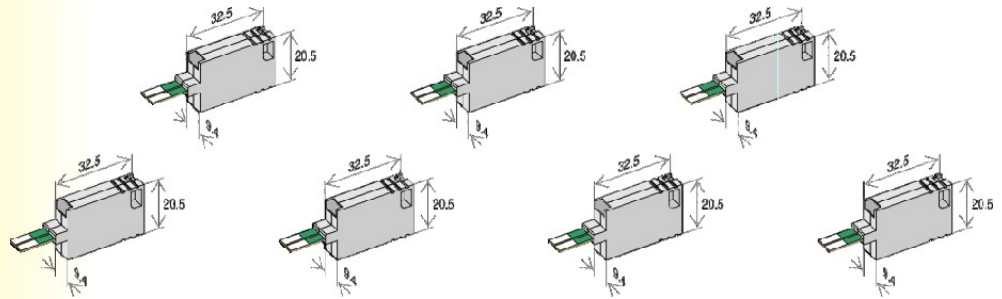
LPA 02 K1M-TK-PTC



LPA 02 M/PTC-BPO



# LPA 04 Series



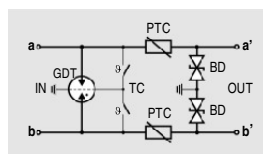
## Technical characteristics

Module type		LPA 04 K1M-TK-E5	LPA 04 K1M-TK-E12	LPA 04 K1M-TK-E15	LPA 04 K1M-TK-E24	LPA 04 K1M-TK-E48	LPA 04 K1M-TK-E60	LPA 04 K1M-TK-E110
No. of protected pairs		1	1	1	1	1	1	1
<b>Electrical characteristics</b>								
Max. operating voltage	$U_C$	6 V	12 V	18 V	28 V	85 V	100 V	180 V
Max. operating current at 20°C	$I_L$	150 mA	150 mA	150 mA	150 mA	150 mA	150 mA	150 mA
Rated DC spark-overvoltage	(a/b-e)	7 - 8 V	14 - 16 V	21 - 23 V	31 - 35 V	90 - 110 V	108 - 132 V	184 - 264 V
	(a-b)	14 - 16 V	28 - 32 V	42 - 46 V	62 - 70 V	180 - 220 V	184 - 264 V	184 - 528 V
Protection level at $I_n$	(a,b-e)	$U_p < 15$ V	$U_p < 28$ V	$U_p < 40$ V	$U_p < 60$ V	$U_p < 240$ V	$U_p < 300$ V	$U_p < 600$ V
	(a-b)	$U_p < 30$ V	$U_p < 65$ V	$U_p < 80$ V	$U_p < 120$ V	$U_p < 240$ V	$U_p < 600$ V	$U_p < 900$ V
Thermal protection		Thermo clip + PTC						
Actuating of thermal protection		*	*	*	*	*	*	*
Rated surge current (8/20 $\mu$ s)	$I_n$	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA
Max. surge current (8/20 $\mu$ s)	$I_{max}$	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
Transverse capacitance	$C$	< 4500 pF	< 2500 pF	< 2000 pF	< 1400 pF	< 300 pF	< 250 pF	< 100 pF
Serial inductance	$L$	/	/	/	/	/	/	/
Serial resistance at 20°C	$R$	9 - 11 $\Omega$	9 - 11 $\Omega$	9 - 11 $\Omega$	9 - 11 $\Omega$	9 - 11 $\Omega$	9 - 11 $\Omega$	9 - 11 $\Omega$
Frequency range	$f$	> 0.9 MHz	> 1.0 MHz	> 1.1 MHz	> 1.2 MHz	> 1.5 MHz	> 1.5 MHz	> 10 MHz
Response time of overvoltage protection		< 1 ns	< 1 ns	< 1 ns	< 1 ns	< 25 ns	< 25 ns	< 25 ns
<b>Mechanical characteristics</b>								
Operating temperature		- 25°C ... + 60°C						
Housing colour		Grey	Grey	Grey	Grey	Grey	Grey	Grey
Housing material		Thermoplastic, extinguishing degree V-0						
Ordering code		123 260	123 261	123 262	123 263	123 265	123 267	123 268

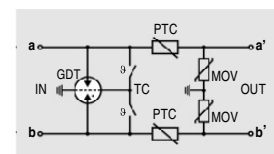
## Connection schemes of modules

Legend:

TC	thermo clip
GDT	gas discharge tube
MOV	varistor
PTC	resistor with a positive temperature coefficient
$\vartheta$	thermal connection
BD	bidirectional diode

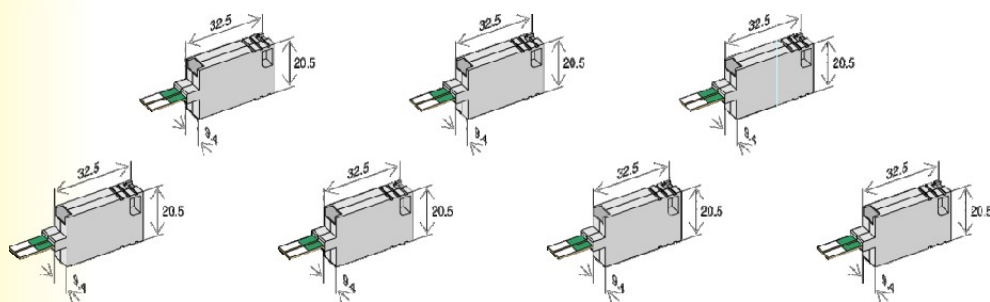


LPA 04 K1M-TK-E5 ... E24



LPA 04 K1M-TK-E48 ... E110

# Protection Modules on the Telecommunication side

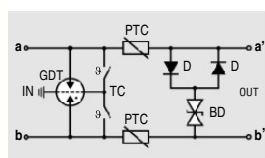


## Technical characteristics

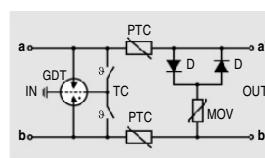
Module type		LPA 04 K1M-TK-C5	LPA 04 K1M-TK-C12	LPA 04 K1M-TK-C15	LPA 04 K1M-TK-C24	LPA 04 K1M-TK-C48	LPA 04 K1M-TK-C60	LPA 04 K1M-TK-C110
No. of protected pairs		1	1	1	1	1	1	1
<b>Electrical characteristics</b>								
Max. operating voltage	$U_C$	6 V	12 V	18 V	28 V	85 V	100 V	180 V
Max. operating current at 20°C	$I_L$	150 mA	150 mA	150 mA	150 mA	150 mA	150 mA	150 mA
Rated DC spark-overvoltage	(a/b-e)	184 - 550 V	184 - 550 V	184 - 550 V	184 - 550 V	184 - 550 V	184 - 550 V	184 - 550 V
	(a-b)	7 - 9 V	14 - 17 V	21 - 24 V	31 - 36 V	90 - 110 V	108 - 132 V	184 - 264 V
Protection level at $I_n$	(a-b)	$U_p$ < 14 V	< 28 V	< 40 V	< 60 V	< 240 V	< 300 V	< 600 V
	(a,b,e)	< 900 V	< 900 V	< 900 V	< 900 V	< 900 V	< 900 V	< 900 V
Thermal protection						Thermo clip + PTC		
Actuating of thermal protection		*	*	*	*	*	*	*
Rated surge current (8/20 $\mu$ s)	$I_n$	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA
Max. surge current (8/20 $\mu$ s)	$I_{max}$	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
Transverse capacitance	C	< 30 pF	< 30 pF	< 30 pF	< 30 pF	< 30 pF	< 30 pF	< 100 pF
Serial inductance	L	/	/	/	/	/	/	/
Serial resistance at 20°C	R	9 - 11 $\Omega$	9 - 11 $\Omega$	9 - 11 $\Omega$	9 - 11 $\Omega$	9 - 11 $\Omega$	9 - 11 $\Omega$	9 - 11 $\Omega$
Frequency range	f	> 30 MHz	> 30 MHz	> 30 MHz	> 30 MHz	> 30 MHz	> 30 MHz	> 10 MHz
Response time of overvoltage protection		< 1 ns	< 1 ns	< 1 ns	< 1 ns	< 25 ns	< 25 ns	< 25 ns
<b>Mechanical characteristics</b>								
Operating temperature		- 25°C ... + 60°C						
Housing colour		Grey	Grey	Grey	Grey	Grey	Grey	Grey
Housing material		Thermoplastic, extinguishing degree V-0						
Ordering code		123 255	123 256	123 257	123 258	123 269	123 270	123 259

### Actuating of thermal protection

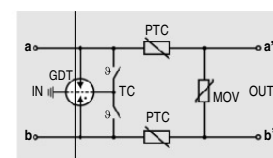
\* Limitation of current into the exchange and short circuit connection between line and ground



LPA 04 K1M-TK-C5 ... C24

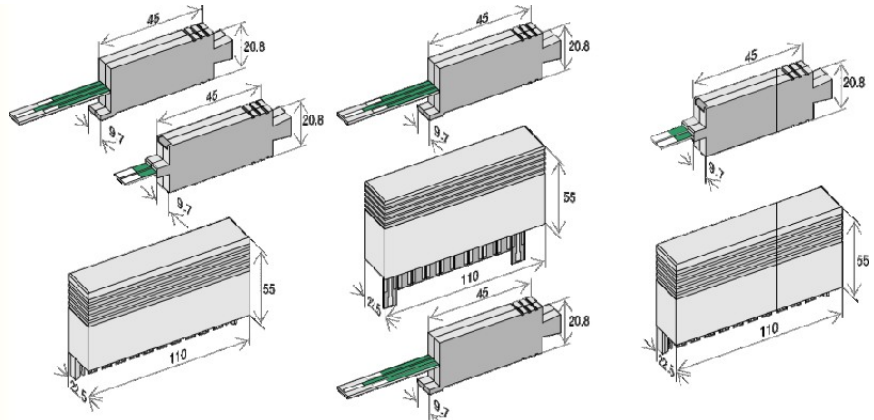


LPA 04 K1M-TK-C48, C60



LPA 04 K1M-TK-C110

# LPA 08 Series



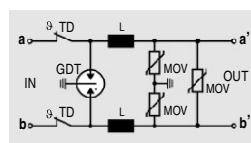
## Technical characteristics

Module type		LPA 08 I LPA 08 K1 LPA 08 K10	LPA 08 I-PTC LPA 08 I10-PTC LPA 08 I BT/PTC	LPA 08 K1-PTC LPA 08 K10-PTC
No. of protected pairs		1 or 10	1 or 10	1 or 10
<b>Electrical characteristics</b>				
Max. operating voltage	$U_C$	180 V	180 V	180 V
Max. operating current at 20°C	$I_L$	150 mA	150 mA	150 mA
Rated DC spark-overvoltage	(a/b-e)	184 - 264 V	184 - 264 V	184 - 264 V
	(a-b)	184 - 264 V	184 - 264 V	184 - 264 V
Protection level at $I_n$ (a,b-e/a-b)	$U_p$	≤ 600 V	≤ 600 V	≤ 600 V
Thermal protection		Thermal decoupler	Thermal decoupler + PTC	Thermal decoupler + PTC
Actuating of thermal protection		*	**	**
Rated surge current (8/20 μs)	$I_n$	5 kA	5 kA	5 kA
Max. surge current (8/20 μs)	$I_{max}$	10 kA	10 kA	10 kA
Transverse capacitance	C	< 250 pF	< 250 pF	< 250 pF
Serial inductance	L	47 μH	/	/
Serial resistance at 20°C	R	3 - 6 Ω	9 - 11 Ω	9 - 11 Ω
Frequency range	f	> 1.2 MHz	> 1.5 MHz	> 1.5 MHz
Response time of overvoltage protection		< 25 ns	< 25 ns	< 25 ns
<b>Mechanical characteristics</b>				
Operating temperature		- 25°C .... + 60°C	- 25°C .... + 60°C	- 25°C .... + 60°C
Housing colour		Grey	Grey	Grey
Housing material			Thermoplastic, extinguishing degree V-0	
Ordering code		123 880	123 948	123 281
		123 280	123 587	123 382
		123 380	123 740	

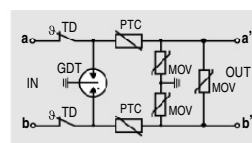
## Connection schemes of modules

Legend:

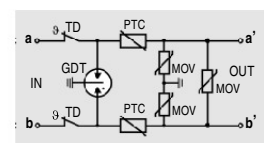
TD	thermal decoupler
GDT	gas discharge tube
MOV	varistor
L	coil
PTC	resistor with a positive temperature coefficient
⊕	thermal connection
D	rectifier diode
R	resistor
BD	bidirectional diode
SID	suppressor diode
TISP	integrated circuit with thyristor



LPA 08 I  
LPA 08 K1  
LPA 08 K10

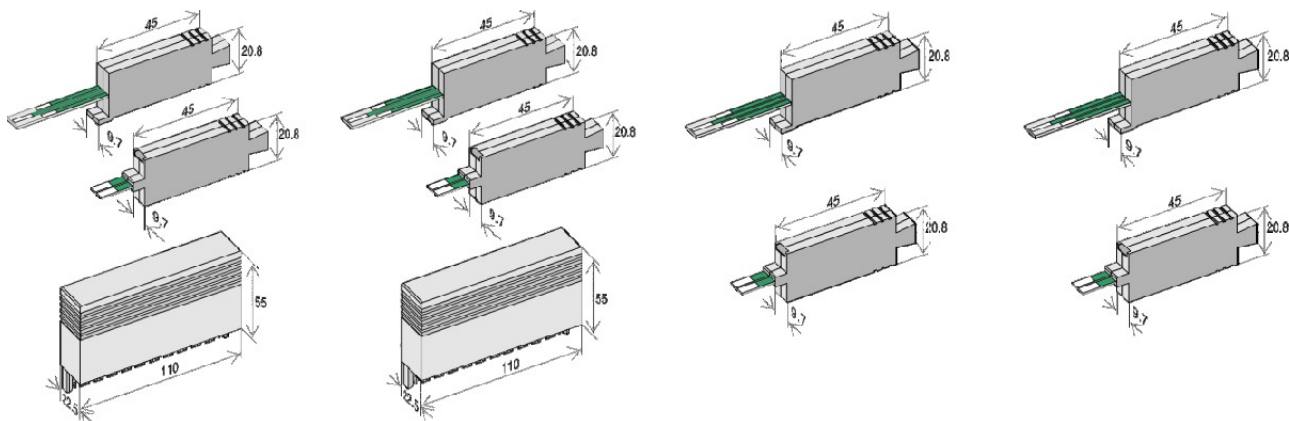


LPA 08 I-PTC  
LPA 08 I10-PTC  
LPA 08 I BT/PTC



LPA 08 K1-PTC  
LPA 08 K10-PTC

# Protection Modules on the Telecommunication side

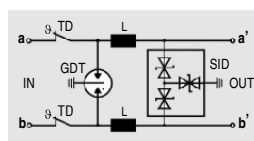


LPA 08 I-SID LPA 08 K1-SID LPA 08 K10-SID	LPA 08 I-PTC-SID LPA 08 K1-PTC-SID LPA 08 K10-PTC-SID	LPA 08 I/BT-HIB2 LPA 08 K1/BT-HIB2	LPA 08 I-HIB-T LPA 08 K1-HIB-T
1 or 10	1 or 10	1	1
180 V	180 V	180 V	180 V
150 mA	150 mA	60 mA	60 mA
184 - 220 V	184 - 220 V	184 - 264 V	184 - 240 V
184 - 220 V	184 - 220 V	184 - 264 V	184 - 240 V
≤ 400 V	≤ 400 V	≤ 600 V	≤ 600 V
Thermal decoupler	Thermal decoupler + PTC	Thermal decoupler + hybrid PTC	Thermal decoupler + hybrid PTC
*	**	**	**
5 kA	5 kA	5 kA	5 kA
10 kA	10 kA	10 kA	10 kA
< 250 pF	< 250 pF	< 250 pF	< 150 pF
47 μH	47 μH	/	/
3 - 6 Ω	9 - 11 Ω	20 - 22 Ω	20 - 22 Ω
> 1.2 MHz	> 1.2 MHz	> 1.5 MHz	> 2 MHz
< 1 ns	< 1 ns	< 25 ns	< 5 ns
- 25°C .... + 60°C	- 25°C .... + 60°C	- 25°C .... + 50°C	- 25°C .... + 50°C
Grey	Grey	Grey	Grey
Thermoplastic, extinguishing degree V-0			
123 822	123 823	123 795	123 590
123 324	123 323	123 485	123 591
123 327	123 326		

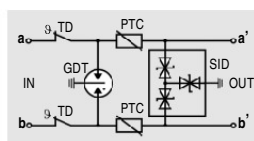
Actuating of thermal protection

\* Disconnection of the line to the exchange

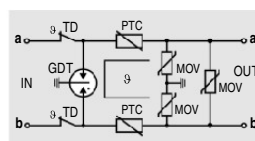
\*\* Limitation of current into the exchange and disconnection of the line to the exchange



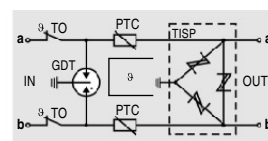
LPA 08 I-SID  
LPA 08 K1-SID  
LPA 08 K10-SID



LPA 08 I-PTC-SID  
LPA 08 K1-PTC-SID  
LPA 08 K10-PTC-SID

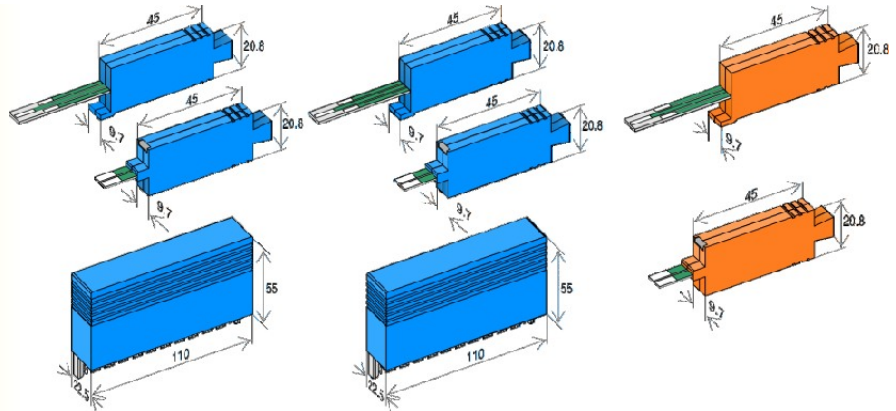


LPA 08 I/BT-HIB2  
LPA 08 K1/BT-HIB2



LPA 08 I-HIB-T  
LPA 08 K1-HIB-T

# LPA 08 Series



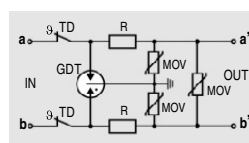
## Technical characteristics

Module type	LPA 08 I-PCM LPA 08 K1-PCM LPA 08 K10-PCM	LPA 08 I-PCM10 LPA 08 K1-PCM10 LPA 08 K10-PCM10	LPA 08 I-2Mbit/s LPA 08 K1-2Mbit/s
No. of protected pairs	1 or 10	1 or 10	1
<b>Electrical characteristics</b>			
Max. operating voltage	$U_C$ 180 V	280 V	8 V
Max. operating current at 20°C	$I_L$ 200 mA	200 mA	200 mA
Rated DC spark-overvoltage	(a/b-e) 184 - 276V	184 - 226 V	184 - 264V
	(a-b) 184 - 297V	324 - 396 V	8 - 11V
Protection level at $I_n$ (a,b-e/a-b)	$U_p$ ≤ 600 V	< 700 V	≤ 100 V (a-b)
Thermal protection	Thermal decoupler	Thermal decoupler	Thermal decoupler
Actuating of thermal protection	*	**	*
Rated surge current (8/20 μs)	$I_n$ 5 kA	5 kA	5 kA
Max. surge current (8/20 μs)	$I_{max}$ 10 kA	10 kA	10 kA
Transverse capacitance	$C$ < 250 pF	< 250 pF	< 150 pF
Serial inductance	$L$ /	/	/
Serial resistance at 20°C	$R$ 4 - 6 Ω	4 - 6 Ω	4 - 6 Ω
Frequency range	$f$ > 1.5 MHz	> 1.5 MHz	> 2 MHz
Response time of overvoltage protection	< 25 ns	< 25 ns	< 1 ns
<b>Mechanical characteristics</b>			
Operating temperature	- 25°C .... + 60°C	- 25°C .... + 60°C	- 25°C .... + 60°C
Housing colour	Blue	Blue	Orange
Housing material	Thermoplastic, extinguishing degree V-0		
Ordering code	123 830 123 305 123 379	123 958 123 316 123 389	123 934 123 390

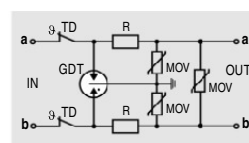
## Connection schemes of modules

Legend:

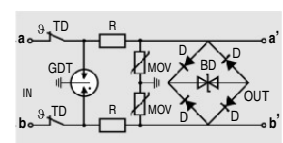
TD	thermal decoupler	Z	zener diode
TC	thermo clip	B	bridge diode
GDT	gas discharge tube	T	trisol
MOV	varistor		
PTC	resistor with a positive temperature coefficient		
⊗	thermal connection		
D	rectifier diode		
R	resistor		
BD	bidirectional diode		
TISP	integrated circuit with thyristor		
LED	light emitting diode		



LPA 08 I-PCM  
LPA 08 K1-PCM  
LPA 08 K10-PCM;

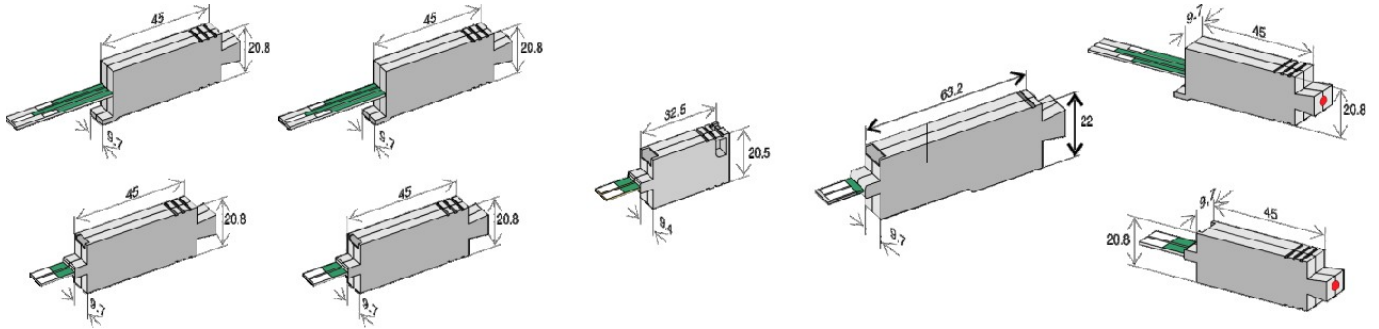


LPA 08 I-PCM10  
LPA 08 K1-PCM10  
LPA 08 K10-PCM10



LPA 08 I-2Mbit/s  
LPA 08 K1-2Mbit/s

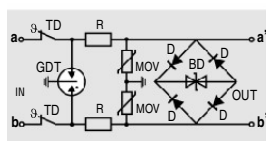
# Protection Modules on the Telecommunication side



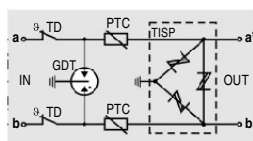
LPA 08 I xDSL LPA 08 K1 xDSL	LPA 08 I-PTC-xDSL LPA 08 K1-PTC-xDSL	LPA 08 K1M-TK-T110	LPA 08 K1 PTC-VAR	LPA 08 IL LPA 08 K1L
1	1	1	1	1
180 V	180 V	180 V	180 V	160 V
200 mA	150 mA	150 mA	60 mA	150 mA
184 - 264 V	184 - 240 V	184 - 240 V	62 - 206 V	180 - 200 V
144 - 176 V	184 - 240 V	184 - 240 V	184 - 284 V	180 - 200 V
< 300 V	< 300 V	< 300 V	< 600 V	< 300 V
Thermal decoupler	Thermal decoupler + PTC	Thermo clip + PTC	Thermal decoupler + PTC	Thermal decoupler + PTC
*	**	***	**	****
5 kA	5 kA	5 kA	5 kA	5 kA
10 kA	10 kA	10 kA	10 kA	10 kA
< 50 pF	< 50 pF	< 100 pF	< 250 pF	< 150 pF
/	/	/	/	/
4 - 6 Ω	9 - 11 Ω	9 - 11 Ω	24 - 26 Ω	9 - 11 Ω
> 20 MHz	> 20 MHz	> 10 MHz	> 1.2 MHz	> 2 MHz
< 5 ns	< 5 ns	< 5 ns	< 25ns	< 5 ns
- 25°C .... + 60°C	- 25°C .... + 60°C	- 25°C .... + 60°C	- 25°C .... + 50°C	- 25°C .... + 60°C
Grey	Grey	Grey	Grey	Grey
Thermoplastic, extinguishing degree V-0				
123 459	123 238	123 254	123 215	123 480
123 437	123 233			123 479

## Actuating of thermal protection

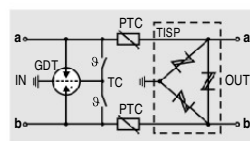
- \* Disconnection of the line to the exchange
- \*\* Limitation of current into the exchange and disconnection of the line to the exchange
- \*\*\* Limitation of current into the exchange and short circuit connection between line and ground
- \*\*\*\* Signalisation of dangerous voltage, limitation of current into the exchange and disconnection of the line to the exchange



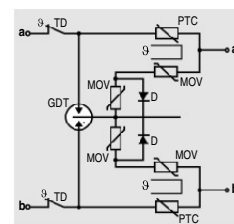
LPA 08 I- xDSL  
LPA 08 K1- xDSL



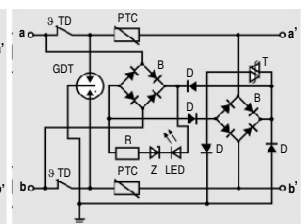
LPA 08 I-PTC- xDSL  
LPA 08 K1-PTC- xDSL



LPA 08 K1M-TK-T110

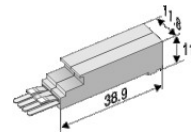
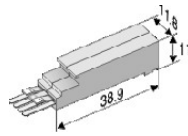


LPA 08 K1 PTC-VAR



LPA 08 IL  
LPA 08 K1L

# LPA2 Series



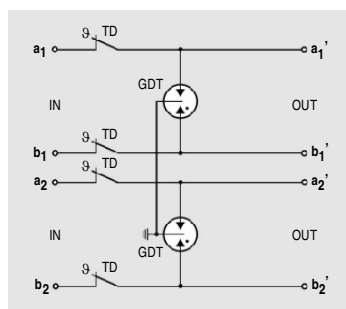
## Technical characteristics

Module type	LPA2 02 IH	LPA2 02 IH-R
No. of protected pairs	2	2
<b>Electrical characteristics</b>		
Max. operating voltage	$U_C$ 180 V	180 V
Max. operating current at 20°C	$I_L$ 300 mA	200 mA
Rated DC spark-overvoltage	(a/b-e) 184 - 276 V	184 - 276 V
	(a-b) 184 - 550 V	184 - 550 V
Protection level at $I_n$ (a,b-e/a-b)	$U_p$ ≤ 900 V	≤ 900 V
Thermal protection	Thermal decoupler	Thermal decoupler
Actuating of thermal protection	*	*
Rated surge current (8/20 μs)	$I_n$ 5 kA	5 kA
Max. surge current (8/20 μs)	$I_{max}$ 10 kA	10 kA
Transverse capacitance	$C$ < 15 pF	< 15 pF
Serial inductance	$L$ /	/
Serial resistance at 20°C	$R$ /	8 - 9 Ω
Frequency range	$f$ > 30 MHz	> 30 MHz
Response time of overvoltage protection	< 100 ns	< 100 ns
<b>Mechanical characteristics</b>		
Operating temperature	- 25°C .... + 60°C	- 25°C .... + 60°C
Housing colour	Grey	Grey
Housing material	Thermoplastic, extinguishing degree V-0	Thermoplastic, extinguishing degree V-0
Ordering code	<b>123 461</b>	<b>123 467</b>

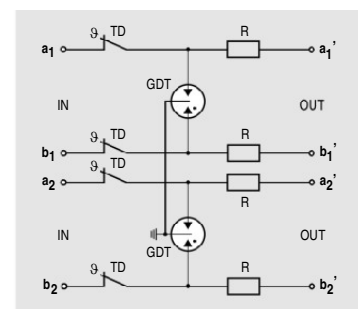
## Connection schemes of modules

Legend:

TD	thermal decoupler
GDT	gas discharge tube
R	resistor
PTC	resistor with a positive temperature coefficient
TISP	integrated circuit with thyristor

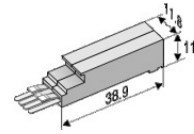
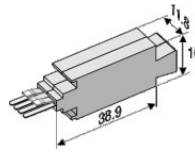
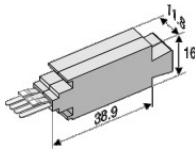


LPA2 02 IH



LPA2 02 IH-R

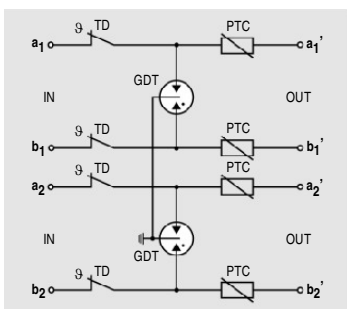
# Protection Modules on the Telecommunication side



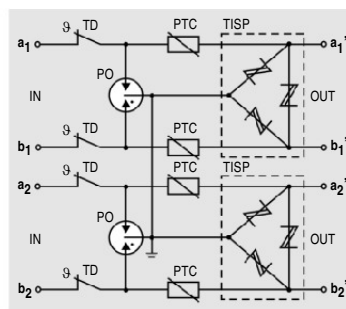
LPA2 02 I-PTC	LPA2 08 I-PTC D	LPA 08 IH-RD
2	2	2
180 V	180 V	180 V
150 mA	150 mA	200 mA
184 - 276 V	184 - 240 V	184 - 240 V
184 - 550 V	184 - 240 V	184 - 240 V
≤ 900 V	≤ 300 V	≤ 300 V
Thermal decoupler + PTC	Thermal decoupler + PTC	Thermal decoupler
**	**	*
5 kA	5 kA	5 kA
10 kA	10 kA	10 kA
< 15 pF	< 50 pF	< 50 pF
/	/	/
9 - 11 Ω	9 - 11 Ω	8 - 9 Ω
> 30 MHz	> 20 MHz	> 20 MHz
< 100 ns	< 5 ns	< 5 ns
- 25°C .... + 50°C	- 25°C .... + 50°C	- 25°C .... + 50°C
Grey	Grey	Grey
	Thermoplastic, extinguishing degree V-0	
123 470	123 471	123 468

## Actuating of thermal protection

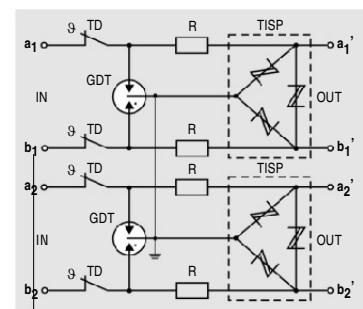
- \* Disconnection of the line to the exchange
- \*\* Limitation of current into the exchange and disconnection of the line to the exchange



LPA2 02 I-PTC



LPA2 08 I-PTC D

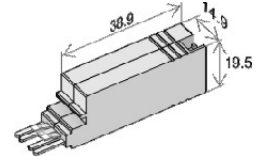
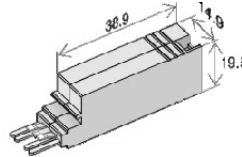
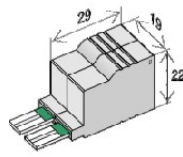


LPA 08 IH-RD



# LPF Series

# DSL Low-pass Filter for POTS & ISDN



## Technical characteristics

Module type	LPF1-LL/K-COMBO	LPF - MLL/I COMBO	LPF - MLL/I P.C.PTC - COMBO
No. of splitters (LPF)	1	1	1
Used for disconnecting strips	LL/K (123 976) LL/I (123 901)	MLL/I 4LPF (123 602)	MLL/I 4LPF (123 602)

## Electrical characteristics

Over-voltage protection	NO	NO	YES
Over-current protection	NO	NO	YES
Thermal protection	NO	NO	YES
Blocking capacitors	NO	NO	YES
ISDN:	$a_E < 0.8 \text{ dB}$	$f \leq 40 \text{ kHz}$	$f \leq 40 \text{ kHz}$
Zline: 135 $\Omega$ (2B1Q)	$a_E < 2.5 \text{ dB}$	$40 \text{ kHz} < f \leq 80 \text{ kHz}$	$40 \text{ kHz} < f \leq 80 \text{ kHz}$
	$a_S > 55 \text{ dB}$	$138 \text{ kHz} \leq f < 150 \text{ kHz}$	$138 \text{ kHz} \leq f < 150 \text{ kHz}$
	$a_S > 65 \text{ dB}$	$150 \text{ kHz} \leq f \leq 1104 \text{ kHz}$	$150 \text{ kHz} \leq f \leq 1104 \text{ kHz}$
	$a_S > 55 \text{ dB}$	$1104 \text{ kHz} \leq f \leq 12 \text{ MHz}$	$1104 \text{ kHz} \leq f \leq 12 \text{ MHz}$
	$a_R > 16 \text{ dB}$	$f \leq 40 \text{ kHz}$	$f \leq 40 \text{ kHz}$
	$a_R > 14 \text{ dB}$	$40 \text{ kHz} < f \leq 80 \text{ kHz}$	$40 \text{ kHz} < f \leq 80 \text{ kHz}$
POTS:	$a_E < 1 \text{ dB}$	$f = 15 \text{ kHz}$	$f = 15 \text{ kHz}$
Zline: 600 $\Omega$	$a_E < 3 \text{ dB}$	$15 \text{ kHz} \leq f \leq 17 \text{ kHz}$	$15 \text{ kHz} \leq f \leq 17 \text{ kHz}$
	$a_S > 55 \text{ dB}$	$138 \text{ kHz} \leq f \leq 12 \text{ MHz}$	$138 \text{ kHz} \leq f \leq 12 \text{ MHz}$
	$a_R > 12 \text{ dB}$	$0.3 \text{ kHz} \leq f \leq 0.6 \text{ kHz}$	$0.3 \text{ kHz} \leq f \leq 0.6 \text{ kHz}$
	$a_R > 10 \text{ dB}$	$1.6 \text{ kHz} < f \leq 3.4 \text{ kHz}$	$1.6 \text{ kHz} < f \leq 3.4 \text{ kHz}$
Cut frequency	$f_S = 138 \text{ kHz}$	$f_S = 138 \text{ kHz}$	$f_S = 138 \text{ kHz}$
Loop current	100 mA	100 mA	100 mA
Standards	ETSI Standard TS 101 952-1-4		

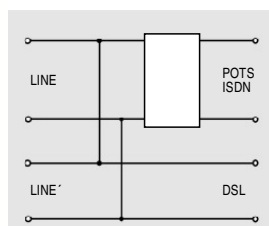
## Mechanical characteristics

Operating temperature	-25°C .... +50°C	-25°C .... +50°C	-25°C .... +50°C
Housing colour	Grey	Grey	Grey
Housing material	Thermoplastic, extinguishing degree V-0		
Ordering code	123 609	123 611	123 421

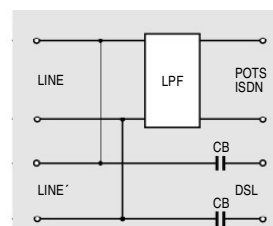
## Connection schemes of modules

### Legend:

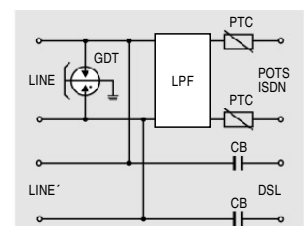
LPF	low pass filter
GDT	gas discharge tube
PTC	resistor with a positive temperature coefficient
CB	blocking capacitor



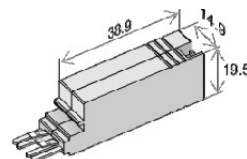
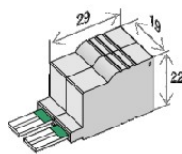
LPF1-LL/K-COMBO



LPF - MLL/I COMBO



LPF - MLL/I P.C.PTC - COMBO



### Technical characteristics

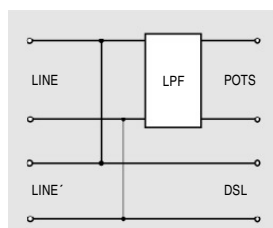
Module type	LPF1-KH-DSL-POTS	LPF-MLL/I-POTS
No. of splitters (LPF)	1	1
Used for disconnecting strips	LL/K (123 976) LL/I (123 901)	MLL/I 4LPF (123 602)

### Electrical characteristics

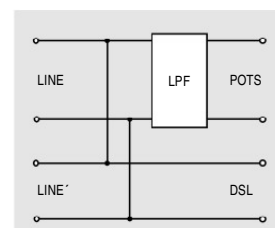
Over-voltage protection	NO	NO	
Over-current protection	NO	NO	
Thermal protection	NO	NO	
Blocking capacitors	NO	NO	
POTS:	$a_E < 0.3 \text{ dB}$	$f = 1 \text{ kHz}$	$f = 1 \text{ kHz}$
Zline: 600 $\Omega$	$a_E < 1 \text{ dB}$	$0.2 \text{ kHz} \leq f \leq 4 \text{ kHz}$	$0.2 \text{ kHz} \leq f \leq 4 \text{ kHz}$
	$a_S > 55 \text{ dB}$	$32 \text{ kHz} \leq f \leq 30 \text{ MHz}$	$32 \text{ kHz} \leq f \leq 30 \text{ MHz}$
	$a_R > 18 \text{ dB}$	$0.5 \text{ kHz} \leq f \leq 2.0 \text{ kHz}$	$0.5 \text{ kHz} \leq f \leq 2.0 \text{ kHz}$
	$a_R > 14 \text{ dB}$	$0.2 \text{ kHz} < f \leq 3.4 \text{ kHz}$	$0.2 \text{ kHz} < f \leq 3.4 \text{ kHz}$
Cut frequency	$f_S = 25 \text{ kHz}$	$f_S = 25 \text{ kHz}$	
Loop current	60 mA	60 mA	
Standards	ITU-T G.992.1, ITU-T G.992.3, ITU-T G.993.2	ITU-T G.992.1, ITU-T G.992.3, ITU-T G.993.2	

### Mechanical characteristics

Operating temperature	- 25°C .... + 50°C	- 25°C .... + 50°C
Housing colour	Grey	Grey
Housing material	Thermoplastic, extinguishing Degree V-0	Thermoplastic, extinguishing Degree V-0
Ordering code	<b>123 601</b>	<b>123 612</b>



LPF1-KH-DSL-POTS



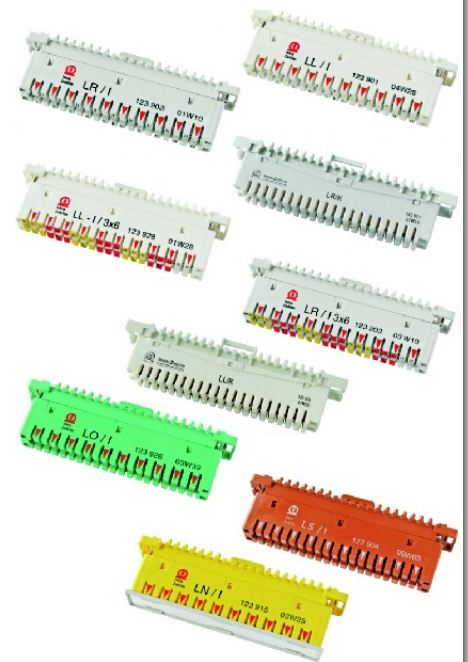
LPF-MLL/I-POTS



# Strips

## Standard Strips 10 pairs

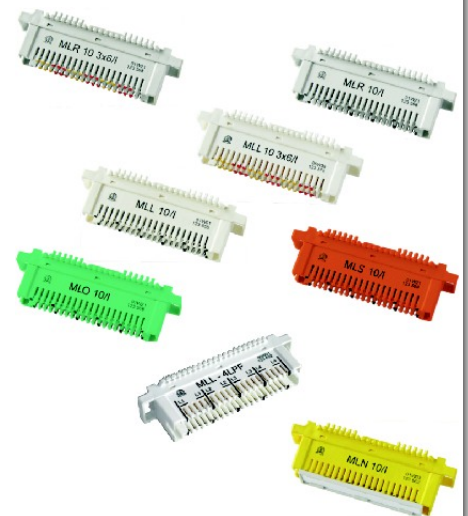
- Line side:**
- LL/I – disconnecting
  - LL/K – disconnecting
  - LS/I – switching
  - LL// 3x6 – disconnecting for 2 Mbit/s lines
  - LO/I – earthing
  - LN/I – inscription
- Exchange side:**
- LR/I – terminal
  - LR/K – terminal
  - LR/I 3x6 - terminal for 2 Mbit/s lines
  - LN/I – inscription
- Optional:**
- LL/I – disconnecting
  - LL/K – disconnecting
  - LL// 3x6 – disconnecting for 2 Mbit/s lines



## Small Strips 10 (8) pairs

With the small strips in comparison with the standard strips we save approximately 30% of space in the exchanges. The Strip type ML... is particularly adequate for mounting in cases when the saving up of space is of a most importance.

- Line side:**
- MLL 10/I – disconnecting
  - MLS 10/I – switching
  - MLL 10/I 3x6 - disconnecting for 2 Mbit/s lines
  - MLO 10/I – earthing
  - MLN 10/I – inscription
  - MLL/I 4LPF - disconnecting
- Exchange side:**
- MLR 10/I – terminal
  - MLR 10//3x6 – terminal for 2 Mbit/s lines
  - MLN 10/I – inscription
- Optional:**
- MLL 10/I – disconnecting
  - MLL 10/I 3x6 - disconnecting for 2 Mbit/s lines
  - MLL/I 4LPF - disconnecting



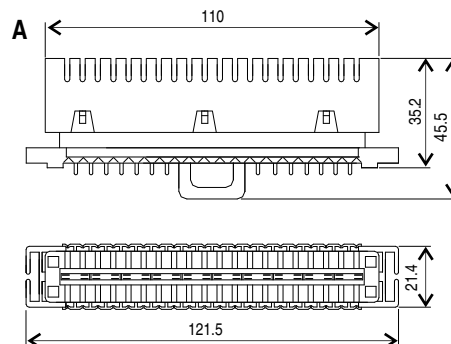
# LR, MLR Series



## Technical characteristics

Type	LR/I	LR/K
<b>Electrical characteristics</b>		
Internal diameter of the Cu connection wire	0.4 ... 0.8 mm	0.4 ... 0.8 mm
External diameter of the connection wire (shield)	0.7 ... 1.5 mm	0.7 ... 1.5 mm
No. of wires connected per contact slot	max. 2 ( $\leq 0.65$ mm)	max. 2 ( $\leq 0.65$ mm)
Insulation resistance	$> 5 \times 10^4$ M $\Omega$	$> 5 \times 10^4$ M $\Omega$
Typical contact resistance of the connection wire	1 m $\Omega$	1 m $\Omega$
Total contact resistance (wire length 50 mm)	$< 15$ m $\Omega$	$< 15$ m $\Omega$
Voltage strength (50 Hz)	$> 2.0$ kV <sub>rms</sub>	$> 2.0$ kV <sub>rms</sub>
Pulse voltage strength 1,2/50 $\mu$ s	$> 3.6$ kV	$> 3.6$ kV
Capacitance between wires a-b	$< 1$ pF	$< 1$ pF
Crosstalk attenuation between neighbouring wires		
1 MHz	$> 70$ dB	$> 70$ dB
10 MHz	$> 60$ dB	$> 60$ dB
30 MHz	$> 50$ dB	$> 50$ dB
60 Mhz	$> 45$ dB	$> 45$ dB
100 Mhz	$> 40$ dB	$> 40$ dB
Insertion loss at 1MHz	$< 0.1$ dB	$< 0.1$ dB
Bit error rate - BER at 2,048 Mbit/s	0	0
<b>Mechanical characteristics</b>		
Operating temperature	- 25°C ... + 80°C	- 25°C ... + 80°C
Storage temperature	- 40°C ... + 90°C	- 40°C ... + 90°C
Colour	Grey-grey	Grey-grey
No. of insertions of connection wire	$\geq 200$ x	$\geq 200$ x
Plastic parts	PBT UL94 V-0	PBT UL94 V-0
Contacts	Tin-brass alloy nickel and silver plated	Tin-brass alloy nickel and silver plated
Dimensions	A	B
Ordering code	<b>123 903</b>	<b>123 977</b>

## Dimensional drawings

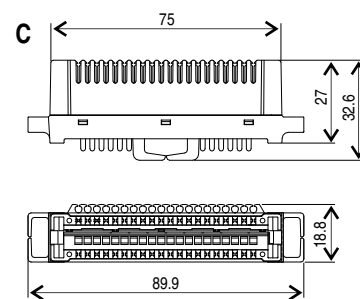
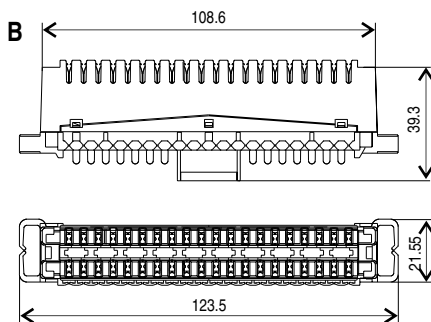


# Terminal Strips

# Exchange side



MLR 10/I	LR/I - 3x6	MLR 10 3x6/I
0.4 ... 0.6 mm	0.4 ... 0.8 mm	0.4 ... 0.6 mm
0.7 ... 1.0 mm	0.7 ... 1.5 mm	0.7 ... 1.0 mm
max. 2	max. 2 (≤ 0.65 mm)	max. 2
> 5 x 10 <sup>4</sup> MΩ	> 5 x 10 <sup>4</sup> MΩ	> 5 x 10 <sup>4</sup> MΩ
1 mΩ	1 mΩ	1 mΩ
< 15 mΩ	< 15 mΩ	< 15 mΩ
> 2.0 kV <sub>rms</sub>	> 2.0 kV <sub>rm</sub>	> 2.0 kV <sub>rms</sub>
> 3.6 kV	> 4 kV	> 3.6 kV
< 1 pF	< 1 pF	< 1 pF
> 65 dB	> 75 dB	> 70 dB
> 55 dB	> 65 dB	> 60 dB
> 45 dB	> 55 dB	> 50 dB
> 40 dB	> 50 dB	> 45 dB
> 35 dB	> 45 dB	> 40 dB
< 0.1 dB	< 0.1 dB	< 0.1 dB
0	0	0
- 25°C ... + 80°C	- 25°C ... + 80°C	- 25°C ... + 80°C
- 40°C ... + 90°C	- 40°C ... + 90°C	- 40°C ... + 90°C
Grey-gray	Grey-grey	Grey-gray
≥ 200 x	≥ 200 x	≥ 200 x
PBT UL94 V-0	PBT UL94 V-0	PBT UL94 V-0
Tin-brass alloy nickel and silver plated	Tin-brass alloy nickel and silver plated	Tin-brass alloy nickel and silver plated
C	A	C
<b>123 568</b>	<b>123 935</b>	<b>123 573</b>



# LL, MLL Series

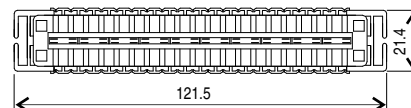
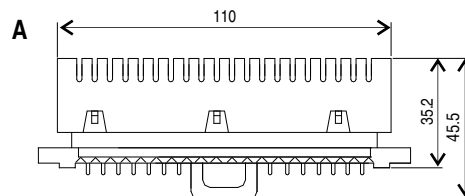


## Technical characteristics

Type	LL/I	LL/K
<b>Electrical characteristics</b>		
Internal diameter of the Cu connection wire	0.4 - 0.8 mm	0.4 ... 0.8 mm
External diameter of the connection wire (shield)	0.7 - 1.5 mm	0.7 ... 1.5 mm
No. of wires connected per contact slot	max. 2 ( $\leq 0.65$ mm)	max. 2 ( $\leq 0.65$ mm)
Insulation resistance	$> 5 \times 10^4$ M $\Omega$	$> 5 \times 10^4$ M $\Omega$
Typical contact resistance of the connection wire	1 m $\Omega$	1 m $\Omega$
Total contact resistance (wire length 50 mm)	$< 15$ m $\Omega$	$< 15$ m $\Omega$
Voltage strength (50 Hz)	$> 2.0$ kV <sub>rms</sub>	$> 2.0$ kV <sub>rms</sub>
Pulse voltage strength 1,2/50 $\mu$ s	$> 3.6$ kV	$> 3.6$ kV
Max. Operating current 8/20 $\mu$ s	10kA	10 kA
Capacitance between wires a-b	$< 1.5$ pF	$< 1$ pF
Crosstalk attenuation between neighbouring wires		
1MHz	$> 70$ dB	$> 70$ dB
10 MHz	$> 60$ dB	$> 60$ dB
30 MHz	$> 50$ dB	$> 50$ dB
60 Mhz	$> 45$ dB	$> 45$ dB
100 Mhz	$> 40$ dB	$> 40$ dB
Insertion loss at 1MHz	$< 0.1$ dB	$< 0.1$ dB
Bit error rate - BER at 2.048 Mbit/s	0	0
<b>Mechanical characteristics</b>		
Earthing contact	Yes	No*
Operating temperature	- 20°C ... + 80°C	- 25°C ... + 80°C
Storage temperature	- 40°C ... + 90°C	- 40°C ... + 90°C
Colour	White-white	White-white
No. of insertions of connection wire	$\geq 200$ x	$\geq 200$ x
Plastic parts	PBT UL94 V-0	PBT UL94 V-0
Contacts	Tin-brass alloy nickel and silver plated	Tin-brass alloy nickel and silver plated
Dimensions	A	B
Ordering code	<b>123 901</b>	<b>123 930</b>

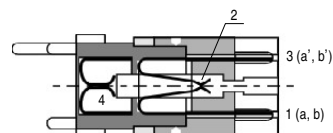
\* External earthing contact K1 (Ordering code 023 025)

## Dimensional drawings



## Strips cross section

1. Connection contact on line side a, b
2. Position of contacts a-a' and b-b' (normally closed)
3. Connection contact for terminal side a', b'
4. Earthing contact

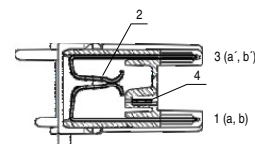
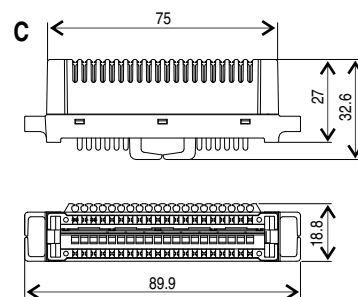
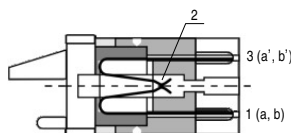
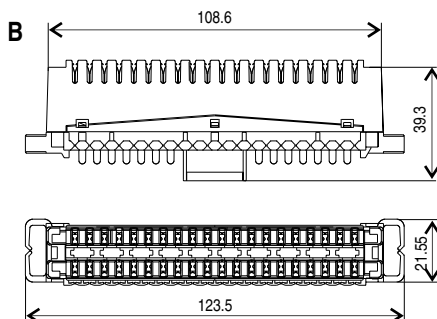


# Disconnecting Strips

Line side



MLL 10/I	LL/I - 3x6	MLL 10/I 3x6
0.4 ... 0.6 mm	0.4 ... 0.8 mm	0.4 ... 0.6 mm
0.7 ... 1.0 mm	0.7 ... 1.5 mm	0.7 ... 1.0 mm
max. 2	max. 2 ( $\leq 0.65$ mm)	max. 2
$> 5 \times 10^4$ M $\Omega$	$> 5 \times 10^4$ M $\Omega$	$> 5 \times 10^4$ M $\Omega$
1 m $\Omega$	1 m $\Omega$	1 m $\Omega$
$< 15$ m $\Omega$	$< 15$ m $\Omega$	$< 10$ m $\Omega$
$> 2.0$ kV <sub>rrm</sub>	$> 2.0$ kV <sub>rrm</sub>	$> 2.0$ kV <sub>rrm</sub>
$> 3.6$ kV	$> 3.6$ kV	$> 4$ kV
10 kA	10 kA	10 kA
$< 1.5$ pF	$< 1.5$ pF	$< 1.5$ pF
$> 65$ dB	$> 75$ dB	$> 70$ dB
$> 55$ dB	$> 65$ dB	$> 60$ dB
$> 45$ dB	$> 55$ dB	$> 50$ dB
$> 40$ dB	$> 50$ dB	$> 45$ dB
$> 35$ dB	$> 45$ dB	$> 40$ dB
$< 0.1$ dB	$< 0.1$ dB	$< 0.05$ dB
0	0	0
Yes	Yes	Yes
- 25°C ... + 80°C	- 25°C ... + 80°C	- 25°C ... + 80°C
- 40°C ... + 90°C	- 40°C ... + 90°C	- 40°C ... + 90°C
White-white	White-white	White-white
$\geq 200$ x	$\geq 200$ x	$\geq 200$ x
PBT UL94 V-0	PBT UL94 V-0	PBT UL94 V-0
Tin-brass alloy nickel and silver plated	Tin-brass alloy nickel and silver plated	Tin-brass alloy nickel and silver plated
C	A	C
<b>123 556</b>	<b>123 928</b>	<b>123 572</b>



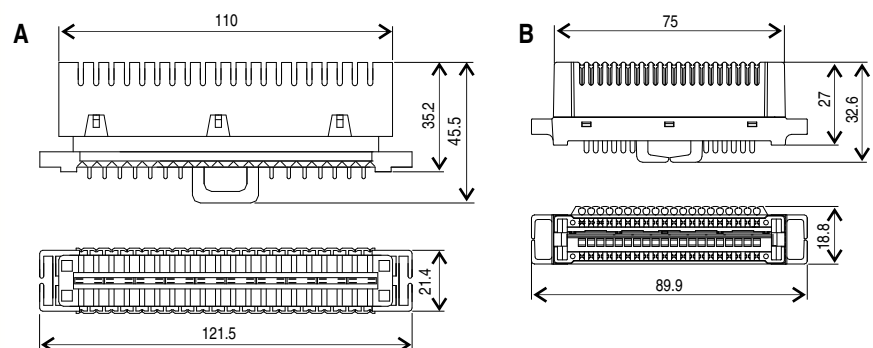




**Technical characteristics**

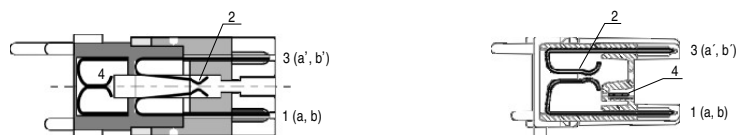
Type	LS/I	MLS 10/I
<b>Electrical characteristics</b>		
Internal diameter of the Cu connection wire	0.4 - 0.8 mm	0.4 ... 0.6 mm
External diameter of the connection wire (shield)	0.7 - 1.5 mm	0.7 ... 1.0 mm
No. of wires connected per contact slot	max. 2 ( $\leq 0.65$ mm)	max. 2
Insulation resistance	$> 5 \times 10^4$ M $\Omega$	$> 5 \times 10^4$ M $\Omega$
Typical contact resistance of the connection wire	1 m $\Omega$	1 m $\Omega$
Total contact resistance (wire length 50 mm)	$< 15$ m $\Omega$	$< 15$ m $\Omega$
Voltage strength (50 Hz)	$> 2.0$ kV <sub>rms</sub>	$> 2.0$ kV <sub>rm</sub>
Pulse voltage strength 1,2/50 $\mu$ s	$> 3.6$ kV	$> 3.6$ kV
Max. Operating current 8/20 $\mu$ s	10kA	10 kA
Capacitance between wires a-b	$< 1.5$ pF	$< 1.5$ pF
Crosstalk attenuation between neighbouring wires		
1MHz	$> 70$ dB	$> 65$ dB
10 MHz	$> 60$ dB	$> 55$ dB
30 MHz	$> 50$ dB	$> 45$ dB
60 Mhz	$> 45$ dB	$> 40$ dB
100 Mhz	$> 40$ dB	$> 35$ dB
Insertion loss at 1MHz	$< 0.1$ dB	$< 0.1$ dB
Bit error rate - BER at 2.048 Mbit/s	0	0
<b>Mechanical characteristics</b>		
Earthing contact	Yes	Yes
Operating temperature	- 20°C ... + 80°C	- 25°C ... + 80°C
Storage temperature	- 40°C ... + 90°C	- 40°C ... + 90°C
Colour	Brown-brown	Brown-brown
No. of insertions of connection wire	$\geq 200$ x	$\geq 200$ x
Plastic parts	PBT UL94 V-0	PBT UL94 V-0
Contacts	Tin-brass alloy nickel and silver plated	Tin-brass alloy nickel and silver plated
Dimensions	A	B
Ordering code	123 904	123 575

**Dimensional drawings**



**Strips cross section**

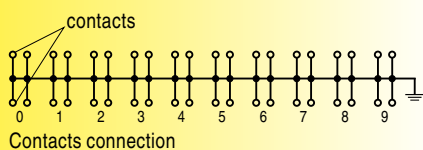
1. Connection contact on line side a, b
2. Position of contacts a-a' and b-b' (normally opened)
3. Connection contact for terminal side a', b'
4. Earthing contact



# LO Series LN Series

# Earthing Strips Inscription Strips

# Line side Line and exchange side



### Technical characteristics

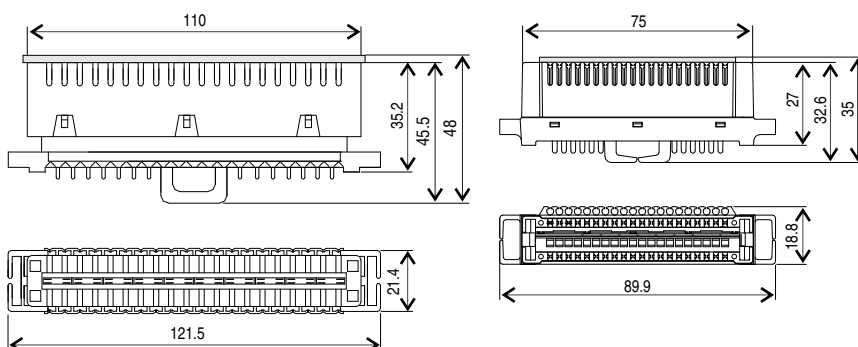
Type	LO/I	MLO 10/I
<b>Electrical characteristics</b>		
Internal diameter of the Cu connection wire	0.4 - 0.8 mm	0.4 ... 0.6 mm
External diameter of the connection wire (shield)	0.7 - 1.5 mm	0.7 ... 1.0 mm
No. of wires connected per contact slot	max. 2 ( $\leq 0.65$ mm)	max. 2
Typical contact resistance of the connection wire	1 m $\Omega$	1 m $\Omega$
Total contact resistance (wire length 50 mm)	< 15 m $\Omega$	< 15 m $\Omega$
<b>Mechanical characteristics</b>		
Operating temperature	- 20°C ... + 80°C	- 25°C ... + 80°C
Storage temperature	- 40°C ... + 90°C	- 40°C ... + 90°C
Colour	Green-green	Green-green
No. of insertions of connection wire	$\geq 200$ x	$\geq 200$ x
Plastic parts	PBT UL94 V-0	PBT UL94 V-0
Contacts	Tin-brass alloy nickel and silver plated	Tin-brass alloy nickel and silver plated
Dimensions	A	B
Ordering code	123 926	123 560



### Mechanical characteristics

Type	LN/I	MLN 10/I
Operating temperature	- 20°C ... + 80°C	- 25°C ... + 80°C
Storage temperature	- 40°C ... + 90°C	- 40°C ... + 90°C
Colour	Green-green	Green-green
No. of insertions of connection wire	$\geq 200$ x	$\geq 200$ x
Plastic parts	PBT UL94 V-0	PBT UL94 V-0
Dimensions	A	B
Ordering code		
Complete	023 217	023 815
Inscription plate	123 924	023 817

### Dimensional drawings

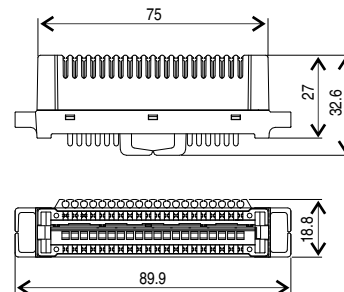




### Technical characteristics

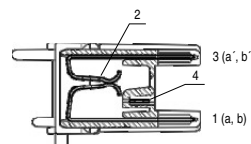
Type	<b>MLL/I 4LPF</b>
<b>Electrical characteristics</b>	
Internal diameter of the Cu connection wire	0.4 - 0.6 mm
External diameter of the connection wire (shield)	0.7 - 1.0 mm
No. of wires connected per contact slot	max. 2 ( $\leq 0.65$ mm)
Insulation resistance	$> 5 \times 10^4$ M $\Omega$
Typical contact resistance of the connection wire	1 m $\Omega$
Total contact resistance (wire length 50 mm)	$< 15$ m $\Omega$
Voltage strength (50 Hz)	$> 2.0$ kV <sub>rms</sub>
Pulse voltage strength 1,2/50 $\mu$ s	$> 3.6$ kV
Max. Operating current 8/20 $\mu$ s	10kA
Capacitance between wires a-b	$< 1$ pF
Crosstalk attenuation between neighbouring wires	
1MHz	$> 70$ dB
10 MHz	$> 60$ dB
30 MHz	$> 50$ dB
60 Mhz	$> 45$ dB
100 Mhz	$> 40$ dB
Insertion loss at 1MHz	$< 0.1$ dB
Bit error rate - BER at 2.048 Mbit/s	0
<b>Mechanical characteristics</b>	
Earthing contact	Yes
Operating temperature	- 20°C ... + 80°C
Storage temperature	- 40°C ... + 90°C
Colour	White-white
No. of insertions of connection wire	$\geq 200$ x
Plastic parts	PBT UL94 V-0
Contacts	Tin-brass alloy nickel and silver plated
Dimensions	A
Ordering code	<b>123 602</b>

### Dimensional drawings



### Strips cross section

1. Connection contact on line side a, b
2. Position of contacts a-a' and b-b' (normally closed)
3. Connection contact for terminal side a', b'
4. Earthing contact



# Earthing Mounting Frames

## Mounting Earthing Frames NMI, NMIM

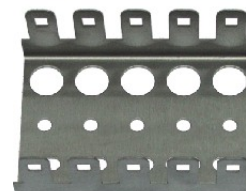
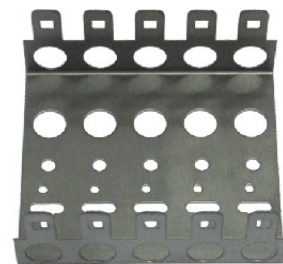
The mounting frames are used for mounting the various types of strips (terminals, disconnecting, switching, earthing, marking) and subsequently they are installed on the MDF's.

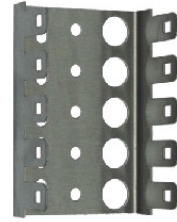
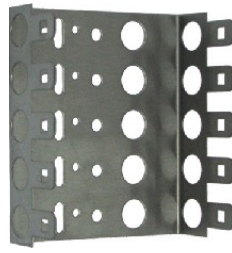
They can be also used as an earthing link for the overvoltage protection and as an entry for the cable bundles.

Mounting earthing frame with strips is suitable for all climates and temperatures.

Corrosion - at the onset of humidity, stainless steel has a great affinity to Al, Cd and Zn.

All fixing components must have zinc or nickel protection or they must be made by the same stainless steel material as the mounting frames.

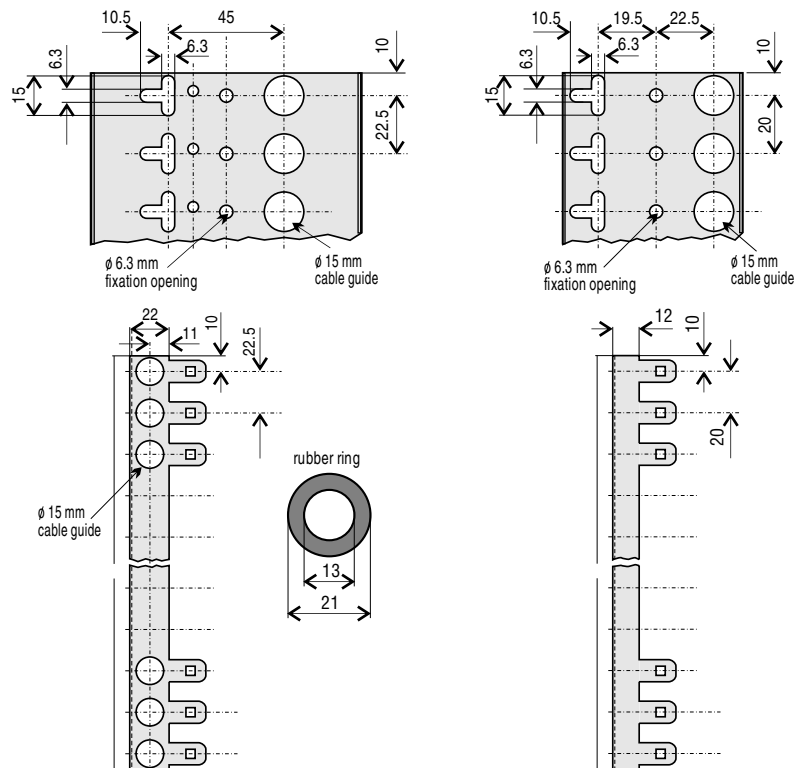




### Technical characteristics

Type	NMI	NMIM
<b>Mechanical characteristics</b>		
Height to frame	22 mm	12 mm
Material	Stainless steel	Stainless steel
Ordering code		
for 1 strip	NMI-22-1 023 559	NMIM-12-1 023 564
for 3 strips	NMI-22-3 023 561	NMIM-12-3 023 565
for 5 strips	NMI-22-5 023 562	NMIM-12-5 023 567
for 8 strips	NMI-22-8 023 563	NMIM-12-8 023 495
for 11 strips	NMI-22-11 023 204	NMIM-12-11 023 821

### Dimensional drawings



# Main Distribution Frames (MDF)

The main distribution frame ISKRA has the following advantages:

- occupies minimum space
- simple mounting
- fast and easy wiring

The MDF is a modular construction and contain components compatible with various telecommunication systems. The structure is of aluminium C profile.

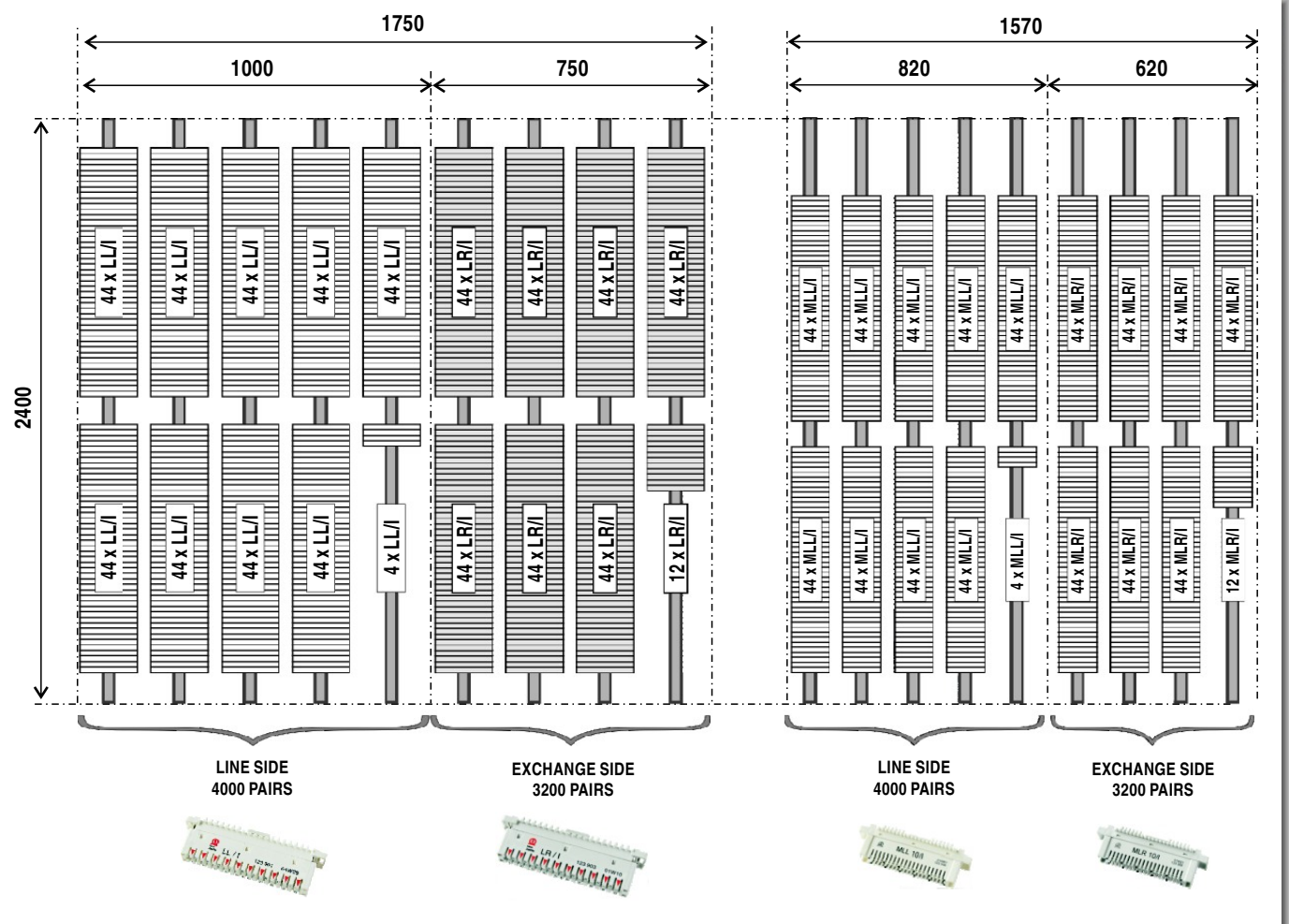
The construction of main distribution frames:

- Free Standing Frames PSD 1, PSD 10, PSD 100, PSD 100M
- Wall Frames SD 10, SD 10M
- Wall mounting Frames PD 10, PD 10M, PD 100, PD 100M

The equipment consists of:

- unit structure (basic module)
- mounting frames
- connection strips
- accessories

Cable entry is available from top or from the bottom. For the top entry a cable distribution net must be mounted on the frame. For the bottom entry is a channel adjusted under the frame. The MDF can be also mounted on a double floor in which case the channel cable entry in the floor becomes superfluous.



# Main Distribution Frames (MDF)

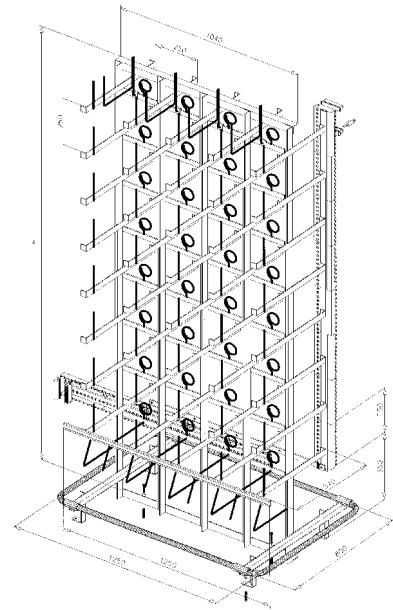
## Free Standing Frame PSD 1

The construction is made of iron and protected against the corrosion. The distribution frame is divided among two parts: the horizontal exchange side and vertical line side.

The distance between two verticals is 250 mm (200 mm).

Standard height

H (mm)	No. of horizontals	No. of connections (Basic module 5 verticals)	
		line / exchange	
2350	8	4000 / 3200	
2850	10	5000 / 4000	
3350	12	6000 / 4800	



## Free Standing Frame PSD 10

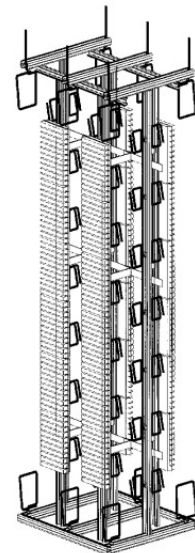
The main characteristic of the free standing frame PDS 10 is that the exchange side and line side are both placed vertically.

The basic module is a double C profile of aluminium.

The distance between two verticals is 250 mm (200 mm).

The frame PSD 10 is constructed for max. 10.000 lines.

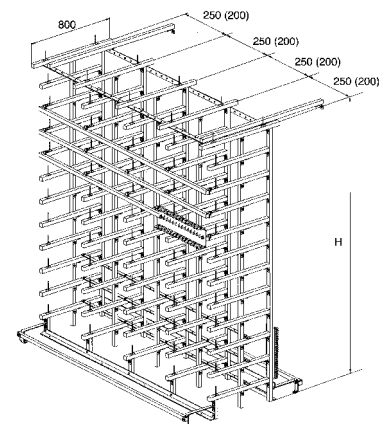
Standard height.



## Free Standing Frame PSD 100 (PSD 100M)

The basic module is a double C profile of aluminium. The distance between two verticals is 250 mm (200 mm). The distance between two verticals by the strips of type ML is 200 mm (150 mm). The distribution frame is divided among two parts: the horizontal part is always the exchange side and the vertical is always the line side.

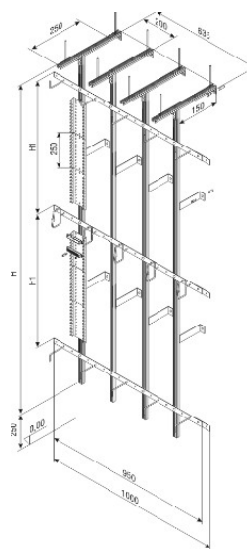
It is possible to add more verticals and more horizontals to the frame.



## Main Distribution Frames (MDF)

### Wall Mounting Frame PD 10 (PD 10M)

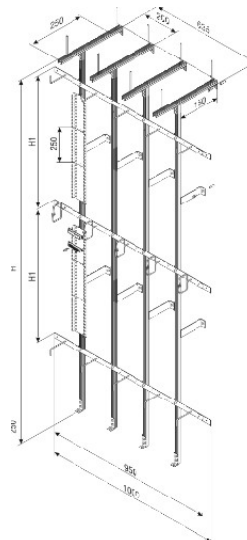
The basic module is a double C profile of aluminium. The distance between two verticals is 200 mm (in case of PD 10M the distance between two verticals can be 150mm). It can be divided among two parts: the upper half vertical as the exchange side and the lower half as the line side. The frame is made for max. 5.000 lines.



### Wall Frame SD 10 (SD 10M)

The basic module is a double C profile of aluminium. The distance between two verticals is 200 mm (in case of SD 10M the distance between two verticals can be 150mm). The frame is used as alternating verticals of the exchange side and the line side. It can also be divided among two parts: the upper half vertical as the exchange side and the lower half as the line side.

The frame is made for max. 5.000 lines.

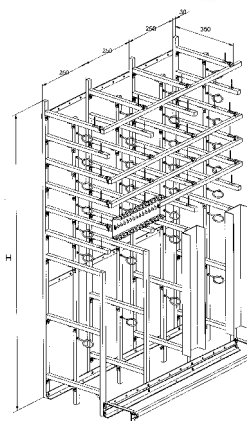


### Free Standing Frame PD 100 (PD 100M)

The basic module is a double C profile of aluminium. The distance between two verticals is 250 mm (200 mm)(in case of PD 100 M, the distance between two verticals can be 150 mm).

The frame is divided among two parts: the exchange side is always horizontal and the line side is always vertical.

The basic versions are two verticals. It can be extended for one more vertical.



### An ordering example for all types of MDF:

For ordering we need:

- The type of distribution frame (PD 100)
- The height of distribution frame (h= 2800 mm)
- Max. width of distribution frame (5200 mm)
- No. of subscribers on the exchange side-exchange= 7000 lines
- No. of subscribers on the line side-line= 8000 lines
- The type of strips (L... or ML10 or MLR16.)

This example is valid for all presented types of distribution frames



# Mounting Accessories

Rubber Ring

Earthing contact K1

Connection Frames

Adapter for connection between strips and with MDF  
"PIPE HOLDERS"

Mounting Tools

Extracting Tool

Group Disconnecting Plug

Disconnecting Plug (blind)

Marking Label

Measuring wires for Iskra and KRONE strip

Measuring wires for Iskra MLL, MLR strip

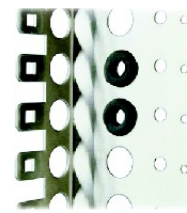
Maintenance Ladder



### Rubber Ring

The rubber ring is used for fixing and protecting cable bundles at the entry through the opening of the mounting frame.

Designation	Code
SG	023 006



### Earthing contact K1

Earthing contact enables protection modules earthing (for one pair) over mounting earthing frame. It must be put on LL/K strip, which is already mounted on mounting earthing frame.

Designation	Description	Code
K1	earthing contact for Krone strip	023 035

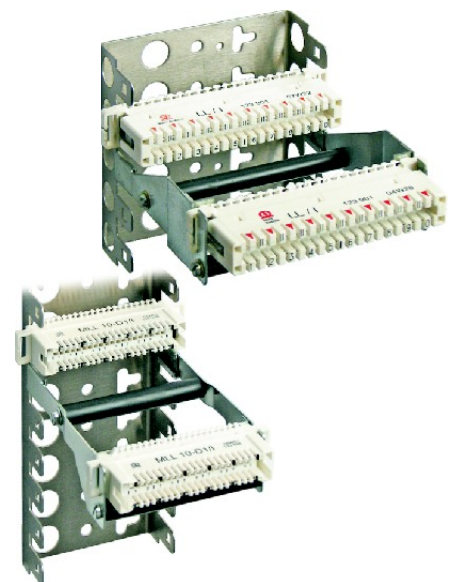


### Connection Frames

The connection frame is used for speedy work with cables. It is inserted on a mounting frame and a strip (LL, LR, LS, MLL, MLR, MLS) is mounted on top.

The cables are led over the contacts and are pressed into the strip by a mounting tool. It is then removed. In this way longer cable lengths are acquired, which come in handy should the wire be torn out of the strip. Since it is longer, the cable can be reattached to the strip.

Designation	Description	Code
PZR 10/I	connection frame for standard strips	023 011
PR-ML10	connection frame for small strips	023 819
PZR 10/K	connection frame for Krone strip	023 490



### Adapter for connection between strips and with MDF "PIPE HOLDERS"

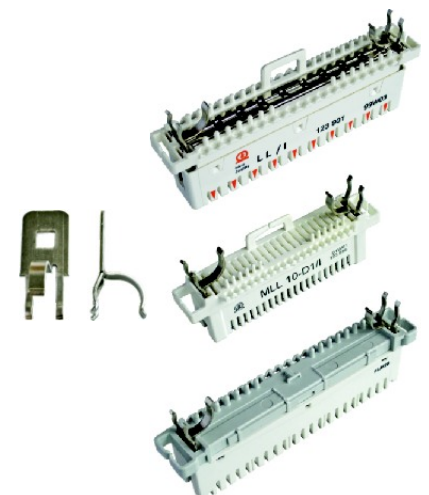
Universal adapter for all types of Iskra strips - mounting of standard I, standard K and small.

Universal adapter connects the strips with the newest MDF "pipe holders". Adapter is good electrical conductor and it is used for electrical connection between earthing of the strips and MDF "pipe holders".

### Technical data for mounting:

Diameter of rod	11.5 - 12.5 mm
Spacing of rads (Strip I standard; type K)	94 - 96 mm
Spacing of rads (Strip I small)	62 - 64 mm
Material	Tin-brass alloy, nickel plated

Designation	Code
NMI-PSA12 (2 pcs)	570 191



## Mounting Accessories

### Mounting Tools

Functions:

- attaching and cutting of wires on the strip
- extraction of wires
- blocking of cuts
- strip extraction

Designation	Code
KLMI / K	023 040
KLM-ML	023 548

### Extracting Tool

Intended for extracting overvoltage protection modules.

Designation	Code
KLD I/K1	023 041
KLD2I	023 829

### Group Disconnecting Plug

The plug is used for disconnection telephone lines. All 10 pairs are disconnected by inserting the plug into the disconnection or terminal strips. The switching strip does not need the plug since it already has the disconnecting function without the module.

Designation	Code
VL-10 I	023 033
VL-10	023 030

### Disconnecting Plug (blind)

It is used with the disconnecting strip LL/I for interrupting telephone lines (cutting-off the subscriber) and simultaneous marking of the cut-off line.

Case colour: red.

For the strips type ML... are available three different disconnecting plugs:

- Disconnecting plug left single (VLL); left part of the case is red - interrupted line, right part of the case is grey - protected line
- Disconnecting plug right single (VLD); right part of the case is red - interrupted line, left part of the casing is grey - protected line
- Disconnecting plug double (VL2); red casing - disconnection of two lines at the same time

The disconnecting plugs are used with the disconnecting strip for interrupting telephone lines (cutting-off the subscriber) and simultaneous marking of the cut-off line.

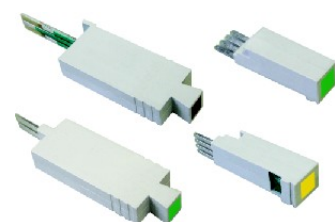
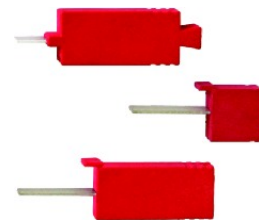
Designation	Code
VL-I	023 039
VL-IM	023 231
VL-K	023 025
VLL1	023 830
VLD1	023 831
VL2	023 832

### Marking Label

The labels are used for marking lines (unpaid subscriber bills, free lines,...).

They are attached to the protection modules.

Designation	Code
Green	023 577
Yellow	023 579
Brown	023 578



## Measuring wires for Iskra and KRONE strip

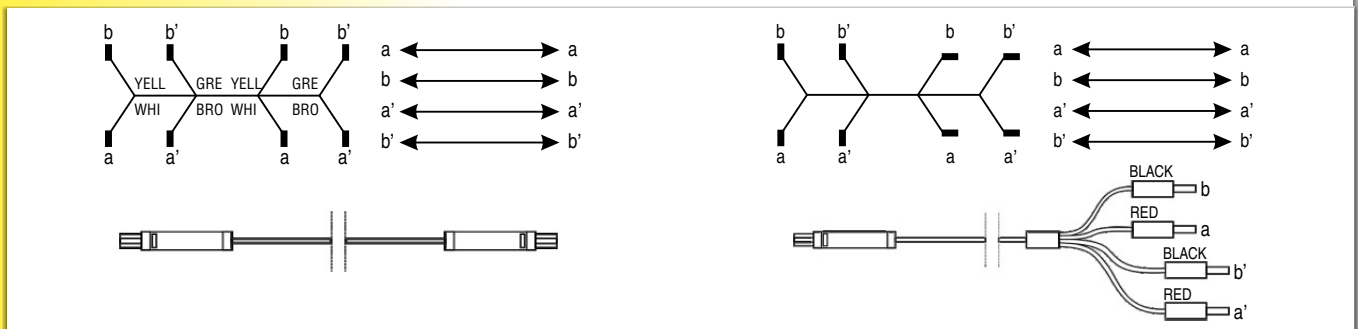
They are used as connecting and testing components of telephone lines.

The standard version is 1.5 m. Shorter or longer lengths are available as well as different combinations of internal connections

4-pole; two plugs and 4 separate contacts



Designation	Code
VMI-P	023 220
VMK-P	023 441
VPO 4I	023 068
VPO 4K	023 111

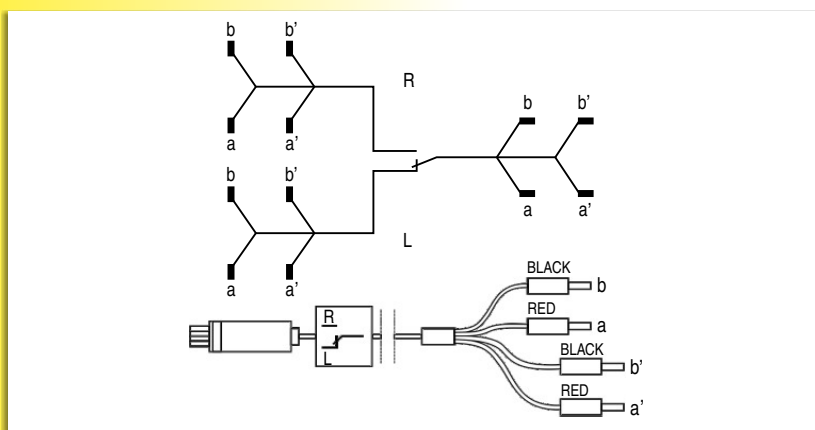


## Measuring wires for Iskra MLL, MLR strip

They are used as connecting and testing components of telephone lines.

Standard version is 4 m. Shorter or longer lengths are available as well as different combinations of internal connections.

Designation	Code
VMK 4I	023 839
VMP 4I	023 911

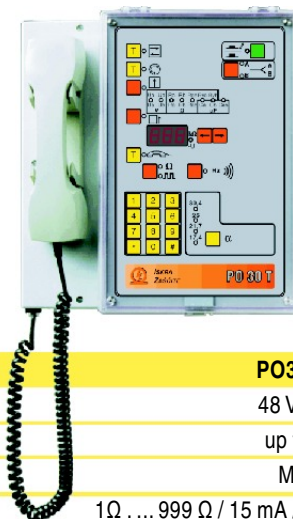


# Testing Device

## PO30 PROT testing device

Testing device serves for the fault detection on telephone exchanges and public lines as well as on end users. They fulfill the requirements of modern electronics and are simple and easy to use for checking all necessary technical parameters in exchanges and public lines.





### Technical characteristics

Type	<b>PO30 PROT</b>
Rated voltage	48 V or 60 V
Consumption	up to 10 W
Fuse	M 0.5 A
Resistance ranges / Measuring currents / Accuracy	1 Ω ... 999 Ω / 15 mA / ± (2 % reading + 2 digits) 10 Ω ... 9.99 k Ω / 3.6 mA / ± (2 % reading + 2 digits) 100 Ω ... 99.9 k Ω / 36 mA / ± (2 % reading + 2 digits) 1 k Ω ... 999 k Ω / 3.6 μA / ± (2 % reading + 2 digits)
Capacitance measuring range / Accuracy	0.05 ... 9.99 μF / ± (2% reading + 3 digits)
Voltage measuring range / Accuracy	- 12,0 V ... + 65.0 V / 48 V or 60 V ± 2 digits
Display	3 digit LED
Pulse count electronic counter	0 ... 99 impulses
Pulse duration range	0.01 s ... 0.63 s
Operating temperature	+ 5 °C ... + 45 °C
Ordering code	<b>023 797</b>

### Description of tester device functions:

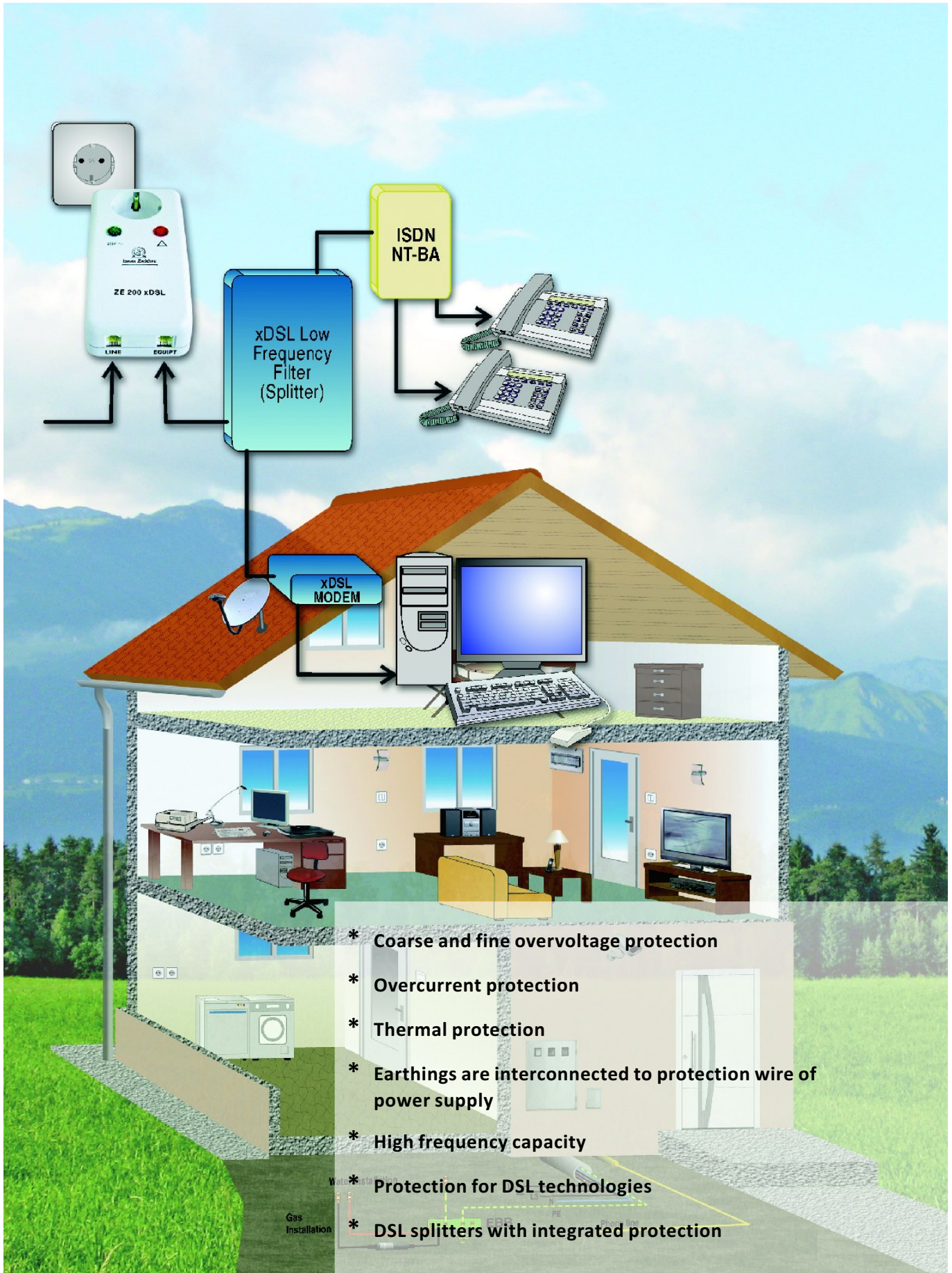
- Telephone calls
- Voltage measurement on 'a' and 'b' wires
- Selection of 'A' or 'B' subscriber - party line for all tests
- Testing of 'a' and 'b' wires for breaking and connecting
- Testing of internal line by dialling the subscriber line
- Voltage measurement on internal line 'a' and 'ab' wires
- Measurement of all insulating resistances between internal line 'a' and 'b' wires and earth
- Measurement of fuse resistance in 'a' wire
- Measurement of fuse resistance in 'b' wire
- Automatic fault detection on the external line and indication of subscriber telephone set presence
- Voltage measurement on external line 'a' and 'b' wires
- Measurement of all insulating resistances between external line 'a' and 'b' wires and earth
- Measurement of all capacitances between external line 'a' and 'b' wires and earth
- Testing of subscriber's telephone set capacitor
- Checking of subscriber's telephone set hook switch
- Direct call to the subscriber and local call (without telephone exchange)
- Measurement of 'a' and 'b' wire loop resistance in combination with the telephone set
- Testing of subscriber's telephone set dialling
- Generation of tone signal 800 Hz
- Testing of speech signal attenuation
- Tone dialling of subscriber - MFC

### Description of symbols on front plate

	ON - OFF
	PARTY LINE
	CONNECTION TEST (#P.O.)
	SET-UP OF SUBSCRIBER NO.
	INTERNAL LINE MEASUREMENT
	EXTERNAL LINE MEASUREMENT
	tone SIGNAL
	RESISTANCE / DIALOG
	CALL TO THE SUBSCRIBER AND LOCAL CALL
	ATTENUATION (dB)



# Independent Line Protection for Terminals and Equipment





# Combined Plug-in Adapters with Overvoltage Protection

## ZE 200 xDSL

Adapter is intended for protection of NT interface, VDSL low-band filter (splitter) and VDSL modem unit.

The protective module ZE 200 xDSL protects the entire telecommunication equipment on the subscriber's side against overvoltages as a result of lightning strikes, switching manipulations of large consumers, inductances and other overvoltage influences.

The protection is functionally divided into power protection (230V/50H) and protection of the telephone line itself through which the existing ISDN service is transmitted and at the same time the expanded service of VDSL technology signal transmissions.



## ZE 200 ISDN-SO

Adapter is intended for the protection of terminals (S-bus) of the ISDN technology, as well as ISDN modems and computers (PC) connected on this bus (4-wire lines). The protection is functionally divided into power protection (230 V) and protection of the ISDN line (S-bus) itself.

It is recommended especially for longer S-bus lines because overvoltages are induced (due to lightning strikes, switching manipulations of large consumers, etc.) which are damaging for terminals, NT interfaces and computers (PC).



## ZE 200 ISDN-BA

Adapter is intended for protection of NT (Network Terminal) interfaces. At the same time they also protect an end user on the terminal sides of interfaces. The protection is functionally divided into power protection (230 V) and protection of an ISDN line (U-bus) itself. The protective modules protect electronic equipment against overvoltages as a result of lightning strikes, switching manipulations of large consumers, inductances and other overvoltage influences.



## ZE 200-FAX/TEL

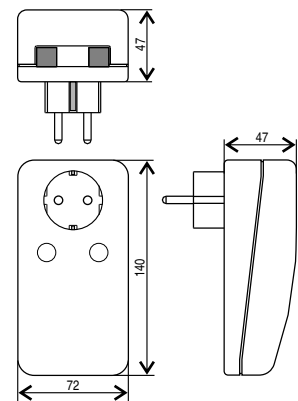
Adapter is intended for the protection of telecommunication terminals from overvoltages, which originate at electrostatic and atmospheric discharges (lightning) and high voltage inductances resulting from power line switching manipulations and large electricity consumers.

The protective module is adequate for protecting facsimile machines, modems, cordless telephones, answering machines and other telecommunication devices.





Dimensional drawings



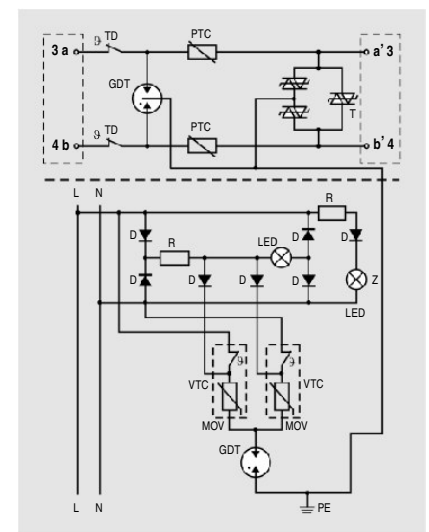
### Technical characteristics

Type	<b>ZE 200 xDSL</b>	
<b>Electrical characteristics</b>		
<b>Data part</b>		
Max. operating voltage	$U_c$	175 V
Max. operating current at 20°C	$I_L$	150 mA
Rated DC spark-overvoltage	(a/b-PE)	184 - 240 V
	(a-b)	184 - 240 V
Protection level at $I_n$ (a,b-PE/a-b)	$U_p$	$\leq 300$ V
Thermal protection	Thermal protection + PTC	
Actuating of thermal protection	*	
Rated surge current (8/20 $\mu$ s)	$I_n$	2.5 kA
Max. surge current (8/20 $\mu$ s)	$I_{max}$	5 kA
Transverse capacitance	$C$	$< 100$ pF
Serial inductance	$L$	/
Serial resistance at 20°C	$R$	9 - 11 $\Omega$
Frequency range	$f$	$> 10$ Mhz
Response time of overvoltage protection	$< 5$ ns	
Connection	RJ11 input, RJ11 output	
<b>Power part</b>		
Nominal AC voltage	$U_n$	230 V
Max. continuous operating AC voltage	$U_c$	275 V
Nominal load current	$I_L$	16 A
Nominal discharge current (8/20) $I_n$	L-N	3 kA
	L/N-PE	6 kA (L+N-PE)
Combined wave (1.2/50 - 8/20) $U_{oc}/I_{sc}$	L-N	6 kV
	L/N-PE	10 kV (L+N-PE)
Protection level $U_p$	L-N	$< 1000$ V
	L/N-PE	$< 1500$ V
Back-up fuse (only required if there is no fuse in mains)	16 A gI / C 16 A	
Connection	Plug in system with grounding contact DIN 49 440-CE(7)III, DIN 49 441-CEE(7)IV	
Tested to	IEC-61643-1	
Category IEC	III	
<b>Mechanical characteristics</b>		
Supervising device	Supply present	Green light
	Error	Red light
Operating temperature	- 25 °C ... + 60 °C	
Degree of protection	IP20	
Housing material, colour	Thermoplastic, extinguishing degree V-O, gray	
Ordering code	<b>121 539</b>	

Actuating of thermal protection

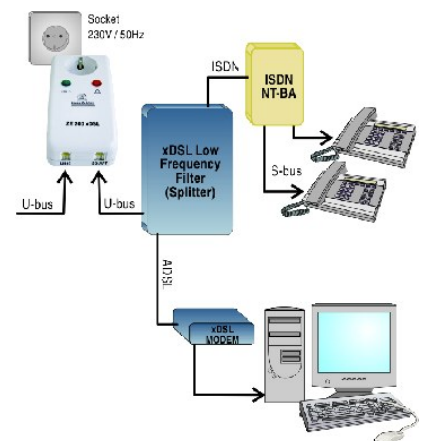
\* Limitation of current into the exchange and disconnection of the line to the exchange.

Connection diagram



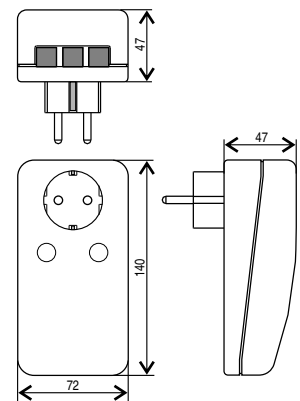
Legend:

TD	thermal decoupler
GDT	gas discharge tube
MOV	varistor
PTC	resistor with a positive temperature coefficient
⊗	thermal decoupled
D	diode
T	thyristor
LED	light emitting diode

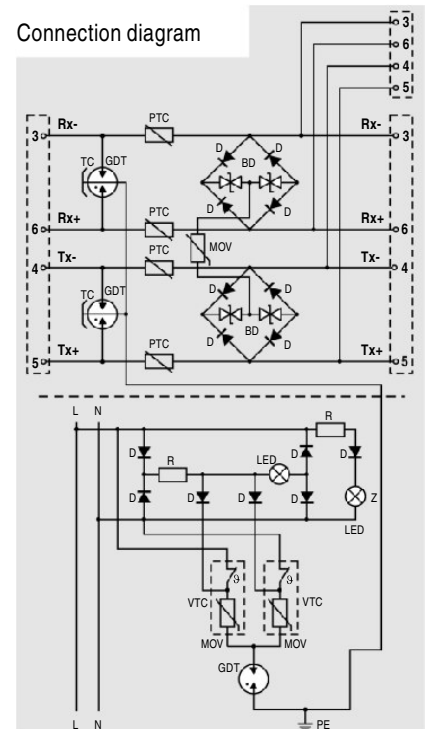




Dimensional drawings



Connection diagram



Legend:

TC	thermo clip
GDT	gas discharge tube
MOV	varistor
PTC	resistor with a positive temperature coefficient
⊗	thermal decoupled
D	diode
BD	bidirectional diode

### Technical characteristics

Type	<b>ZE 200 ISDN-S0</b>	
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### Electrical characteristics

#### Data part

Max. operating voltage (signal/power)	$U_c$	9 V / 56 V
Max. operating current at 20°C	$I_L$	150 mA
Rated DC spark-overvoltage	(Rx(Tx)-PE)	184 - 276 V
	(Rx(Tx)-Rx(Tx))	13 - 16 V
Protection level at $I_n$	$U_p$	$\leq 30$ V (Rx(Tx)-Rx(Tx)), $\leq 900$ V (Rx(Tx)-PE)
Thermal protection	Thermo clip + PTC	
Actuating of thermal protection	*	
Rated surge current (8/20 $\mu$ s)	$I_n$	2.5 kA
Max. surge current (8/20 $\mu$ s)	$I_{max}$	5 kA
Transverse capacitance	C	< 100 pF
Serial inductance	L	/
Serial resistance at 20°C	R	9 - 11 $\Omega$
Frequency range	f	> 10 Mhz
Response time of overvoltage protection	< 1 ns (Rx(Tx)-Rx(Tx)), < 100 ns (Rx(Tx)-PE)	
Connection	RJ45 input, RJ45 2x output	

#### Power part

Nominal AC voltage	$U_n$	230 V
Max. continuous operating AC voltage	$U_c$	275 V
Nominal load current	$I_L$	16 A
Nominal discharge current (8/20) $I_n$	L-N	3 kA
	L/N-PE	6 kA (L+N-PE)
Combined wave (1.2/50 - 8/20) $U_{oc}/I_{sc}$	L-N	6 kV
	L/N-PE	10 kV (L+N-PE)
Protection level $U_p$	L-N	< 1000 V
	L/N-PE	< 1500 V
Back-up fuse (only required if there is no fuse in mains)	16 A gl / C 16 A	

Connection	Plug in system with grounding contact DIN 49 440-CE(7)III, DIN 49 441-CEE(7)IV	
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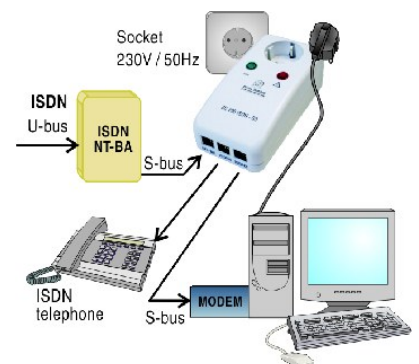
Tested to	IEC-61643-1	
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Category IEC	III	
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### Mechanical characteristics

Supervising device	Supply present	Green light
	Error	Red light
Operating temperature	- 25 °C ... + 60 °C	
Degree of protection	IP20	
Housing material, colour	Thermoplastic, extinguishing degree V-O, gray	
Ordering code	<b>121 540</b>	

Actuating of thermal protection  
\* Limitation of current into the exchange and short circuit connection between line and ground.

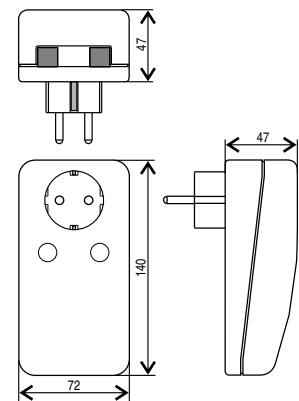


# ZE 200 ISDN-BA

# Combined Plug-in Adapter with Overvoltage Protection



Dimensional drawings



### Technical characteristics

Type **ZE 200 ISDN-BA**

### Electrical characteristics

#### Data part

Max. operating voltage	$U_c$	155 V
Max. operating current at 20°C	$I_L$	150 mA
Rated DC spark-overvoltage	(a/b-PE)	184 - 264 V
	(a-b)	170 - 210 V
Protection level at $I_n$	$U_p$	$\leq 300$ V (a-b), $\leq 600$ V (a,b-PE)
Thermal protection	Thermal protection + PTC	
Actuating of thermal protection	*	
Rated surge current (8/20 $\mu$ s)	$I_n$	2.5 kA
Max. surge current (8/20 $\mu$ s)	$I_{max}$	5 kA
Transverse capacitance	$C$	$< 100$ pF
Serial inductance	$L$	/
Serial resistance at 20°C	$R$	9 - 11 $\Omega$
Frequency range	$f$	$> 10$ Mhz
Response time of overvoltage protection	$< 1$ ns (a-b), $< 25$ ns (a,b-PE)	
Connection	RJ45 input, RJ45 output	

#### Power part

Nominal AC voltage	$U_n$	230 V
Max. continuous operating AC voltage	$U_c$	275 V
Nominal load current	$I_L$	16 A
Nominal discharge current (8/20) $I_n$	L-N	3 kA
	L/N-PE	6 kA (L+N-PE)
Combined wave (1.2/50 - 8/20) $U_{oc}/I_{sc}$	L-N	6 kV
	L/N-PE	10 kV (L+N-PE)
Protection level $U_p$	L-N	$< 1000$ V
	L/N-PE	$< 1500$ V

Back-up fuse (only required if there is no fuse in mains) 16 A gl / C 16 A

Connection Plug in system with grounding contact  
DIN 49 440-CE(7)III, DIN 49 441-CEE(7)IV

Tested to IEC-61643-1

Category IEC III

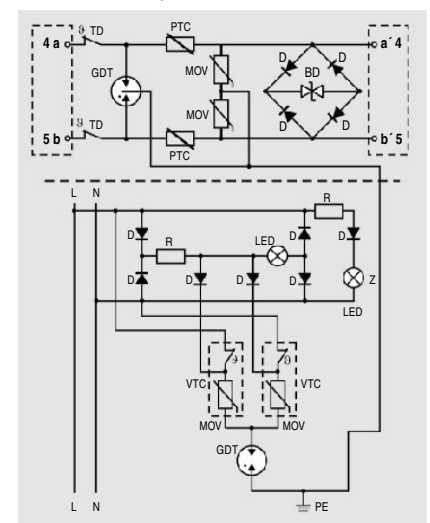
### Mechanical characteristics

Supervising device	Supply present	Green light
	Error	Red light
Operating temperature	- 25 °C ... + 60 °C	
Degree of protection	IP20	
Housing material, colour	Thermoplastic, extinguishing degree V-O, gray	
Ordering code	<b>121 248</b>	

Actuating of thermal protection

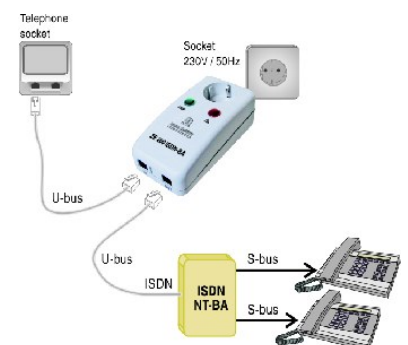
\* Limitation of current into the exchange and disconnection of the line to the exchange.

Connection diagram



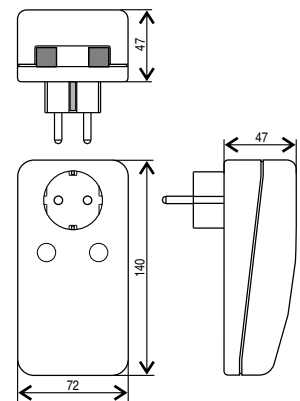
Legend:

TD	thermal decoupler
GDT	gas discharge tube
MOV	varistor
PTC	resistor with a positive temperature coefficient
⊗	thermal decoupled
D	diode
BD	bidirectional diode

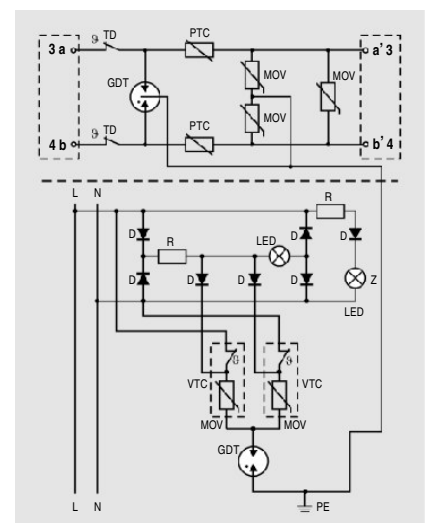




Dimensional drawings



Connection diagram



Legend:

TD *thermal decoupler*

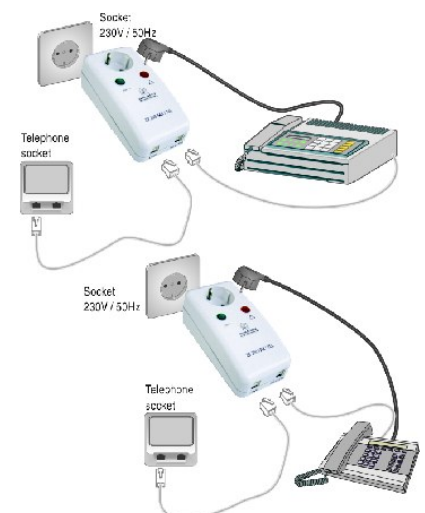
GDT *gas discharge tube*

MOV *varistor*

PTC *resistor with a positive temperature coefficient*

⊗ *thermal decoupled*

D *diode*



### Technical characteristics

Type	<b>ZE 200 FAX/TEL</b>	
<b>Electrical characteristics</b>		
<b>Data part</b>		
Max. operating voltage	$U_c$	175 V
Max. operating current at 20°C	$I_L$	150 mA
Rated DC spark-overvoltage	(a/b-PE)	184 - 264 V
	(a-b)	184 - 264 V
Protection level at $I_n$ (a,b-PE/a-b)	$U_p$	≤ 600 V
Thermal protection	Thermal protection + PTC	
Actuating of thermal protection	*	
Rated surge current (8/20 μs)	$I_n$	2.5 kA
Max. surge current (8/20 μs)	$I_{max}$	5 kA
Transverse capacitance	C	< 250 pF
Serial inductance	L	/
Serial resistance at 20°C	R	9 - 11 Ω
Frequency range	f	> 1.5 Mhz
Response time of overvoltage protection	< 25 ns	
Connection	RJ11 input, RJ11 output	
<b>Power part</b>		
Nominal AC voltage	$U_n$	230 V
Max. continuous operating AC voltage	$U_c$	275 V
Nominal load current	$I_L$	16 A
Nominal discharge current (8/20) $I_n$	L-N	3 kA
	L/N-PE	6 kA (L+N-PE)
Combined wave (1.2/50 - 8/20) $U_{oc}/I_{sc}$	L-N	6 kV
	L/N-PE	10 kV (L+N-PE)
Protection level $U_p$	L-N	< 1000 V
	L/N-PE	< 1500 V
Back-up fuse (only required if there is no fuse in mains)	16 A gI / C 16 A	
Connection	Plug in system with grounding contact DIN 49 440-CE(7)III, DIN 49 441-CEE(7)IV	
Tested to	IEC-61643-1	
Category IEC	III	
<b>Mechanical characteristics</b>		
Supervising device	Supply present	Green light
	Error	Red light
Operating temperature	- 25 °C ... + 60 °C	
Degree of protection	IP20	
Housing material, colour	Thermoplastic, extinguishing degree V-O, gray	
Ordering code	<b>121 244</b>	

Actuating of thermal protection

\* Limitation of current into the exchange and disconnection of the line to the exchange.

# Overvoltage Protection for DSL, ISDN and POTS Technologies

## LZ-DSL 01P

The module LZ-DSL 01P is intended for the protection of NT interface, ADSL low-band filter (splitter) and ADSL modem unit.

A complete overvoltage protection on the telecommunication side (U-bus) entirely enables signal transmissions of ADSL technology even on utmost ranges (lengths) of this system. It is also suitable for signal transmission technology VDSL.



## LZ-ISDN-BA/TEL

The module LZ-ISDN-BA/TEL is intended for the protection of NT interface and terminals on the subscriber's side of the ISDN line, and is also used for the protection of classical telephone terminals on the subscriber's side of the telephone line.

A complete overvoltage protection on the telecommunication side (U-bus) entirely enables signal transmissions of ISDN technology even on utmost ranges (lengths) of this system.



## TPNO-ISDN

The TPNO-ISDN socket is intended for the protection of terminals on the subscriber's side of the ISDN line.

A complete overvoltage protection on the telecommunication side (S0-bus) entirely enables signal transmission of ISDN technology.



## Splitter LPF-DSL01P DSL-COMBO

Splitter can be used for ISDN technology as well as for analog POTS communication on the telephone exchange side. DSL splitter is universally designed (COMBO version for ISDN & POTS) with 600  $\Omega$  line impedance.

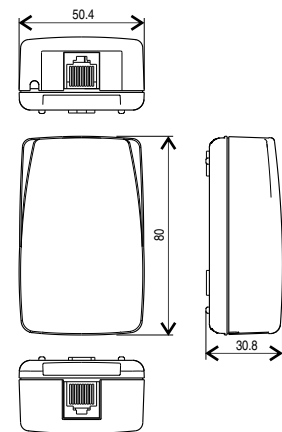


# LZ-DSL 01P

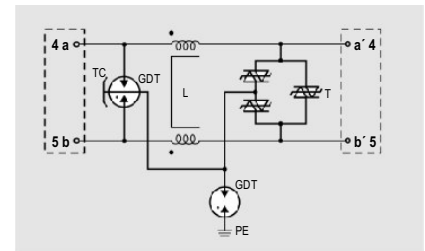
## Overvoltage Protection for DSL Technologies



### Dimensional drawings



### Connection diagram



### Legend:

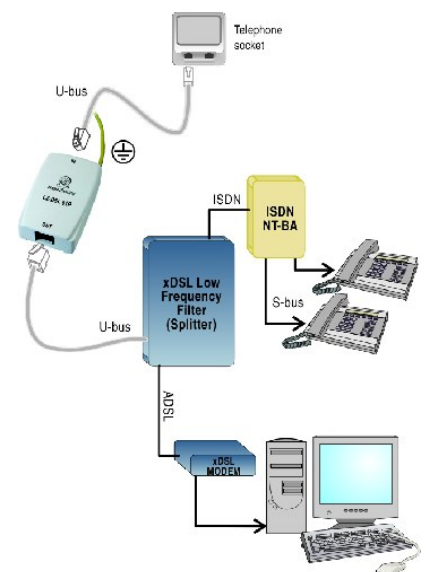
TC	thermo clip
GDT	gas discharge tube
T	thyristor
L	coil

### Technical characteristics

Type	LZ-DSL 01P	
<b>Electrical characteristics</b>		
<b>Data part</b>		
Max. operating voltage	$U_c$	175 V
Max. operating current	$I_L$	150 mA
Rated DC spark-overvoltage	(a/b-PE)	368 - 516 V
	(a-b)	184 - 240 V
Protection level at $I_n$	$U_p$	$\leq 300$ V (a-b)
		$\leq 1000$ V (a,b-PE)
Thermal protection	Thermo clip	
Actuating of thermal protection	*	
Rated surge current (8/20 $\mu$ s)	$I_n$	2.5 kA
Max. surge current (8/20 $\mu$ s)	$I_{max}$	5 kA
Transverse capacitance	C	< 100 pF
Serial inductance	L	2 x 25 $\mu$ H
Inductance in transmission		< 0.5 $\mu$ H
Serial resistance at 20°C	R	0.2 - 0.4 $\Omega$
Frequency range	f	> 10 Mhz
Response time of overvoltage protection		< 5 ns (a-b)
		< 100 ns (a,b-PE)
Connection	RJ45 input, RJ45 output	
<b>Mechanical characteristics</b>		
Operating temperature	- 25 °C ... + 60 °C	
Degree of protection	IP20	
Housing material, colour	Thermoplastic, extinguishing degree V-0, gray	
Ordering code	124 143	

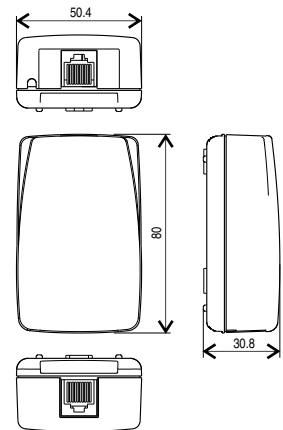
Actuating of thermal protection

\* Short circuit connection between line and ground.





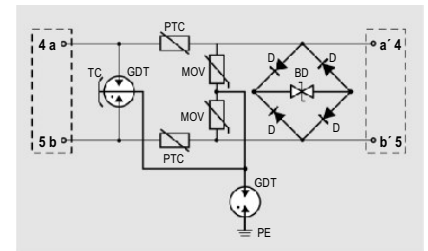
### Dimensional drawings



### Technical characteristics

Type	<b>LZ-ISDN-BA/TEL 01P</b>	
<b>Electrical characteristics</b>		
<b>Data part</b>		
Max. operating voltage	$U_C$	155 V
Max. operating current	$I_L$	150 mA
Rated DC spark-overvoltage	(a/b-PE)	368 - 540 V
	(a-b)	170 - 210 V
Protection level at $I_n$	$U_p$	$\leq 300$ V (a-b)
		$\leq 1000$ V (a,b-PE)
Thermal protection	Thermo clip + PTC	
Actuating of thermal protection	*	
Rated surge current (8/20 $\mu$ s)	$I_n$	2.5 kA
Max. surge current (8/20 $\mu$ s)	$I_{max}$	5 kA
Transverse capacitance	$C$	< 100 pF
Serial inductance	$L$	/
Serial resistance at 20°C	$R$	9 - 11 $\Omega$
Frequency range	$f$	> 10 Mhz
Response time of overvoltage protection		< 1 ns (a-b)
		< 100 ns (a,b-PE)
Connection	RJ45 input, RJ45 output	
<b>Mechanical characteristics</b>		
Operating temperature	- 25 °C ... + 60 °C	
Degree of protection	IP20	
Housing material, colour	Thermoplastic, extinguishing degree V-0, gray	
Ordering code	<b>124 136</b>	

### Connection diagram

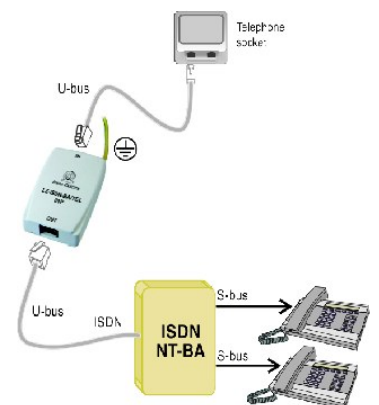


### Legend:

TC	<i>thermo clip</i>
GDT	<i>gas discharge tube</i>
D	<i>diode</i>
BD	<i>bidirectional diode</i>
MOV	<i>varistor</i>
PTC	<i>resistor with a positive temperature coefficient</i>

Actuating of thermal protection

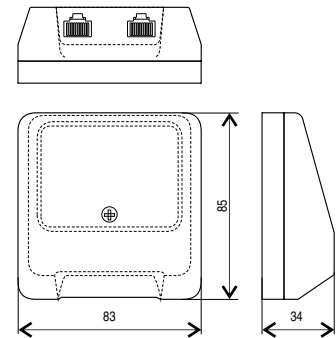
\* Limitation of current into the exchange and short circuit connection between line and ground.



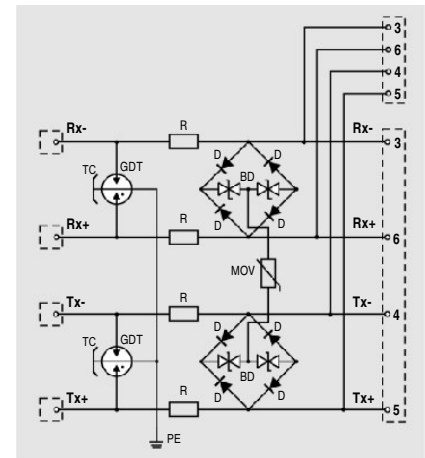




Dimensional drawings

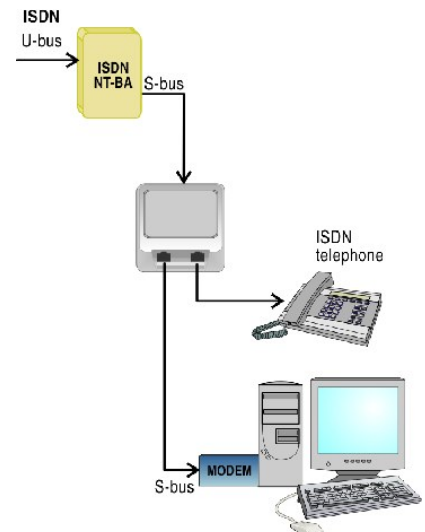


Connection diagram



Legend:

TC	thermo clip
GDT	gas discharge tube
R	resistor
D	diode
BD	bidirectional diode
MOV	varistor



### Technical characteristics

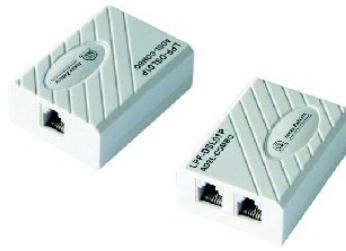
Type	TPNO-ISDN	
<b>Electrical characteristics</b>		
<b>Data part</b>		
Max. operating voltage (signal/power)	$U_c$	9 V / 56 V
Max. operating current at 20°C	$I_L$	150 mA
Rated DC spark-overvoltage	(Rx(Tx)-PE)	184 - 276 V
	(Rx(Tx)-Rx(Tx))	13 - 16 V
Protection level at $I_n$	$U_p$	$\leq 30$ V (Rx(Tx)-Rx(Tx))
		$\leq 900$ V (Rx(Tx)-PE)
Thermal protection	Thermo clip + PTC	
Actuating of thermal protection	*	
Rated surge current (8/20 $\mu$ s)	$I_n$	2.5 kA
Max. surge current (8/20 $\mu$ s)	$I_{max}$	5 kA
Transverse capacitance	C	< 100 pF
Serial inductance	L	/
Serial resistance at 20°C	R	9 - 11 $\Omega$
Frequency range	f	> 10 Mhz
Response time of overvoltage protection		< 1 ns (Rx(Tx)-Rx(Tx))
		< 100 ns (Rx(Tx)-PE)
Connection	Terminal block input, RJ45 2x output	
<b>Mechanical characteristics</b>		
Operating temperature	- 25 °C ... + 60 °C	
Degree of protection	IP20	
Housing material, colour	Thermoplastic, extinguishing degree V-0, gray	
Ordering code	125 334	

Actuating of thermal protection

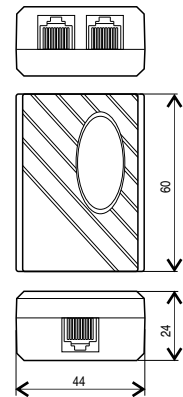
\* Short circuit connection between line and ground.

# LPF-DSL01P DSL-COMBO

# DSL Low-pass Filter for POTS & ISDN



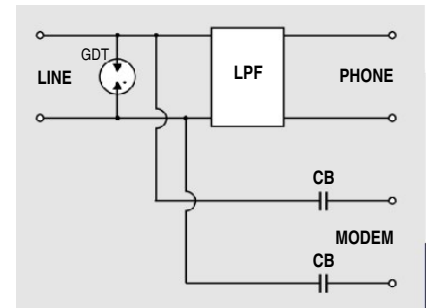
Dimensional drawings



### Technical characteristics

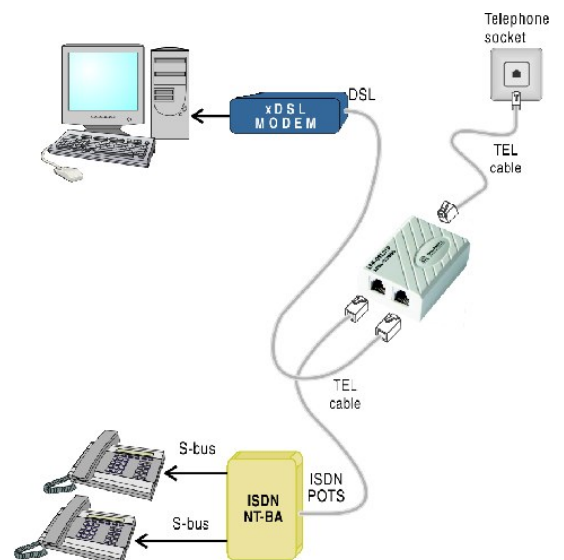
Type		LPF-DSL01P DSL-COMBO	
No. of splitters (LPF)		1	
ISDN: Zline: 135 Ω (2B1Q)	$a_E < 0.8 \text{ dB}$	1 kHz < f < 40 kHz	
	$a_E < 2.0 \text{ dB}$	40 kHz < f < 80 kHz	
	$a_S > 65 \text{ dB}$	150 kHz < f < 12 MHz	
	$a_S > 55 \text{ dB}$	138 kHz < f < 30 MHz	
	$a_R > 16 \text{ dB}$	1 kHz < f < 40 kHz	
	$a_R > 12 \text{ dB}$	1 kHz < f < 40 kHz	
POTS: Zline: 600 Ω	$a_E < 1 \text{ dB}$	f = 1 kHz	
	$a_E < 1 \text{ dB}$	200 Hz < f < 4 kHz	
	$a_E < 5 \text{ dB}$	15 kHz < f < 17 kHz	
	$a_S > 55 \text{ dB}$	138 kHz < f < 30 MHz	
	$a_R > 8 \text{ dB}$	0.3 kHz < f < 3.4 kHz	
	$a_R > 12 \text{ dB}$	0.6 kHz < f < 1.6 kHz	
Cut frequency		f = 138 kHz	
Loop current		80 mA	
Standards		ETSI Standard TS 101 952-1-4	
Connection		RJ11 line, RJ11 modem, RJ11 phone	
<b>Mechanical characteristics</b>			
Operating temperature		- 20 °C ... + 80 °C	
Storage temperature		- 40 °C ... + 85 °C	
Housing material, colour		PBT, white	
Ordering code			
	ADSL-COMBO	123 157	
	VDSL - COMBO	123 156	

Connection diagram



Legend:

LPF	low pass filter
GDT	gas discharge tube
CB	blocking capacitor



# Independent Line Overvoltage Protection for POTS and DSL Technologies

## RVD Distribution Housing for External and Internal Mounting

This rain - proof housing can incorporate terminal, disconnecting or switching strips (up to 10 lines) Iskra Zaščite or KRONE as well as corresponding protection modules LPA. Both parts are interconnected with a string, which prevents the cover from falling during the mounting.

Possibility of a special version with lock.



## LZ-D Protection Devices for External and Internal Mounting

LZ-D protection device is a product for the line protection of telephone terminals. They are used in different variations of 1 - 6 lines.

They contain coarse and fine overvoltage protection in the longitudinal and transversal directions.

Special version LZD is used for external mounting (IP54).



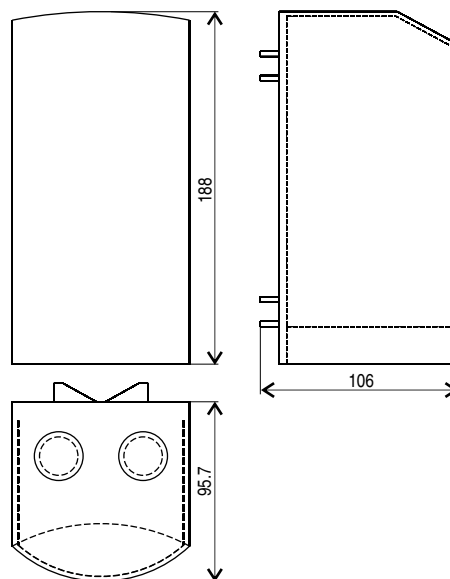
## RVD Series Independent Line Overvoltage Protection for POTS and DSL Technologies

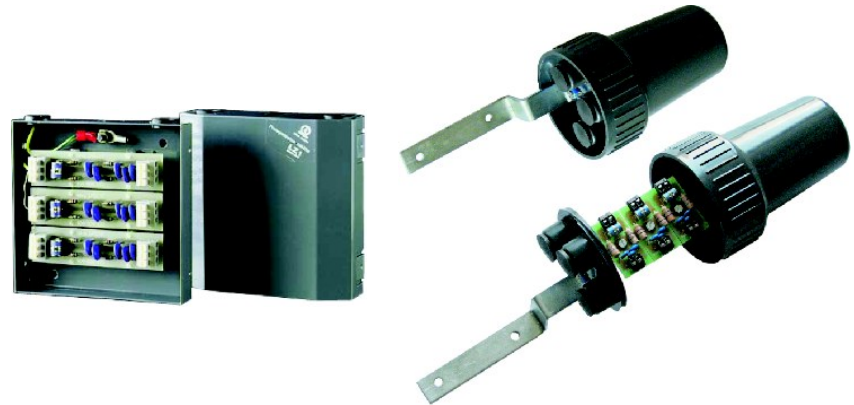


### Technical characteristics

Type	RVD 10 LL/I	RVD 10 LL/K	RVD 20 LL/K	RVD 30 MLL/I
Number of strips	1	1	2	3
Strip type	LL/I (123 901)	LL/K (123 976)	LL/K (123 976)	MLL/I (123 556)
Housing with lock	Yes	Yes	No	No
Glade type	2 x PG 13.5	2 x PG 13.5	2 x PG 13.5	2 x PG 13.5
<b>Mechanical characteristics</b>				
Material	PBT UL94 V-0	PBT UL94 V-0	PBT UL94 V-0	PBT UL94 V-0
Color	Gray	Gray	Gray	Gray
Set of fixing	Kit included	Kit included	Kit included	Kit included
Set of grounding	Kit included	Kit included	Kit included	Kit included
Dimensions (Width, Height, Depth)	94 x 188 x 97 mm	94 x 188 x 97 mm	94 x 188 x 97 mm	94 x 188 x 97 mm
Ordering code	<b>124 014</b>	<b>124 117</b>	<b>124 162</b>	<b>124 161</b>

### Dimensional drawings





### Technical characteristics

Type		LZ-2A	LZD-2AB
<b>Electrical characteristics</b>			
<b>Data part</b>			
No. of protected pairs		1-6	1-4
Max. operating voltage	$U_c$	175 V	175 V
Max. operating current	$I_L$	2 A	2 A
Rated DC spark-overvoltage	(a/b-PE)	184 - 264 V	184 - 264 V
	(a-b)	184 - 264 V	184 - 264 V
Protection level at $I_n$	$U_p$	$\leq 600$ V	$\leq 600$ V
Thermal protection		Thermo clip	Thermo clip
Actuating of thermal protection		*	*
Rated surge current (8/20 $\mu$ s)	$I_n$	5 kA	5 kA
Max. surge current (8/20 $\mu$ s)	$I_{max}$	10 kA	10 kA
Transverse capacitance	C	< 250 pF	< 250 pF
Serial inductance	L	47 $\mu$ H	47 $\mu$ H
Serial resistance at 20°C	R	< 0.5 $\Omega$	< 0.5 $\Omega$
Frequency range	f	> 1.2 Mhz	> 1.2 Mhz
Response time of overvoltage protection		< 25 ns	< 25 ns
Connection		Terminal block	Terminal block
<b>Mechanical characteristics</b>			
Operating temperature		- 25 °C ... + 60 °C	- 25 °C ... + 60 °C
Degree of protection		IP20	IP54
Housing material, colour		Steel sheets, gray	Thermoplastic, extinguishing degree V-0, black
Dimensions (Width, Height, Depth)		120 x 115 (225) x 35 mm	$\varnothing$ 75 (95) x 100 (140) mm
Ordering code	1-pair	124 171	124 231
	2-pairs	124 172	124 232
	3-pairs	124 173	124 233
	4-pairs	124 174	124 234
	5-pairs	124 175	124 235
	6-pairs	124 176	124 236

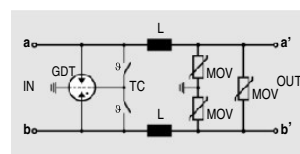
Actuating of thermal protection

\* Short circuit connection between line and ground.

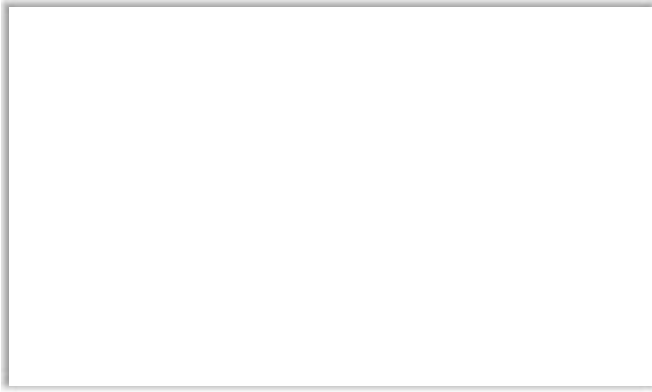
### Connection schemes of modules

Legend:

TC	thermo clip
GDT	gas discharge tube
MOV	varistor
$\Theta$	thermal decoupled
L	coil







**ISKRA ZAŠČITE**



ISKRA ZAŠČITE d.o.o., Surge Voltage Protection Systems, Engineering and Cooperation  
Stegne 35, 1521 Ljubljana, Slovenia, EU  
P: 00386(1)5003 100; F: 00386(1)5003 236  
E: [sales@iskrazascite.si](mailto:sales@iskrazascite.si);  
[www.iskrazascite.si](http://www.iskrazascite.si)

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