

## Modular SPD for Single Pair

# RayDat SPH-2 Series

### D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3  
 Mode of Protection: Longitudinal, Transverse  
 Coarse Protection: 3 Terminal GDT  
 Voltages: 30, 230V DC  
 Frequency Range: 30MHz  
 Surge Discharge Ratings:  $I_n$ : 10 kA,  $I_{max}$ : 20 kA,  $I_{imp}$ : 5 kA  
 Series Load Current: 1 A  
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount  
 Terminals: Stranded to 4 mm<sup>2</sup>  
 Housing: Modular Design  
 Compliance: IEC/EN 61643-21

The RayDAT SPH-2 Series of surge protective devices has been developed to protect a single pair loop, which could be ungrounded 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 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. Both common (longitudinal) mode and differential (transverse) mode protection is provided.

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

## Technical Data

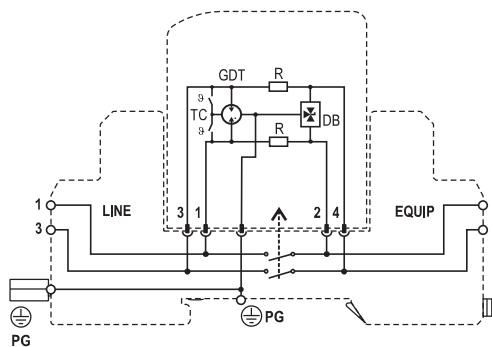
SPH-2 Series		30V	230V
Electrical			
Lines Protected		1 (2 Conductors)	
Nominal Operating Voltage (DC)	U <sub>n</sub>	30V	320V
Maximum Continuous Operating Voltage (DC)	U <sub>c</sub>	33V	320V
Rated Load Current at 25°C	I <sub>L</sub>	1 A	5 A
C2 Nominal Discharge Current (8/20µs)	I <sub>n</sub>	10 kA	
Maximum Discharge Current (8/20µs)	I <sub>max</sub>	20 kA	
D1 Impulse Current (10/350µs)	I <sub>imp</sub>	5 kA	
Residual Voltage at 5 kA (8/20µs)	(Line-Line) U <sub>res</sub>	< 80V	< 450V
Rated Spark Overvoltage	(Line-Line)	184-276V	350-429V
	(Line-Ground)	36-44V	350-504V
Response Time Overvoltage Protection	(Line-Line) t <sub>A</sub>	< 1 ns	< 25 ns
	(Line-Ground)	< 100 ns	
Insulation Resistance of the Protection	(Line-Ground) R <sub>iso</sub>	> 1 GΩ/100V	
	(Line-Line)	≥ 33 MΩ	≥ 100 MΩ
Serial Resistance per Path	R	1.6-2.0 Ω	
Transverse Capacitance	(Line-Line) C	50 pF	
	(Line-Ground)	50 pF	
Cut-off Frequency	f <sub>G</sub>	10 MHz	
Mechanical			
Temperature Range		-40 °C to +80 °C	
Terminal Cross Section Multi-strand		4 mm², 2.5 mm² Q Version	
Terminal Screw Torque		0.5 Nm	
Degree of Protection IEC/EN 60529		IP 20	
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0	
Mounting IEC/EN 60715		35 mm DIN Rail	
Order Information			
Order Code		30V	230V
SPH-2-xxx		7082,84	7081,06
SPH-2-xxxQ (Quick Connect Terminals)		7085,25	7085,26
SPH-2-xxxM (module)		7082,85	7081,08

## RayDat SPH-2 Series

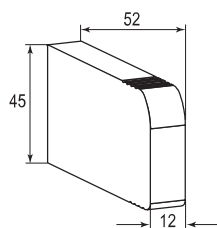
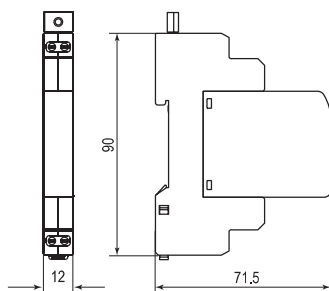
### Internal Configuration

#### Legend

- DB Diode Block
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor
- TC Thermo-clip



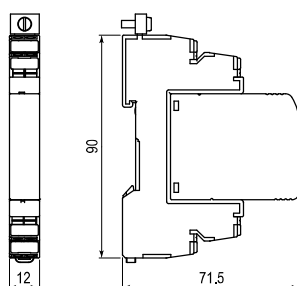
### Dimensions & Packaging



SPH-2 Series	30V	230V
<b>Dimensions</b>		
Weight per Unit	60g	
Dimensions DIN 43880	2/3 TE	
Packaging Dimensions (Single Unit)	87 × 15 × 102 mm	
Minimum Package Quantity	15 pieces	

SPH-2-xxxM Series	30V	230V
<b>Dimensions</b>		
Weight per Unit	26g	
Packaging Dimensions (Single Unit)	87 × 15 × 102 mm	
Minimum Package Quantity	15 pieces	

### Quick Connect Terminals



SPH-2-xxxQ Series	30V	230V
<b>Dimensions</b>		
Weight per Unit	62g	
Dimensions DIN 43880	2/3 TE	
Packaging Dimensions (Single Unit)	87 × 15 × 102 mm	
Minimum Package Quantity	15 pieces	

Bases with Quick Connect Terminals enable faster installation and have built-in contacts to enhance vibration resistance.

## Modular SPD for Two Pair RayDat SPH-4 Series D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3  
 Mode of Protection: Longitudinal, Transverse  
 Coarse Protection: 3 Terminal GDT  
 Voltages: 30V DC  
 Frequency Range: 30MHz  
 Surge Discharge Ratings:  $I_n$ : 10kA,  $I_{max}$ : 20kA,  $I_{imp}$ : 5kA  
 Series Load Current: 1A  
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount  
 Terminals: Stranded to 4 mm<sup>2</sup>  
 Housing: Modular Design  
 Compliance: IEC/EN 61643-21

The RayDAT SPH-4 Series of surge protective devices has been developed to protect two pair loops, which could be ungrounded 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 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. Both common (longitudinal) mode and differential (transverse) mode protection is provided.

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

### Technical Data

#### SPH-4 Series

30V

#### Electrical

Lines Protected		2 (4 Conductors)
Nominal Operating Voltage (DC)	$U_n$	30V
Maximum Continuous Operating Voltage (DC)	$U_c$	33V
Rated Load Current at 25°C	$I_L$	1A
C2 Nominal Discharge Current (8/20µs)	$I_n$	10kA
Maximum Discharge Current (8/20µs)	$I_{max}$	20kA
D1 Impulse Current (10/350µs)	$I_{imp}$	5kA
Residual Voltage at 5kA (8/20µs)	(Line-Line) $U_{res}$	<80V
Rated Spark Overvoltage	(Line-Ground)	184-276V
	(Line-Line)	35-44V
Response Time Overvoltage Protection	(Line-Line) $t_A$	<1ns
	(Line-Ground)	<100ns
Insulation Resistance of the Protection	(Line-Ground) $R_{iso}$	>1GΩ/100V
	(Line-Line)	≥33MΩ
Serial Resistance per Path	$R$	1.6-2.0Ω
Transverse Capacitance	(Line-Line) $C$	50pF
	(Line-Ground)	5pF
Cut-off Frequency	$f_G$	30MHz

#### Mechanical

Temperature Range	-40 °C to +80 °C
Terminal Cross Section Multi-strand	4 mm <sup>2</sup> , 2.5 mm <sup>2</sup> Q Version
Terminal Screw Torque	0.5 Nm
Degree of Protection IEC/EN 60529	IP 20
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715	35 mm DIN Rail

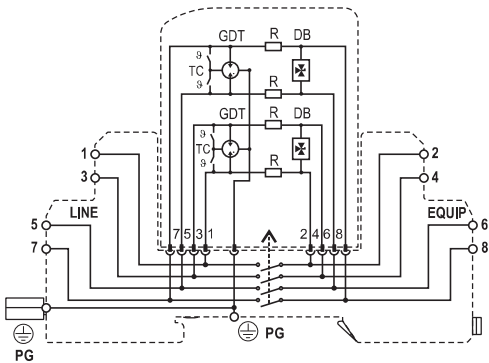
#### Order Information

Order Code	30V
SPH-4-xx	7082,82
SPH-4-xxQ (Quick Connect Terminals)	7085,24
SPH-4-xxM (module)	7082,83

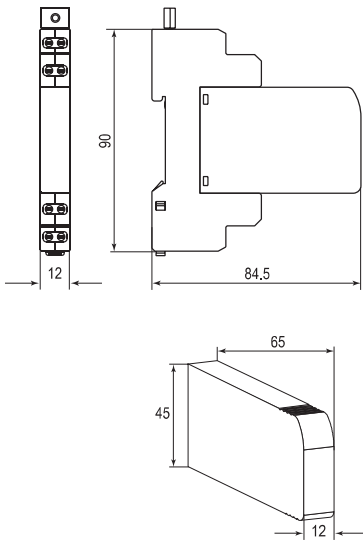
RayDat SPH-4 Series

Internal Configuration

- Legend**
- DB Diode Block
  - GDT Gas Discharge Tube
  - PG Protective Grounding
  - R Resistor
  - TC Thermo-clip



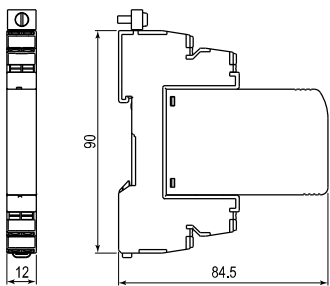
Dimensions & Packaging



SPH-4 Series	30V
Dimensions	
Weight per Unit	60g
Dimensions DIN 43880	2/3 TE
Packaging Dimensions (Single Unit)	87 × 15 × 102mm
Minimum Package Quantity	15 pieces

SPH-4-xxM Series	30V
Dimensions	
Weight per Unit	26g
Packaging Dimensions (Single Unit)	87 × 15 × 102mm
Minimum Package Quantity	15 pieces

Quick Connect Terminals



SPH-4-xxQ Series	30V
Dimensions	
Weight per Unit	62g
Dimensions DIN 43880	2/3 TE
Packaging Dimensions (Single Unit)	87 × 15 × 102mm
Minimum Package Quantity	15 pieces



Bases with Quick Connect Terminals enable faster installation and have built-in contacts to enhance vibration resistance.