

Modular Surge Protective Devices (SPDs) for Data & Signal Lines

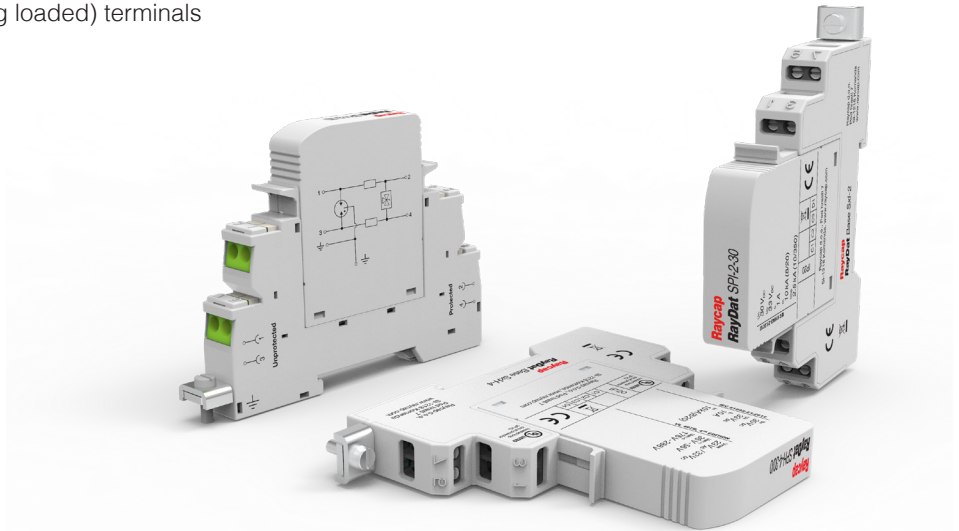
RayDat SP Series

RayDat SPH-2*
 RayDat SPH-4*
 RayDat SPI-2
 RayDat SPI-4






Special features:

*UL Listed

- Very high surge ratings
- The connection lines remain enabled during module replacement
- High density – up to 2 protected pairs at only 12mm width
- Equipped with Screw or Quick connect (spring loaded) terminals



Symbol Legend:

-  DIN Rail Mounting
-  Screw Connect Terminals
-  Quick Connect Terminals
-  Modular design
-  Shield Directly Grounded

The RayDat SP Series of surge protective devices has been developed to protect a 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 (GDT), while fine protection is provided using a high-speed silicon avalanche diode (SAD) or metal oxide varistor (MOV) stage.

Care is taken between these two stages to ensure coordination without voltage or surge current blind spots occurring. Thermal protection reduces 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 from the base, the connection lines remain enabled.



DATA SHEET

Modular SPD for Single Pair

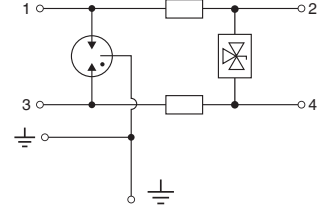
RayDat SPH-2 Series

D1 • C1 • C2 • C3

UL Listed

IEC/EN Category: D1/C1/C2/C3
 Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA, I_{imp} : 2.5 kA
 Voltages: 30V DC
 Frequency Range: 30 MHz, 10 MHz
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

Configuration:

**Technical Data****SPH-2 Series****30****Electrical**

Lines Protected		1 (2 Conductors)
Nominal Operating Voltage (DC)	U_n	30V
Maximum Continuous Operating Voltage (DC)	U_c	33V
Rated Load Current at 25°C	I_L	1 A
C2 Nominal Discharge Current (8/20 μ s)	I_n	10 kA
Maximum Discharge Current (8/20 μ s)	I_{max}	20 kA
D1 Impulse Current (10/350 μ s)	I_{imp}	2.5 kA
Residual Voltage at 5 kA (8/20 μ s)	(Line-Line) U_{res}	< 80V
Rated Spark Overvoltage	(Line-Ground)	184-276V
	(Line-Line)	36-44V
Response Time Overvoltage Protection	(Line-Line) t_A	< 1 ns
	(Line-Ground)	< 100 ns
Insulation Resistance of the Protection	(Line-Ground) R_{iso}	> 1 G Ω /100V
	(Line-Line)	\geq 33 M Ω
Serial Resistance per Path	R	1.6-2.0 Ω
Transverse Capacitance	(Line-Line) C	50 pF
	(Line-Ground)	5 pF
Cut-off Frequency	f_G	30 MHz

Mechanical

Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]
Terminal Cross Section Multi-strand (max.)		12 AWG
		4 mm ² , 2.5 mm ² Q Version
Terminal Screw Torque		4.5 lbf-in [0.5 Nm]
Degree of Protection IEC/EN 60529		IP 20 (built-in)
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715		35 mm DIN Rail

Order Information

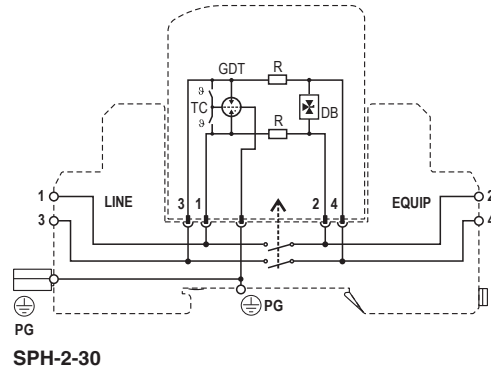
Order Code		30
SPH-2-xxx		7082.84
SPH-2-xxxQ (Quick Connect Terminals)		7085.25
SPH-2-xxxM (module)		7082.85

RayDat SPH-2 Series

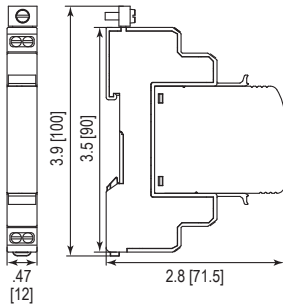
Internal Configuration

Legend

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



Dimensions & Packaging

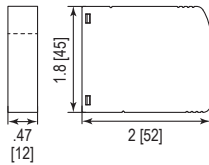


SPH-2 Series

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Dimensions

Weight per Unit	1.83 oz [52 g]
Dimensions DIN 43880	2/3 TE
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]
Minimum Package Quantity	15 pieces



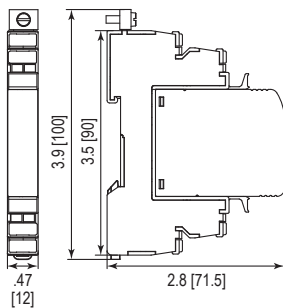
SPH-2-xxxM Series

30

Dimensions

Weight per Unit	.84 oz [24 g]
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]
Minimum Package Quantity	15 pieces

Quick Connect Terminals



SPH-2-xxxQ Series

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Dimensions

Weight per Unit	1.9 oz [54 g]
Dimensions DIN 43880	2/3 TE
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]
Minimum Package Quantity	15 pieces

inches
[mm]

Information contained in this document is subject to change at any time without notice.



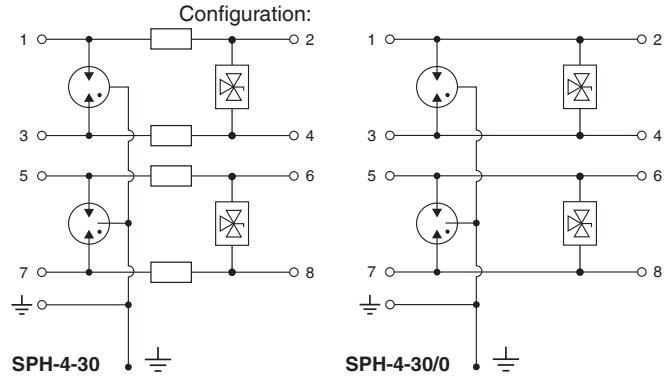
DATA SHEET

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

UL Listed



IEC/EN Category: D1/C1/C2/C3
Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA, I_{imp} : 5 kA
Voltages: 30V DC
Frequency Range: 30 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition



30

30/0

Technical Data

SPH-4 Series

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	1 A	10 A
C2 Nominal Discharge Current (8/20 μ s)	I_n	10 kA	
Maximum Discharge Current (8/20 μ s)	I_{max}	20 kA	
D1 Impulse Current (10/350 μ s)	I_{imp}	5 kA	
Residual Voltage at 5 kA (8/20 μ s)	(Line-Line) U_{res}	< 80V	
Rated Spark Overvoltage	(Line-Ground)	184-276V	
	(Line-Line)	36-44V	
Response Time Overvoltage Protection	(Line-Line) t_A	< 1 ns	
	(Line-Ground)	< 100 ns	
Insulation Resistance of the Protection	(Line-Ground) R_{iso}	> 1 G Ω /100V	
	(Line-Line)	\geq 33 M Ω	
Serial Resistance per Path	R	1.6-2.0 Ω	0.1 Ω
Transverse Capacitance	(Line-Line) C	50 pF	
	(Line-Ground)	5 pF	
Cut-off Frequency	f_G	30 MHz	

Mechanical

Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]		
Terminal Cross Section Multi-strand (max.)	12 AWG		
	4 mm ² , 2.5 mm ² Q Version		
Terminal Screw Torque	4.5 lbf-in [0.5 Nm]		
Degree of Protection IEC/EN 60529	IP 20 (built-in)		
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0		
Mounting IEC/EN 60715	35mm DIN Rail		

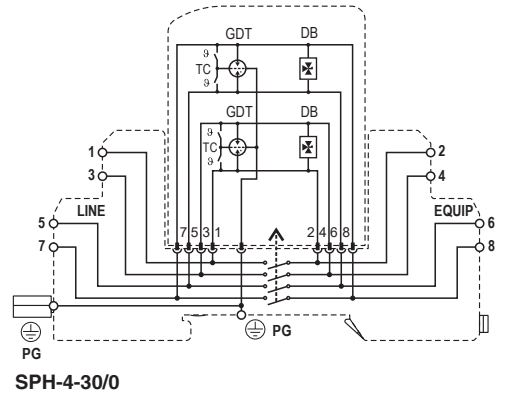
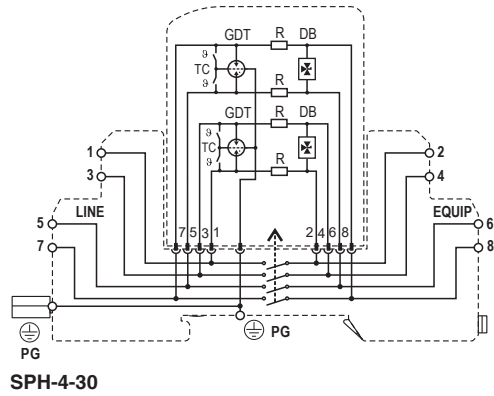
Order Information

Order Code	30	30/0
SPH-4-xx	7082.82	7086.89
SPH-4-xxQ (Quick Connect Terminals)	7085.24	7085.28
SPH-4-xxM (module)	7082.83	7085.29

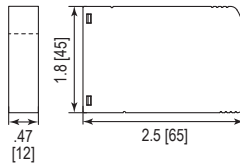
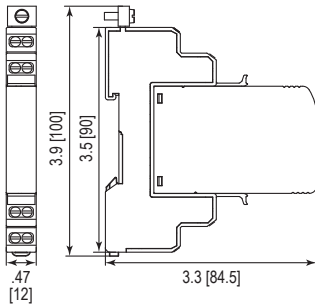
RayDat SPH-4 Series

Internal Configuration

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



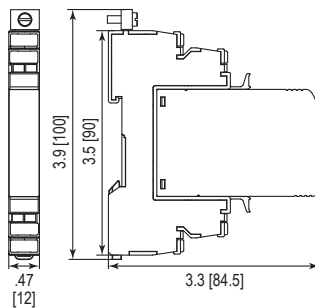
Dimensions & Packaging



SPH-4 Series	30	30/0
Dimensions		
Weight per Unit	2.32 oz [66g]	2.25 oz [64g]
Dimensions DIN 43880	2/3 TE	
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]	
Minimum Package Quantity	15 pieces	

SPH-4-xxM Series	30	30/0
Dimensions		
Weight per Unit	1.05 oz [30g]	.99 oz [28g]
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]	
Minimum Package Quantity	15 pieces	

Quick Connect Terminals



SPH-4-xxQ Series	30	30/0
Dimensions		
Weight per Unit	2.40 oz [68g]	2.32 oz [66g]
Dimensions DIN 43880	2/3 TE	
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]	
Minimum Package Quantity	15 pieces	

inches
[mm]

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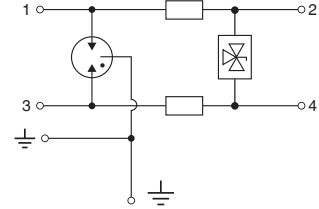


DATA SHEET

Modular SPD for Two Pair **RayDat SPI-2 Series** D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA, I_{imp} : 2.5 kA
 Voltages: 30 V DC
 Frequency Range: 30 MHz, 10 MHz
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 Configuration:



Technical Data

SPI-2 Series

30

Electrical

Lines Protected		1 (2 Conductors)
Nominal Operating Voltage (DC)	U_n	30V
Maximum Continuous Operating Voltage (DC)	U_c	33V
Rated Load Current at 25°C	I_L	1 A
C2 Nominal Discharge Current (8/20 μs)	I_n	10 kA
Maximum Discharge Current (8/20 μs)	I_{max}	20 kA
D1 Impulse Current (10/350 μs)	I_{imp}	2.5 kA
Total Impulse Current (10/350 μs)	I_{imp}	5 kA
Residual Voltage at 5 kA (8/20 μs)	(Line-Line) U_{res}	< 80V
Rated Spark Overvoltage	(Line-Ground)	184-276V
	(Line-Line)	36-44V
Response Time Overvoltage Protection	(Line-Line) t_A	< 1 ns
	(Line-Ground)	< 100 ns
Insulation Resistance of the Protection	(Line-Ground) R_{iso}	> 1 GΩ/100V
	(Line-Line)	≥ 33 MΩ
Serial Resistance per Path	R	1.6-2.0 Ω
Transverse Capacitance	(Line-Line) C	50 pF
	(Line-Ground)	5 pF
Cut-off Frequency	f_G	30 MHz

Mechanical

Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]
Terminal Cross Section Multi-strand (max.)		12 AWG
		4 mm ² , 2.5 mm ² Q Version
Terminal Screw Torque		4.5 lbf-in [0.5 Nm]
Degree of Protection IEC/EN 60529		IP 20 (built-in)
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715		35mm DIN Rail

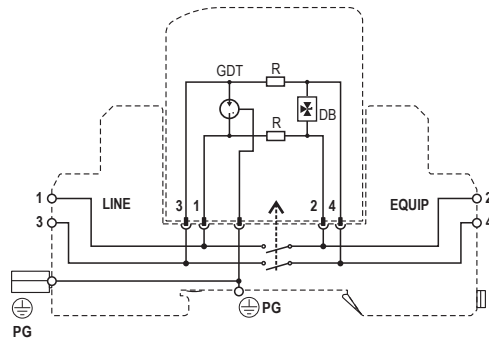
Order Information

Order Code		30
SPI-2-xxx		7085.67
SPI-2-xxxM (module)		7085.68

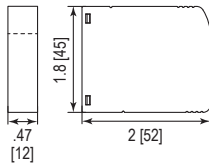
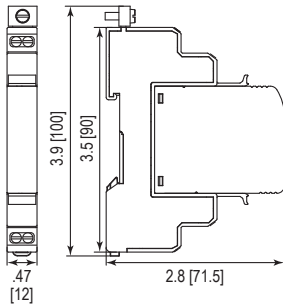
RayDat SPI-2 Series

Legend

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



Dimensions & Packaging



SPI-2 Series

30

Dimensions

Weight per Unit	1.90 oz [54 g]
Dimensions DIN 43880	2/3 TE
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]
Minimum Package Quantity	15 pieces

SPI-2-xxxM Series

30

Dimensions

Weight per Unit	.84 oz [24 g]
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]
Minimum Package Quantity	15 pieces

inches
[mm]

Information contained in this document is subject to change at any time without notice.

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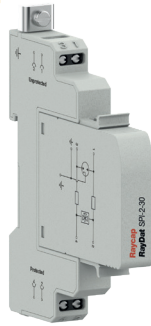
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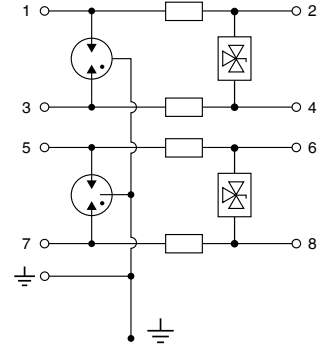
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DATA SHEET

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



IEC/EN Category: D1/C1/C2/C3
 Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA, I_{imp} : 2.5 kA
 Voltages: 30 V DC
 Frequency Range: 30 MHz, 10 MHz
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 Configuration:



Technical Data

SPI-4 Series

30

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	1 A
C2 Nominal Discharge Current (8/20 μs)	I_n	10 kA
Maximum Discharge Current (8/20 μs)	I_{max}	20 kA
D1 Impulse Current (10/350 μs)	I_{imp}	2.5 kA
Total Impulse Current (10/350 μs)	I_{imp}	10 kA
Residual Voltage at 5 kA (8/20 μs)	(Line-Line) U_{res}	< 80V
Rated Spark Overvoltage	(Line-Ground)	184-276V
	(Line-Line)	36-44V
Response Time Overvoltage Protection	(Line-Line) t_A	< 1 ns
	(Line-Ground)	< 100 ns
Insulation Resistance of the Protection	(Line-Ground) R_{iso}	> 1 GΩ/100V
	(Line-Line)	≥ 33 MΩ
Serial Resistance per Path	R	1.6-2.0 Ω
Transverse Capacitance	(Line-Line) C	50 pF
	(Line-Ground)	5 pF
Cut-off Frequency	f_G	30 MHz

Mechanical

Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]
Terminal Cross Section Multi-strand (max.)		12 AWG
		4 mm ² , 2.5 mm ² Q Version
Terminal Screw Torque		4.5 lbf-in [0.5 Nm]
Degree of Protection IEC/EN 60529		IP 20 (built-in)
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715		35 mm DIN Rail

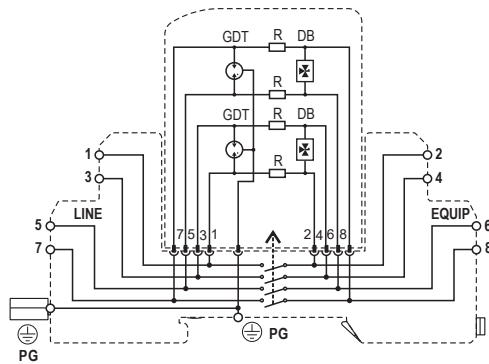
Order Information

Order Code		30
SPI-4-xxx		7085.69
SPI-4-xxxM (module)		7085.70

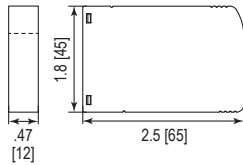
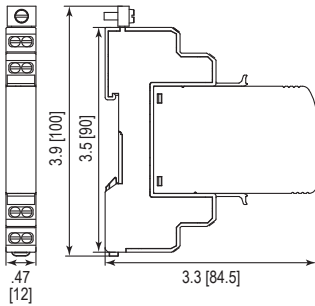
RayDat SPI-4 Series

Legend

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



Dimensions & Packaging



SPI-4 Series

30

Dimensions

Weight per Unit	2.40 oz [68g]
Dimensions DIN 43880	2/3 TE
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102mm]
Minimum Package Quantity	15 pieces

SPI-4-xxM Series

30

Dimensions

Weight per Unit	1.05 oz [30g]
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102mm]
Minimum Package Quantity	15 pieces

inches
[mm]

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