

Raycap

Surge Protection for
Data & Signal Line Systems



2018
CATALOG

About Raycap



Raycap is a privately-held technology solutions provider offering products and services that support and protect the world's critical telecommunications, energy, transportation and other infrastructure.


Since 1987 Raycap has built a worldwide organization with offices and production facilities throughout Europe and North America. The company combines advanced engineering, superior product design, systems integration and manufacturing capability with a deep understanding of the needs of the customer to create unique technological solutions for mission-critical applications. It also offers engineering services such as custom product design and site surveys, as well as warehousing, logistics, customer training, and much more.

The company's comprehensive understanding of customer needs and the industries in which they operate is crucial to its ability to develop effective products and solutions that integrate the latest technology with the highest quality of service.

The Raycap team of talented, highly experienced staff works together with customers to find the best-fit solutions. As a result, more than half of the products delivered are custom-built for unique customer applications and to their specifications. From rigorous internal and independent testing to a consultative customer-focused approach, Raycap is determined to deliver the highest quality products with responsiveness, innovation and agility.



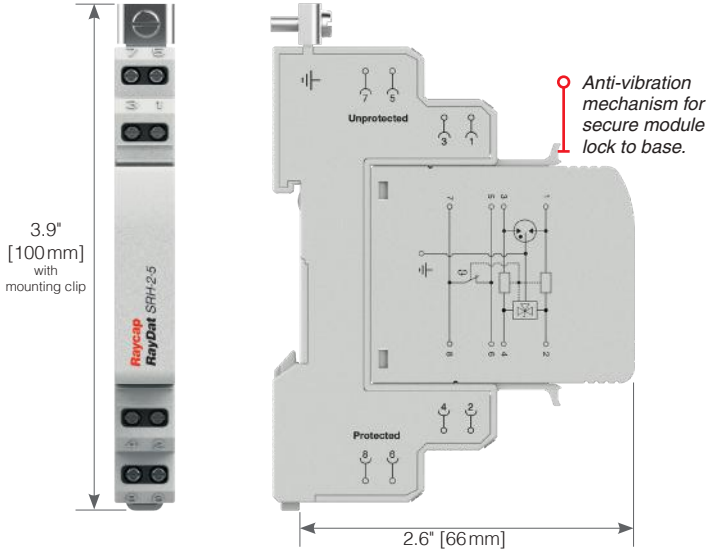
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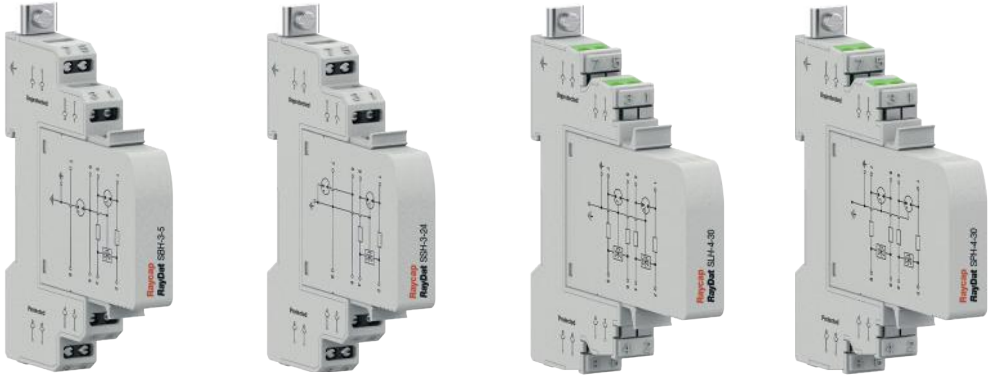
RayDat Modular Features



RayDat surge protection for data and signal line systems provide unsurpassed electrical protection for signal power applications. These products meet the diverse requirements of industrial and other signal protection applications. RayDat products are available in a variety of operating voltages and configurations that conform to the latest industry standards and certifications.



Raycap's anti-vibration mechanism ensures the pluggable surge protection modules remain locked onto their bases despite severe shock or vibration conditions.

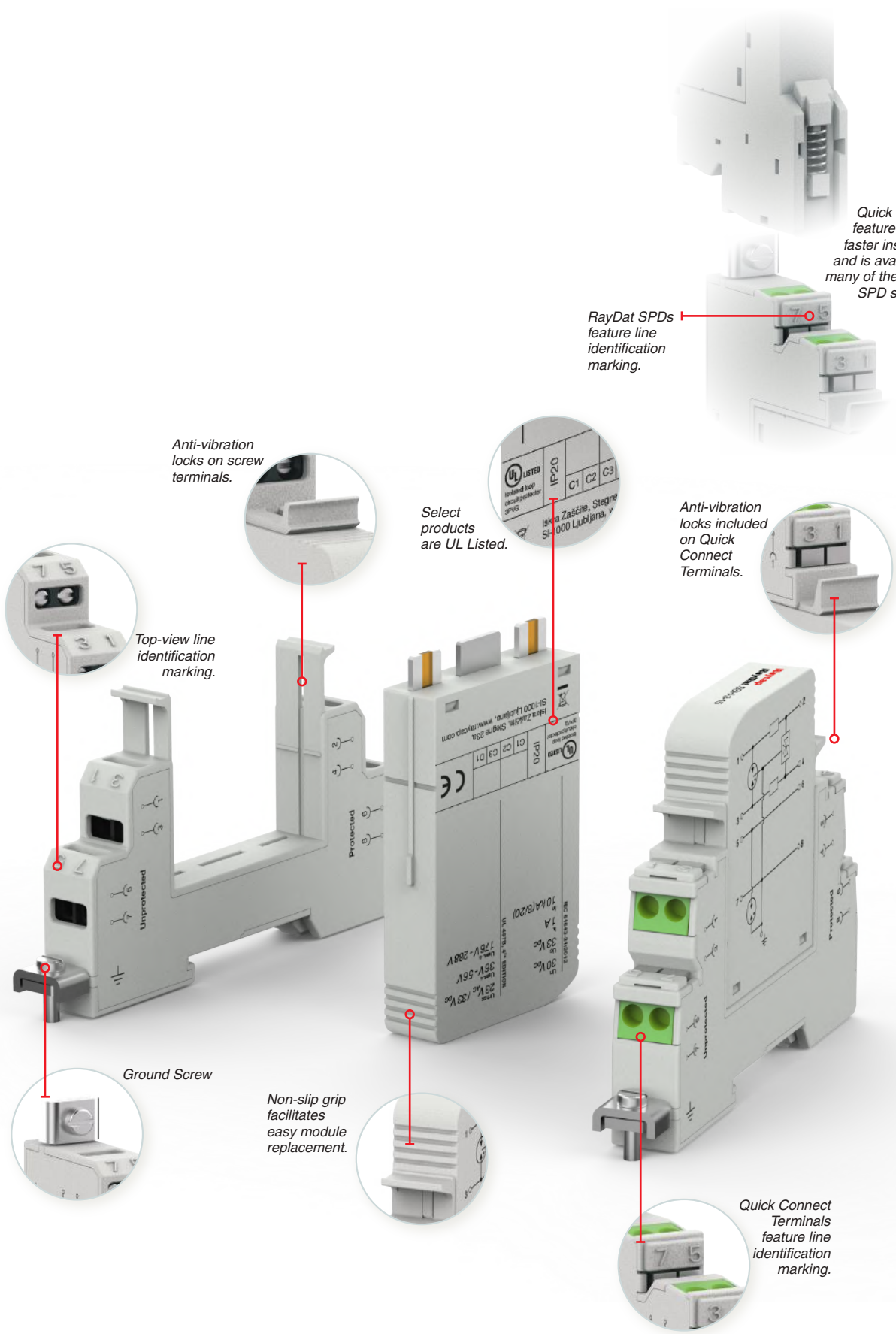


RayDat SBH-3-5

RayDat SSH-3-24

RayDat SLH-4-30

RayDat SPH-4-30



Quick Connect feature enables faster installation and is available on many of the RayDat SPD solutions.

RayDat SPDs feature line identification marking.

Anti-vibration locks on screw terminals.

Select products are UL Listed.

Anti-vibration locks included on Quick Connect Terminals.

Top-view line identification marking.

Ground Screw

Non-slip grip facilitates easy module replacement.

Quick Connect Terminals feature line identification marking.

Introduction



Selection Table for Recommended Surge Protective Devices (SPDs)

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

Lightning Protection Zones	Test Class of SPD to IEC 61643-11	Category of SPD to IEC 61643-21
0/1	Test Class 1	D1
1/2	Test Class 2	C2
2/3	Test Class 3	C1



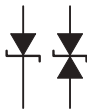
Typical Components Used in SPDs Voltage-limiting and Current Limiting Devices

Voltage-clamping Devices



Varistor (MOV)

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



Transient Voltage Suppression (TVS) Diode

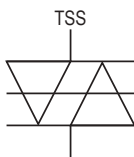
A TVS diode is a clamping device that limits voltage spikes by the low impedance avalanche breakdown of the P/N junction. TVS diode contains a P/N junction similar to a Zener diode but with a larger cross section, which is proportional to its surge power rating. TVS diode has a very short response time,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

Voltage-switching Devices



Gas Discharge Tube (GDT)

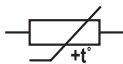
A GDT is an arrangement of electrodes in a gas within an insulating, temperature-resistant ceramic or glass cylinder. Because of their switching characteristic and rugged construction, GDTs exceed other components in current carrying capability.



Thyristor Surge Suppressor (TSS) Fixed Voltage Types

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

Current Limiting Devices



Positive Temperature Coefficient Resistor (PTC Resistor)





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

Regulatory Standards

1	IEC 61643-21:2012	Low voltage surge protective devices – Part 21: Surge protective devices connected to telecommunications and signaling networks – Performance requirements and testing methods
2	IEC 61643-22:2015	Low voltage surge protective devices – Part 21: Surge protective devices connected to telecommunications and signaling networks – Performance requirements and testing methods
3	IEC 61643-11:2011	Surge protective devices connected to low voltage power distribution systems – Requirements and test methods
4	IEC 61643-12:2008	Surge protective devices connected to low voltage power distribution systems – Selection and application principles
5	IEC 60364-5-53:2015	Electrical installation of buildings – Part 5-53: Selection and erection of electrical equipment-isolation, switching and control
6	IEC 61000-4-5:2017	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test
7	IEC 62305-1:2010	Protection against lightning – Part 1: General principles
8	IEC 62305-2:2010	Protection against lightning – Part 2: Risk management
9	IEC 62305-3:2010	Protection against lightning – Part 3: Physical damage to structures and life hazard
10	IEC 62305-4:2010	Protection against lightning – Part 4: Electrical and electronic systems within structures
11	ITU-T K.20:2017	Resistibility of telecommunication equipment installed in a telecommunications center to overvoltages and overcurrents
12	ITU-T K.21:2017	Resistibility of telecommunication equipment installed in customer premises to overvoltages and overcurrents
13	ITU-T K.44:2011	Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents – Basic Recommendation
14	IEC 60099-4:2014	Surge arresters – Part 4: Metal-oxide surge arresters without gaps for AC systems
15	IEC 60099-5:2013	Surge arresters – Part 5: Selection and application recommendations
16	IEC PAS 60099-7:2004	Surge arresters – Part 7: Glossary of terms and definitions from IEC publications 60099-1, 60099-4, 60099-6, 61643-11, 61643-12, 61643-21, 61643-311, 61643-321, 61643-331 and 61643-341
17	IEC 60038:2009	IEC standard voltages
18	UL 497B 4th Edition	Protectors for Data Communications and Fire-Alarm Circuits
19	IEC 62497-2:2010	Railway applications – Insulation coordination – Part 2: Overvoltages and related protection
20	EN 50526-1:2012	Railway applications – Fixed installations – DC surge arresters and voltage limiting devices – Part 1: Surge arresters
21	EN 50123-5:2003	Railway applications – Fixed installations – DC switchgear – Part 5: Surge arresters and low-voltage limiters for specific use in DC systems
22	EN 50122-1:2017	Railway applications – Fixed installations – Part 1: Protective provisions relating to electrical safety and earthing
23	IEC 60364-7-712:2002	Electrical installations of buildings – Part 7-712: Requirements for special installations or locations – Solar photovoltaic (PV) power supply systems
24	HD 60364-7-712:2016	Electrical installations of buildings – Part 7-712: Requirements for special installations or locations – Solar photovoltaic (PV) power supply systems
25	EN 61173:2001	Overvoltage protection for photovoltaic (PV) power generating systems – guide 32. SIST EN 61400-1:2006/A1:2011 Wind turbines – Part 1: Design requirements (IEC 61400-1:2005/A1:2010)
26	IEC 61400-24:2010	Wind turbine generator systems – Part 24: Lightning protection
27	EN 50539-12:2014	Low-voltage surge protective devices – Surge protective devices for specific application including DC – Part 12: Selection and application principles – SPDs connected to photovoltaic installations
28	EN 50539-11:2012	Low-voltage surge protective devices – Surge protective devices for specific application including DC – Part 11: Requirements and tests for SPDs in photovoltaic applications
29	IEEE 802.3-2015	IEEE standard for Ethernet

Quick Product Selector

Data & Signal Lines

Product	Page		Description	Connection/Signal
RayDat SLH-2 <i>*UL Listed</i>	16		<ul style="list-style-type: none"> Modular universal single-pair data SPD Coarse and fine protection 	<ul style="list-style-type: none"> -20mA current loop -Analog telephone line -RS 232, RS 422, V.11, RS 485 -Thermal probe PT 100, TTL
RayDat SLH-4 <i>*UL Listed</i>	18		<ul style="list-style-type: none"> Modular universal two-pair data SPD Coarse and fine protection 	<ul style="list-style-type: none"> -20mA current loop -Analog telephone line -RS 232, RS 422, V.11, RS 485 -Thermal probe PT 100, TTL
RayDat SPH-2 <i>*UL Listed</i>	20		<ul style="list-style-type: none"> Modular universal single-pair data SPD for balanced (symmetrical) lines Coarse and fine protection 	<ul style="list-style-type: none"> -20mA current loop -Analog telephone line -Thermal probe PT 100, TTL
RayDat SPH-4 <i>UL Listed</i>	22		<ul style="list-style-type: none"> Modular universal two-pair data SPD for balanced (symmetrical) lines Coarse and fine protection 	<ul style="list-style-type: none"> -20mA current loop -Thermal probe PT 100, TTL
RayDat SBH-3 <i>UL Listed</i>	24		<ul style="list-style-type: none"> Modular single-pair data SPD with separated signal ground (RS 232) Coarse and fine protection Insulation resistance to earth 	<ul style="list-style-type: none"> -CAN bus -Profibus DP -RS 232/v.24, RS 485 -Sinec L2
RayDat SSH-3 <i>*UL Listed</i>	26		<ul style="list-style-type: none"> Modular universal single-pair data SPD for shielded cables Coarse and fine protection 	<ul style="list-style-type: none"> -20mA current loop -Analog telephone line -RS 232, RS 422, V.11, RS 485 -Thermal probe PT 100, TTL
RayDat SRH-2 <i>*UL Listed</i>	28		<ul style="list-style-type: none"> Modular universal single-pair data SPD with remote contacts (RC) Coarse and fine protection 	<ul style="list-style-type: none"> -20mA current loop -Analog telephone line -RS 232, RS 422, V.11, RS 485 -Thermal probe PT 100, TTL
RayDat SLL-4 <i>UL Listed</i>	30		<ul style="list-style-type: none"> Modular two-pair SPD Fine protection suppressor diode only 	—
RayDat SGH-3	32		<ul style="list-style-type: none"> Modular single-pair data SPD with separated signal ground (RS 232) Coarse and fine protection Insulation resistance to earth 	<ul style="list-style-type: none"> -Analog telephone line -RS 232, RS 485 -Thermal probe PT 100
RayDat SUI-4	34		<ul style="list-style-type: none"> Modular 2-pair SPD for exposed line Coarse and fine protection $I_{imp}=5\text{ kA/pair}$ 	<ul style="list-style-type: none"> -20mA current loop -Analog telephone line -RS 232, RS 422, V.11, RS 485 -Thermal probe PT 100, TTL
RayDat SCH-2	36		<ul style="list-style-type: none"> Universal compact single-pair data SPD Coarse and fine protection 	<ul style="list-style-type: none"> -20mA current loop -Analog telephone line -RS 232, RS 422, V.11, RS 485 -Thermal probe PT 100, TTL
RayDat SCH-4	38		<ul style="list-style-type: none"> Universal compact two-pair data SPD Coarse and fine protection 	<ul style="list-style-type: none"> -20mA current loop -Analog telephone line -RS 232, RS 422, V.11, RS 485 -Thermal probe PT 100, TTL
RayDat SUR-2	40		<ul style="list-style-type: none"> Modular single-pair SPD Coarse protection only Coordination elements 	-Analog telephone line





U_n V DC	U_c V DC	I_L at 25°C A	I_n 8/20kA	I_{max} 8/20kA	I_{imp} 10/350 kA	Frequency up to	Housing IP Dimensions DIN 43880
5, 12, 15, 24, 30*, 48, 60, 110V	6, 15, 18, 28, 33, 52, 64, 170V	1	10	20	2.5	30MHz	Modular IP 20 12mm
5, 12, 15, 24, 30*, 48, 60, 110V	6, 15, 18, 28, 33, 52, 64, 170V	1	10	20	5	30MHz	Modular IP 20 12mm
30*, 230V	33, 320V	5	10	20	2.5	30MHz	Modular IP 20 12mm
30V	33V	1, 10	10	20	5	30MHz	Modular IP 20 12mm
5, 12, 30V	6, 15, 33V	1	10	20	2.5	30MHz	Modular IP 20 12mm
5*, 12*, 15, 24, 30*, 48, 60, 110V	6, 15, 18, 28, 33, 52, 64, 170V	1	10	20	2.5	30MHz	Modular IP 20 12mm
5*, 12*, 15, 24*, 30*, 48, 60, 110V	6, 15, 18, 28, 33, 52, 64, 170V	1	10	20	2.5	30MHz	Modular IP 20 12mm
30V	33V	10	0.25	—	—	30MHz	Modular IP 20 12mm
5, 12, 15, 24, 30, 48, 60, 110V	6, 15, 18, 28, 33, 52, 64, 170V	1	10	20	2.5	30MHz	Modular IP 20 12mm
5, 12, 15, 24, 30, 48, 60, 110V	6, 15, 18, 28, 33, 52, 64, 170V	1	20	30	10	30MHz	Modular IP 20 12mm
5, 12, 15, 24, 30, 48, 60, 110V	6, 15, 18, 28, 33, 52, 64, 170V	1	10	20	2.5	35MHz	Compact IP 20 12mm
5, 12, 15, 24, 30, 48, 60, 110V	6, 15, 18, 28, 33, 52, 64, 170V	0.8	10	20	5	3MHz	Compact IP 20 12mm
110V	170V	0.3	10	20	2.5	16MHz	Modular IP 20 12mm

Quick Product Selector



Data & Signal Lines

Product	Page		Description	Connection/Signal
RayDat SUR-4	42		<ul style="list-style-type: none"> Modular two-pair SPD Coarse protection only Coordination elements 	-Analog telephone line
RayDat SCL-1	44		<ul style="list-style-type: none"> Compact single-pair SPD Fine protection MOV only 	-20mA current loop
RayDat SCL-2	46		<ul style="list-style-type: none"> Compact single-pair SPD Fine protection suppressor diode only 	-20mA current loop
RayDat SUH-2 PS	48		<ul style="list-style-type: none"> Modular SPD for DC power and data line in one (CAN bus) Coarse and fine protection Overcurrent protection 	-DC power system + data line -CAN bus
RayDat SRH-2L	50		<ul style="list-style-type: none"> Modular universal single-pair data SPD with visual signalization Coarse and fine protection 	-20mA current loop -Analog telephone line -RS 232, RS 422, V.11, RS 485 -Thermal probe PT 100, TTL




Explosive Environments

 RayDat Ex-2	54		<ul style="list-style-type: none"> Modular single-pair SPD for explosive environments (Ex) Coarse and fine protection Insulation resistance to earth 	-Hazardous areas
 RayDat PLP Ex	56		<ul style="list-style-type: none"> Compact SPD for explosive environments (Ex) Coarse and fine protection Insulation resistance to earth 	-Hazardous areas

DC Power Systems

Protec DMDR 20	60		<ul style="list-style-type: none"> Modular SPD for DC/AC power systems Class III/Type 3/D U_{oc} up to 6kV Remote contacts + LED status indicator 	-DC power systems
RayDat PSC-2	62		<ul style="list-style-type: none"> Modular universal single-pair SPD Coarse and fine protection Various options available for base unit 	-DC power systems




Local Area Networks (LAN)

RayDat NET 6 POE <i>UL Listed</i>	66		<ul style="list-style-type: none"> LAN protector (1 way) All 4 pairs protected Frequency > 250MHz, Cat 6 capable Termination: RJ45, shielded 	-LAN up to Cat 6
RayDat NET 5 Series	68		<ul style="list-style-type: none"> LAN protector 1 way All 4 pairs protected Frequency > 100MHz, Cat 5 capable Termination: RJ45, Cat 5 connectors 	-LAN up to Cat 5
RayDat NET 5 19	70		<ul style="list-style-type: none"> LAN protector 19" rack patch panel up to 24 ports All 4 pairs protected Frequency > 100MHz, Cat 5 capable Termination: RJ45, Cat 5 connectors 	-LAN up to Cat 5


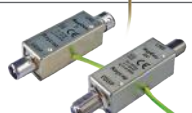





U_n V DC	U_c V DC	I_L at 25°C A	I_n 8/20kA	I_{max} 8/20kA	I_{imp} 10/350 kA	Frequency up to	Housing IP Dimensions DIN 43880
110V	170V	0.3	10	20	5	16MHz	Modular IP 20 12mm
12, 24V	22, 28V	10	0.5	—	—	0.5MHz	Compact IP 20 6mm
5, 12, 24, 60V	6, 15, 28, 64V	10	0.5, 0.25, 0.1	—	—	3MHz	Compact IP 20 6mm
24V	28V	1,3	10	20	2.5	30MHz	Modular IP 20 12mm
5, 12, 24, 30V	6, 15, 28, 33V	1	10	20	2.5	30 MHz	Modular IP 20 12mm
12 mm	15, 28V	1	5	10	1	3MHz	Compact IP 20 6mm
24, 48, 24/5V	33, 54, 33/7.5V	—	10	20	2	30MHz	In-line IP 67 1/2"
24, 48, 60, 120V	34/44, 60, 75, 150V _{AC/DC}	—	1.2, 2.5, 2.5, 4	3,6,6,10	—	—	Modular IP 20 1TE
12, 24, 48V	15, 28, 52V	4	10	20	—	—	Modular IP 20 12mm
48V	50V	1	0.15 (Line-Line) 10 (Lines- Ground)	10	1	250MHz	Compact IP 20 19mm
5, 48, 5V	6, 58, 6V	—	0.3 (Line-Line) 0.06 (Line-Line) 0.3 (Line-Line)	1	—	100MHz	Compact IP 20
5, 48V	6, 48V	—	0.3 (Line-Line) 0.06 (Line-Line)	1, .25	—	100MHz	Compact IP 20

Quick Product Selector

Data Protocols

Product	Page	Description	Connection/Signal
RayDat RS 485	74	<ul style="list-style-type: none"> • Compact single-pair data SPD • Coarse and fine protection 	-RS 422 -V.11 -RS 485
			
<h3>Various Data Systems</h3>			
RayDat PLP 24	78	<ul style="list-style-type: none"> • Single-pair SPD for 3/4" pipe installation • Coarse and fine protection • $t_A < 1\text{ns}$ 	-20mA current loop
			
RayDat GD	80	<ul style="list-style-type: none"> • OEM PCB module • Single-pair SPD • Coarse protection only • Flying leads or screw terminals 	-Analog telephone line -xDSL -EIB
			

Coaxial & RF Systems






Product	Page	Description	Connection/Signal
RayCox BNC	84	<ul style="list-style-type: none"> • Coaxial BNC protector for analog video surveillance systems • Coarse and fine protection • Indirect shield earthing 	-Arcnet -Analog video
			
RayCox IEC, F	86	<ul style="list-style-type: none"> • Coaxial protector for TV and cable TV • Direct shield earthing 	-TV -Cable TV
			
RayDat CP BNC	88	<ul style="list-style-type: none"> • Coaxial protector for RF antenna systems • Frequency 2.6 GHz • GDT 	-Analog video
			
RayDat CP 7/16	90	<ul style="list-style-type: none"> • Coaxial protector for base station RF antenna systems • Frequency 2.5 GHz • GDT 	-GSM, UMTS, LTE -GPS -Radio systems
			
RayDat CP N	92	<ul style="list-style-type: none"> • Coaxial protector for RF antenna systems • Frequency 2.6 GHz • GDT 	-GSM, UMTS, LTE -GPS -Radio systems
			
RayDat CP N-6G	94	<ul style="list-style-type: none"> • Coaxial protector for RF antenna systems • Frequency 6 GHz • GDT 	-GSM, UMTS, LTE -GPS -Radio systems
			
RayDat TNC-6G	96	<ul style="list-style-type: none"> • Coaxial protector for RF antenna systems • Frequency 6 GHz • GDT 	-GSM, UMTS, LTE -GPS -Radio systems
			

U_n V DC	U_c V DC	I_L at 25°C A	I_n 8/20 kA	I_{max} 8/20 kA	I_{imp} 10/350 kA	Frequency up to	Housing IP Dimensions
5V	6V	0.5	20	—	2.5	1 MHz	Compact IP 20 2TE
24V	28V	0.145	10	20	—	3 MHz	In-line IP 55 3/4"
110V	170V	6	5	10	—	30 MHz	Compact IP 20

U_n V DC	U_c V DC	Max Peak Power W	I_L at 25°C A	I_n 8/20 kA	I_{max} 8/20 kA	Frequency up to	Termination
10, 24V	12, 28V	—	0.1	10	20	100 MHz	BNC Type M-F, F-F
48, 48V	66, 60V	—	0.1, 0.1	5, 5	—	40-860 MHz	IEC TV & F
—	70, 180, 280V	40, 125, 300W	—	10	20	2.6 GHz	BNC Type M-F, F-F
—	70, 180, 280V	40, 125, 300W	—	10	20	2.5 GHz	7/16 Type M-F
—	70, 180, 280V	40, 125, 300W	—	10	20	2.6 GHz	N Type M-F, F-F
—	180V	125W	—	10	20	6 GHz	N Type M-F, F-F
—	180V	125W	—	10	20	6 GHz	TNC Type M-F, F-F

Quick Product Selector

Coaxial & RF Systems

Product	Page		Description	Connection/Signal
RayDat CP UHF	98		<ul style="list-style-type: none"> • Coaxial protector for RF antenna systems • Frequency 600MHz • GDT 	-Radio systems
RayDat CP F75	100		<ul style="list-style-type: none"> • Coaxial protector for RF antenna CCTV and CATV systems • Frequency 2GHz • GDT 	-Cable TV
RayDat CP TV75	102		<ul style="list-style-type: none"> • Coaxial protector for RF antenna CCTV and CATV systems • Frequency 2GHz • GDT 	-TV
RayDat CP L/4-7/16	104		<ul style="list-style-type: none"> • Coaxial protector for RF antenna systems • Frequency 865-965 MHz, 1.7-1.95 GHz 	-GSM, UMTS, LTE
RayDat CP L/4-N	106		<ul style="list-style-type: none"> • Coaxial protector for RF antenna systems • Frequency 865-965 MHz, 1.7-1.95 GHz 	-GSM, UMTS, LTE

U_n V DC	U_c V DC	Max. Peak Power W	I_L at 25°C A	I_n 8/20kA	I_{max} 8/20kA	Frequency up to	Termination
—	70, 180, 280V	40, 125, 300W	—	10	20	600 MHz	UHF Type M-F, F-F
—	70, 180V	40, 125W	—	20	20	2 GHz	F Type M-F, F-F
—	70, 180V	40, 125W	—	10	20	2 GHz	TV Type M-F, F-F
—	—	500W	—	15	30	865- 1950 MHz	L/4-7/16 Type M-F, F-F
—	—	500W	—	15	30	865- 1950 MHz	L/4-N Type M-F, F-F

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



RayDat products are universal data surge protective devices that contain both coarse and fine over voltage stages and provide longitudinal and transverse surge protection.

RayDat SRH-2 products feature additional remote contacts. If the unit fails, the contacts change state.

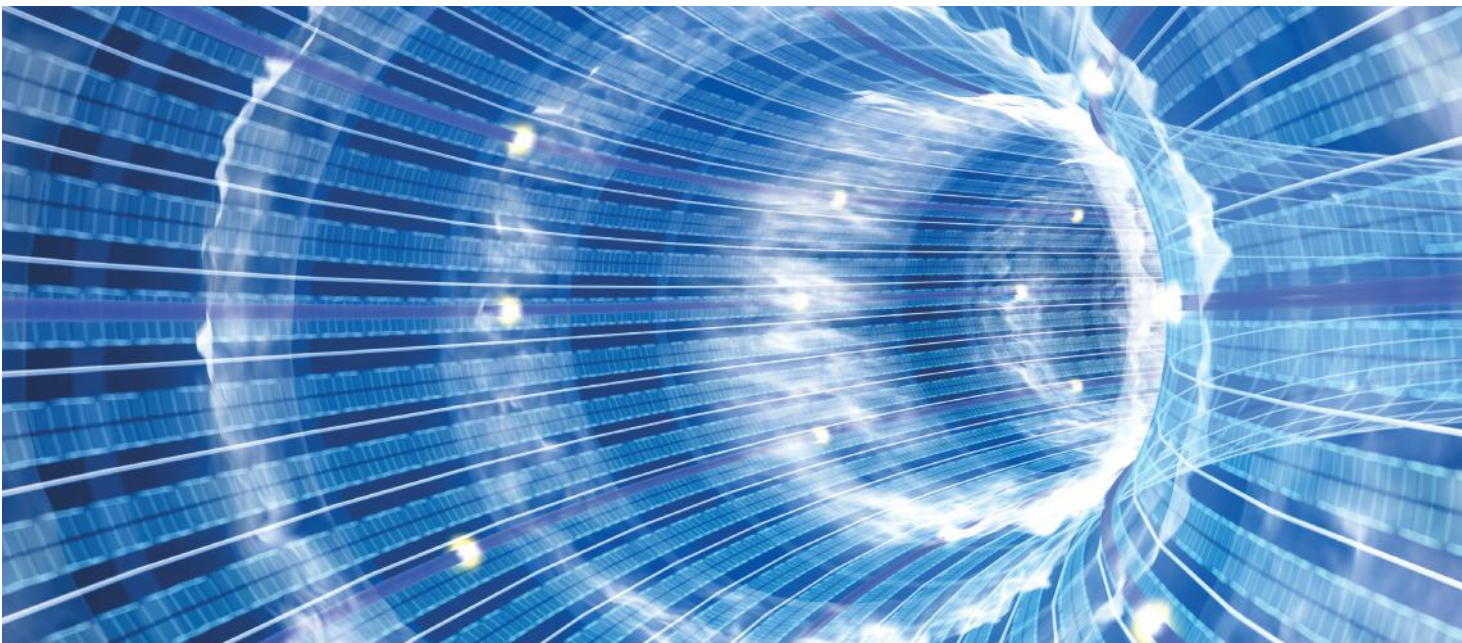
RayDat SSH-3 Series is equipped with additional protection for cable shield.

RayDat SUI-4 Series was designed to withstand greater surge level [$I_{imp}=10\text{kA}$].

RayDat SLH-4 Series is a universal data surge protective device (SPD) designed to protect two independent symmetrical data lines.

RayDat SLH-2*
RayDat SLH-4*
RayDat SPH-2*
RayDat SPH-4*
RayDat SBH-3*
RayDat SSH-3*
RayDat SRH-2*
RayDat SLL-4*
RayDat SGH-3
RayDat SUI-4
RayDat SCH-2
RayDat SCH-4
RayDat SUR-2
RayDat SUR-4
RayDat SCL-1
RayDat SCL-2
RayDat SUH-2 PS
RayDat SRH-2L

**UL Listed*



Modular SPD for Single Pair RayDat SLH-2 Series

D1 • C1 • C2 • C3

*UL Listed



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Coarse Protection: 3 Terminal GDT
 Voltages: 5, 12, 15, 24, 30*, 48, 60, 110V DC
 Frequency Range: 30MHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
 Series Load Current: 1A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

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 coordination between the

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

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

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

Technical Data

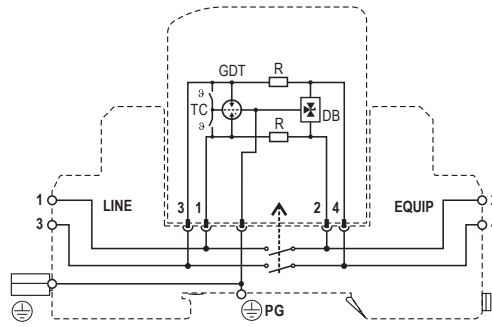
SLH-2 Series		5	12	15	24	30*	48	60	110
Electrical									
Lines Protected		1 (2 Conductors)							
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V	110V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated Load Current at 25°C	I_L	1 A							
C2 Nominal Discharge Current (8/20µs)	I_n	10kA							
Maximum Discharge Current (8/20µs)	I_{max}	20kA							
D1 Impulse Current (10/350µs)	I_{imp}	2.5kA							
Residual Voltage at 5kA (8/20µs)	U_{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V	<450V
Rated Spark Overvoltage	(Line-Ground)	7-10V	16-21V	21-25V	31-37V	36-44V	57-69V	68-84V	184-264V
	(Line-Line)	7-10V	16-21V	21-25V	31-37V	36-44V	57-69V	68-84V	184-264V
Response Time Overvoltage Protection	t_A	< 1 ns							
Thermal Protection		Yes							
Insulation Resistance of the Protection	R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial Resistance per Path	R	1.6-2.0Ω							
Transverse Capacitance	C	50pF							
Cut-off Frequency	f_G	30MHz							
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		5	12	15	24	30*	48	60	110
SLH-2-xxx		7086.33	7086.34	7086.35	7086.36	7082.80	7086.37	7086.38	7086.39
SLH-2-xxxQ (Quick Connect Terminals)		7085.05	7085.06	7085.07	7085.08	7085.09	7085.10	7085.11	7085.12
SLH-2-xxxM (module)		7086.40	7086.41	7086.42	7086.43	7082.81	7086.44	7086.45	7086.46

RayDat SLH-2 Series

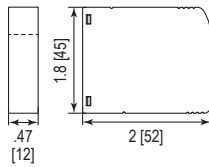
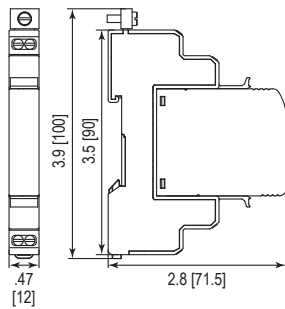
Internal Configuration

Legend

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



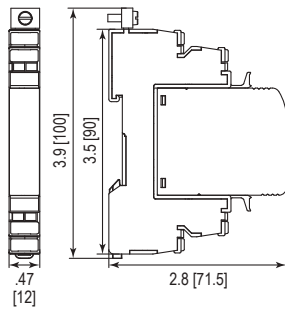
Dimensions & Packaging



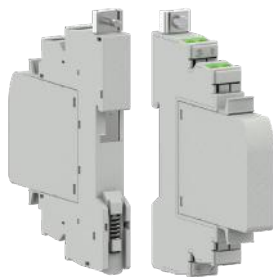
SLH-2 Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	1.83 oz [52 g]							
Dimensions DIN 43880	2/3 TE							
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]							
Minimum Package Quantity	15 pieces							

SLH-2-xxxM Series	5	12	15	24	30	48	60	110
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



SLH-2-xxxQ Series	5	12	15	24	30	48	60	110
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							



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

Modular SPD for Two Pair

RayDat SLH-4 Series

D1 • C1 • C2 • C3

*UL Listed



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Coarse Protection: 3 Terminal GDT
 Voltages: 5, 12, 15, 24, 30*, 48, 60, 110V DC
 Frequency Range: 30MHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 5kA
 Series Load Current: 1 A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

Like the RayDat SLH-2 Series, the SLH-4 provides the same level of protection to two independent circuit pairs. A number of protection voltages are available to ensure the user is able to select the closest clamping voltage to the normal signal operation of the equipment being protected.

The plug-in module/base design facilitates replacement of a failed module without the need to remove system wiring. If the module is unplugged out of the base, the connection lines remain enabled.

Technical Data

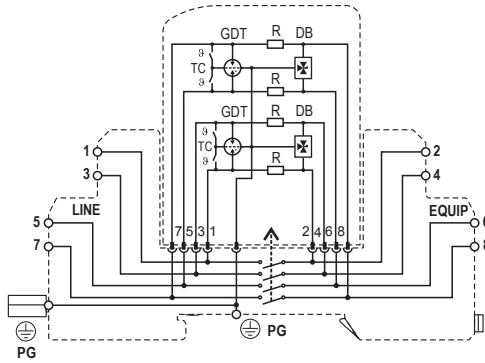
SLH-4 Series		5	12	15	24	30*	48	60	110
Electrical									
Lines Protected		2 (4 Conductors)							
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V	110V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated Load Current at 25°C	I_L	1 A							
C2 Nominal Discharge 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)	U_{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V	<450V
Rated Spark Overvoltage	(Line-Ground)	7-10V	17-21V	21-25V	31-37V	36-44V	57-69V	68-84V	184-264V
	(Line-Line)	7-10V	17-21V	21-25V	31-37V	36-44V	57-69V	68-84V	184-264V
Response Time Overvoltage Protection	t_A	< 1 ns							
Thermal Protection		Yes							
Insulation Resistance of the Protection	R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial Resistance per Path	R	1.6-2.0Ω							
Transverse Capacitance	C	50pF							
Cut-off Frequency	f_G	30MHz							
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		5	12	15	24	30*	48	60	110
SLH-4-xxx		7086.47	7086.48	7086.49	7086.50	7082.78	7086.51	7086.52	7086.53
SLH-4-xxxQ (Quick Connect Terminals)		7085.13	7085.14	7085.15	7085.16	7085.17	7085.18	7085.19	7085.20
SLH-4-xxxM (module)		7086.54	7086.55	7086.56	7086.57	7082.79	7086.58	7086.59	7086.60

RayDat SLH-4 Series

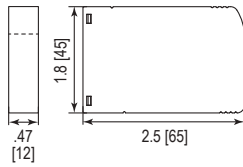
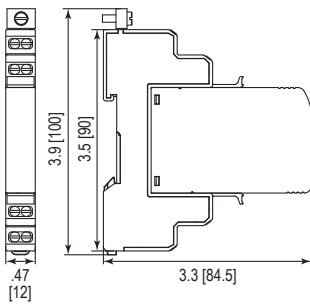
Internal Configuration

Legend

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



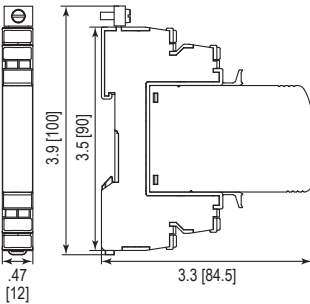
Dimensions & Packaging



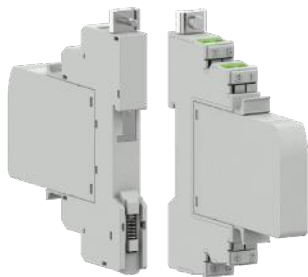
SLH-4 Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	2.32 oz [66 g]							
Dimensions DIN 43880	2/3 TE							
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]							
Minimum Package Quantity	15 pieces							

SLH-4-xxxM Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	1.05 oz [30 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



SLH-4-xxxQ Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	2.32 oz [66 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							



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

Modular SPD for Single Pair RayDat SPH-2 Series

D1 • C1 • C2 • C3

*UL Listed



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Coarse Protection: 3 Terminal GDT
 Voltages: 30*, 230V DC
 Frequency Range: 30MHz, 10MHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
 Series Load Current: 1A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

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

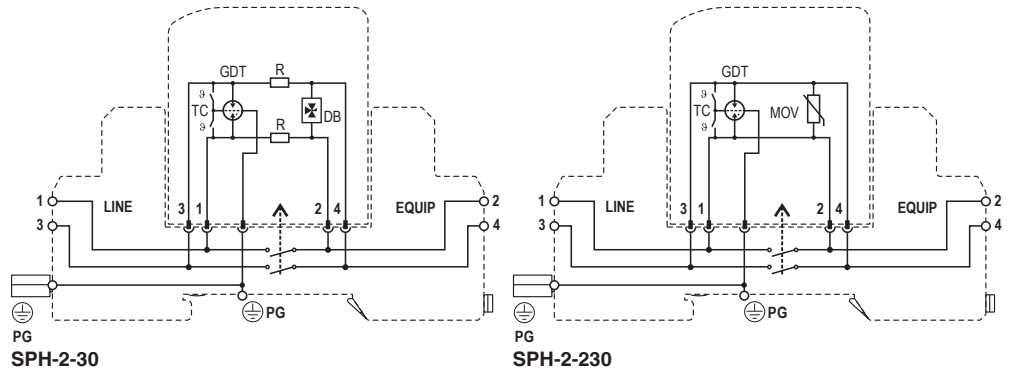
SPH-2 Series		30*	230
Electrical			
Lines Protected		1 (2 Conductors)	
Nominal Operating Voltage (DC)	U_n	30V	230V
Maximum Continuous Operating Voltage (DC)	U_c	33V	320V
Rated Load Current at 25°C	I_L	1A	5A
C2 Nominal Discharge Current (8/20 μ s)	I_n	10kA	
Maximum Discharge Current (8/20 μ s)	I_{max}	20kA	
D1 Impulse Current (10/350 μ s)	I_{imp}	2.5kA	
Residual Voltage at 5kA (8/20 μ s)	(Line-Line) U_{res}	<80V	<700V
Rated Spark Overvoltage	(Line-Ground)	184-276V	350-550V
	(Line-Line)	36-44V	350-429V
Response Time Overvoltage Protection	(Line-Line) t_A	<1ns	<25ns
	(Line-Ground)	<100ns	
Insulation Resistance of the Protection	(Line-Ground) R_{iso}	>1G Ω /100V	
	(Line-Line)	\geq 33M Ω	\geq 100M Ω
Serial Resistance per Path	R	1.6-2.0 Ω	0.1 Ω
Transverse Capacitance	(Line-Line) C	50pF	100pF
	(Line-Ground)	5pF	
Cut-off Frequency	f_G	30MHz	10MHz
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		IP20 (built-in)	
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0	
Mounting IEC/EN 60715		35 mm DIN Rail	
Order Information			
Order Code		30*	230
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

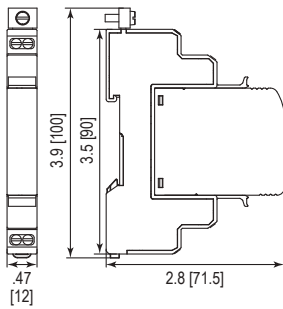
Internal Configuration

Legend

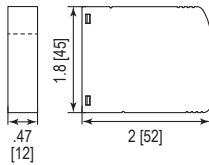
- DB Diode Block
- GDT Gas Discharge Tube
- MOV Metal Oxide Varistor
- PG Protective Grounding
- R Resistor
- TC Thermo-clip



Dimensions & Packaging

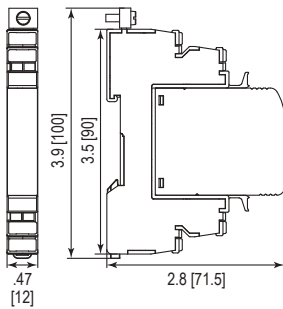


SPH-2 Series	30	230
Dimensions		
Weight per Unit	2.11 oz [60 g]	
Dimensions DIN 43880	2/3 TE	
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]	
Minimum Package Quantity	15 pieces	

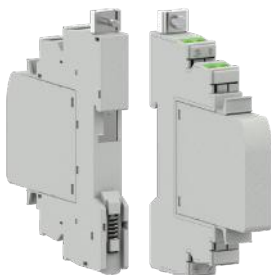


SPH-2-xxxM Series	30	230
Dimensions		
Weight per Unit	.91 oz [26 g]	
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]	
Minimum Package Quantity	15 pieces	

Quick Connect Terminals



SPH-2-xxxQ Series	30	230
Dimensions		
Weight per Unit	2.18 oz [62 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	



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

UL Listed



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, 10A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

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

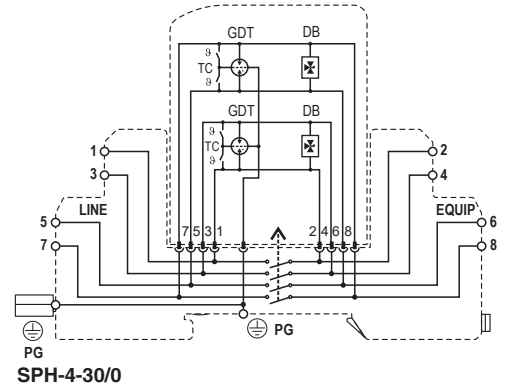
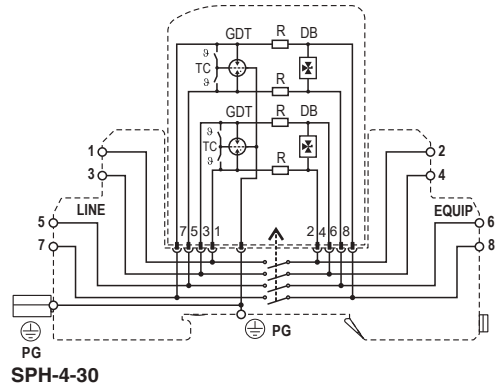
SPH-4 Series	30	30/0	
Electrical			
Lines Protected	2 (4 Conductors)		
Nominal Operating Voltage (DC)	U_n	30V	
Maximum Continuous Operating Voltage (DC)	U_c	33V	
Rated Load Current at 25°C	I_L	1 A	10 A
C2 Nominal Discharge Current (8/20 μs)	I_n	10 kA	
Maximum Discharge Current (8/20 μs)	I_{max}	20 kA	
D1 Impulse Current (10/350 μs)	I_{imp}	5 kA	
Residual Voltage at 5kA (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	1.6-2.0Ω	0.1Ω
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	IP20 (built-in)		
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0		
Mounting IEC/EN 60715	35 mm 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

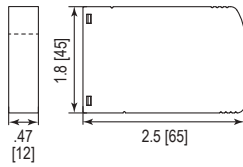
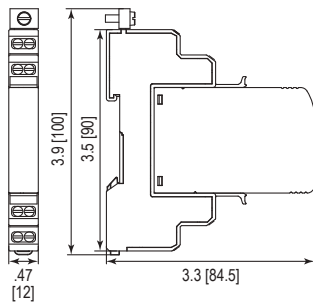
Internal Configuration

Legend

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



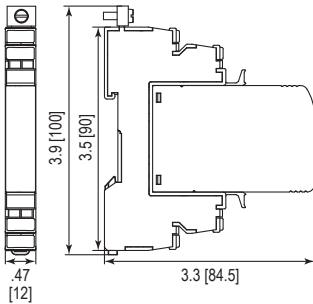
Dimensions & Packaging



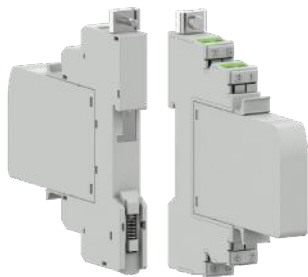
SPH-4 Series	30	30/0
Dimensions		
Weight per Unit	2.11 oz [60g]	2.04 oz [58g]
Dimensions DIN 43880	2/3 TE	
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]	
Minimum Package Quantity	15 pieces	

SPH-4-xxM Series	30	30/0
Dimensions		
Weight per Unit	.91 oz [26g]	.84 oz [24g]
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	2.18 oz [62g]	2.11 oz [60g]
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	



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

Modular SPD for Industrial Fieldbus Systems

RayDat SBH-3 Series

D1 • C1 • C2 • C3

UL Listed



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Coarse Protection: 3 Terminal GDT
 Voltages: 5, 12, 30V DC
 Frequency Range: 30MHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
 Series Load Current: 1A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

The RayDAT SBH-3 Series of surge protective devices has been developed to protect fieldbus systems (CAN Bus, Profibus DP, RS 232/V.24 m, RS 485, Sinec L2).

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

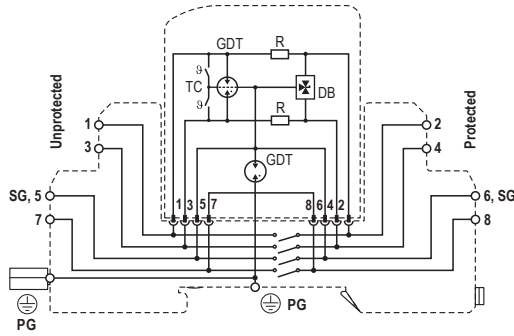
SBH-3 Series		5	12	30
Electrical				
Lines Protected		1 (2 Conductors)		
Nominal Operating Voltage (DC)	U_n	5V	12V	30V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	33V
Rated Load Current at 25°C	I_L	1A		
C2 Nominal Discharge Current (8/20µs)	I_n	10kA		
Maximum Discharge Current (8/20µs)	I_{max}	20kA		
D1 Impulse Current (10/350µs)	I_{imp}	2.5kA		
Residual Voltage at 5kA (8/20µs)	(Line-Line) U_{res}	<22V	<42V	<80V
Rated Spark Overvoltage	(SG-Ground)	184-276V		
	(Line-Line)	7-10V	16-19V	35-43V
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)	≥ 6 KΩ	≥ 15 MΩ	≥ 33 MΩ
Serial Resistance per Path	R	1.6-2.0Ω		
Transverse Capacitance	(Line-Line) C	50 pF		
	(Line-Ground)	5 pF		
Cut-off Frequency	f_G	30MHz		
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		IP20 (built-in)		
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0		
Mounting IEC/EN 60715		35 mm DIN Rail		
Order Information				
Order Code		5	12	30
SBH-3-xx		7082.86	7082.88	7082.90
SBH-3-xxQ (Quick Connect Terminals)		7085.21	7085.22	7085.23
SBH-3-xxM (module)		7082.87	7082.89	7082.91

RayDat SBH-3 Series

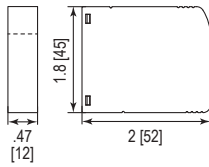
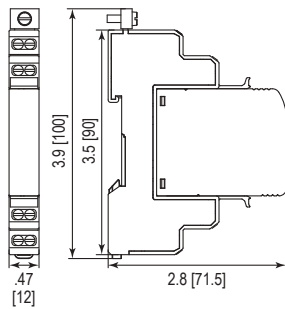
Internal Configuration

Legend

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



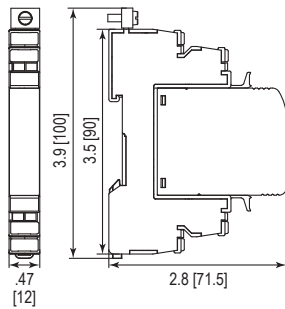
Dimensions & Packaging



SBH-3 Series	5	12	30
Dimensions			
Weight per Unit	2.11 oz [60 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		

SBH-3-xxM Series	5	12	30
Dimensions			
Weight per Unit	.91 oz [26 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



SBH-3-xxQ Series	5	12	30
Dimensions			
Weight per Unit	2.18 oz [62 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		

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

SPD for Shielded Cable

RayDat SSH-3 Series

D1 • C1 • C2 • C3

*UL Listed



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Coarse Protection: 3 Terminal GDT
 Voltages: 5*, 12*, 15, 24, 30*, 48, 60, 110V DC
 Frequency Range: 30MHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
 Series Load Current: 1A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

The RayDAT SSH-3 Series of surge protective devices has been developed to protect against the effects of induced voltages onto data, signal and communication circuits.

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

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

avalanche 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

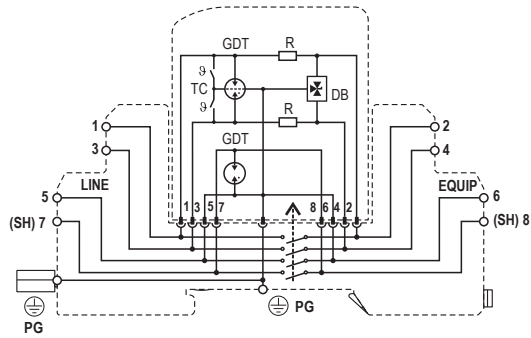
SSH-3 Series	5*	12*	15	24	30*	48	60	110	
Electrical									
Lines Protected	1 (2 Conductors)								
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V	110V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated Load Current at 25°C	I_L	1 A							
C2 Nominal Discharge Current (8/20µs)	I_n	10kA							
Maximum Discharge Current (8/20µs)	I_{max}	20kA							
D1 Impulse Current (10/350µs)	I_{imp}	2.5kA							
Residual Voltage at 5kA (8/20µs)	(Line-Line) U_{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V	<450V
Rated Spark Overvoltage	(Shield-Ground)	184-276V							
	(Line-Line), (Line-Ground)	7-10V	16-21V	20-24V	30-36V	35-43V	55-68V	67-85V	184-264V
Response Time Overvoltage Protection (Shield-Ground)	t_A	< 100ns							
	(Line-Line), (Line-Ground)	< 1 ns							
Insulation Resistance of the Protection (Shield-Ground)	R_{iso}	> 1GΩ/100V							
	(Line-Line), (Line-Ground)	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial Resistance per Path	R	1.6-2.0Ω							
Transverse Capacitance	(Shield-Ground)	5pF							
	(Line-Line), (Line-Ground)	50pF							
Cut-off Frequency	f_G	30MHz							
Mechanical									
Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]								
Terminal Cross Section Multi-strand (max.)	12 AWG [4 mm ² , 2.5mm ² Q Version]								
Terminal Screw Torque	4.5 lbf-in [0.5Nm]								
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	5*	12*	15	24	30*	48	60	110	
SSH-3-xxx	7086.01	7086.02	7086.03	7086.04	7086.05	7086.06	7086.07	7086.08	
SSH-3-xxxQ (Quick Connect Terminals)	7086.90	7086.91	7086.92	7086.93	7086.94	7086.95	7086.96	7086.97	
SSH-3-xxxM (module)	7086.09	7086.10	7086.11	7086.12	7086.13	7086.14	7086.15	7086.16	

RayDat SSH-3 Series

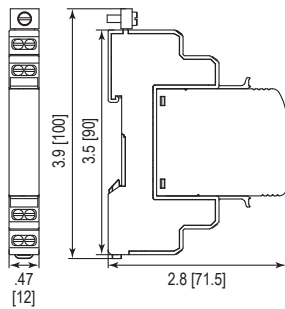
Internal Configuration

Legend

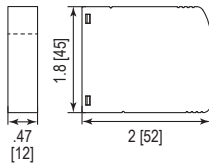
- DB Diode Block
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor
- SH Shielded
- TC Thermo-clip



Dimensions & Packaging

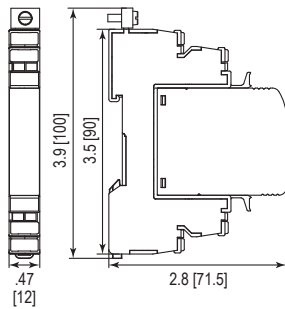


SSH-3 Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	2.11 oz [60g]							
Dimensions DIN 43880	2/3 TE							
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]							
Minimum Package Quantity	15 pieces							



SSH-3-xxxM Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	.91 oz [26g]							
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]							
Minimum Package Quantity	15 pieces							

Quick Connect Terminals



SSH-3-xxxQ Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	2.18 oz [62g]							
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							



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

SPD with Remote Contacts

RayDat SRH-2 Series

D1 • C1 • C2 • C3

*UL Listed



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Voltages: 5*, 12*, 15, 24*, 30*, 48, 60, 110V DC
 Frequency Range: 30MHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
 Series Load Current: 1 A
 Enclosure: DIN 43880 2/3 TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

The RayDat SRH-2 Series provides the same level of protection and technical performance as the SLH-2 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 is used to ensure energy co-ordination between the coarse and fine protection stages irrespective of the magnitude of the incident surge. When power frequency contact occurs between power and communication lines, the hazard of electric shock and fire is increased. To prevent such risk, a thermo-clip is included in the primary protection stage of this device 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 Data

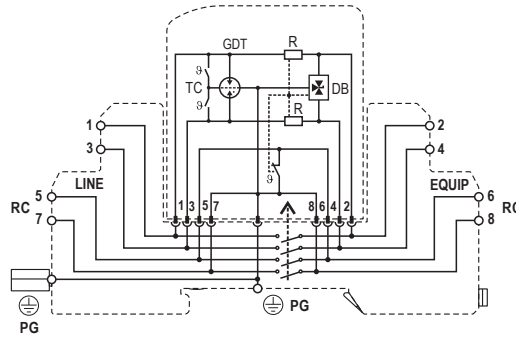
SRH-2 Series		5*	12*	15	24*	30*	48	60	110
Electrical									
Lines Protected					1 (2 Conductors)				
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V	110V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated Load Current at 25°C	I_L	1 A							
C2 Nominal Discharge Current (8/20µs)	I_n	10kA							
Maximum Discharge Current (8/20µs)	I_{max}	20kA							
D1 Impulse Current (10/350µs)	I_{imp}	2.5kA							
Residual Voltage at 5kA (8/20µs)	U_{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V	<450V
Rated Spark Overvoltage	(Line-Ground)	7-10V	16-21V	21-25V	31-37V	36-44V	57-69V	68-84V	184-264V
	(Line-Line)	7-10V	16-21V	21-25V	31-37V	36-44V	57-69V	68-84V	184-264V
Response Time Overvoltage Protection	t_A	< 1 ns							
Thermal Protection		Yes							
Insulation Resistance of the Protection	R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial Resistance per Path	R	1.6-2.0Ω							
Transverse Capacitance	C	50pF							
Cut-off Frequency	f_G	30MHz							
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							
Remote Contacts Ratings		AC 250V/0.5A, DC 50V/1 A							
Order Information									
Order Code		5*	12*	15	24*	30*	48	60	110
SRH-2-xxx		7086.17	7086.18	7086.19	7086.20	7086.21	7086.22	7086.23	7086.24
SRH-2-xxxQ (Quick Connect Terminals)		7085.33	7085.34	7085.35	7085.36	7085.37	7085.38	7085.39	7085.40
SRH-2-xxxM (module)		7086.25	7086.26	7086.27	7086.28	7086.29	7086.30	7086.31	7086.32

RayDat SRH-2 Series

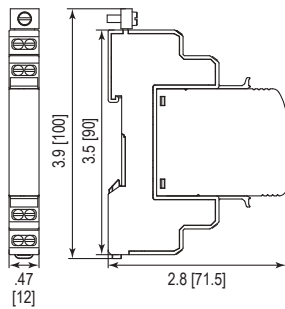
Internal Configuration

Legend

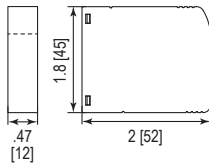
- DB Diode Block
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor
- RC Remote Control (NC)
- TC Thermo-clip



Dimensions & Packaging

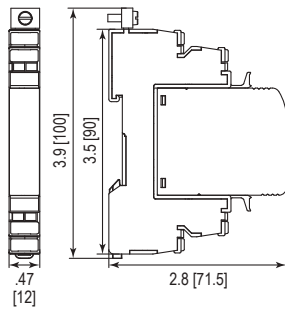


SRH-2 Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	2.04 oz [58 g]							
Dimensions DIN 43880	2/3 TE							
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]							
Minimum Package Quantity	15 pieces							



SRH-2-xxxM Series	5	12	15	24	30	48	60	110
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



SRH-2-xxxQ Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	2.11 oz [60 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							



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

SPD for Two Pair with Single Protection Mode

RayDat SLL-4 Series

C1 • C3

UL Listed



IEC/EN Category: C1/C3
 Mode of Protection: Transverse
 Voltages: 30V DC
 Frequency Range: 30MHz
 Surge Discharge Ratings: I_n : 250 A
 Series Load Current: 10A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

The RayDAT SLL-4 has been developed to protect data transmission circuits or low voltage alarm circuits such as fire or security.

The unit provides fine protection using a high speed, bi-directional, silicon stage.

Where necessary, the RayDat SLL-4 may be used with a higher energy coarse protection unit such as the SUR-4-110 Series.

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

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

Technical Data

SLL-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	10A
C1 Nominal Discharge Current (8/20 μs)	I_n	250 A
Residual Voltage at 5kA (8/20 μs)	(Line-Line) U_{res}	< 80V
Rated Spark Overvoltage	(Line-Line)	36-44V
	(Line-Ground)	36-44V
Response Time Overvoltage Protection	(Line-Line) t_A	< 1 ns
	(Line-Ground)	< 1 ns
Insulation Resistance of the Protection	(Line-Line) R_{iso}	≥ 33MΩ
	(Line-Ground)	≥ 33MΩ
Serial Resistance per Path	R	0.1Ω
Transverse Capacitance	(Line-Line) C	50pF
	(Line-Line)	50pF
Cut-off Frequency	f_G	30MHz

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	IP20 (built-in)
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715	35 mm DIN Rail

Order Information

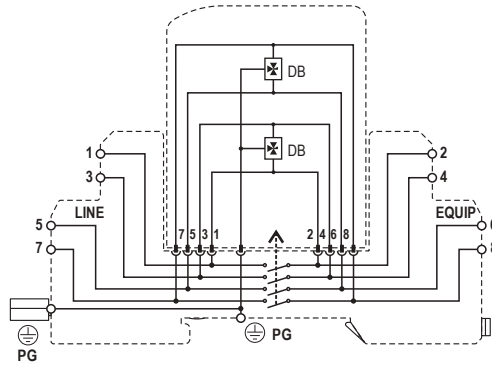
Order Code	30
SLL-4-xx	7082.92
SLL-4-xxQ (Quick Connect Terminals)	7085.27
SLL-4-xxM (module)	7082.93

RayDat SLL-4 Series

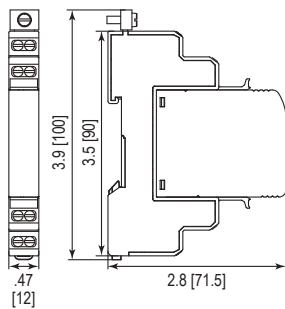
Internal Configuration

Legend

- DB Diode Block
- PG Protective Grounding



Dimensions & Packaging

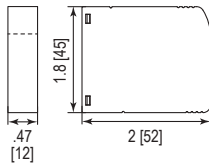


SLL-4 Series

30

Dimensions

Weight per Unit	1.97 oz [56 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



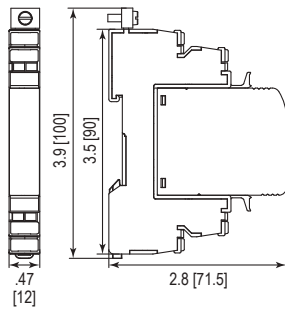
SLL-4-xxM Series

30

Dimensions

Weight per Unit	.77 oz [22 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



SLL-4-xxQ Series

30

Dimensions

Weight per Unit	2.04 oz [58 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



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

SPD with Separated Signal Ground (RS 232)

RayDat SGH-3 Series

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3

Mode of Protection: Longitudinal, Transverse

Coarse Protection: 3 Terminal GDT

Voltages: 5, 12, 15, 24, 30, 48, 60, 110V DC

Frequency Range: 30MHz

Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA

Series Load Current: 1A

Enclosure: DIN 43880 2/3TE, DIN Rail Mount

Terminals: Stranded to 4 mm²

Housing: Modular Design

Compliance: IEC/EN 61643-21

The RayDAT SGH-3 Series of surge protective devices has been developed to protect against the effects of induced voltages onto data, signal and communication circuits.

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

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

Coarse protection is provided by a three terminal gas discharge

tube while fine protection is provided using a high speed silicon avalanche 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

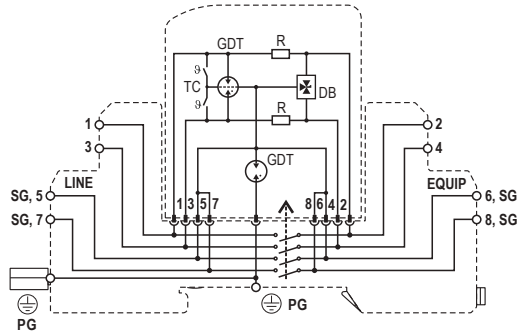
SGH-3 Series		5	12	15	24	30	48	60	110
Electrical									
Lines Protected		1 (2 Conductors)							
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V	110V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated Load Current at 25°C	I_L	1 A							
C2 Nominal Discharge Current (8/20µs)	I_n	10 kA							
Maximum Discharge Current (8/20µs)	I_{max}	20 kA							
D1 Impulse Current (10/350µs)	I_{imp}	2.5 kA							
Residual Voltage at 5kA (8/20µs)	(Line-Line) U_{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V	<450V
Rated Spark Overvoltage	(SG-Ground)	184-276V							
	(Line-Line), (Line-SG)	7-10V	16-19V	20-24V	30-36V	35-43V	55-68V	67-85V	184-264V
Response Time Overvoltage Protection	(Line-Line) t_A	< 1 ns							
	(Line-Ground)	< 100 ns							
Insulation Resistance of the Protection	(Line-Line) R_{iso}	> 1 GΩ/100V							
	(Line-Ground)	≥ 6 KΩ	≥ 15 MΩ	≥ 18 MΩ	≥ 28 MΩ	≥ 33 MΩ	≥ 52 MΩ	≥ 64 MΩ	≥ 170 MΩ
Serial Resistance per Path	R	1.6-2.0Ω							
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		5	12	15	24	30	48	60	110
SGH-3-xxx		7086.61	7086.62	7086.63	7086.64	7086.65	7086.66	7086.67	7086.68
SGH-3-xxxM (module)		7086.69	7086.70	7086.71	7086.72	7086.73	7086.74	7086.75	7086.76

RayDat SGH-3 Series

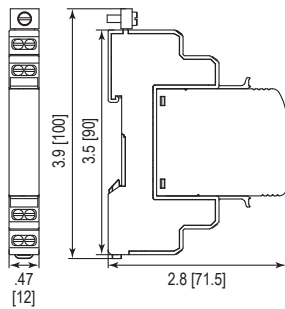
Internal Configuration

Legend

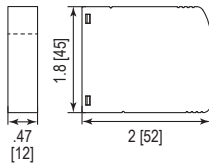
- DB Diode Block
- GDT Gas Discharge Tube
- R Resistor
- PG Protective Grounding
- SG Signal Grounding
- TC Thermo-clip



Dimensions & Packaging



SGH-3 Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	2.11 oz [60 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							



SGH-3-xxxM Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	.91 oz [26 g]							
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]							
Minimum Package Quantity	15 pieces							

SPD for Two Pair Exposed Lines

RayDat SUI-4 Series

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Voltages: 5, 12, 15, 24, 30, 48, 60, 110V DC
 Frequency Range: 30MHz
 Surge Discharge Ratings: I_n : 20kA, I_{max} : 30kA, I_{imp} : 5kA
 Series Load Current: 1A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21

The RayDat SUI-4 Series provides the same electrical performance as the SLH-4 Series but with a greater surge withstand level or impulse current 10kA, 5kA 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 is used to ensure energy coordination between the coarse and fine protection stages irrespective of the magnitude of the incident surge. When power frequency contact occurs between power and communication lines, the hazard of electric shock and fire is increased. To prevent such risk, a thermo-clip is included in the primary protection stage of this device 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 Data

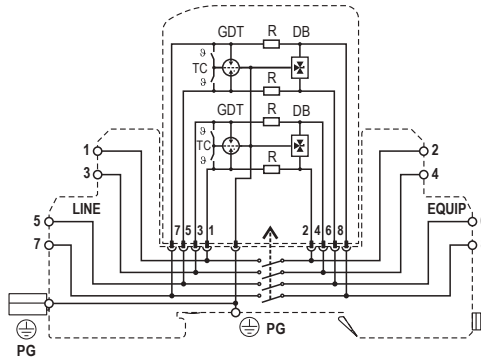
SUI-4 Series		5	12	15	24	30	48	60	110
Electrical									
Lines Protected		2 (4 Conductors)							
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V	110V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated Load Current at 25°C	I_L	1 A							
C2 Nominal Discharge Current (8/20 μ s)	I_n	20kA							
Maximum Discharge Current (8/20 μ s)	I_{max}	30kA							
D1 Impulse Current (10/350 μ s)	I_{imp}	5kA							
Residual Voltage at 5kA (8/20 μ s)	U_{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V	<450V
Rated Spark Overvoltage	(Line-Ground)	7-10V	16-21V	21-25V	31-37V	36-44V	57-69V	68-84V	184-264V
	(Line-Line)	7-10V	16-21V	21-25V	31-37V	36-44V	57-69V	68-84V	184-264V
Response Time Overvoltage Protection	t_A	< 1 ns							
Thermal Protection		Yes							
Insulation Resistance of the Protection	R_{iso}	$\geq 6 K\Omega$	$\geq 15 M\Omega$	$\geq 18 M\Omega$	$\geq 28 M\Omega$	$\geq 33 M\Omega$	$\geq 52 M\Omega$	$\geq 64 M\Omega$	$\geq 170 M\Omega$
Serial Resistance per Path	R	1.6-2.0 Ω							
Transverse Capacitance	C	50pF							
Cut-off Frequency	f_G	30MHz							
Mechanical									
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]							
Terminal Cross Section Multi-strand (max.)		12 AWG [4 mm ²]							
Terminal Screw Torque		4.5 lbf-in [0.5Nm]							
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		5	12	15	24	30	48	60	110
SUI-4-xxx		7083.21	7083.22	7083.23	7083.24	7083.25	7083.26	7083.27	7083.28
SUI-4-xxxM (module)		7083.29	7083.30	7083.31	7083.32	7083.33	7083.34	7083.35	7083.36

RayDat SUI-4 Series

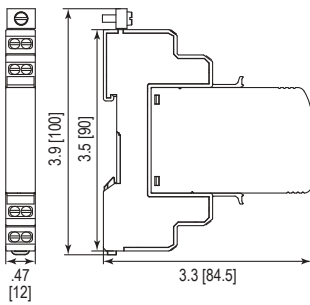
Internal Configuration

Legend

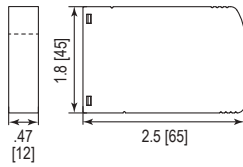
- DB Diode Block
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor
- TC Thermo-clip



Dimensions & Packaging



SUI-4 Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	2.46 oz [70 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							



SUI-4-xxxM Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	1.05 oz [30 g]							
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]							
Minimum Package Quantity	15 pieces							

Compact SPD for Single Pair RayDat SCH-2 Series

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Coarse Protection: 3 Terminal GDT
 Voltages: 5, 12, 15, 24, 30, 48, 60, 110V DC
 Frequency Range: Up to 35MHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
 Series Load Current: 1A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Compact Design
 Compliance: IEC/EN 61643-21

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

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

capacitive line loading and thereby ensuring a low insertion loss and wide operating frequency range.

Care is taken to ensure energy coordination between the coarse and a fine protection stages at all levels of the incident surge. When power frequency contact occurs between power and communication lines, the hazard of electric shock and fire is increased. To prevent such risk, a thermo-clip is included in the primary protection stage of this device to divert the power frequency current to ground.

Technical Data

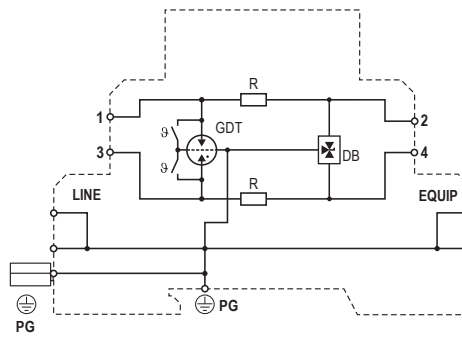
SCH-2 Series		5	12	15	24	30	48	60	110
Electrical									
Lines Protected		1 (2 Conductors)							
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V	110V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated Load Current at 25°C	I_L	1A							
C2 Nominal Discharge Current (8/20µs)	I_n	10kA							
Maximum Discharge Current (8/20µs)	I_{max}	20kA							
D1 Impulse Current (10/350µs)	I_{imp}	2.5kA							
Residual Voltage at 5kA (8/20µs)	U_{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V	<450V
Rated Spark Overvoltage	(Line-Ground)	7-10V	16-21V	20-24V	30-36V	35-43V	55-68V	67-86V	184-264V
	(Line-Line)	7-10V	16-21V	20-24V	30-36V	35-43V	55-68V	67-86V	184-264V
Response Time Overvoltage Protection	t_A	<1 ns							<25 ns
Thermal Protection		Yes							
Insulation Resistance of the Protection	R_{iso}	≥ 6KΩ	≥ 15MΩ	≥ 18MΩ	≥ 28MΩ	≥ 33MΩ	≥ 52MΩ	≥ 64MΩ	≥ 170MΩ
Serial Resistance per Path	R	1cca. 1.0Ω							
Transverse Capacitance	C	30pF							150pF
Cut-off Frequency	f_G	35MHz							10MHz
Mechanical									
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]							
Terminal Cross Section Multi-strand (max.)		12 AWG [4 mm ²]							
Terminal Screw Torque		4.5 lbf-in [0.5Nm]							
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		5	12	15	24	30	48	60	110
SCH-2-xxx		7070.09	7070.10	7070.11	7070.12	7070.13	7070.14	7070.15	7070.16

RayDat SCH-2 Series

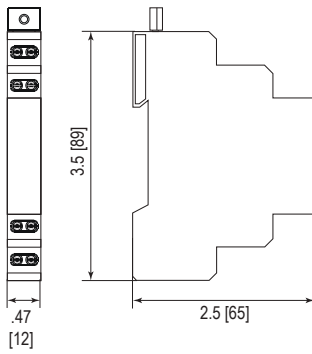
Internal Configuration

Legend

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



Dimensions & Packaging



SCH-2 Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	1.90 oz [54 g]							
Dimensions DIN 43880	2/3 TE							
Packaging Dimensions (Single Unit)	2.8 x .62 x 4.3" [70 x 16 x 110mm]							
Minimum Package Quantity	15 pieces							

Compact SPD for Two Pair RayDat SCH-4 Series

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Coarse Protection: 3 Terminal GDT
 Voltages: 5, 12, 15, 24, 30, 48, 60, 110V DC
 Frequency Range: Up to 5MHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 5kA
 Series Load Current: 0.8A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Compact Design
 Compliance: IEC/EN 61643-21

Like the RayDat SCH-2 Series, the SCH-4 provides the same level of protection but in a compact enclosure which can provide protection to two independent circuits pairs. A number of protection

voltages are available to ensure the user is able to select the closest clamping voltage to the normal signal operation of the equipment being protected.

Technical Data

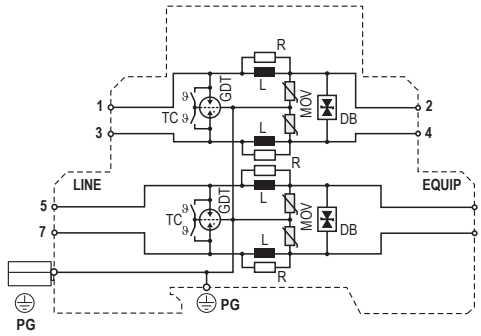
SCH-4 Series		5	12	15	24	30	48	60	110
Electrical									
Lines Protected		2 (4 Conductors)							
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V	110V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V	170V
Rated Load Current at 25°C	I_L	0.8A							
C2 Nominal Discharge 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}	<22V	<42V	<48V	<70V	<80V	<140V	<160V	<450V
Rated Spark Overvoltage	(Line-Ground)	7-10V	16-21V	20-24V	30-36V	35-43V	55-68V	67-86V	184-264V
	(Line-Line)	7-10V	16-21V	20-24V	30-36V	35-43V	55-68V	67-86V	184-264V
Response Time Overvoltage Protection	t_A	< 1 ns							
Thermal Protection		Yes							
Insulation Resistance of the Protection	R_{iso}	≥ 6 KΩ	≥ 15 MΩ	≥ 18 MΩ	≥ 28 MΩ	≥ 33 MΩ	≥ 52 MΩ	≥ 64 MΩ	≥ 170 MΩ
Serial Resistance per Path	R	0.5Ω							
Transverse Capacitance	C	500pF						250pF	
Cut-off Frequency	f_G	3MHz						5MHz	
Mechanical									
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]							
Terminal Cross Section Multi-strand (max.)		12 AWG [4 mm ²]							
Terminal Screw Torque		4.5 lbf-in [0.5Nm]							
Degree of Protection IEC/EN 60529		IP20 (built-in)							
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0							
Mounting IEC/EN 60715		35mm DIN Rail							
Order Information									
Order Code		5	12	15	24	30	48	60	110
SCH-4-xxx		7072.09	7072.10	7072.11	7072.12	7072.13	7072.14	7072.15	7072.16

RayDat SCH-4 Series

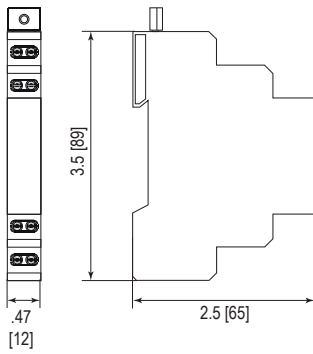
Internal Configuration

Legend

- DB Diode Block
- GDT Gas Discharge Tube
- L Inductor
- MOV Metal Oxide Varistor
- PG Protective Grounding
- R Resistor
- TC Thermo-clip



Dimensions & Packaging



SCH-4 Series	5	12	15	24	30	48	60	110
Dimensions								
Weight per Unit	2.25 oz [64 g]							
Dimensions DIN 43880	2/3 TE							
Packaging Dimensions (Single Unit)	2.8 x .62 x 4.3" [70 x 16 x 110mm]							
Minimum Package Quantity	15 pieces							

SPD with Single Protection Mode

RayDat SUR-2 Series

D1 • C1 • C2 • C3



IEC/EN Category:	D1/C1/C2/C3
Mode of Protection:	Longitudinal, Transverse
Coarse Protection:	3 Terminal GDT
Voltage:	110V DC
Maximum Operating Voltage:	170V DC
Serial Resistance per Path:	9-11 Ω
Frequency Range:	16MHz
Surge Discharge Ratings:	I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
Series Load Current:	300mA
Enclosure:	DIN 43880 2/3 TE, DIN Rail Mount
Terminals:	Stranded to 4 mm ²
Housing:	Modular Design
Compliance:	IEC/EN 61643-21

The RayDat SUR-2 has been developed as a generic protector for use on data transmission circuits.

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

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

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

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

Technical Data

SUR-2 Series

110

Electrical

Lines Protected		1 (2 Conductors)
Nominal Operating Voltage (DC)	U_n	110V
Maximum Continuous Operating Voltage (DC)	U_c	170V
Rated Load Current at 25°C	I_L	300mA
C2 Nominal Discharge Current (8/20 μ s)	I_n	10kA
Maximum Discharge Current (8/20 μ s)	I_{max}	20kA
D1 Impulse Current (10/350 μ s)	I_{imp}	2.5kA
Residual Voltage at 5kA (8/20 μ s)	U_{res}	< 500V
Rated Spark Overvoltage	(Line-Ground)	184-276V
	(Line-Line)	184-550V
Response Time Overvoltage Protection	t_A	< 100ns
Thermal Protection		Yes
Insulation Resistance of the Protection	R_{iso}	> 1 G Ω
Serial Resistance per Path	R	9-11 Ω
Transverse Capacitance	C	10pF
Cut-off Frequency	f_G	16MHz

Mechanical

Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]
Terminal Cross Section Multi-strand (max.)		12 AWG [4 mm ²]
Terminal Screw Torque		4.5 lbf-in [0.5 Nm]
Degree of Protection IEC/EN 60529		IP20 (built-in)
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715		35 mm DIN Rail

Order Information

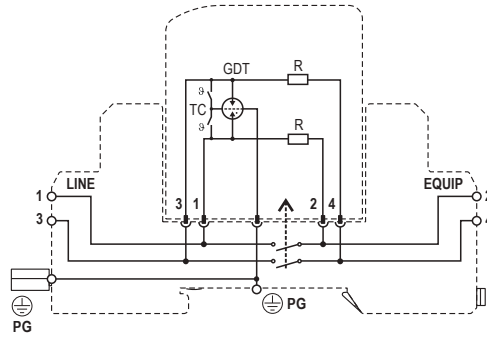
Order Code		110
SUR-2-xxx		7086.77
SUR-2-xxxM (module)		7086.78

RayDat SUR-2 Series

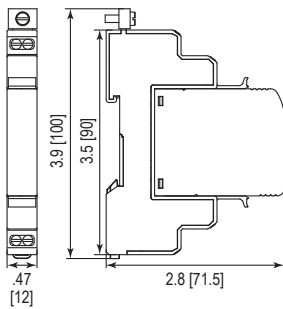
Internal Configuration

Legend

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



Dimensions & Packaging

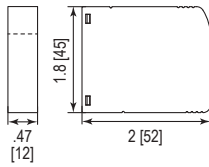


SUR-2 Series

110

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



SUR-2-xxxM Series

110

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

SPD for Two Pair with Single Protection Mode

RayDat SUR-4 Series

D1 • C1 • C2 • C3



IEC/EN Category:	D1/C1/C2/C3
Mode of Protection:	Longitudinal, Transverse
Coarse Protection:	3 Terminal GDT
Voltage:	110V DC
Maximum Operating Voltage:	170V DC
Serial Resistance per Path:	9-11 Ω
Frequency Range:	16MHz
Surge Discharge Ratings:	I_n : 10kA, I_{max} : 20kA, I_{imp} : 5kA
Series Load Current:	300mA
Enclosure:	DIN 43880 2/3 TE, DIN Rail Mount
Terminals:	Stranded to 4 mm ²
Housing:	Modular Design
Compliance:	IEC/EN 61643-21

The RayDat SUR-4 has been developed as a generic protector for use on data transmission circuits.

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

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

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

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

Technical Data

SUR-4 Series

110

Electrical

Lines Protected		2 (4 Conductors)
Nominal Operating Voltage (DC)	U_n	110V
Maximum Continuous Operating Voltage (DC)	U_c	170V
Rated Load Current at 25°C	I_L	300mA
C2 Nominal Discharge Current (8/20 μ s)	I_n	10kA
Maximum Discharge Current (8/20 μ s)	I_{max}	20kA
D1 Impulse Current (10/350 μ s)	I_{imp}	5kA
Residual Voltage at 5kA (8/20 μ s)	U_{res}	< 500V
Rated Spark Overvoltage	(Line-Ground)	184-276V
	(Line-Line)	184-550V
Response Time Overvoltage Protection	t_A	< 100ns
Thermal Protection		Yes
Insulation Resistance of the Protection	R_{iso}	> 1 G Ω
Serial Resistance per Path	R	9-11 Ω
Transverse Capacitance	C	10pF
Cut-off Frequency	f_G	16MHz

Mechanical

Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]
Terminal Cross Section (max.)		12 AWG [4 mm ²]
Terminal Screw Torque		4.5 lbf-in [0.5 Nm]
Degree of Protection IEC/EN 60529		IP20 (built-in)
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715		35 mm DIN Rail

Order Information

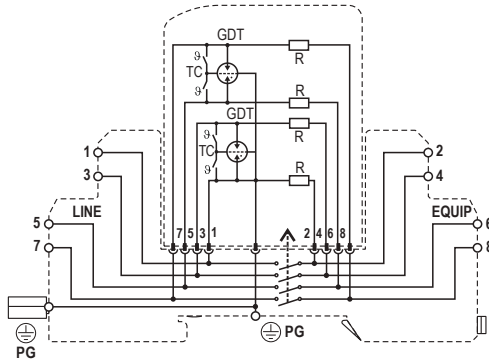
Order Code		110
SUR-4-xxx		7086.79
SUR-4-xxxM (module)		7086.80

RayDat SUR-4 Series

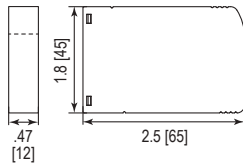
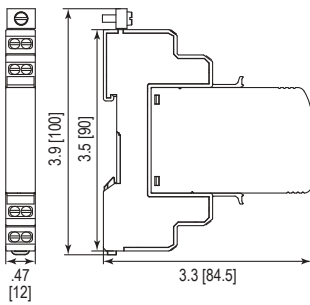
Internal Configuration

Legend

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



Dimensions & Packaging



SUR-4 Series

110

Dimensions

Weight per Unit 2.32 oz [66 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

SUR-4-xxxM Series

110

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

SPD with Single Protection Mode

RayDat SCL-1 Series

C1 • C3



IEC/EN Category: C1/C3
 Mode of Protection: Transverse
 Fine Protection: MOV
 Voltages: 12, 24V DC
 Frequency Range: 0.5 MHz
 Surge Discharge Ratings: I_n : 500 A
 Series Load Current: 10 A
 Enclosure: DIN 43880 1/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Compact Design
 Compliance: IEC/EN 61643-21

The RayDat SCL-1 Series has been developed to protect data transmission circuits or low voltage alarm circuits such as fire or security.

The unit provides fine protection using a MOV.

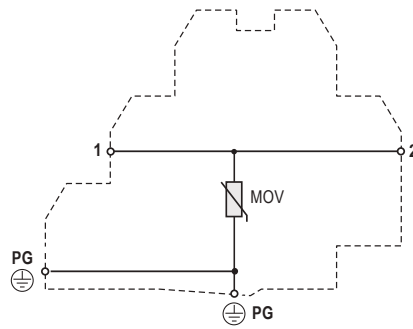
Where necessary, the SCL-1 may be used with a higher energy coarse protection unit such as the SUR-2 110 Series.

Technical Data

SCL-1 Series		12	24
Electrical			
Lines Protected		1 Conductor	
Nominal Operating Voltage (DC)	U_n	12V	24V
Maximum Continuous Operating Voltage (DC)	U_c	22V	38V
Rated Load Current at 25°C	I_L	10 A	
C1 Nominal Discharge Current (8/20 μs)	I_n	500 A	
Residual Voltage at I_n (8/20 μs)	U_{res}	<48V	<87V
Rated Spark Overvoltage		24-30V	42-52V
Response Time Overvoltage Protection	t_A	<25 ns	
Insulation Resistance of the Protection	R_{iso}	≥ 1.5 MΩ	≥ 3.0 MΩ
Serial Resistance per Path	R	<0.1 Ω	
Transverse Capacitance	C	<10 nF	<6.0 nF
Cut-off Frequency	f_G	0.5 MHz	
Mechanical			
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]	
Terminal Cross Section (max.)		Stranded to 12 AWG [4 mm ²]	
Terminal Screw Torque		4.5 lbf-in [0.5 Nm]	
Degree of Protection IEC/EN 60529		IP20 (built-in)	
Housing Material		Thermoplastic; Beige; Extinguishing Degree V-0	
Mounting IEC/EN 60715		35 mm DIN Rail	
Order Information			
Order Code		12	24
SCL-1-xx		704 552	704 553

RayDat SCL-1 Series

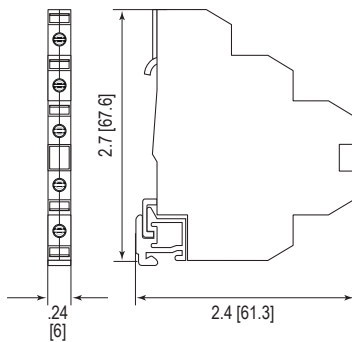
Internal Configuration



Legend

MOV Metal Oxide Varistor
PG Protective Grounding

Dimensions & Packaging



SCL-1 Series	12	24
Dimensions		
Weight per Unit	.98 oz [28 g]	
Dimensions DIN 43880	1/3 TE	
Packaging Dimensions (Single Unit)	3.5 x 5.9 x .3" [90 x 150 x 8 mm]	
Minimum Package Quantity	40 pieces	

SPD with Single Protection Mode

RayDat SCL-2 Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3 (see Technical Data)
 Mode of Protection: Transverse
 Fine Protection: Bi-directional TVS Diode
 Voltages: 5, 12, 24, 60V DC
 Frequency Range: Up to 1.4MHz
 Surge Discharge Ratings: I_n : up to 500A
 Series Load Current: 10A
 Enclosure: DIN 43880 1/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Compact Design
 Compliance: IEC/EN 61643-21

The RayDat SCL-2 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.

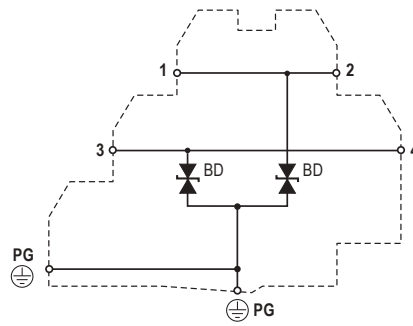
Where necessary, the SCL-2 may be used with a higher energy coarse protection unit such as the SUR-2-110 series.

Technical Data

SCL-2 Series		5	12	24	60
Electrical					
Type per IEC/EN 61643-21		C1/C2/C3	C1/C3	C1/C3	C3
Lines Protected		1 (2 Conductors)			
Nominal Operating Voltage (DC)	U_n	5V	15V	24V	60V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	28V	64V
Rated Load Current at 25°C	I_L	10A			
Nominal Discharge Current (8/20 μ s)	I_n	500A	500A	250A	100A
Residual Voltage at I_n (8/20 μ s)	U_{res}	<20V	<39V	<65V	<150V
Rated Spark Overvoltage	(Line-Ground)	8-10V	15-19V	30-36V	67-85V
	(Line-Line)	16-20V	30-38V	60-72V	134-170V
Response Time Overvoltage Protection	t_A	< 1 ns			
Insulation Resistance of the Protection	R_{iso}	$\geq 6 K\Omega$	$\geq 15 M\Omega$	$\geq 28 M\Omega$	$\geq 64 M\Omega$
Serial Resistance per Path	R	<0.1 Ω			
Transverse Capacitance	C	<7.0 nF	<3.0 nF	<1.0 nF	<0.5 nF
Cut-off Frequency	f_G	0.6MHz	0.9MHz	1.4MHz	3MHz
Mechanical					
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]			
Terminal Cross Section Multi-strand (max.)		Stranded to 12 AWG [4 mm ²]			
Terminal Screw Torque		4.5 lbf-in [0.5Nm]			
Degree of Protection IEC/EN 60529		IP 20 (built-in)			
Housing Material		Thermoplastic; Beige; Extinguishing Degree V-0			
Mounting IEC/EN 60715		35mm DIN Rail			
Order Information					
Order Code		5	12	24	60
SCL-2-xx		7045.16	7045.17	7045.18	7045.19

RayDat SCL-2 Series

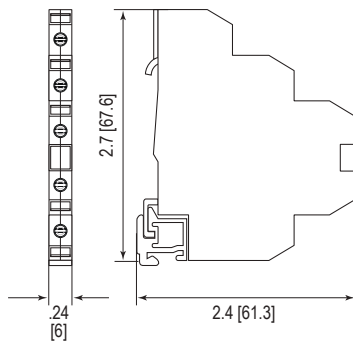
Internal Configuration



Legend

BD Bi-directional TVS Diode
PG Protective Grounding

Dimensions & Packaging



SCL-2 Series	5	12	24	60
Dimensions				
Weight per Unit		.91 oz [26g]		
Dimensions DIN 43880		1/3 TE		
Packaging Dimensions (Single Unit)		3.5 x 5.9 x .3" [90 x 150 x 8mm]		
Minimum Package Quantity		40 pieces		

SPD for DC Power Supply & Data

RayDat SUH-2 PS

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Coarse Protection: 3 Terminal GDT (Data Line)
 MOVs (PS Line)

Voltages: 24V DC (Data Line)
 24V AC (Power Line)

Frequency Range: 30MHz

Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA

Series Load Current: 1A (Data Line), 3A (PS Line)

Enclosure: DIN 43880 2/3 TE, DIN Rail Mount

Terminals: Stranded to 4 mm²

Housing: Modular Design

Compliance: IEC/EN 61643-21

The RayDat SUH-2 PS Series has been developed for protection of systems with one supply and one signal line (CAN bus, DeviceNet,...).

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

The signal line circuit is designed to minimize inter-capacitance, and shunt capacitance, thereby maximizing the operating frequency to 30 MHz.

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

Technical Data

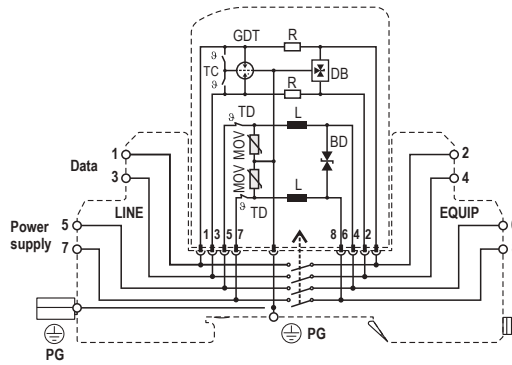
SUH-2 PS		Data Line	Power Supply Line
Electrical			
Lines Protected		2 (1 Data Line + 1 Power Supply Line)	
Nominal Operating Voltage (DC)	U_n	24V	24V AC/30V DC
Maximum Continuous Operating Voltage (DC)	U_c	28V	28V AC/40V DC
Rated Load Current at 25°C	I_L	1 A	3 A
C2 Nominal Discharge Current (8/20 μs)	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
Residual Voltage at 5kA (8/20 μs)	U_{res}	<70V	<100V
Rated Spark Overvoltage	(Line-Ground)	31-37V	90-110V
	(Line-Line)	31-37V	42-52V
Response Time Overvoltage Protection	t_A		< 1 ns
Insulation Resistance of the Protection	R_{iso}	≥ 28 MΩ	≥ 40 MΩ
Serial Resistance per Path	R	1.6-2.0 Ω	<0.2 Ω
Serial Inductivity	L		15 μH
Transverse Capacitance	C	50 pF	6.0 nF
Cut-off Frequency	f_G	30 MHz	1 kHz
Mechanical			
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]	
Terminal Cross Section Multi-strand (max.)		12 AWG [4 mm ²]	
Terminal Screw Torque		4.5 lbf-in [0.5 Nm]	
Degree of Protection IEC/EN 60529		IP20 (built-in)	
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0	
Mounting IEC/EN 60715		35 mm DIN Rail	
Order Information			
Order Code		24	
SUH-2-xxPS		7086.81	
SUH-2-xxPSM (module)		7086.82	

RayDat SUH-2 PS

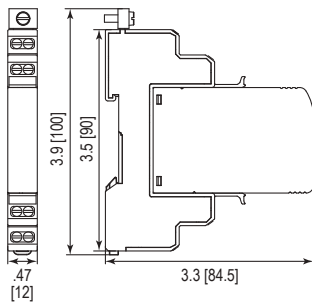
Internal Configuration

Legend

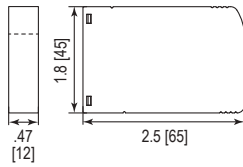
- BD Bi-directional TVS Diode
- DB Diode Block
- GDT Gas Discharge Tube
- L Inductor
- MOV Metal Oxide Varistor
- PG Protective Grounding
- R Resistor
- TC Thermo-clip
- TD Thermal Disconnecter



Dimensions & Packaging



SUH-2-xxPS	24
Dimensions	
Weight per Unit	2.53 oz [72 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



SUH-2-xxPSM	24
Dimensions	
Weight per Unit	1.19 oz [34 g]
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]
Minimum Package Quantity	15 pieces

SPD with Visual Indication

RayDat SRH-2L Series

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Voltages: 5, 12, 24, 30V DC
 Frequency Range: 30MHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA, I_{imp} : 2.5kA
 Series Load Current: 1 A
 Enclosure: DIN 43880 2/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21

The RayDat SRH-2L Series provides the same level of protection and technical performance as the SLH-2L Series, but also provides visual LED indication. If the unit fails, the LED is lighted.

Note: device must be properly connected to RayDat PSU-14 unit. 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 is used to ensure energy co-ordination between the coarse and fine protection stages irrespective of the magnitude of the incident surge. When power frequency contact occurs between power and communication lines, the hazard of electric shock and fire is increased. To prevent such risk, a thermo-clip is included in the primary protection stage of this device 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 Data

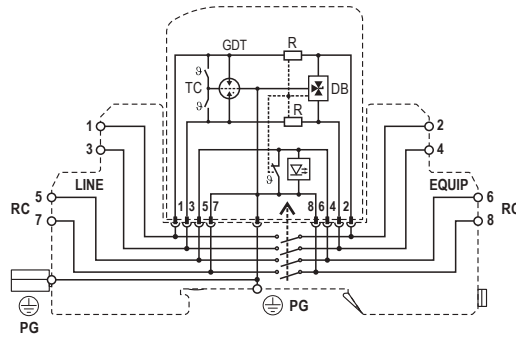
SRH-2L Series		5	12	24	30
Electrical					
Lines Protected		1 (2 Conductors)			
Nominal Operating Voltage (DC)	U_n	5V	12V	24V	30V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	28V	33V
Rated Load Current at 25°C	I_L	1 A			
C2 Nominal Discharge Current (8/20µs)	I_n	10kA			
Maximum Discharge Current (8/20µs)	I_{max}	20kA			
D1 Impulse Current (10/350µs)	I_{imp}	2.5kA			
Residual Voltage at 5kA (8/20µs)	U_{res}	<22V	<42V	<70V	<80V
Rated Spark Overvoltage	(Line-Ground)	7-10V	16-21V	31-37V	36-44V
	(Line-Line)	7-10V	16-21V	31-37V	36-44V
Response Time Overvoltage Protection	t_A	< 1 ns			
Thermal Protection		Yes			
Insulation Resistance of the Protection	R_{iso}	≥ 6 KΩ	≥ 15 MΩ	≥ 28 MΩ	≥ 33 MΩ
Serial Resistance per Path	R	1.6-2.0Ω			
Transverse Capacitance	C	50pF			
Cut-off Frequency	f_G	30MHz			
Mechanical					
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]			
Terminal Cross Section Multi-strand (max.)		12 AWG [4 mm ²]			
Terminal Screw Torque		4.42 lbf-in [0.5 Nm]			
Degree of Protection IEC/EN 60529		IP20 (built-in)			
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0			
Mounting IEC/EN 60715		35mm DIN Rail			
Remote Contacts Ratings		AC 250V/0.5A, DC 50V/1 A			
Order Information					
Order Code		5	12	24	30
SRH-2-xxxL		7085.44	7085.46	7085.48	7085.42
SRH-2-xxxLM (module)		7085.45	7085.47	7085.49	7085.43
SRH-2-xxxLQ		7085.56	7085.58	7085.60	7085.62

RayDat SRH-2L Series

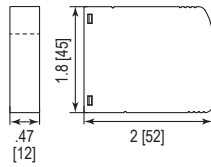
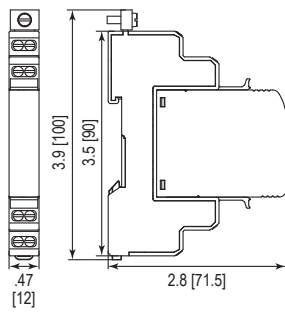
Internal Configuration

Legend

- DB Diode Block
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor
- RC Remote Control (NC)
- TC Thermo-clip



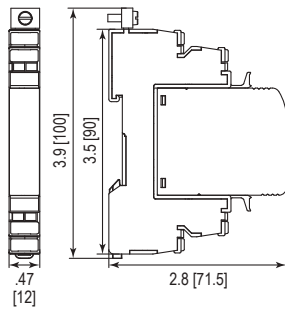
Dimensions & Packaging



SRH-2L Series	5	12	24	30
Dimensions				
Weight per Unit	2.04 oz [58 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			

SRH-2-xxxLM Series	5	12	24	30
Dimensions				
Weight per Unit	.85 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



SRH-2LQ Series	5	12	24	30
Dimensions				
Weight per Unit	2.11 oz [60 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			



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

SPD with Visual Indication
RayDat SRH-2L Accessories
 D1 • C1 • C2 • C3

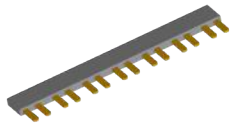
RayDat PSU-14



RayDat PSU-14 127 621

Electrical		
Input Voltage	U_{out}	21.5V DC ... 28V DC
Output Voltage		max. 28V DC
Output Current	I_{out}	2x2mA
Input Terminals		3 (+), 1 (-)

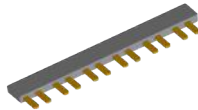
RayDat PSU-PB-7P



RayDat PSU-PB-7P 127 622

Electrical	
Number of Poles	7

RayDat PSU-PB-6P



RayDat PSU-PB-6P 127 623

Electrical	
Number of Poles	6

Surge Protective Devices (SPDs) for Explosive Environments



The RayDat 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.

RayDat Ex-2
RayDAT PLP Ex
RayDAT PLP2 Ex
RayDAT PLP-24/5 Ex
RayDAT PLP3L Ex



SPD for Explosive Environments

RayDat Ex-2 Series

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Coarse Protection: 3 Terminal GDT
 Voltages: 12, 24V DC
 Maximum Operating Voltage: U_c : 15, 28VDC
 Frequency Range: 3MHz
 Surge Discharge Ratings: I_n : 5kA, I_{max} : 10kA, I_{imp} : 1kA
 Series Load Current: 500mA
 Enclosure: DIN 43880 1/3TE, DIN Rail Mount
 Terminals: Stranded to 4 mm²
 Housing: Modular Design
 Compliance: IEC/EN 61643-21



The RayDat Ex-2 Series is intended to provide protection to low voltage signal and data circuits located in potentially explosive environments.

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

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

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

Technical Data

Ex-2 Series

12

24

Type

Intrinsic Safety Parameters

Input Power P_i	Temperature Class	Maximum Ambient
$P_i=1W$	T6	50 °C
$P_i=1.3W$	T5	55 °C
$P_i=2W$	T4	60 °C

$$U_o = U_i$$

$$I_o = I_i$$

$$P_o = P_i$$

Explosion Protected	II 1G Ex ia IIC T* Ga (-40 °C ≤ Ta ≤ *°C)	
Maximum Input Voltage	U_i	16V / 29V
Maximum Input Current	I_i	500 mA
Maximum Input Power	P_i	2W
Maximum Internal Capacitance	C_i	10 nF
Maximum Internal Inductance	L_i	0.11 mH
Number of Protected Pairs	1 (2 Conductors)	

Electrical

Nominal Operating Voltage (DC)	U_n	12V	24V
Maximum Continuous Operating Voltage (DC)	U_c	15V	28V
Rated Load Current at 25°C	I_L	500 mA	
Nominal Discharge Current (8/20 μs)	I_n	5 kA	
Maximum Discharge Current (8/20 μs)	I_{max}	10 kA	
D1 Impulse Current (10/350 μs)	I_{imp}	1 kA	
Residual Voltage at 5kA (8/20 μs)	U_{res}	< 145V	
Rated Spark Overvoltage	(Line-Line)	16-21V	31-37V
	(Line-Ground)	584-876V	
Response Time Overvoltage Protection	t_A	< 1 ns	
Insulation Resistance at U_c	R_{iso}	≥ 15 MΩ	≥ 28 MΩ
Insulation Resistance at 500VDC	(Line-Ground)	> 1 GΩ	
Serial Resistance per Path	R	< 1 Ω	
Transverse Capacitance	C	< 10 pF	
Cut-off Frequency	f_G	3 MHz	

Mechanical

Terminal Cross Section Multi-strand (max.)	12 AWG [4 mm ²]		
Terminal Screw Torque	4.5 lbf-in [0.5 Nm]		
Degree of Protection IEC/EN 60529	IP20 (built-in)		
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0		
Mounting IEC/EN 60715	35 mm DIN Rail		

Order Information

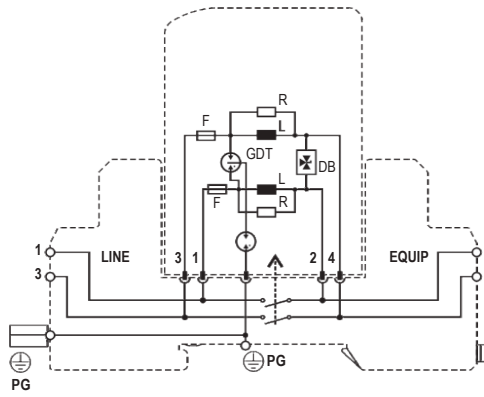
Order Code	12	24
Ex-2-xx	704 120	704 121

RayDat EX-2 Series

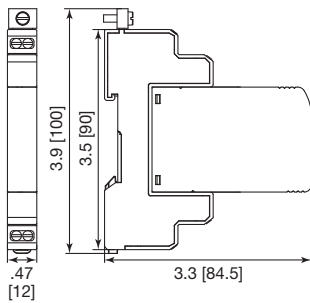
Internal Configuration

Legend

- DB Diode Block
- F Fuse
- GDT Gas Discharge Tube
- L Inductor
- PG Protective Grounding
- R Resistor



Dimensions & Packaging

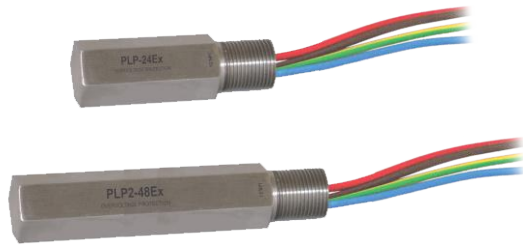


Ex-2 Series	12	24
Dimensions		
Weight per Unit	3.10 oz [88 g]	
Dimensions DIN 43880	2/3 TE	
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]	
Minimum Package Quantity	15 pieces	

SPD for Explosive Environments

RayDat PLP Ex Series

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Mode of Protection: Longitudinal, Transverse
 Coarse Protection: 3 Terminal GDT
 Voltages: 24, 48, 24/5 V DC
 Maximum Operating Voltage: U_c : 33, 54, 33/7.5 VDC
 Frequency Range: 30 MHz
 Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA, I_{imp} : 2.0 kA
 Enclosure: Stainless Steel IP67
 Terminals: Connecting Cables 1 mm², 250 mm length
 Housing: In-line 1/2" Conduit Fitting
 Compliance: IEC/EN 61643-21



The RayDat PLP Ex Series is intended to provide protection to low voltage signal and data circuits located in potentially explosive environments.

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

The circuit consists of a multi-stage protector providing both

common (longitudinal) mode and differential (transverse) mode protection.

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

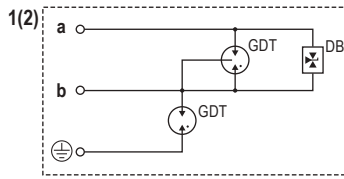
Technical Data

PLPEx	PLP-24Ex	PLP2-24Ex	PLP2-48Ex	PLP 24/5Ex	PLP3L-24Ex	
Type						
Intrinsic Safety Parameters						
IEC Type Examination Certificate	Baseefa	Baseefa 14ATEX0364X Ex II 1GD Ex ia IIC T6 Ga (-30 °C ≤ Ta ≤ 50 °C)				
	IEC	IECEx BAS 15.0012X Ex ia IIIC T85 °C Da (-30 °C ≤ Ta ≤ 50 °C)				
Maximum Input Voltage	U_i	50V				
Maximum Input Current	I_i	800 mA				
Maximum Input Power	P_i	2W				
Maximum Internal Inductance	L_i	60 μH				
Electrical						
Nominal Operating Voltage (DC)	U_n	24V	24V	48V	24V/5V	24V
Maximum Continuous Operating Voltage (DC)	U_c	33V	33V	54V	33V/7.5V	33V
Rated Spark Overvoltage	(Line-Ground)	584-864V	584-864V	584-864V	584-864V	584-864V
	(Line-Line)	36-44V	36-44V	58-68V	36-44V, 9-13V	36-44V
Total Nominal Discharge Current (8/20 μs)	I_n	5 kA	10 kA	10 kA	10 kA	7.5 kA
Total Discharge Current (8/20 μs)	I_{max}	10 kA	20 kA	20 kA	20 kA	15 kA
Total Impulse Current (10/350 μs)	I_{imp}	1.0 kA	2.0 kA	2.0 kA	2.0 kA	1.5 kA
Residual Voltage at I_{max} (8/20 μs)	(Line-Line) U_{res}	< 1.3 kV	< 1.3 kV	< 1.3 kV	< 1.3 kV	< 1.3 kV
Response Time Overvoltage Protection	t_A	< 1 ns				
Insulation Resistance of the Protection	(Line-Line) R_{iso}	> 32 MΩ	> 32 MΩ	> 32 MΩ	> 32 MΩ/75 kΩ	> 32 MΩ
Insulation Resistance at U (Line-Ground) = 500 VDC	R	> 1 GΩ				
Transverse Capacitance	C	< 30 pF				
Cut-off Frequency	f_G	30 MHz				
Mechanical						
Ambient Temperature Range		-22 °F < Ta < +140 °F [-30 °C < Ta < +60 °C]				
Connection Cables	D × L	17 AWG × 9.8" [1 mm ² × 250 mm]				
Degree of Protection IEC/EN 60529		IP 67				
Housing Material		Stainless Steel				
Dimension	Length	3.07" [78 mm]	4.72" [120 mm]	4.72" [120 mm]	4.72" [120 mm]	4.72" [120 mm]
Order Information						
Order Code		PLP-24Ex	PLP2-24Ex	PLP2-48Ex	PLP 24/5Ex	PLP3L-24Ex
1/2" NPT		127 594	127 600	127 597	127 603	127 606
M20 × 1.5		127 595	127 601	127 598	127 604	127 607
G 1/2" (BSP 1/2 inch)		127 596	127 602	127 599	127 605	127 608

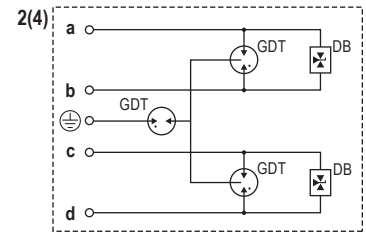
RayDat PLP Ex Series

Internal Configuration

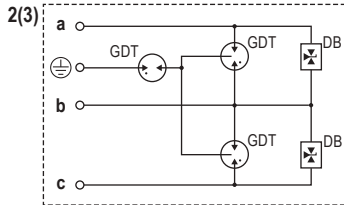
Legend
 DB Diode Block
 GDT Gas Discharge Tube



PLP-24Ex

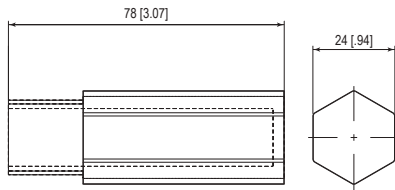


PLP2-xxEx

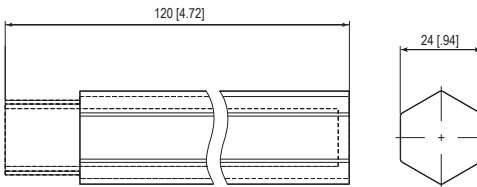


PLP3L-24Ex

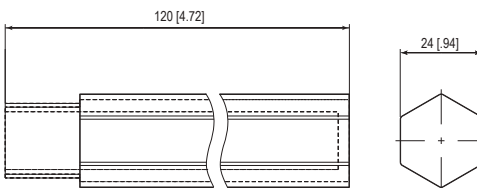
Dimensions & Packaging



PLP-24Ex	PLP-24 Ex 1/2" NPT	PLP-24 Ex M 20 x 1/2"	PLP-24 Ex G 1/2"
Dimensions			
Weight per Unit	5.99 oz [170g]		
Packaging Dimensions (Single Unit)	1.34 x 1.34x 4.25" [34 x 34 x 108mm]		
Minimum Package Quantity	6 pieces		



PLP2-xxEx	PLP2-xx Ex 1/2" NPT	PLP2-xx Ex M 20 x 1/2"	PLP2-xx Ex G 1/2"
Dimensions			
Weight per Unit	10.22 oz [290g]		
Packaging Dimensions (Single Unit)	1.34 x 1.34x 5.43" [34 x 34 x 138mm]		
Minimum Package Quantity	6 pieces		



PLP3L-24Ex	PLP3L-24 Ex 1/2" NPT	PLP3L-24 Ex M 20 x 1/2"	PLP3L-24 Ex G 1/2"
Dimensions			
Weight per Unit	10.22 oz [290g]		
Packaging Dimensions (Single Unit)	1.34 x 1.34x 5.43" [34 x 34 x 138mm]		
Minimum Package Quantity	6 pieces		

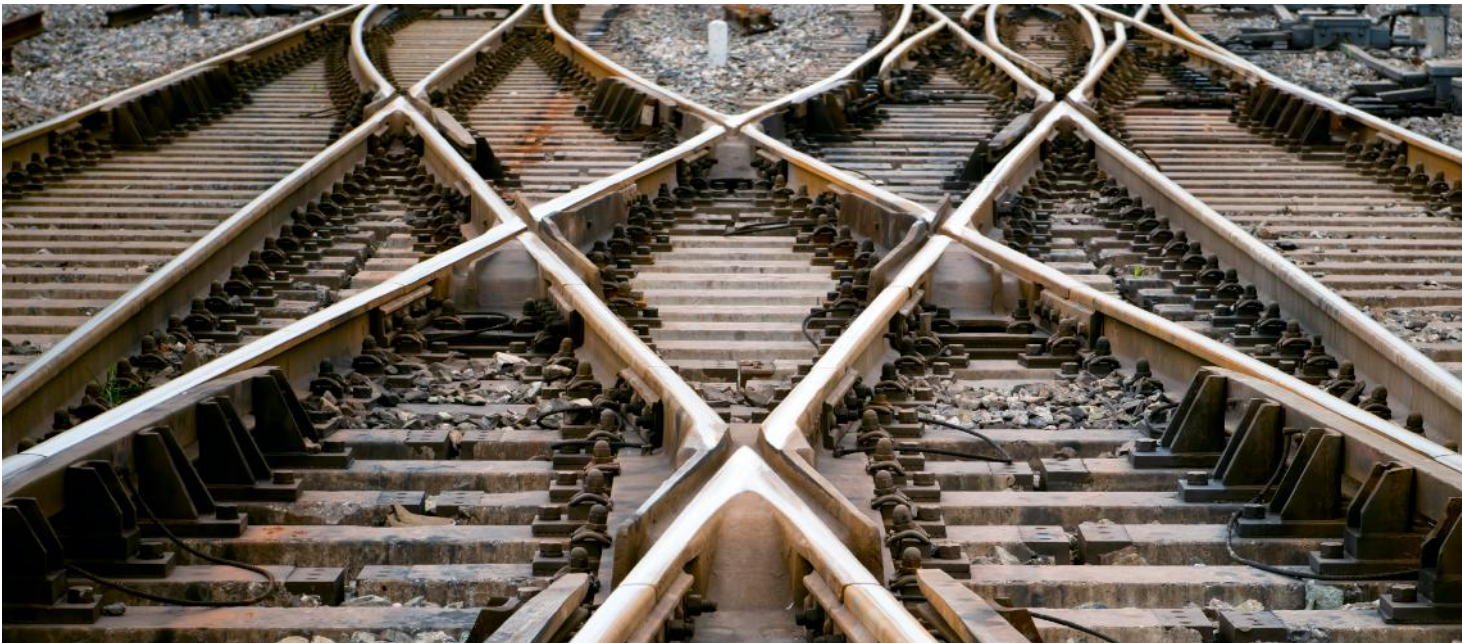


Modular Surge Protective Devices (SPDs) for DC Power Systems



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

Protec DMDR 20
RayDat PSC-2



SPD for DC Power Systems

Protec DMDR 20 Series

Class III



IEC/EN Category: Class III/Type 3
 Mode of Protection: L-PE, N-PE, L-N
 Location of Use: Sub-distribution Boards
 Protection Element: High Energy MOV and GDT
 Voltages: 24, 48, 60, 120V AC
 Surge Discharge Ratings: U_{oc}/I_{cw} = up to 6kV/3kA
 I_{max} = up to 4kA (8/20 μ s)
 Status Indication: Remote Contacts + LED
 Enclosure: DIN 43880 1TE, DIN Rail Mount
 Terminals: Stranded to 6 mm²
 Housing: Modular Design
 Compliance: IEC 61643-11:2011
 EN 61643-11:2012

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

Technical Data

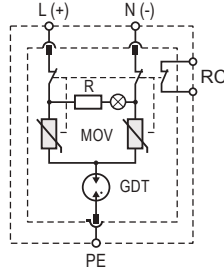
Protec DMDR 20 Series		24	48	60	120	
Electrical						
Nominal AC/DC Voltage	U_o	17V/24V	34V/48V	43V/60V	85V/120V	
Maximum Continuous Operating Voltage (AC/DC)	U_c	24V/34V	48V/60V	60V/75V	120V/150V	
Open Circuit Voltage of the Combination Wave Generator (1.2/50 μ s)	U_{oc}	2.4kV	2.4kV	6kV	6kV	
Short Circuit Current of the Combination Wave Generator (8/20 μ s)	I_{cw}	1.2kA	1.2kA	3kA	3kA	
Maximum Discharge Current (8/20 μ s)	I_{max}	2kA	2kA	4kA	4kA	
Voltage Protection Level	(L - N)	U_p	< 250V	< 500V	< 600V	< 1100V
	(L - PE)/(N - PE)		< 700V	< 800V	< 850V	< 1200V
Response Time of Overvoltage Protection	(L - N)	t_A		< 25 ns		
	(L - PE)/(N - PE)			< 100 ns		
Back-Up Fuse (if mains > 32A)				32 A gG		
Short-Circuit Current Rating (AC)	I_{SCCR}			2 kA		
TOV Withstand 5s (AC)	U_T	115V	148V	163V	225V	
Number of Ports				1		
Mechanical						
Temperature Range	T_a	-40 °F to +158 °F [-40 °C to +70 °C]				
Permissible Humidity	RH	5%...95%				
Terminal Screw Torque	M_{max}	4.5 lbf-in [0.5Nm]				
Conductor Cross Section (max.)		10 AWG (Solid, Stranded) / 12 AWG (Flexible)				
		6 mm ² (Solid, Stranded) / 4 mm ² (Flexible)				
Mounting		35 mm DIN Rail, EN 60715				
Degree Of Protection		IP 20 (built-in)				
Housing Material		Thermoplastic: Extinguishing Degree UL 94 V-0				
Thermal Protection		Yes				
Operating Status Indication		Green LED				
Order Information						
Order Code		24	48	60	120	
Protec DMDR 20/xxx		510 783	510 833	510 834	510 835	
Protec DMDR 20/xxxM (module)		510 784	510 836	510 837	510 838	

Protec DMDR 20 Series

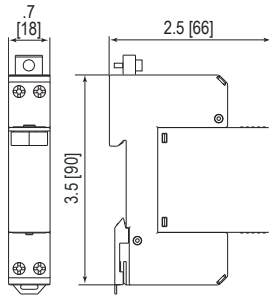
Internal Configuration

Legend

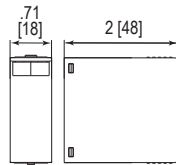
- GDT Gas Discharge Tube
- MOV Metal Oxide Varistor
- PE Ground
- R Resistor
- RC Remote Control (NC)



Dimensions & Packaging



Protec DMDR 20 Series	24	48	60	120
Dimensions				
Weight per Unit	3.38 oz [96 g]			
Dimensions DIN 43880	1 TE			
Packaging Dimensions (Single Unit)	4.2 x 3 x .9" [109 x 77 x 24 mm]			
Minimum Package Quantity	12 pieces			



Protec DMDR 20/xxx M	24	48	60	120
Dimensions				
Weight per Unit	1.12 oz [32 g]			
Packaging Dimensions (Single Unit)	3.8 x 3 x 4.3" [98 x 77 x 110 mm]			
Minimum Package Quantity	12 pieces			



SPD for DC Power Systems with Low Residual Voltage

RayDat PSC-2 Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3

Mode of Protection: Longitudinal, Transverse

Location of Use: DC Power Systems

Coarse Protection: MOV

Voltages: 12, 24, 48V DC

Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA

Serial Inductivity: 10–14 μ H

Series Load Current: 4A

Enclosure: DIN 43880 2/3TE, DIN Rail Mount

Terminals: Stranded to 4 mm²

Housing: Modular Design

Compliance: IEC/EN 61643-21

The RayDat PSC-2 Series has been developed to protect power supplies.

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

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

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

Technical Data

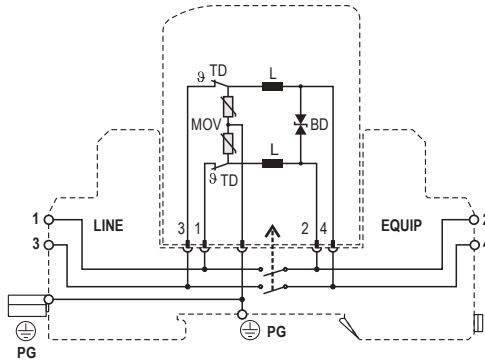
PSC-2 Series		12	24	48
Electrical				
Lines Protected		1 (2 Conductors)		
Nominal Operating Voltage (DC)	U_n	12V	24V	48V
Maximum Continuous Operating Voltage (DC)	U_c	15V	28V	52V
Rated Operating Current at 25 °C	I_L	4A		
C2 Nominal Discharge Current (8/20 μ s)	I_n	10kA		
Maximum Discharge Current (8/20 μ s)	I_{max}	20kA		
Residual Voltage at 5kA (8/20 μ s)	U_{res}	<32V	<60V	<135V
Rated Spark Overvoltage	(1, 3-PG)	90-110V	90-110V	90-110V
	(1, 3)	16-20V	30-36V	57-69V
Response Time Overvoltage Protection	t_A	<1 ns		
Thermal Protection Thermal Disconnection				
Insulation Resistance of the Protection	R_{iso}	$\geq 15M\Omega$	$\geq 28M\Omega$	$\geq 52M\Omega$
Serial Inductance per Path	L	10–14 μ H		
Transverse Capacitance	C	<5nF	<3nF	<1.5nF
Mechanical				
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]		
Terminal Cross Section Multi-strand (max.)		12 AWG [4 mm ²]		
Terminal Screw Torque		4.5 lbf-in [0.5 Nm]		
Degree of Protection IEC/EN 60529		IP20 (built-in)		
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0		
Mounting IEC/EN 60715		35 mm DIN Rail		
Order Information				
Order Code		12	24	48
PSC-2-xx		7086.83	7086.84	7086.85
PSC-2-xxM (module)		7086.86	7086.87	7086.88

RayDat PSC-2 Series

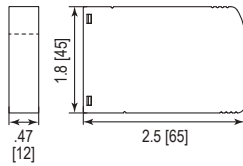
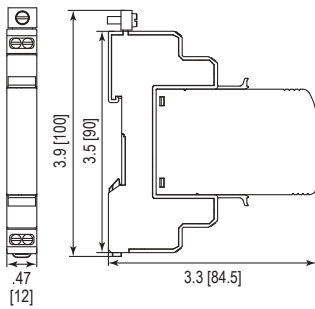
Internal Configuration

Legend

- BD Bi-Directional TVS Diode
- L Inductor
- MOV Metal Oxide Varistor
- PG Protective Ground
- TD Thermal Disconnecter



Dimensions & Packaging



PSC-2 Series	12	24	48
Dimensions			
Weight per Unit	2.25 oz [64 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		

PSC-2-xxM	12	24	48
Dimensions			
Weight per Unit	1.26 oz [36 g]		
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]		
Minimum Package Quantity	15 pieces		





Surge Protective Devices (SPDs) for Local Area Networks (LAN)



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

RayDat NET 5 Series is designed to protect Cat 5 Local Area Networks. They are available in standard, PoE and STP versions.

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

RayDat NET 5 xx-19 Series is designed to protect Cat 5 Local Area Networks. It is available in 8, 16 and 24 line versions.

RayDat NET 6 POE*
RayDat NET 5
RayDat NET 5-19

**UL Listed*



SPD for Category 6 LAN Networks

RayDat NET 6 POE

D1 • C1 • C2 • C3

UL Listed



IEC/EN Category: D1/C1/C2/C3
 Protection: All 4 Pairs
 Voltages: 48V DC
 Maximum Operating Voltage: 50V
 Frequency Range: 250 MHz, up to Cat 6, PoE Compatible
 Surge Discharge Ratings: I_n : 10kA, I_{imp} : 1kA
 Enclosure: UTB In-line Patch, DIN Rail Mount
 Terminals: RJ45, Shielded
 Housing: Compact Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

The RayDat NET 6 POE is intended to protect Local Area Networks (LAN) from overvoltage surges and electrostatic discharges created by switching transients in buildings. LAN systems are particularly prone to such disturbances because long cable lengths often behave like antennas to such atmospheric disturbances.

It provides protection to all 4 lines in the UTP, STP and is Cat 6 capable.

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

Product is designed to fulfill all versions of PoE applications compatible with standards IEEE 802.3af, IEEE 802.3at and IEEE 802.3bt.

Technical Data

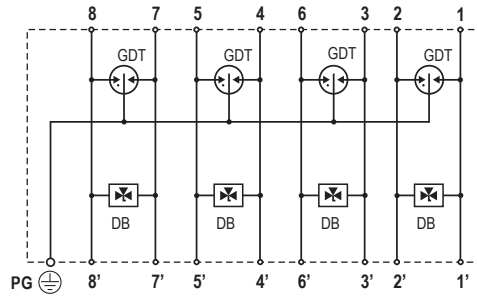
NET 6 POE		48
Electrical		
Number of Protected Pairs		4 Pairs (8 Conductors)
Nominal Operating Voltage (DC)	U_n	48V
Maximum Continuous Operating Voltage (DC)	(Line-Line) U_c	50V
	(Pair-Pair)	72V
Rated Load Current at 25°C	I_L	1 A
Nominal Discharge Current (8/20 μ s)	(Line-Line) I_n	150A
C2 Total Discharge Current (8/20 μ s)	(Lines-Ground) I_n	10kA
D1 Impulse Current (10/350 μ s)	I_{imp}	1 kA
Voltage Protection Level at I_n	(Line-Line) U_p	150V
	(Line-Ground)	550V
Response Time Overvoltage Protection	t_A	< 1 ns
Cut-off Frequency	f_G	250 MHz
Mechanical		
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]
Connection Type		Input/Output: RJ45 Sockets
Degree of Protection IEC/EN 60529		IP 20 (built-in)
Housing Material		Metal
Mounting IEC/EN 60715		35 mm DIN Rail
Order Information		
Order Code		48
NET 6 POE		706 312

RayDat NET 6 POE

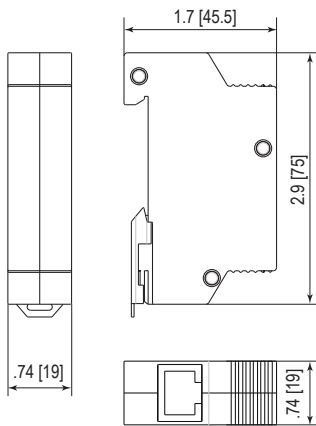
Internal Configuration

Legend

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



Dimensions & Packaging



NET 6 POE

48

Dimensions

Weight per Unit	4.23 oz [120g]
Dimensions DIN 43880	.74" [19mm]
Packaging Dimensions (Single Unit)	3.1 x .91 x 4.3" [78 x 23 x 108mm]
Minimum Package Quantity	12 pieces

SPD for Category 5 LAN Networks

RayDat NET 5 Series



- IEC/EN Category: C1/C2/C3 (see Technical Data)
- Protection: All 4 Pairs
- Voltages: 5, 48V DC
- Maximum Operating Voltage: 6, 58V DC
- Frequency Range: 100MHz, Cat 5, PoE Compatible
- Surge Discharge Ratings: I_n : up to 300A per Line
- Enclosure: UTB In-line Patch
- Termination: RJ45, Cat 5 Connectors
- Housing: Compact Design
- Compliance: IEC/EN 61643-21

The RayDat NET 5 Series is intended to protect Local Area Networks (LAN) from overvoltage surges and electrostatic discharges created by switching transients in buildings. LAN systems are particularly prone to such disturbances because long cable lengths often behave like antennas to such atmospheric disturbances.

It provides protection to all 4 lines in the UTP and is Cat 5 capable. Ground potential equalization between signal and protective network or PC chassis ground is provided. PoE version RayDat NET 5 PoE is designed to fulfill all versions of PoE applications compatible with standards IEEE 802.3af and IEEE 802.3at.

Technical Data

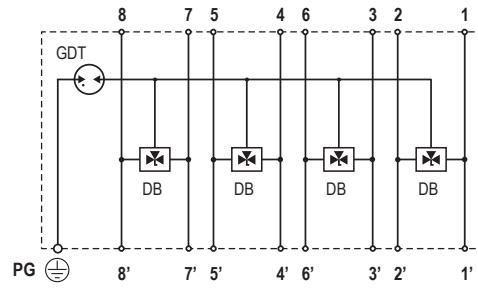
NET 5	NET 5	NET 5 PoE	NET 5 STP		
Electrical					
Type per IEC/EN 61643-21	C1/C2/C3	C1/C3	C1/C2/C3		
Number of Protected Pairs	4 Pairs (8 Conductors)				
Nominal Operating Voltage (DC)	U_n	5V	48V	5V	
Maximum Continuous Operating Voltage (DC)	U_c	6V	58V	6V	
C1 Nominal Discharge Current (8/20 μ s) (Line-Line)	I_n	300A	60A	300A	
C2 Total Discharge Current (8/20 μ s) (Lines-Ground)	I_{max}	1kA	250A	1kA	
Voltage Protection Level at I_n	(Line-Line)	U_p	35V	150V	35V
	(Lines-Ground)		350V	550V	350V
Response Time Overvoltage Protection	t_A		< 1 ns		
Cut-off Frequency	f_G		100MHz		
Mechanical					
Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]				
Connection Type	Input/Output: RJ45 Sockets				
Degree of Protection IEC/EN 60529	IP20 (built-in)				
Housing Material	Thermoplastic; Grey, Extinguishing Degree V-0				
Order Information					
Order Code	NET 5	NET 5 PoE	NET 5 STP		
NET 5 Series	7060.22	7060.23	7060.24		

RayDat NET 5 Series

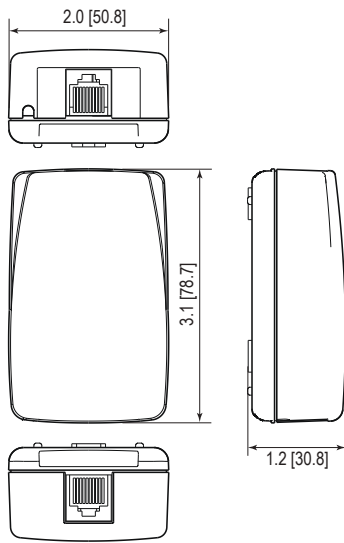
Internal Configuration

Legend

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



Dimensions & Packaging



NET 5	NET 5	NET 5 PoE	NET 5 STP
Dimensions			
Weight per Unit		1.97 oz [56 g]	
Packaging Dimensions (Single Unit)		2.2 x 2 x 4.2" [55 x 50 x 106 mm]	
Minimum Package Quantity		8 pieces	

SPD for Multi-Port Category 5 LAN Networks

RayDat NET 5 19 Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3 (see Technical Data)
 Protection: All 4 Pairs
 Voltages: 5, 48V DC
 Maximum Operating Voltage: 6, 58V DC
 Frequency Range: 100MHz, Cat 5, PoE Compatible
 Surge Discharge Ratings: I_n : up to 300A per Line
 Enclosure: 19" Rack, Shielded, In-line Patch
 Termination: RJ45, Cat 5 Connectors
 Housing: Modular Design
 Options: 8, 16, 24 Port
 Replaceable 8 Port Module
 Compliance: IEC/EN 61643-21

The RayDat NET 5 19 Series is intended to protect Local Area Networks (LAN) from overvoltage surges and electrostatic discharges created by switching transients in buildings. LAN systems are particularly prone to such disturbances because long cable lengths often behave like antennas to such atmospheric disturbances.

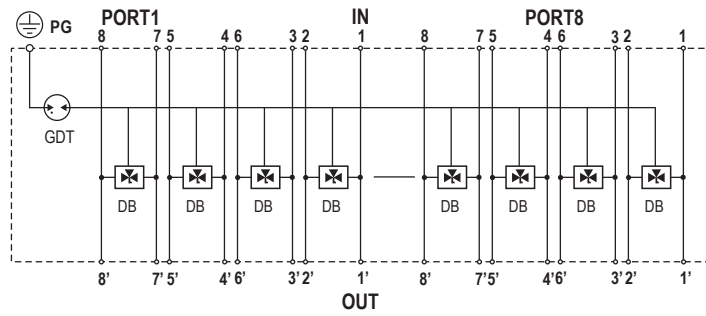
It is designed to fit a 19" rack mount and can provide 8, 16 or 24 ports patching to UTP lines.
 PoE version RayDat NET 5 19 PoE is designed to fulfill all versions of PoE applications compatible with standards IEEE 802.3af and IEEE 802.3at.

Technical Data

NET 5 19	NET 5 19	NET 5 19 PoE
Electrical		
Type per IEC/EN 61643-21	C1/C2/C3	C1/C3
Number of Protected Ports	8, 16, 24 Ports	
Nominal Operating Voltage (DC)	U_n	5V
Maximum Continuous Operating Voltage (DC)	U_c	6V
C1 Nominal Discharge Current (8/20 μ s) (Line-Line)	I_n	300A
C2 Total Discharge Current (8/20 μ s) (Lines-Ground)	I_{max}	1kA
Voltage Protection Level at I_n (Line-Line)	U_p	35V
(Lines-Ground)		350V
Response Time Overvoltage Protection	t_A	< 1 ns
Cut-off Frequency	f_G	100MHz
Mechanical		
Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]	
Connection Type	Input/Output: RJ45 Sockets	
Degree of Protection IEC/EN 60529	IP20 (built-in)	
Housing Material	Al	
Mounting	19" Rack	
Order Information		
Order Code	NET 5 19	NET 5 19 PoE
NET 5 8-19	706 140	706 144
NET 5 16-19	706 141	706 145
NET 5 24-19	706 142	706 146
NET 5 8-19 M (module)	706 143	706 147

RayDat NET 5 19 Series

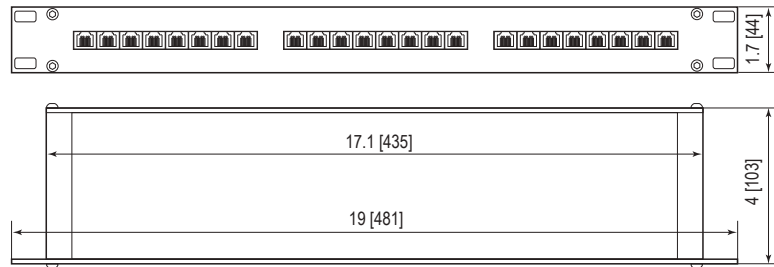
Internal Configuration



Legend

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

Dimensions & Packaging



NET 5 19 Series	8 Port	16 Port	24 Port
Dimensions			
Weight per Unit	37.4 oz [1.06 kg]	40.9 oz [1.16 kg]	43.7 oz [1.24 kg]
Packaging Dimensions (Single Unit)	19 × 4.3 × 1.8" [483 × 108 × 45 mm]		
Minimum Package Quantity	1 pieces		

Replacement Surge Module for 8 Ports

NET 5 19 M Series	8 Port	16 Port	24 Port
Dimensions			
Weight per Unit	5.14 oz [146 g]		
Packaging Dimensions (Single Unit)	10.2 × 4.5 × 1.9" [258 × 113 × 49 mm]		
Minimum Package Quantity	1 pieces		

NET 5 19 PoE Series	8 Port	16 Port	24 Port
Dimensions			
Weight per Unit	37.4 oz [1.06 kg]	40.9 oz [1.16 kg]	43.7 oz [1.24 kg]
Packaging Dimensions (Single Unit)	19 × 4.3 × 1.8" [483 × 108 × 45 mm]		
Minimum Package Quantity	1 pieces		

Replacement Surge Module for 8 Ports

NET 5 19 M PoE Series	8 Port	16 Port	24 Port
Dimensions			
Weight per Unit	5.14 oz [146 g]		
Packaging Dimensions (Single Unit)	10.2 × 4.5 × 1.9" [258 × 113 × 49 mm]		
Minimum Package Quantity	1 pieces		



Surge Protective Devices (SPDs) for Data Protocols



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

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

RayDat RS 485



SPD for Data Protocols

RayDat RS 485

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Protection: Longitudinal, Transverse
 Coarse Protection: 2 × 2, 2 × 3 terminal GDT
 Voltages: 5VDC
 Maximum Operating Voltage: 6VDC
 Serial Resistance per Path: 1.7–1.90Ω per line
 Frequency Range: 1 MHz
 Surge Discharge Ratings: I_n : 20 kA, I_{imp} : 2.5 kA
 Enclosure: DIN 43880 2TE, DIN Rail Mount
 Terminals: Stranded 2 × 2.5 mm²
 Housing: 16 Terminal, Compact Design
 Compliance: IEC/EN 61643-21

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

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

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

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

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

Technical Data

RS 485

Electrical

Number of Protected Pairs		2(4 Conductors)
Nominal Operating Voltage (DC)	U_n	5V
Maximum Continuous Operating Voltage (DC)	U_c	6V
Rated Load Current at 25°C	I_L	500 mA
C2 Nominal Discharge Current (8/20 μs) (Line-Line)	I_n	20 kA
D1 Impulse Current (10/350 μs)	I_{imp}	2.5 kA
Residual Voltage at 5 kA (8/20 μs) (Line-Line)	U_{res}	20V
Rated Spark Overvoltage	(5, 6, 7 & 8-4, SG)	6.5V–8.5V
	(5-6 & 7-8)	6.5V–8.5V
	(5,6,7 & 8-2, PG)	78V–116V
Response Time Overvoltage Protection (5,6,7,8,SG)	t_A	< 1 ns
Thermal Protection (5,6,7,8)		Yes
Insulation Resistance of Protection	R_{iso}	6 kΩ
Serial Resistance per Path	R	1.7–1.9 Ω
Transverse Capacitance	C	< 2 nF
Cut-off Frequency	f_G	> 1 MHz

Mechanical

Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]
Terminal Cross Section Multi-strand (max.)	2x14 AWG [2 × 2.5 mm ²]
Terminal Screw Torque	17.7 lbf.in [2.0 Nm]
Degree of Protection IEC/EN 60529	IP20 (built-in)
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715	35 mm DIN Rail

Order Information

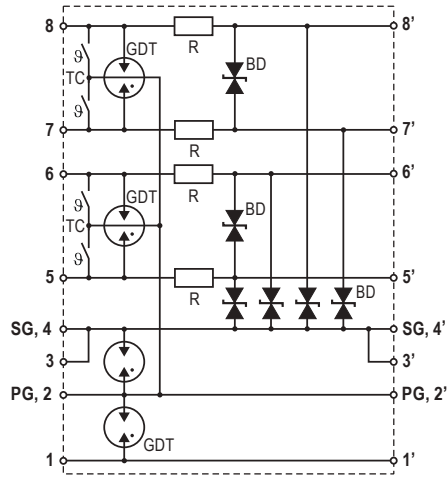
Order Code	
RS 485	703 812

RayDat RS 485

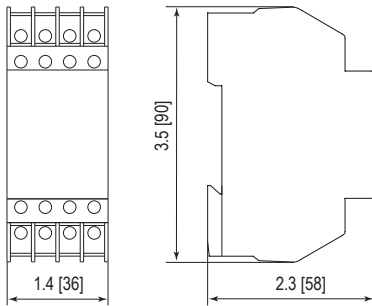
Internal Configuration

Legend

- BD Bi-directional TVS Diode
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor
- SG Signal Grounding
- TC Thermo-clip



Dimensions & Packaging



RS 485

Dimensions

Weight per Unit	4.02 oz [114 g]
Dimensions DIN 43880	2TE
Packaging Dimensions (Single Unit)	1.5 x 2.9 x 4.2" [39 x 74 x 106 mm]
Minimum Package Quantity	6 pieces

10100

Various Data Surge Protective Devices (SPDs)



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

RayDat PLP 24
RayDat GD

The RayDat GD is intended as a generic protector for data circuits.



Data Line Fitting SPD for Current Loops

RayDat PLP 24

C1 • C2 • C3



IEC/EN Category: C1/C2/C3

Mode of Protection: Longitudinal, Transverse

Coarse Protection: 3 Terminal GDT

Voltages: 24VDC

Maximum Operating

Voltage: 28VDC

Frequency Range: 3.0MHz

Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA

Serial Resistance per Path: $< 5 \Omega$ per line

Series Load Current: 145mA

Enclosure: 3/4" Stainless Steel Fitting Conduit

Terminals: Stranded to 2.5 mm²

Housing: In-line 3/4" Conduit Fitting

Compliance: IEC/EN 61643-21

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

The 3/4 inch pipe fitting makes this device ideal for applications such as the protection of field mount sensors, transducers and RTUs. The unit can be configured in-line with the cable conduit and sensor terminals, or in a "T" configuration.

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

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

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

Technical Data

PLP 24

PLP 24V

Electrical

Number of Protected Pairs		1 (2 conductors)
Nominal Operating Voltage (DC)	U_n	24V
Maximum Continuous Operating Voltage (DC)	U_c	28V
Rated Load Current at 25°C	I_L	145mA
C2 Nominal Discharge Current (8/20µs)	I_n	10kA
Maximum Discharge Current (8/20µs)	I_{max}	20kA
Residual Voltage at 5kA (8/20µs)	(Line-Line) U_{res}	$< 59V$
Rated Spark Overvoltage	(Line-Ground)	90-110V
	(Line-Line)	36-44V
Response Time Overvoltage Protection	t_A	$< 1 ns$
Insulation Resistance of the Protection	R_{iso}	$\geq 28 M\Omega$
Serial Resistance per Path	R	$< 5.0 \Omega$
Transverse Capacitance	C	$< 3 nF$
Cut-off Frequency	f_G	3MHz

Mechanical

Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]
Terminal Cross Section Multi-strand (max.)		14 AWG [2.5mm ²]
Degree of Protection IEC/EN 60529		IP55
Housing Material		Stainless Steel
Mounting IEC/EN 60715		On pipe 3/4"

Order Information

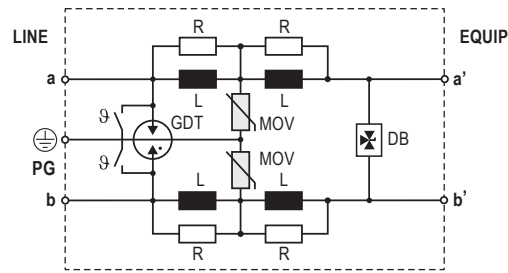
Order Code		
PLP 24		127 700

RayDat PLP 24

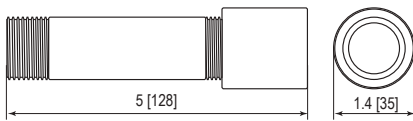
Internal Configuration

Legend

- DB Diode Block
- GDT Gas Discharge Tube
- L Inductor
- MOV Metal Oxide Varistor
- PG Protective Grounding
- R Resistor



Dimensions & Packaging



PLP 24

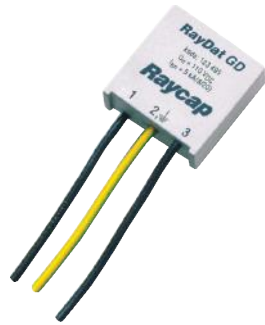
Dimensions

Weight per Unit	11.4 oz [324 g]
Packaging Dimensions (Single Unit)	5.7 x 4 x 3.1" [144 x 100 x 80mm]
Minimum Package Quantity	8 pieces

SPD with Terminal Connection for Data Circuits

RayDat GD

C1 • C2 • C3



IEC/EN Category:	C1/C2/C3
Mode of Protection:	Transverse, Differential
Voltages:	110V DC
Maximum Operating Voltage:	170V DC
Surge Discharge Ratings:	I_n : 5kA, I_{max} : 10kA
Series Load Current:	6A
Enclosure:	PCB Hybrid
Terminals:	Flying Leads or Screw Terminals
Housing:	Compact Design
Compliance:	IEC/EN 61643-21

The RayDat GD Series is intended as a generic protector for data circuits.

It provides coarse protection via a three terminal gas discharge tube.

An internal thermal disconnecter provides protection during mains incursion.

Technical Data

GD

Electrical

Number of Protected Pairs		1 (2 conductors)
Nominal Operating Voltage (DC)	U_n	110V
Maximum Continuous Operating Voltage (DC)	U_c	170V
Rated Load Current at 25°C	I_L	6A
C2 Nominal Discharge Current (8/20µs)	I_n	5kA
Maximum Discharge Current (8/20µs)	I_{max}	10kA
Residual Voltage at 5kA (8/20µs)	U_{res}	< 700V
Rated Spark Overvoltage	(Line-Ground)	184-312V
	(Line-Line)	184-624V
Response Time Overvoltage Protection	t_A	< 100ns
Thermal Protection		Yes
Insulation Resistance of the Protection	R_{iso}	≥ 1 GΩ
Transverse Capacitance	C	< 1 pF
Cut-off Frequency	f_G	30 MHz

Mechanical

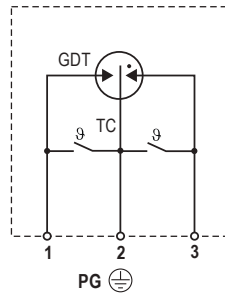
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]
Line Conductors Cross Section (max.)		20AWG [0.5mm ²]
Ground Conductor Cross Section (max.)		18AWG [0.75mm ²]
Connecting Conductor Length		5.9" [150mm]
Degree of Protection IEC/EN 60529		IP20 (built-in)
Housing Material		Thermoplastic; Grey; Extinguishing Degree V-0

Order Information

Order Code		
GD		127 701

RayDat GD

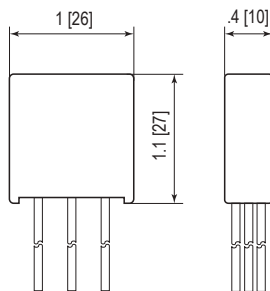
Internal Configuration



Legend

- GDT Gas Discharge Tube
- PG Protective Grounding
- TC Thermo-clip

Dimensions & Packaging



GD

Dimensions

Weight per Unit	.42oz [12g]
Packaging Dimensions (Single Unit)	2.4 x 1.9 x .8" [61 x 49 x 21 mm]
Minimum Package Quantity	30 pieces



Surge Protective Devices (SPDs) for Coaxial & RF Systems



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

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

RayCox BNC
RayCox IEC, F
RayDat CP BNC
RayDat CP 7/16
RayDat CP N
RayDat CP N-6G
RayDat CP TNC-6G
RayDat CP UHF
RayDat CP F75
RayDat CP TV75
RayDat CP L/4-7/16
RayDat CP L/4-N



Coaxial SPD for Analog Video Surveillance Systems

RayCox BNC Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3

Protection: Impedance Matched

Voltages: 10, 24 VDC

Maximum Operating

Voltage: 12, 24 VDC

Frequency Range: 100 MHz

Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA

Series Load Current: 100 mA

Enclosure: In-line Installation

Termination: BNC Connectors

Housing: Shielded Enclosure

Compliance: IEC/EN 61643-21

The RayCox 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 by core-shield and shield-protective ground.

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

Technical Data

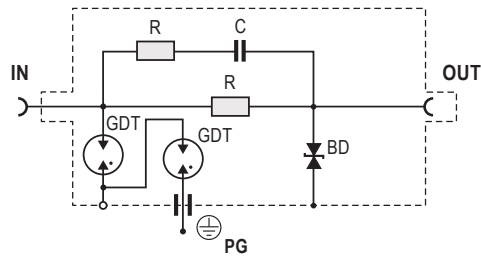
BNC		BNC 5	BNC 12
Electrical			
Nominal Operating Voltage (DC)	U_n	10V	24V
Maximum Continuous Operating Voltage (DC)	U_c	12V	28V
Rated Operating Current at 25°C	I_L		100 mA
C2 Nominal Discharge Current (8/20 μ s)	I_n		10 kA
Maximum Discharge Current (8/20 μ s)	I_{max}		20 kA
Residual Voltage at 5 kA (8/20 μ s)	(Wire-Shield) U_{res}	< 35V	< 65V
Rated Spark Overvoltage	(Wire-Shield)	13.5V – 16.5V	30V – 36V
	(Shield-Ground)	72V – 108V	72V – 108V
Response Time Overvoltage Protection	(Wire-Shield) t_A		< 10 ns
	(Shield-Ground)		< 100 ns
Insulation Resistance of Protection	(Wire-Shield) R_{iso}	$\geq 12 M\Omega$	$\geq 28 M\Omega$
	(Shield-Ground)		$\geq 1 G\Omega$
Serial Resistance per Path	R		9 – 11 Ω
Transverse Capacitance	(Wire-Shield) C		30 pF
	(Shield-Ground)		1 pF
Cut-off Frequency	f_G		100 MHz
Transmission Rate			16 Mbit/s
Mechanical			
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]	
Connection		BNC Connector	
Degree of Protection IEC/EN 60529		IP 20 (built-in)	
Housing Material		Metal	
Order Information			
Order Code		BNC 5	BNC 12
BNC xx		7050.22	7050.13

RayCox BNC Series

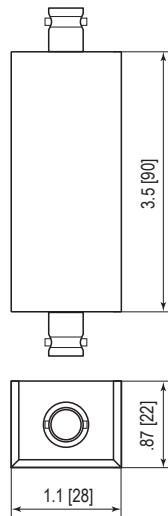
Internal Configuration

Legend

- BD* Bi-directional TVS Diode
- C* Capacitor
- D* Diode
- GDT* Gas Discharge Tube
- PG* Protective Grounding
- R* Resistor



Dimensions & Packaging

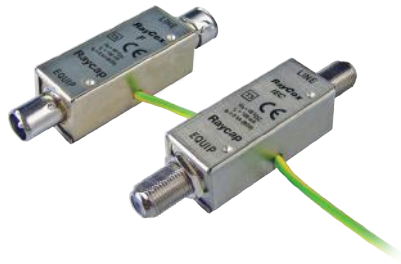


BNC	BNC 5	BNC 12
Dimensions		
Weight per Unit	2.04 oz [58 g]	
Packaging Dimensions (Single Unit)	5.5 × 7.9" [140 × 200 mm]	

Coaxial SPD for TV & Cable TV

RayCox IEC 48, F 48

C1 • C2 • C3



IEC/EN Category: C1/C2/C3
 Protection: Impedance Matched
 Voltages: 148 VDC
 Maximum Operating Voltage: 60 VDC
 Frequency Range: 40–860 MHz
 Surge Discharge Ratings: I_n : 5 kA
 Series Load Current: 100 mA
 Termination: IEC TV or F Connectors
 Housing: In-line Installation, Shielded Enclosure
 Compliance: IEC/EN 61643-21

The aerial adapters RayCox IEC 48 and F 48 are intended for the protection of TV sets, aerial amplifiers and cable television CATV. It should be connected to the aerial input of the TV set, with the coaxial cable from the aerial plugged into the other side. It should be grounded to the protective earth conductor of the housing installation.

In the case of an individual aerial system with an individual aerial amplifier it is recommended to install an additional aerial adapter which should be connected in the same way as for the TV set. The aerial adapter is not suitable for outdoor installation or installation in very damp places.

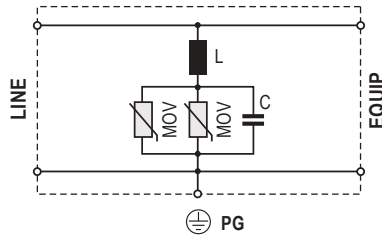
Technical Data

	IEC 48	F 48
Electrical		
Nominal Operating Voltage (DC)	U_n	48V
Maximum Continuous Operating Voltage (DC)	U_c	60V
Rated Operating Current at 25°C	I_L	100mA
C2 Nominal Discharge Current (8/20 μs)	I_n	5 kA
Residual Voltage at 5 kA (8/20 μs)	U_{res}	< 500V
Rated Spark Overvoltage (Wire-Shield)		90V – 110V
Response Time Overvoltage Protection (Wire-Shield)	t_A	< 25 ns
Insulation Resistance of Protection (Wire-Shield)	R_{iso}	≥ 6 MΩ
Serial Resistance per Path	R	< 0.1 Ω
Frequency Range	f_G	40–860 MHz
Mechanical		
Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]	
Connection	TV Connector	F Connector
Degree of Protection IEC/EN 60529	IP 20 (built-in)	
Housing Material	Metal	
Order Information		
Order Code	IEC 48	F 48
XXX 48	125 093	125 094

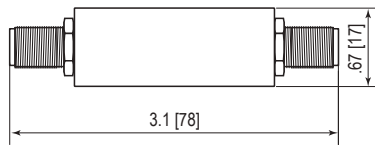
RayCox IEC 48, F 48

Internal Configuration

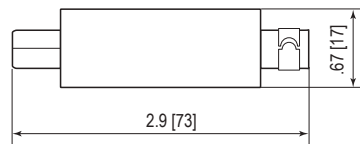
- Legend**
 C Capacitor
 L Inductor
 MOV Metal Oxide Varistor
 PG Protective Grounding



Dimensions & Packaging



IEC 48



F 48

	IEC 48	F 48
Dimensions		
Weight per Unit	1.13 oz [32 g]	
Packaging Dimensions (Single Unit)	3.5 x 5.9" [90 x 150 mm]	

In-line SPD for Coaxial & RF Systems

RayDat CP BNC Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3
 Protection: Impedance Matched
 Maximum Operating Voltage: 70, 180, 280 V
 Maximum Peak Power: 40, 125, 300 W
 Frequency Range: DC–2.6 GHz
 Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA
 Impedance: 50 Ω
 Insertion Loss: < 0.4 dB
 Return Loss: > 20 dB
 Termination: BNC Type (F-F, M-F)
 Housing: In-line Installation, Shielded Enclosure
 Compliance: IEC/EN 61643-21

The RayDat CP BNC Series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 2.6 GHz.

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

Transfer power is 40W to 300W continuous, depending on the coaxial cable protector voltage.

The CP coaxial cable protector is designed in accordance with IEC 61643-21: 2012 standards and regulations.

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

Technical Data

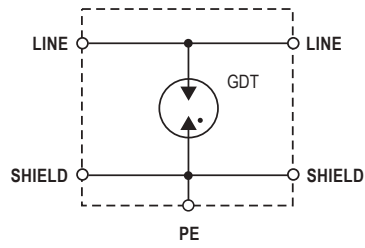
CP BNC		70	180	280
Electrical				
Maximum Continuous Operating Voltage	U_c	70V	180V	280V
Maximum Peak Power	P_{max}	40W	125W	300W
C2 Nominal Discharge Current (8/20 μ s)	I_n		10 kA	
Maximum Discharge Current (8/20 μ s)	I_{max}		20 kA	
Residual Voltage at (1 kV/ μ s)	U_{res}	< 600V	< 700V	< 900V
Impedance	Z		50 Ω	
Insertion Loss	I_L		< 0.4 dB	
Return Loss	R_L		> 20 dB	
Insulation Resistance of Protection	R_{iso}		> 10 G Ω	
Frequency Range	f_G		0–2.6 GHz	
Mechanical				
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]		
Connection		BNC Female/Female	BNC Male/Female	
Degree of Protection IEC/EN 60529		IP 20 (built-in)		
Housing Material		Metal		
Order Information				
Order Code		70	180	280
CP BNC-FF-xxx		800 850	800 851	800 852
CP BNC-MF-xxx		800 853	800 854	800 855

RayDat CP BNC Series

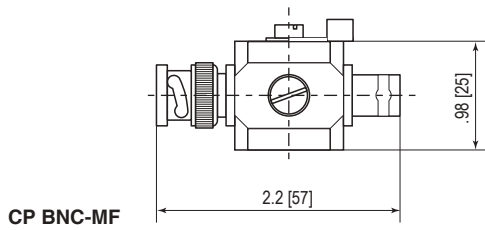
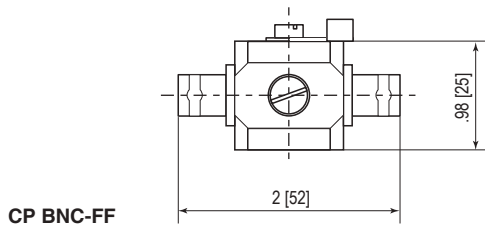
Internal Configuration

Legend

GDT Gas Discharge Tube
PE Ground



Dimensions & Packaging



CP BNC	CP BNC-FF-xxx			CP BNC-MF-xxx		
	70	180	280	70	180	280
Dimensions						
Weight per Unit	3.74 oz [106 g]			4.02 oz [114 g]		
Packaging Dimensions (Single Unit)	2.9 × 1.2 × 1.2" [73 × 30 × 30 mm]					
Minimum Package Quantity	100 pieces					

In-line SPD for Coaxial & RF Systems
RayDat CP 7/16 Series
C1 • C2 • C3

CCP-7/16 Series



IEC/EN Category: C1/C2/C3
 Protection: Impedance Matched
 Maximum Operating Voltage: 70, 180, 280V
 Maximum Peak Power: 40, 125, 300W
 Frequency Range: DC–2.5GHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA
 Impedance: 50Ω
 Insertion Loss: <0.2dB
 Return Loss: >20dB
 Termination: 7/16 Type (M-F)
 Housing: Bulkhead Installation, Shielded Enclosure
 Compliance: IEC/EN 61643-21

The RayDat CP 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 coaxial cable protector voltage.

The CP 7/16 coaxial cable protector is designed in accordance with the IEC 61643-21: 2012 standards and regulations.

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

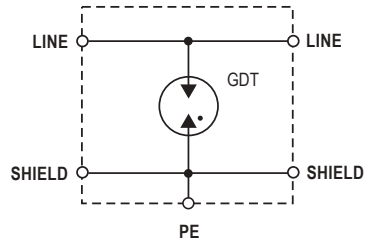
Technical Data

CP 7/16-MF		70	180	280
Electrical				
Maximum Continuous Operating Voltage	U_c	70V	180V	280V
Maximum Peak Power	P_{max}	40W	125W	300W
C2 Nominal Discharge Current (8/20μs)	I_n		10kA	
Maximum Discharge Current (8/20μs)	I_{max}		20kA	
Residual Voltage at (1kV/μs)	U_{res}	<600V	<700V	<900V
Impedance	Z		50Ω	
Insertion Loss	I_L		<0.2dB	
Return Loss	R_L		>20dB	
Insulation Resistance of Protection	R_{iso}		>10GΩ	
Frequency Range	f_G		0–2.5 GHz	
Mechanical				
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]		
Connection		7/16 Male/Female		
Degree of Protection IEC/EN 60529		IP20 (built-in)		
Housing Material		Metal		
Order Information				
Order Code		70	180	280
CP 7/16-MF-xxx		800 856	800 857	800 858

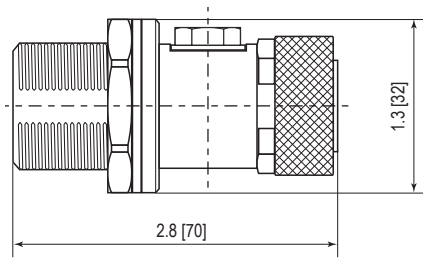
RayDat CP 7/16 Series

Internal Configuration

Legend
 GDT Gas Discharge Tube
 PE Ground



Dimensions & Packaging



CP 7/16-MF	70	180	280
Dimensions			
Weight per Unit		7.7 oz [218 g]	
Packaging Dimensions (Single Unit)		3.2 x 1.6 x 1.6" [82 x 40 x 40 mm]	
Minimum Package Quantity		100 pieces	

In-line SPD for Coaxial & RF Systems

RayDat CP N Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3

Protection: Impedance Matched

Maximum Operating

Voltage: 70, 180, 280V

Maximum Peak Power: 40, 125, 300W

Frequency Range: DC–2.6GHz

Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA

Impedance: 50Ω

Insertion Loss: <0.4dB

Return Loss: >20dB

Termination: N Type (F-F, M-F)

Housing: In-line Installation, Shielded Enclosure

Compliance: IEC/EN 61643-21

The RayDat CP N Series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 2.6 GHz.

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

Transfer power is 40W to 300W continuous, depending on the coaxial cable protector voltage.

The CP N coaxial cable protector is designed in accordance with IEC 61643-21: 2012 standards and regulations.

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

Technical Data

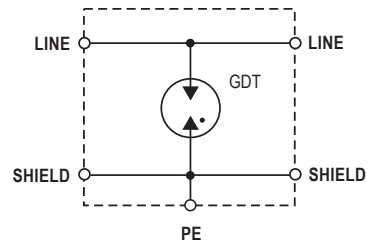
CP-N		70	180	280
Electrical				
Maximum Continuous Operating Voltage	U_c	70V	180V	280V
Maximum Peak Power	P_{max}	40W	125W	300W
C2 Nominal Discharge Current (8/20μs)	I_n		10kA	
Maximum Discharge Current (8/20μs)	I_{max}		20kA	
Residual Voltage at (1kV/μs)	U_{res}	<600V	<700V	<900V
Impedance	Z		50Ω	
Insertion Loss	I_L		<0.4dB	
Return Loss	R_L		>20dB	
Insulation Resistance of Protection	R_{iso}		>10GΩ	
Frequency Range	f_G		0–2.6 GHz	
Mechanical				
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]		
Connection		N Female/Female		N Male/Female
Degree of Protection IEC/EN 60529		IP 20 (built-in)		
Housing Material		Metal		
Order Information				
Order Code		70	180	280
CP N-FF-xxx		800 859	800 860	800 861
CP N-MF-xxx		800 862	800 863	800 864

RayDat CP N Series

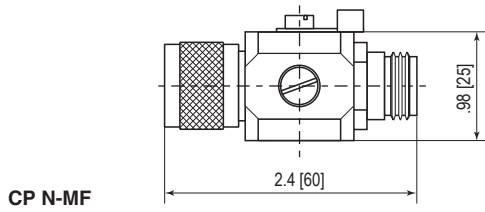
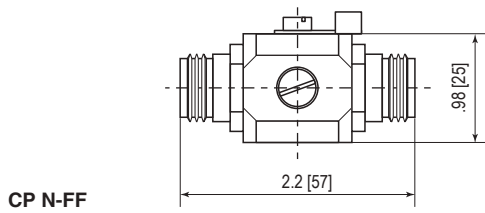
Internal Configuration

Legend

GDT Gas Discharge Tube
PE Ground



Dimensions & Packaging



CP N	CP N-FF-xxx			CP N-MF-xxx		
	70	180	280	70	180	280
Dimensions						
Weight per Unit	4.87 oz [138 g]			5.01 oz [142 g]		
Packaging Dimensions (Single Unit)	2.9 × 1.2 × 1.2" [73 × 30 × 30 mm]					
Minimum Package Quantity	100 pieces					

In-line SPD for High Frequency Coaxial & RF Systems

RayDat CP N-6G Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3
 Protection: Impedance Matched
 Maximum Operating Voltage: 180V
 Maximum Peak Power: 125W
 Frequency Range: DC–6.0GHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA
 Impedance: 50Ω
 Insertion Loss: <0.4dB
 Return Loss: >20dB
 Termination: N Type (F-F, M-F)
 Housing: Bulkhead Installation, Shielded Enclosure
 Compliance: IEC/EN 61643-21

The RayDat CP N-6G Series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 6.0 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 125W continuous.

The CP N-6G coaxial cable protector is designed in accordance with IEC 61643-21: 2012 standards and regulations.

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

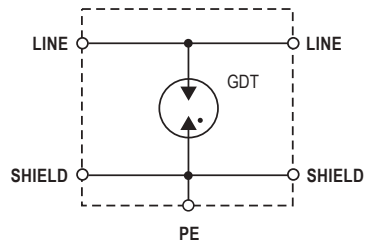
Technical Data

CP N-6G	CP N-6G-FF	CP N-6G-MF
Electrical		
Maximum Continuous Operating Voltage	U_c	180V
Maximum Peak Power	P_{max}	125W
C2 Nominal Discharge Current (8/20μs)	I_n	10kA
Maximum Discharge Current (8/20μs)	I_{max}	20kA
Residual Voltage at (1kV/μs)	U_{res}	<700V
Impedance	Z	50Ω
Insertion Loss	I_L	<0.4dB
Return Loss	R_L	>20dB
Insulation Resistance of Protection	R_{iso}	>10GΩ
Frequency Range	f_G	0–6.0 GHz
Mechanical		
Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]	
Connection	N Female/Female	N Male/Female
Degree of Protection IEC/EN 60529	IP20 (built-in)	
Housing Material	Metal	
Order Information		
Order Code		
CP N-6G-XX	800 865	800 866

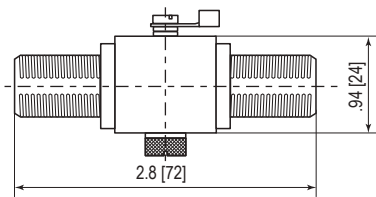
RayDat CP N-6G Series

Internal Configuration

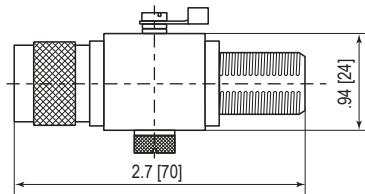
Legend
 GDT Gas Discharge Tube
 PE Ground



Dimensions & Packaging



CP N-6G-FF



CP N-6G-MF

CP N-6G	CP N-6G-FF	CP N-6G-MF
Dimensions		
Weight per Unit	4.65 oz [132 g]	4.58 oz [130 g]
Packaging Dimensions (Single Unit)	2.9 × 1.2 × 1.2" [73 × 30 × 30mm]	
Minimum Package Quantity	100 pieces	

In-line SPD for High Frequency Coaxial & RF Systems

RayDat CP TNC-6G Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3
 Protection: Impedance Matched
 Maximum Operating Voltage: 180V
 Maximum Peak Power: 125W
 Frequency Range: DC–6.0GHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA
 Impedance: 50Ω
 Insertion Loss: <0.4dB
 Return Loss: >20dB
 Termination: TNC Type (F-F, M-F)
 Housing: In-line Installation, Shielded Enclosure
 Compliance: IEC/EN 61643-21

The RayDat CP TNC-6G Series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 6.0 GHz.

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

Transfer power is 125W continuous.

The CP TNC-6G coaxial cable protector is designed in accordance with IEC 61643-21: 2012 standards and regulations.

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

Technical Data

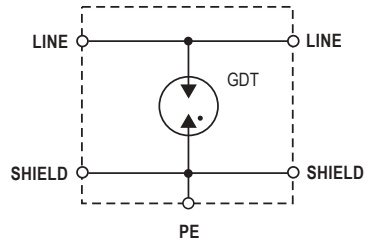
CP TNC-6G	CP TNC-6G-FF	CP TNC-6G-MF
Electrical		
Maximum Continuous Operating Voltage	U_c	180V
Maximum Peak Power	P_{max}	125W
C2 Nominal Discharge Current (8/20μs)	I_n	10kA
Maximum Discharge Current (8/20μs)	I_{max}	20kA
Residual Voltage at (1kV/μs)	U_{res}	<700V
Impedance	Z	50Ω
Insertion Loss	I_L	<0.4dB
Return Loss	R_L	>20dB
Insulation Resistance of Protection	R_{iso}	>10GΩ
Frequency Range	f_G	0–6.0 GHz
Mechanical		
Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]	
Connection	TNC Female/Female	TNC Male/Female
Degree of Protection IEC/EN 60529	IP20 (built-in)	
Housing Material	Metal	
Order Information		
Order Code		
CP TNC-6G-XX	800 867	800 868

RayDat CP TNC-6G Series

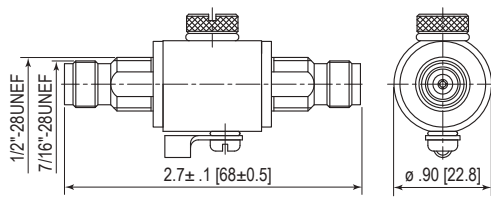
Internal Configuration

Legend

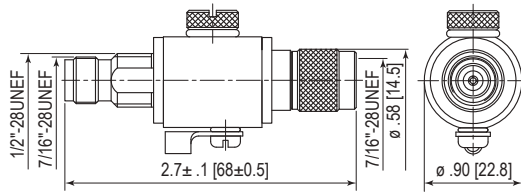
GDT Gas Discharge Tube
PE Ground



Dimensions & Packaging



CP TNC-6G-FF



CP TNC-6G-MF

CP TNC-6G	CP TNC-6G-FF	CP TNC-6G-MF
Dimensions		
Weight per Unit	4.6 oz [130 g]	4.51 oz [128 g]
Packaging Dimensions (Single Unit)	2.9 × 1.2 × 1.2" [73 × 30 × 30 mm]	
Minimum Package Quantity	100 pieces	

In-line SPD for Coaxial & RF Systems

RayDat CP UHF Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3
 Protection: Impedance Matched
 Maximum Operating Voltage: 70, 180, 280 V
 Maximum Peak Power: 40, 125, 300 W
 Frequency Range: DC–600 MHz
 Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA
 Impedance: 50 Ω
 Insertion Loss: < 0.4 dB
 Return Loss: > 20 dB
 Termination: UHF Type (F-F, M-F)
 Housing: In-line Installation, Shielded Enclosure
 Compliance: IEC/EN 61643-21

The RayDat CP 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 40 W to 300 W continuous, depending on the coaxial cable protector voltage.

The CP UHF coaxial cable protector is designed in accordance with IEC 61643-21: 2012 standards and regulations.

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

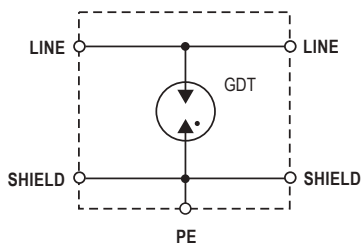
Technical Data

CP UHF		70	180	280
Electrical				
Maximum Continuous Operating Voltage	U_c	70 V	180 V	280 V
Maximum Peak Power	P_{max}	40 W	125 W	300 W
C2 Nominal Discharge Current (8/20 μ s)	I_n		10 kA	
Maximum Discharge Current (8/20 μ s)	I_{max}		20 kA	
Residual Voltage at (1 kV/ μ s)	U_{res}	< 600 V	< 700 V	< 900 V
Impedance	Z		50 Ω	
Insertion Loss	I_L		< 0.4 dB	
Return Loss	R_L		> 20 dB	
Insulation Resistance of Protection	R_{iso}		> 10 G Ω	
Frequency Range	f_G		0–600 MHz	
Mechanical				
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]		
Connection		UHF Female/Female	UHF Male/Female	
Degree of Protection IEC/EN 60529		IP 20 (built-in)		
Housing Material		Metal		
Order Information				
Order Code		70	180	280
CP UHF-FF-xxx		800 869	800 870	800 871
CP UHF-MF-xxx		800 872	800 873	800 874

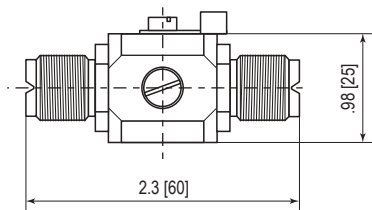
RayDat CP UHF Series

Internal Configuration

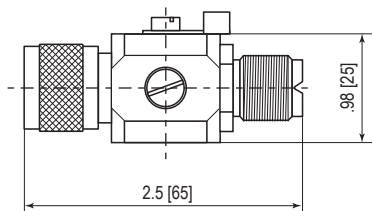
Legend
 GDT Gas Discharge Tube
 PE Ground



Dimensions & Packaging



CP UHF-FF



CP UHF-MF

CP UHF	CP UHF-FF-xxx			CP UHF-MF-xxx		
	70	180	280	70	180	280
Dimensions						
Weight per Unit	3.67 oz [104 g]			3.67 oz [104 g]		
Packaging Dimensions (Single Unit)	2.4 x 1.2 x 1.4" [62 x 30 x 35 mm]					
Minimum Package Quantity	100 pieces					

In-line SPD for Coaxial & RF Systems

RayDat CP F75 Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3
 Protection: Impedance Matched
 Maximum Operating Voltage: 70, 180V
 Maximum Peak Power: 40, 125W
 Frequency Range: DC–2.0GHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA
 Impedance: 75Ω
 Insertion Loss: <0.4dB
 Return Loss: >20dB
 Termination: F Type (F-F, M-F)
 Housing: In-line Installation, Shielded Enclosure
 Compliance: IEC/EN 61643-21

The RayDat CP F Series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 2.0GHz. It is eminently suitable for the protection of CCTV and CATV systems.

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

Transfer power is 40W to 125W continuous, depending on the coaxial cable protector voltage.

The CP F coaxial cable protector is designed in accordance with IEC 61643-21: 2012 standards and regulations.

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

Technical Data

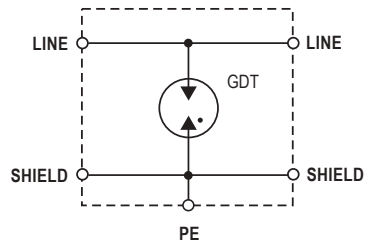
CP F75		70	180
Electrical			
Maximum Continuous Operating Voltage	U_c	70V	180V
Maximum Peak Power	P_{max}	40W	125W
C2 Nominal Discharge Current (8/20μs)	I_n	10kA	
Maximum Discharge Current (8/20μs)	I_{max}	20kA	
Residual Voltage at (1kV/μs)	U_{res}	<600V	<700V
Impedance	Z	75Ω	
Insertion Loss	I_L	<0.4dB	
Return Loss	R_L	>20dB	
Insulation Resistance of Protection	R_{iso}	>10GΩ	
Frequency Range	f_G	0–2.0 GHz	
Mechanical			
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]	
Connection		F Female/Female	F Male/Female
Degree of Protection IEC/EN 60529		IP20 (built-in)	
Housing Material		Metal	
Order Information			
Order Code		70	180
CP F75-FF-xxx		800 875	800 876
CP F75-MF-xxx		800 877	800 878

RayDat CP F75 Series

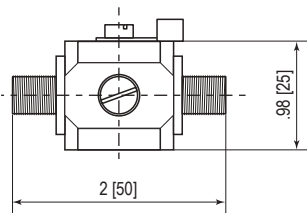
Internal Configuration

Legend

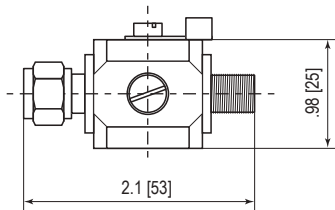
GDT Gas Discharge Tube
PE Ground



Dimensions & Packaging



CP F75-FF



CP F75-MF

CP F75	CP F75-FF		CP F75-MF	
	70	180	70	180
Dimensions				
Weight per Unit	2.82 oz [80 g]		2.96 oz [84 g]	
Packaging Dimensions (Single Unit)	2.8 × 1.2 × 1.2" [73 × 30 × 30 mm]			
Minimum Package Quantity	100 pieces			

In-line SPD for Coaxial & RF Systems

RayDat CP TV75 Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3
 Protection: Impedance Matched
 Maximum Operating Voltage: 70, 180V
 Maximum Peak Power: 40, 125W
 Frequency Range: DC–2.0GHz
 Surge Discharge Ratings: I_n : 10kA, I_{max} : 20kA
 Impedance: 75Ω
 Insertion Loss: <0.4dB
 Return Loss: >20dB
 Termination: TV Type (F-F, M-F)
 Housing: In-line Installation, Shielded Enclosure
 Compliance: IEC/EN 61643-21

The RayDat CP TV Series of coaxial surge protectors is intended to protect RF antenna systems terminating in TV-type connections and is suitable for frequencies from DC to 2.0GHz. It is eminently suitable for the protection of 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 the coaxial cable protector voltage.

The CP TV coaxial cable protector is designed in accordance with IEC 61643-21: 2012 standards and regulations.

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

Technical Data

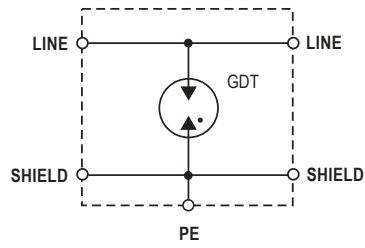
CP TV75		70	180
Electrical			
Maximum Continuous Operating Voltage	U_c	70V	180V
Maximum Peak Power	P_{max}	40W	125W
C2 Nominal Discharge Current (8/20μs)	I_n	10 kA	
Maximum Discharge Current (8/20μs)	I_{max}	20 kA	
Residual Voltage at (1kV/μs)	U_{res}	<600V	<700V
Impedance	Z	75Ω	
Insertion Loss	I_L	<0.4dB	
Return Loss	R_L	>20dB	
Insulation Resistance of Protection	R_{iso}	>10GΩ	
Frequency Range	f_G	0–2.0 GHz	
Mechanical			
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]	
Connection		TV Female/Female	TV Male/Female
Degree of Protection IEC/EN 60529		IP20 (built-in)	
Housing Material		Metal	
Order Information			
Order Code		70	180
CP TV75-FF-xx		800 879	800 880
CP TV75-MF-xx		800 881	800 882

RayDat CP TV75 Series

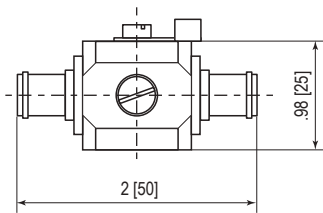
Internal Configuration

Legend

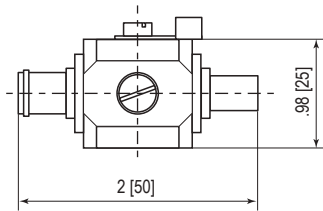
GDT Gas Discharge Tube
PE Ground



Dimensions & Packaging



CP TV75-FF



CP TV75-MF

CP TV75	CP TV75-FF-xxx		CP TV75-MF-xxx	
	70	180	70	180
Dimensions				
Weight per Unit	2.82 oz [80 g]		2.89 [82 g]	
Packaging Dimensions (Single Unit)	2.8 × 1.2 × 1.2" [73 × 30 × 30 mm]			
Minimum Package Quantity	100 pieces			

In-line SPD for High Frequency Coaxial & RF Systems

RayDat CP L/4-7/16 Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3
 Protection: Impedance Matched
 Maximum Peak Power: 500W
 Frequency Range: 865–965 MHz, 1.7–1.95 GHz
 Surge Discharge Ratings: I_n : 15 kA, I_{max} : 30 kA
 Impedance: 50 Ω
 Insertion Loss: < 0.2 dB
 Return Loss: > 20 dB
 Termination: L/4-7/16 Type (F-F, M-F)
 Housing: Bulkhead Installation, Shielded Enclosure
 Compliance: IEC/EN 61643-21

The RayDat CP L/4-7/16 Series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 865–965 MHz, 1.7–1.95 GHz.

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

Transfer power is 500W continuous.

The CP L/4-7/16 coaxial cable protector is designed in accordance with IEC 61643-21: 2012 standards and regulations.

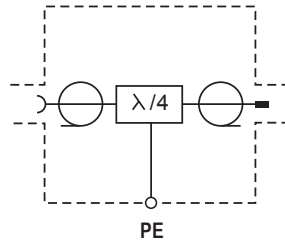
A grounding stud is provided which should be connected to the system ground or coaxial feed-through bulkhead, as directly as possible.

Technical Data

CP L/4-7/16	CP L/4-7/16-FF	CP L/4-7/16-MF
Electrical		
Maximum Peak Power	P_{max}	500W
C2 Nominal Discharge Current (8/20 μ s)	I_n	15 kA
Maximum Discharge Current (8/20 μ s)	I_{max}	30 kA
Voltage Protection Level	U_p	< 100V
Impedance	Z	50 Ω
Insertion Loss	I_L	< 0.2 dB
Return Loss	R_L	> 20 dB
Frequency Range	f_G	865–965 MHz, 1.7–1.95 GHz
Mechanical		
Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]	
Connection	L/4-7/16 Female/Female	L/4-7/16 Male/Female
Degree of Protection IEC/EN 60529	IP 20 (built-in)	
Housing Material	Metal	
Order Information		
Order Code		
CP L/4-7/16-XX	800 884	800 883

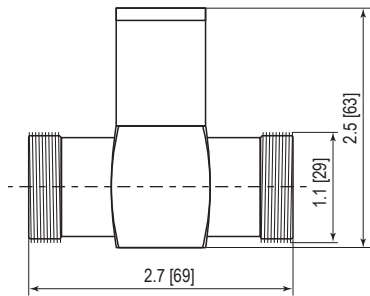
RayDat CP L/4-7/16 Series

Internal Configuration

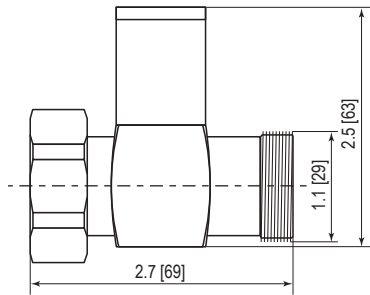


Legend
PE Ground

Dimensions & Packaging



CP L/4-7/16-FF



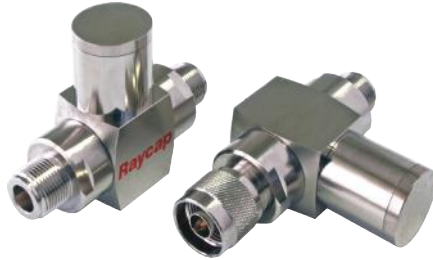
CP L/4-7/16-MF

CP L/4-7/16	CP L/4-7/16-FF	CP L/4-7/16-MF
Dimensions		
Weight per Unit	11.28 oz [320 g]	11 oz [312 g]
Packaging Dimensions (Single Unit)	2.9 × 1.2 × 2.8" [73 × 30 × 70 mm]	
Minimum Package Quantity	100 pieces	

In-line SPD for High Frequency Coaxial & RF Systems

RayDat CP L/4-N Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3
 Protection: Impedance Matched
 Maximum Peak Power: 500W
 Frequency Range: 865–965 MHz, 1.7–1.95 GHz
 Surge Discharge Ratings: I_n : 15 kA, I_{max} : 30 kA
 Impedance: 50 Ω
 Insertion Loss: < 0.2 dB
 Return Loss: > 20 dB
 Termination: L/4-N Type (F-F, M-F)
 Housing: Bulkhead Installation, Shielded Enclosure
 Compliance: IEC/EN 61643-21

The RayDat CP L/4-N Series of coaxial surge protectors is intended to protect RF antenna systems and is suitable for frequencies from DC to 865–965 MHz, 1.7–1.95 GHz.

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

Transfer power is 500W continuous.

The CP L/4-N coaxial cable protector is designed in accordance with IEC 61643-21: 2012 standards and regulations.

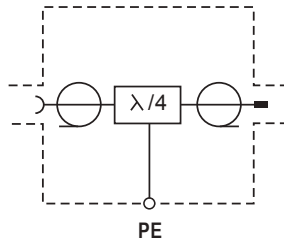
A grounding stud is provided which should be connected to the system ground or coaxial feed-through bulkhead, as directly as possible.

Technical Data

CP L/4-N	CP L/4-N-FF	CP L/4-N-MF
Electrical		
Maximum Peak Power	P_{max}	500W
C2 Nominal Discharge Current (8/20 μ s)	I_n	15 kA
Maximum Discharge Current (8/20 μ s)	I_{max}	30 kA
Voltage Protection Level	U_p	< 100V
Impedance	Z	50 Ω
Insertion Loss	I_L	< 0.2 dB
Return Loss	R_L	> 20 dB
Frequency Range	f_G	865–965 MHz, 1.7–1.95 GHz
Mechanical		
Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]	
Connection	L/4-N Female/Female	L/4-N Male/Female
Degree of Protection IEC/EN 60529	IP 20 (built-in)	
Housing Material	Metal	
Order Information		
Order Code		
CP L/4-N-XX	800 886	800 885

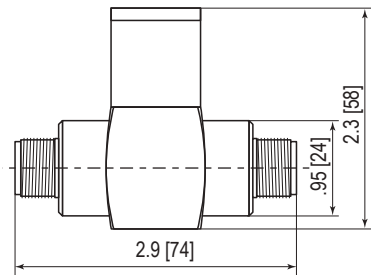
RayDat CP L/4-N Series

Internal Configuration

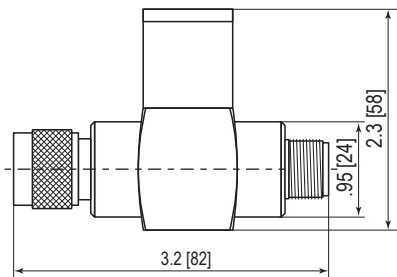


Legend
PE Ground

Dimensions & Packaging



CP L/4-N-FF



CP L/4-N-MF

CP L/4-N	CP L/4-N-FF	CP L/4-N-MF
Dimensions		
Weight per Unit	9.95 oz [282 g]	9.38 [266 g]
Packaging Dimensions (Single Unit)	3 × 1.2 × 2.4" [77 × 30 × 60 mm]	
Minimum Package Quantity	100 pieces	

Selection Guide

Signal/Data Transmission

Signal Type	Recommended SPD	Page	Signal Type	Recommended SPD	Page
0-20 mA, 4-20 mA Current Loops	SPH-2-30	20	Fieldbus (Ex)	Ex-2	54
	SGH-3-24	32		PLP Ex	56
	SCH-2-24	36	Genius Bus	SLH-4-12	18
	PLP-24	78		SLH-2-12	16
ARCNET	RayCox BNC 5	84		SSH-3-12	26
Binary Signals	SPH-2-30	20	Industrial Ethernet	NET 6 POE	66
	SLH-2-5 ... SLH-2-60	16	INTERBUS Inline (Remote)	SBH-3-5	24
	SLH-4-5 ... SLH-4-60	18		SLH-2-5	16
	SGH-3-5 ... SGH-3-60	32		SCH-2-5	36
	SSH-3-5 ... SSH-3-60	26		SCH-4-5	38
	SUI-4-5 ... SUI-4-60	34	SSH-3-5	26	
	SCH-2-5 ... SCH-2-60	36	INTERBUS Inline (I/O)	SLH-4-24	18
SCH-4-5 ... SCH-4-60	38	SCH-4-24		38	
		SUI-4-24		34	
BITBUS (IEEE-1118)	SBH-3-5	24	INTERBUS Field Multiplexer	SBH-3-5	24
	SLH-2-5	16		SGH-3-5	32
	SLH-4-5	18	KNX Bus	GD	80
	SGH-3-5	32	Local Operating Network (LON)	SBH-3-5	24
	SSH-3-5	26		SLH-2-5	16
		SLH-4-5		18	
CAN Bus (Data Line)	SBH-3-12	24		SGH-3-5	32
	SLH-2-12	16	Modbus	SBH-3-5	24
	SLH-4-12	18		SLH-2-5	16
	SGH-3-12	32		SLH-4-5	18
	SSH-3-12	26		SGH-3-5	32
CAN Bus (Power Line)	PSC-2-24	62		SSH-3-5	26
	Protec DMDR 20/24	60	Opto Interface	SPH-2-30	20
CAN Bus (Data + Power Line)	SUH-2-30PS	48		SBH-3-30	24
CCTV	RayCox BNC 12	84		SLH-4-24	18
ControlNet	RayCox BNC 12	84		SCH-4-24	38
Data Highway Plus	SBH-3-12	24		SUI-4-24	34
	SLH-4-12	18	SSH-3-24	26	
	SLH-2-12	16	Power Over Ethernet (PoE)	NET 6 POE	66
DeviceNet (Data Line)	SBH-3-12	24		NET 5 PoE	68
	SLH-2-12	16		NET 5 19 PoE	70
	SLH-4-12	18	Power Supply (AC or DC)	PSC-2-12 ... PSC-2-48	62
	SGH-3-12	32		Protec DMDR 20/24 ...	60
		Protec DMDR 20/120		60	
DeviceNet (Power Line)	PSC-2-24	62	PROFIBUS DP	SBH-3-5	24
	Protec DMDR 20/24	60		SLH-2-5	16
DeviceNet (Data + Power Line)	SUH-2-30PS	48		SLH-4-5	18
				SGH-3-5	32
EIB	GD	80	SSH-3-5	26	
Ex(i) Circuits	Ex-2	54			
	PLP Ex	56			
Ethernet CAT 5	NET 6 POE	66			
	NET 5	68			
	NET 5 19	70			
Ethernet CAT 6	NET 6 POE	66			
FDDI, CDDI	NET 6 POE	66			
	NET 5	68			
	NET 5 19	70			

Signal Type	Recommended SPD	Page
PROFIBUS PA	SBH-3-24	24
	SPH-2-30	20
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	RayDat SUH-2-30PS	7086.81	SMH-TC+PS 24V	7081.81	2/3TE	48	
	RayDat SUH-2-30PSM	7086.82	Module SMH-TC+PS 24V	7081.82	2/3TE	48	
	RayDat SRH-2-5-L	7085.44			2/3TE	50	
	RayDat SRH-2-12-L	7085.46			2/3TE	50	
	RayDat SRH-2-24-L	7085.48			2/3TE	50	
	RayDat SRH-2-30-L	7085.42			2/3TE	50	
	RayDat SRH-2-5-LM	7085.45			2/3TE	50	
	RayDat SRH-2-12-LM	7085.47			2/3TE	50	
	RayDat SRH-2-24-LM	7085.49			2/3TE	50	
	RayDat SRH-2-30-LM	7085.43			2/3TE	50	
	RayDat SRH-2-5-LQ	7085.56			2/3TE	50	
	RayDat SRH-2-12-LQ	7085.58			2/3TE	50	
	RayDat SRH-2-24-LQ	7085.60			2/3TE	50	
	RayDat SRH-2-30-LQ	7085.62			2/3TE	50	
	RayDat PSU-14	127 621			2/3TE	52	
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	RayDat PLP-24Ex 1/2" NPT	127 594	PLP-24Ex 1/2" NPT	127 560		56	
	RayDat PLP-24Ex M20x1.5	127 595	PLP-24Ex M20x1.5	127 561		56	
	RayDat PLP-24Ex G 1/2"	127 596	PLP-24Ex G 1/2"	127 562		56	
	RayDat PLP2-24Ex 1/2" NPT	127 600	PLP2-24Ex 1/2" NPT	127 566		56	
	RayDat PLP2-24Ex M20x1.5	127 601	PLP2-24Ex M20x1.5	127 567		56	
	RayDat PLP2-24Ex G 1/2"	127 602	PLP2-24Ex G 1/2"	127 568		56	
	RayDat PLP2-48 Ex 1/2" NPT	127 597	PLP2-48 Ex 1/2" NPT	127 563		56	
	RayDat PLP2-48 Ex M20x1.5	127 598	PLP2-48 Ex M20x1.5	127 564		56	
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	RayDat PLP-24/5 Ex 1/2" NPT	127 603	PLP-24/5 Ex 1/2" NPT	127 569		56	
	RayDat PLP-24/5 Ex M20x1.5	127 604	PLP-24/5 Ex M20x1.5	127 570		56	
	RayDat PLP-24/5 Ex G 1/2"	127 605	PLP-24/5 Ex G 1/2"	127 571		56	
	RayDat PLP3L-24Ex 1/2" NPT	127 606	PLP3L-24Ex 1/2" NPT	127 579		56	
	RayDat PLP3L-24Ex M20x1.5	127 607	PLP3L-24Ex M20x1.5	127 580		56	
RayDat PLP3L-24Ex G 1/2"	127 608	PLP3L-24Ex G 1/2"	127 581		56		

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	Protec DMDR 20/48V	510 833	Protec DMDR 20/48V	515 053	1TE	60
	Protec DMDR 20/60V	510 834	Protec DMDR 20/60V	515 054	1TE	60
	Protec DMDR 20/120V	510 835	Protec DMDR 20/120V	515 055	1TE	60
	Module Protec DMDR 20/24V	510 784	Module Protec DMDR 20/24V	515 086	1TE	60
	Module Protec DMDR 20/48V	510 836	Module Protec DMDR 20/48V	515 087	1TE	60
	Module Protec DMDR 20/60V	510 837	Module Protec DMDR 20/60V	515 088	1TE	60
	Module Protec DMDR 20/120V	510 838	Module Protec DMDR 20/120V	515 089	1TE	60
	RayDat PSC-2-12	7086.83	SMH-PS 12V	7081.20	2/3TE	62
	RayDat PSC-2-24	7086.84	SMH-PS 24V	7081.21	2/3TE	62
	RayDat PSC-2-48	7086.85	SMH-PS 48V	7081.22	2/3TE	62
	RayDat PSC-2-12M	7086.86	Module SMH-PS 12M	7081.25	2/3TE	62
	RayDat PSC-2-24M	7086.87	Module SMH-PS 24M	7081.26	2/3TE	62
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	RayDat NET 5 16-19	706 141	LZ 16 NET 19	706 111		70
	RayDat NET 5 24-19	706 142	LZ 24 NET 19	706 112		70
	RayDat NET 5 8-19 PoE	706 144	LZ 8 NET 19 PoE	706 130		70
	RayDat NET 5 16-19 PoE	706 145	LZ 16 NET 19 PoE	706 131		70
	RayDat NET 5 24-19 PoE	706 146	LZ 24 NET 19 PoE	706 132		70
	RayDat NET 5 8-19M	706 143	LZ 8 NET 19M	706 113		70
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	RayDat CP BNC-FF-180	800 851	CCP 180-BNC-FF	800 730		88
	RayDat CP BNC-FF-280	800 852	CCP 280-BNC-FF	800 731		88
	RayDat CP BNC-MF-70	800 853	CCP 70-BNC-MF	800 732		88
	RayDat CP BNC-MF-180	800 854	CCP 180-BNC-MF	800 733		88
	RayDat CP BNC-MF-280	800 855	CCP 280-BNC-MF	800 734		88
	RayDat CP 7/16-MF-70	800 856	CCP 70-7/16-MF	800 720		90
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	RayDat CP UHF-FF-180	800 870	CCP 180-UHF-FF	800 736		98
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