Raycap

RayDat Narrow Data & Signal Line System Protection

C A T A L O G

About Raycap

Raycap was founded in 1987 with a vision of creating and providing solutions that protect the world's infrastructure. From telecommunications to new traditional energy networks, and from transportation systems to industrial applications of all types, Raycap is there with solutions to ensure equipment uptime in spite of harsh electrical environments. The company strives to keep its customers' sophisticated, mission-critical equipment running seamlessly and continuously, and is driven to make ongoing advancements in its surge protection technologies and product offerings.

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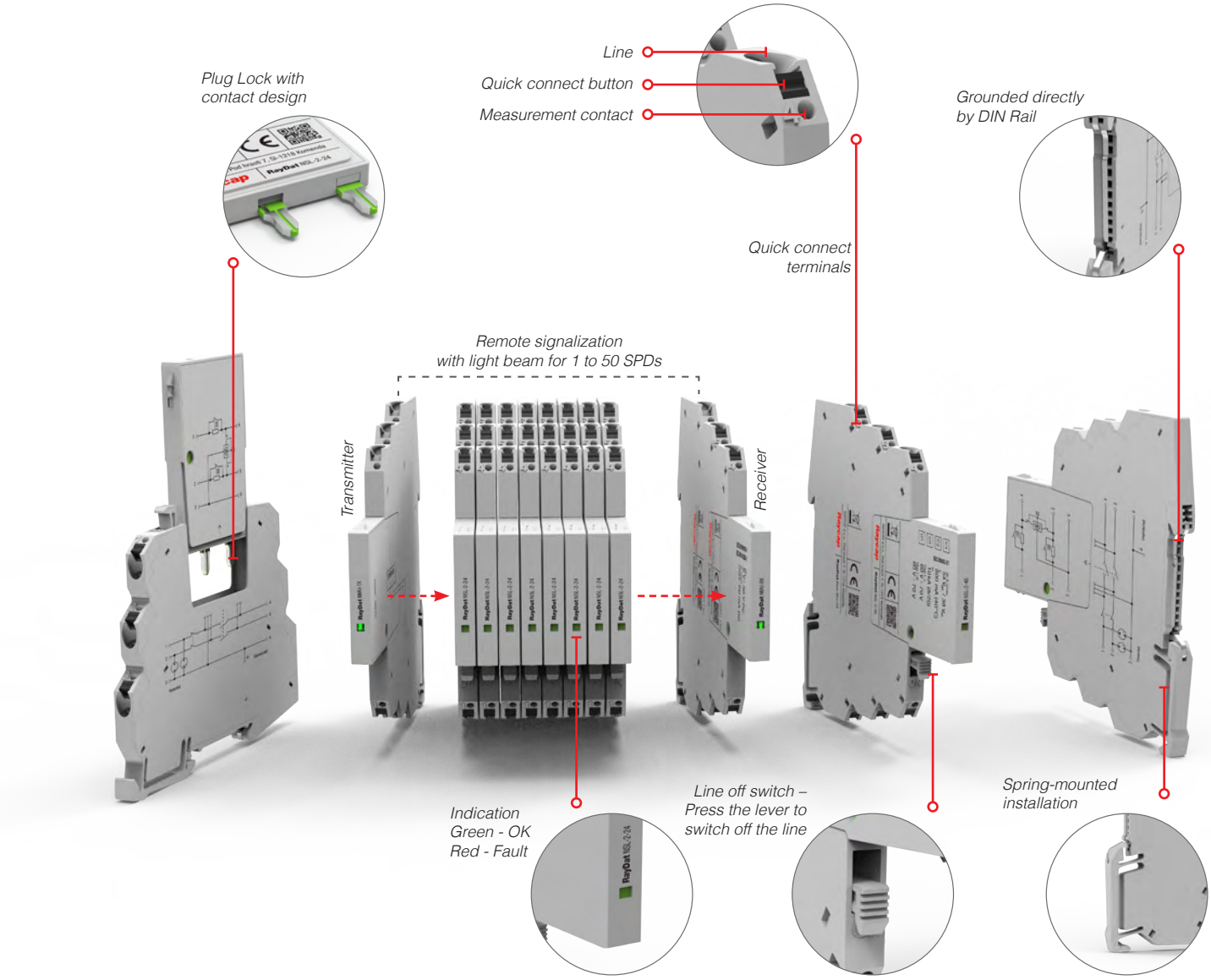
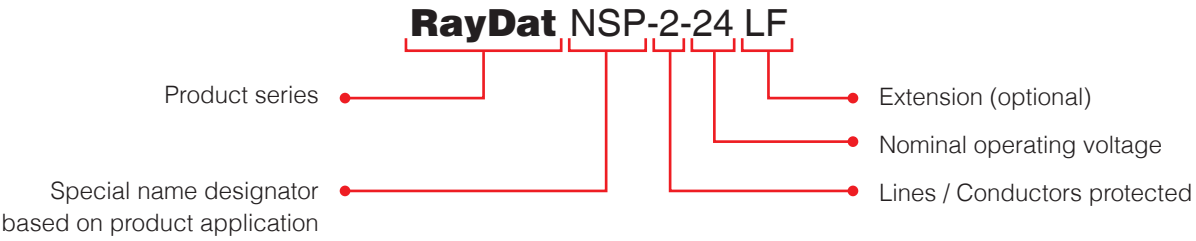
RayDat Narrow Modular Features

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

- All SPDs can be monitored remotely for alarm/defect messages
- Products may be manually disconnected, and their signals monitored/measured in the field or the control room
- Each quick connect terminal has its own measurement point
- The grounding clip enables surge dissipation to the ground and provides a secure connection to the DIN Rail
- No tools are required for assembly
- If the fine SPD protection elements (Diodes) become defective, protection remains in place via basic Gas Discharge Tube protection
- Low damping enables usage for longer distances



Naming Convention



NSL	Narrow Signal protection for Lines with high surge capability
NSP	Narrow Signal protection for Pairs with high surge capability
NSP/0	Version with ‘0’ ohm resistance
NPS	Narrow Power Supply protection used with signal systems
NSB	Narrow Signal protection for Bus systems with high surge capability
NMU	Narrow Monitoring Unit
TX	Monitoring Unit Transmitter
RX	Monitoring Unit Receiver
M	Extension for Module
LF	Low Frequency product version

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

Signal Line Systems

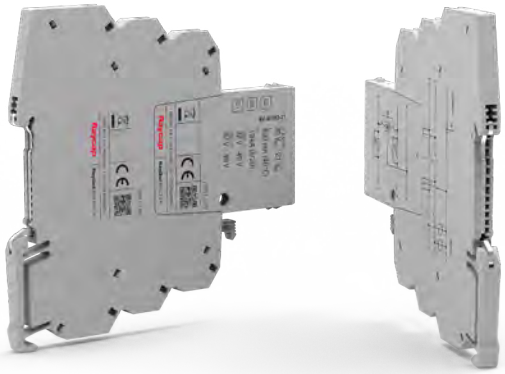
RayDat NSL-2 LF Series
RayDat NSL-2 Series

Special features:

- Narrow form factor - just 6.2 mm wide
- Very high surge ratings
- Different shield-handling options available
- The connection lines remain enabled during module replacement (hot swapping)
- Equipped with quick connect terminals for fast wiring

Application:

- Signals and communication circuits which could be isolated from ground



Raycap offers surge protectors for a variety of analog signal lines. In industrial operations, analog signals are used in control systems for sensing and measurement purposes.

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

Sensors such as temperature sensors, pressure sensors, level sensors, and position sensors generate analog signals that provide continuous and precise information about the physical parameters being measured.

Due to their internal configuration, RayDat analog signal protection products can also protect high-frequency signals.

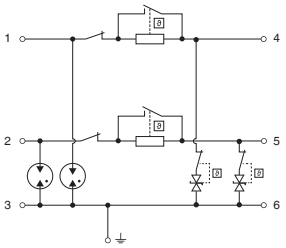
RoHS COMPLIANT CE UL LISTED

Modular SPD for Single Pair

RayDat NSL-2 LF Series

D1 • C1 • C2 • C3

IEC/EN Category: D1/C1/C2/C3
Voltages: 5, 12, 24 V DC
Frequency Range: up to 1 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition
Configuration:

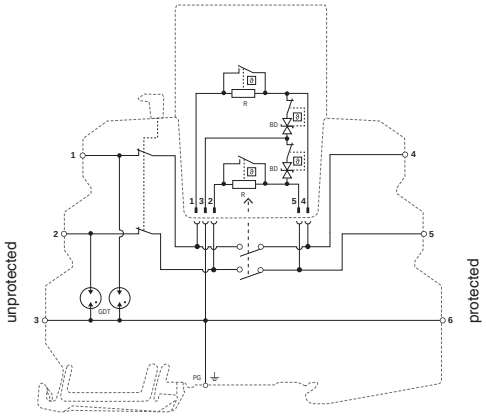


Technical Data

RayDat NSL-2-xx LF Series			5	12	24
Electrical					
Lines Protected				1 (2 Conductors)	
Nominal Operating Voltage (DC)		U_n	5 V	12 V	24 V
Maximum Continuous Operating Voltage (DC)		U_c	8.5 V	15 V	30 V
Rated Load Current at 40 °C		I_L		800 mA	
Rated Load Current at 70 °C		I_L		600 mA	
C2 Nominal Discharge Current (8/20 µs)	(Line-Line)	I_n		10 kA	
	(Line-Ground)			10 kA	
C2 Total Nominal Discharge Current (8/20 µs)		I_n		20 kA	
C2 Voltage Protection Level (10 kV / 5 kA)	(Line-Line)	U_p	80 V	100 V	160 V
	(Line-Ground)		100 V	110 V	140 V
C3 Voltage Protection Level (1 kV / µs)	(Line-Line)	U_p	48 V	60 V	120 V
	(Line-Ground)		24 V	30 V	60 V
D1 Impulse Current (10/350 µs)	(Line-Line)	I_{imp}		2.5 kA	
	(Line-Ground)			2.5 kA	
D1 Total Impulse Current (10/350 µs)		I_{imp}		5 kA	
Rated Spark Overvoltage	(Line-Line)		18 V - 46 V	32 V - 62 V	66 V - 98 V
	(Line-Ground)		9 V - 23 V	16 V - 31 V	33 V - 49 V
Response Time Overvoltage Protection		t_A		< 1 ns	
Thermal Protection				Yes	
Insulation Resistance of the Protection	(Line-Line)	R_{iso}	> 340 kΩ	> 7.5 MΩ	> 15 MΩ
Serial Resistance per Path		R		1 Ω	
Capacitance	(Line-Line)	C	typ. 5 nF	typ. 3 nF	typ. 1.5 nF
	(Line-Ground)		typ. 10 nF	typ. 6 nF	typ. 3 nF
Maximum Frequency		f_G	250 kHz	500 kHz	1 MHz
Mechanical					
Temperature Range				-40 °F to +176 °F [-40 °C to +80 °C]	
Conductor Cross Section (max.)				12 AWG / 4 mm² (solid)	
				14 AWG / 2.5 mm² (flexible)	
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	
Operating State / Fault Indication				Green Flag / Red Flag	
Order Information					
Order Code			**5**	**12**	**24**
NSL-2-xx LF			7088.32	7088.34	7088.36
NSL-2-xxM LF (module)			7088.33	7088.35	7088.37

RayDat NSL-2 LF Series

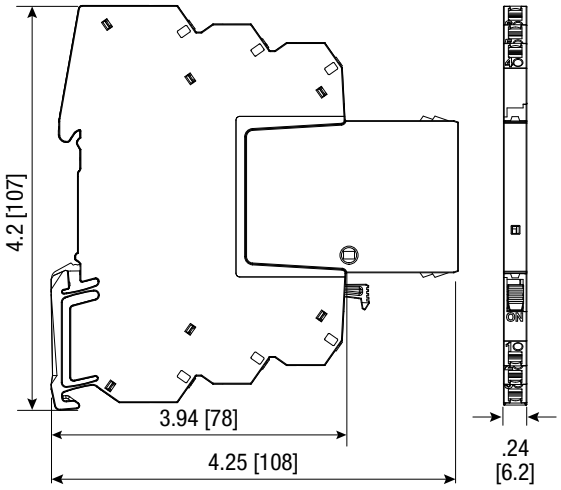
Configuration



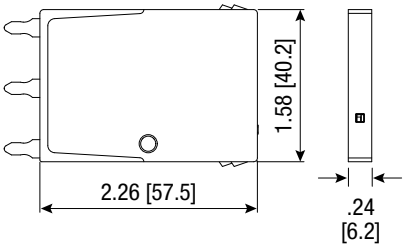
Legend

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

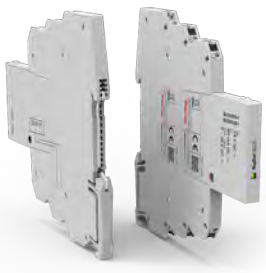
Dimensions & Packaging



NSL-2-xx LF Series	5	12	24
Dimensions			
Weight per Unit		2.12 oz [60 g]	
Dimensions DIN 43880		.24" [6.2 mm]	
Packaging Dimensions (Single Unit)		4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]	
Minimum Package Quantity		15 pieces	



NSL-2-xxxM LF Series	5	12	24
Dimensions			
Weight per Unit		0.56 oz [16 g]	
Packaging Dimensions (Single Unit)		4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]	
Minimum Package Quantity		15 pieces	



Monitoring Unit Transmiter & Receiver available for all product variants.

inches
[mm]

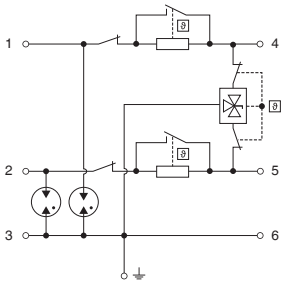
RoHS COMPLIANT

Modular SPD for Single Pair

RayDat NSL-2 Series

D1 • C1 • C2 • C3

IEC/EN Category: D1/C1/C2/C3
Voltages: 5, 12, 24, 48 V DC
Frequency Range: 120 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition
Configuration:

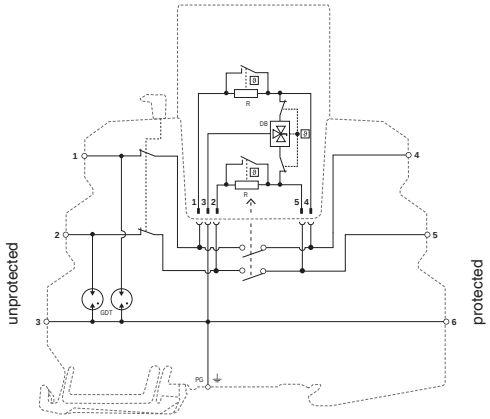


Technical Data

RayDat NSL-2-xx Series			5	12	24	48
Electrical						
Lines Protected				1 (2 Conductors)		
Nominal Operating Voltage (DC)		U_n	5 V	12 V	24 V	48 V
Maximum Continuous Operating Voltage (DC)		U_c	8.5 V	15 V	30 V	54 V
Rated Load Current at 40 °C		I_L		800 mA		
Rated Load Current at 70 °C		I_L		600 mA		
C2 Nominal Discharge Current (8/20 µs)	(Line-Line)	I_n		10 kA		
	(Line-Ground)			10 kA		
C2 Total Nominal Discharge Current (8/20 µs)		I_n		20 kA		
C2 Voltage Protection Level (10 kV / 5 kA)	(Line-Line)	U_p	140 V	150 V	170 V	210 V
	(Line-Ground)		260 V	270 V	290 V	300 V
C3 Voltage Protection Level (1 kV / µs)	(Line-Line)	U_p	24 V	36 V	70 V	130 V
	(Line-Ground)		24 V	36 V	70 V	130 V
D1 Impulse Current (10/350 µs)	(Line-Line)	I_{imp}		2.5 kA		
	(Line-Ground)			2.5 kA		
D1 Total Impulse Current (10/350 µs)		I_{imp}		5 kA		
Rated Spark Overvoltage	(Line-Line)		9 V - 25 V	16 V - 33 V	33 V - 51 V	60 V - 81 V
	(Line-Ground)		9 V - 25 V	16 V - 33 V	33 V - 51 V	60 V - 81 V
Response Time Overvoltage Protection		t_A		< 1 ns		
Thermal Protection				Yes		
Insulation Resistance of the Protection	(Line-Line)	R_{iso}	> 170 kΩ	> 7.5 MΩ	> 15 MΩ	> 27 MΩ
Serial Resistance per Path		R		1 Ω		
Capacitance	(Line-Line)	C		typ. 25 pF		
	(Line-Ground)			typ. 20 pF		
Maximum Frequency		f_G		120 MHz		
Mechanical						
Temperature Range				-40 °F to +176 °F [-40 °C to +80 °C]		
Conductor Cross Section (max.)				12 AWG / 4 mm² (solid)		
				14 AWG / 2.5 mm² (flexible)		
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		
Operating State / Fault Indication				Green Flag / Red Flag		
Order Information						
Order Code			5	12	24	48
NSL-2-xx			7088.26	7088.28	7088.01	7088.30
NSL-2-xxM (module)			7088.27	7088.29	7088.02	7088.31

RayDat NSL-2 Series

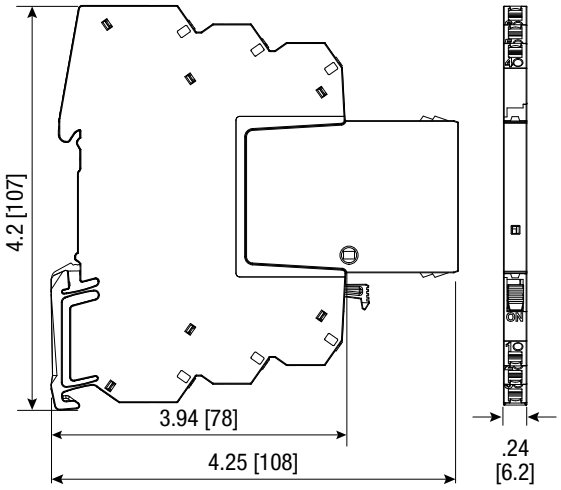
Configuration



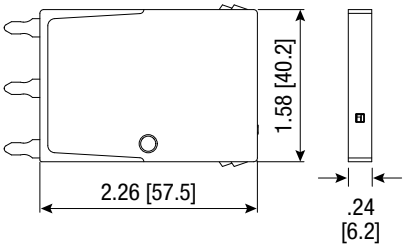
Legend

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

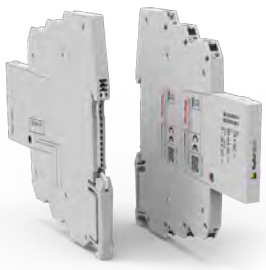
Dimensions & Packaging



NSL-2-xx Series	5	12	24	48
Dimensions				
Weight per Unit	2.12 oz [60 g]			
Dimensions DIN 43880	.24" [6.2 mm]			
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]			
Minimum Package Quantity	15 pieces			



NSL-2-xxxM Series	5	12	24	48
Dimensions				
Weight per Unit	0.56 oz [16 g]			
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]			
Minimum Package Quantity	15 pieces			



Monitoring Unit Transmitter & Receiver available for all product variants.

inches
[mm]

RoHS COMPLIANT

Notes

Modular Surge Protective Devices (SPDs)
for Single Pair Systems

RayDat NSP-2 LF Series
RayDat NSP-2 Series

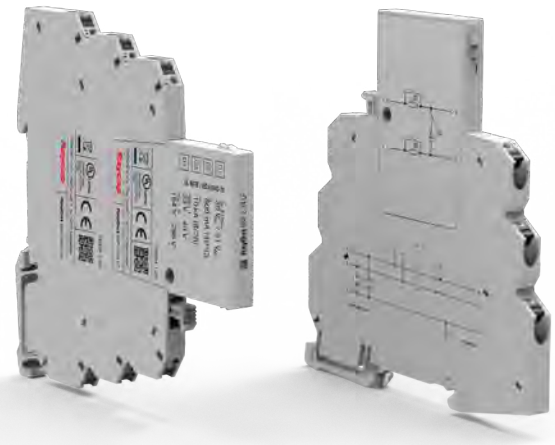
Single Pair Systems

Special features:

- Narrow form factor - just 6.2 mm wide
- Very high surge ratings
- Different shield-handling options available
- The connection lines remain enabled during module replacement (hot swapping)
- Equipped with quick connect terminals for fast wiring

Application:

- Current loops



Raycap offers surge protectors for a variety of analog signal lines. In industrial operations, analog signals are used in control systems for sensing and measurement purposes.

The RayDat SP Series of surge protective devices has been developed to protect a pair loop, which could be ungrounded onto data, signal and communication circuits. It is intended for those applications where high ground potential rises may frequently occur, such as locations close to electric railways. Sensors such as temperature sensors, pressure sensors, level sensors, and position sensors generate analog signals that provide continuous and precise information about the physical parameters being measured.

Due to their internal configuration, RayDat analog signal protection products can also protect high-frequency signals.

inches
[mm]

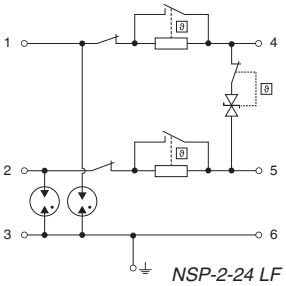
RoHS COMPLIANT CE UL LISTED

Modular Low Frequency SPD for Single Pair

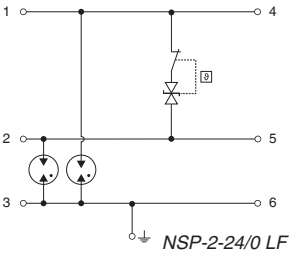
RayDat NSP-2 LF Series

D1 • C1 • C2 • C3

IEC/EN Category: D1/C1/C2/C3
Voltages: 24, 24/0 V DC
Frequency Range: 1.5 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21, UL 497B 4th Edition
Configuration:



NSP-2-24 LF



NSP-2-24/0 LF

Technical Data

NSP-2 LF Series			24	24/0
Electrical				
Lines Protected			1 (2 Conductors)	
Nominal Operating Voltage (DC)		U_n	24 V	24 V
Maximum Continuous Operating Voltage (DC)		U_c	30 V	30 V
Rated Load Current at 40 °C		I_L	800 mA	12 A
Rated Load Current at 70 °C		I_L	600 mA	10 A
C2 Nominal Discharge Current (8/20 µs)	(Line-Line)	I_n	10 kA	250 A
	(Line-Ground)		10 kA	
C2 Total Nominal Discharge Current (8/20 µs)		I_n	20 kA	
C2 Voltage Protection Level (10 kV / 5 kA)	(Line-Line)	U_p	140 V	-
	(Line-Ground)		950 V	950 V
C3 Voltage Protection Level (1 kV / µs)	(Line-Line)	U_p	60 V	60 V
	(Line-Ground)		650 V	
D1 Impulse Current (10/350 µs)	(Line-Line)	I_{imp}	2.5 kA	
	(Line-Ground)		2.5 kA	
D1 Total Impulse Current (10/350 µs)		I_{imp}	5 kA	
Rated Spark Overvoltage	(Line-Line)		33 V - 49 V	33 V - 51 V
	(Line-Ground)		184 V - 286 V	184 V - 286 V
Response Time Overvoltage Protection		t_A	< 1 ns	
Thermal Protection			Yes	
Insulation Resistance of the Protection	(Line-Line)	R_{iso}	> 15 MΩ	
Serial Resistance per Path		R	1 Ω	0.1 Ω
Capacitance	(Line-Line)	C	typ. 1 nF	typ. 1 nF
	(Line-Ground)		typ. 15 pF	
Maximum Frequency		f_G	1.5 MHz	
Mechanical				
Temperature Range			-40 °F to +176 °F [-40 °C to +80 °C]	
Conductor Cross Section (max.)			12 AWG / 4 mm² (solid)	
			14 AWG / 2.5 mm² (flexible)	
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	
Operating State / Fault Indication			Green Flag / Red Flag	

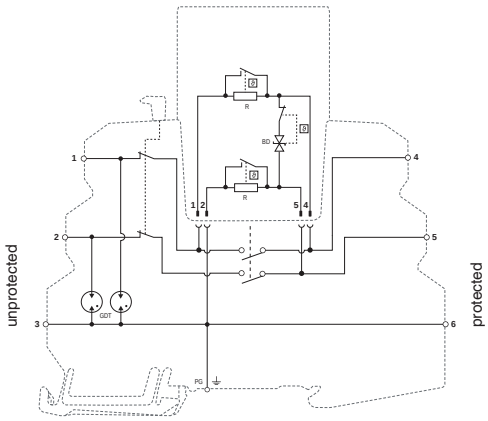
Order Information		
Order Code	**24**	**24/0**
NSP-2-xx LF	7088.03	7088.60
NSL-2-xxM LF (module)	7088.04	7088.61

RayDat NSP-2 LF Series

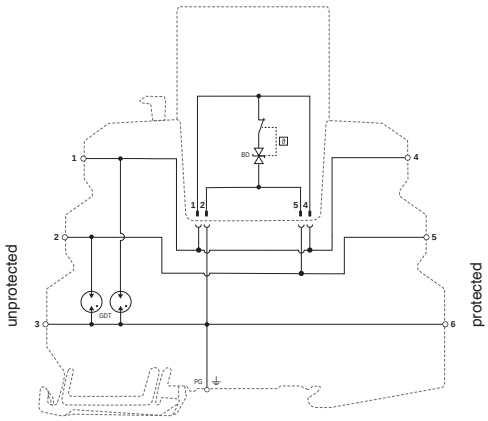
Configuration

Legend

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

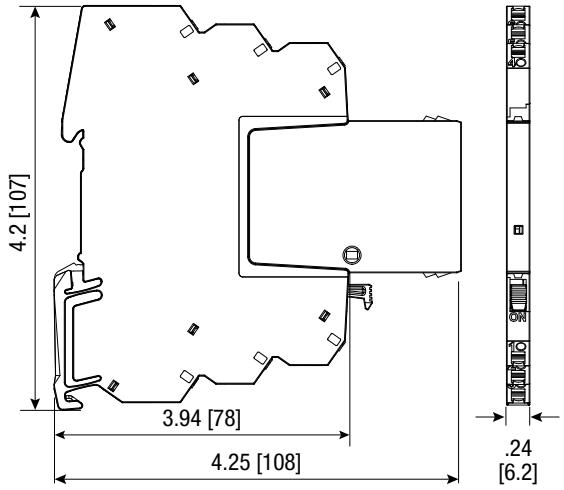


NSP-2-24 LF

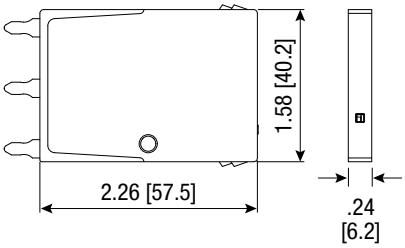


NSP-2-24/0 LF

Dimensions & Packaging



NSP-2 LF Series	24	24/0
Dimensions		
Weight per Unit	2.12 oz [60 g]	2.05 oz [58 g]
Dimensions DIN 43880	.24" [6.2 mm]	
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]	
Minimum Package Quantity	15 pieces	



NSP-2-xxxM LF Series	24	24/0
Dimensions		
Weight per Unit	0.56 oz [16 g]	0.49 oz [14 g]
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]	
Minimum Package Quantity	15 pieces	

Monitoring Unit Transmitter & Receiver available for all product variants.

inches
[mm]

RoHS COMPLIANT

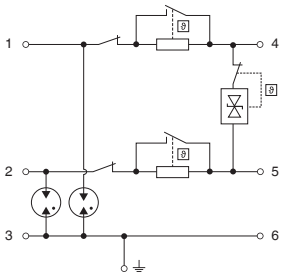
Modular SPD for Single Pair

RayDat NSP-2 Series

D1 • C1 • C2 • C3

IEC/EN Category: D1/C1/C2/C3
Voltages: 24, 110 V DC
Frequency Range: 120 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition

Configuration:



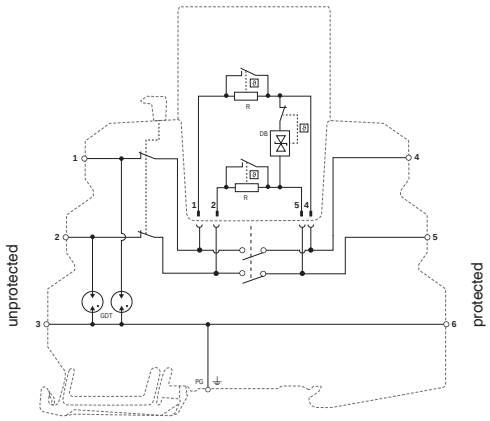
Technical Data

NSP-2 Series			24	110*
Electrical				
Lines Protected			1 (2 Conductors)	
Nominal Operating Voltage (DC)		U_n	24 V	110 V
Maximum Continuous Operating Voltage (DC)		U_c	30 V	170 V
Rated Load Current at 40 °C		I_L	800 mA	
Rated Load Current at 70 °C		I_L	600 mA	
C2 Nominal Discharge Current (8/20 µs)	(Line-Line)	I_n	10 kA	
	(Line-Ground)		10 kA	
C2 Total Nominal Discharge Current (8/20 µs)		I_n	20 kA	
C2 Voltage Protection Level (10 kV/5 kA)	(Line-Line)	U_p	180 V	400 V
	(Line-Ground)		950 V	980 V
C3 Voltage Protection Level (1 kV/µs)	(Line-Line)	U_p	70 V	300 V
	(Line-Ground)		650 V	
D1 Impulse Current (10/350 µs)	(Line-Line)	I_{imp}	2.5 kA	
	(Line-Ground)		2.5 kA	
D1 Total Impulse Current (10/350 µs)		I_{imp}	5 kA	
Rated Spark Overvoltage	(Line-Line)		33 V - 51 V	188 V - 255 V
	(Line-Ground)		184 V - 286 V	184 V - 276 V
Response Time Overvoltage Protection		t_A	< 1 ns	
Thermal Protection			Yes	
Insulation Resistance of the Protection	(Line-Line)	R_{iso}	> 15 MΩ	> 85 MΩ
Serial Resistance per Path		R	1 Ω	
Capacitance	(Line-Line)	C	typ. 25 pF	
	(Line-Ground)		typ. 15 pF	
Maximum Frequency		f_G	120 MHz	
Mechanical				
Temperature Range			-40 °F to +176 °F [-40 °C to +80 °C]	
Conductor Cross Section (max.)			12 AWG / 4 mm² (solid)	
			14 AWG / 2.5 mm² (flexible)	
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	
Operating State / Fault Indication			Green Flag / Red Flag	
Order Information				
Order Code			**24**	**110***
NSP-2-xx			7088.05	7088.07
NSP-2-xxM (module)			7088.06	7088.08

**No UL Certification.*

RayDat NSP-2 Series

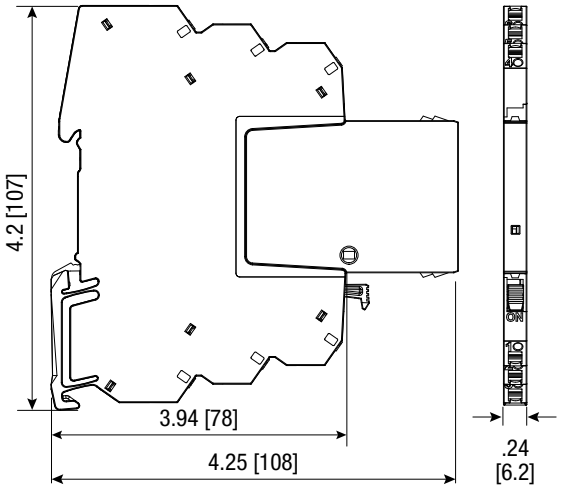
Configuration



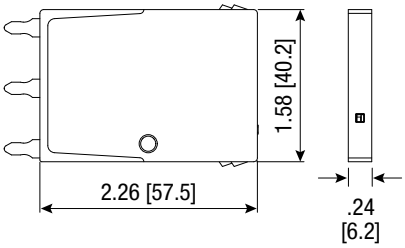
Legend

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

Dimensions & Packaging



NSP-2 Series	24	110*
Dimensions		
Weight per Unit	2.12 oz [60 g]	
Dimensions DIN 43880	.24" [6.2 mm]	
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]	
Minimum Package Quantity	15 pieces	



NSP-2-xxxM Series	24	110*
Dimensions		
Weight per Unit	0.56 oz [16 g]	
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]	
Minimum Package Quantity	15 pieces	

Monitoring Unit Transmitter & Receiver available for all product variants.

inches
[mm]

RoHS COMPLIANT

Notes

Surge Protective Devices
(SPDs) for Bus Systems

RayDat NSB-3 LF Series
RayDat NSB-3 Series

Bus Systems

Special features:

- Narrow form factor - just 6.2 mm wide
- Very high surge ratings
- Different shield-handling options available
- The connection lines remain enabled during module replacement (hot swapping)
- Equipped with quick connect terminals for fast wiring

Application:

- Fieldbus systems
  (CAN Bus, Profibus DP,
  RS 232/V.24 m, RS 485, Sinec L2)

Bus systems play a pivotal role in communicating between connected equipment in modern smart homes, offices, and factories. A wide range of electronic devices use digital signals. As the reliance on digital equipment grows, so does the need to protect these critical systems from electrical overvoltage.

The RayDat NSB-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). The products are intended for those applications where high ground potential rises may frequently occur, such as in locations close to electric railways.

RoHS COMPLIANT CE UL LISTED

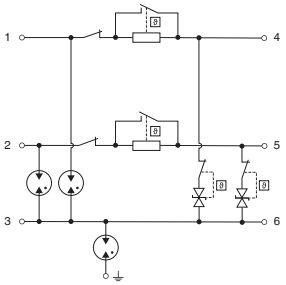
Modular SPD for Industrial Fieldbus Systems

RayDat NSB-3 LF Series

D1 • C1 • C2 • C3

IEC/EN Category: D1/C1/C2/C3
Voltages: 5, 12, 24, 48 V DC
Frequency Range: up to 4 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition

Configuration:

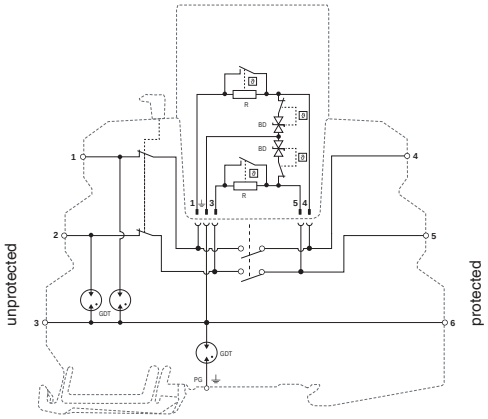


Technical Data

NSB-3 LF Series			5	12	24
Electrical					
Lines Protected				1 (3 Conductors)	
Nominal Operating Voltage (DC)		U_n	5 V	12 V	24 V
Maximum Continuous Operating Voltage (DC)		U_c	8.5 V	15 V	30 V
Rated Load Current at 40 °C		I_L		800 mA	
Rated Load Current at 70 °C		I_L		600 mA	
C2 Nominal Discharge Current (8/20 µs)	(Line-Line)	I_n		10 kA	
	(Line-Ground)			10 kA	
C2 Total Nominal Discharge Current (8/20 µs)		I_n		10 kA	
C2 Voltage Protection Level (10 kV / 5 kA)	(Line-Line)	U_p	80 V	100 V	160 V
	(Line-Ground)		1100 V	1100 V	1100 V
C3 Voltage Protection Level (1 kV / µs)	(Line-Line)	U_p	48 V	60 V	120 V
	(Line-Ground)		650 V	660 V	680 V
D1 Impulse Current (10/350 µs)	(Line-Line)	I_{imp}		2.5 kA	
	(Line-Ground)			2.5 kA	
D1 Total Impulse Current (10/350 µs)		I_{imp}		2.5 kA	
Rated Spark Overvoltage	(Line-Line)		18 V - 46 V	32 V - 62 V	66 V - 98 V
	(Line-Ground)		193 V - 334 V	200 V - 354 V	217 V - 360 V
Response Time Overvoltage Protection		t_A		< 1 ns	
Thermal Protection				Yes	
Insulation Resistance of the Protection	(Line-Line)	R_{iso}	> 340 kΩ	> 15 MΩ	> 30 MΩ
Serial Resistance per Path		R		1 Ω	
Capacitance	(Line-Line)	C	typ. 5 nF	typ. 2 nF	typ. 0.8 nF
	(Line-Ground)		typ. 10 pF	typ. 10 pF	typ. 10 pF
Maximum Frequency		f_G	550 kHz	1.2 MHz	2 MHz
Mechanical					
Temperature Range				-40 °F to +176 °F [-40 °C to +80 °C]	
Conductor Cross Section (max.)				12 AWG / 4 mm² (solid)	
				14 AWG / 2.5 mm² (flexible)	
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	
Operating State / Fault Indication				Green Flag / Red Flag	
Order Information					
Order Code			**5**	**12**	**24**
NSB-3-xx LF			7088.15	7088.17	7088.19
NSB-3-xxM LF (module)			7088.16	7088.18	7088.20

RayDat NSB-3 LF Series

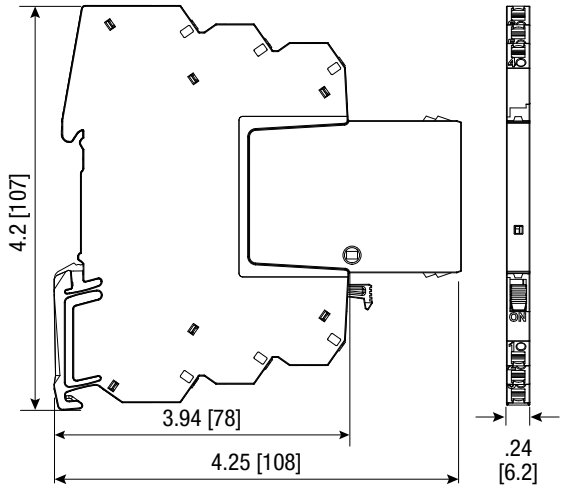
Configuration



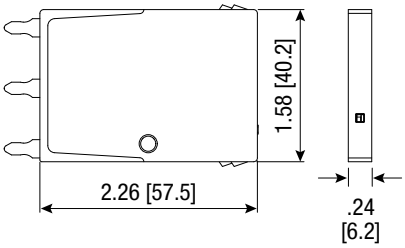
Legend

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

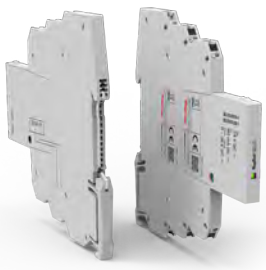
Dimensions & Packaging



NSB-3 LF Series	5	12	24
Dimensions			
Weight per Unit		2.12 oz [60 g]	
Dimensions DIN 43880		.24" [6.2 mm]	
Packaging Dimensions (Single Unit)		4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]	
Minimum Package Quantity		15 pieces	



NSB-3-xxxM LF Series	5	12	24
Dimensions			
Weight per Unit		0.56 oz [16 g]	
Packaging Dimensions (Single Unit)		4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]	
Minimum Package Quantity		15 pieces	



Monitoring Unit Transmitter & Receiver available for all product variants.

inches
[mm]

RoHS COMPLIANT

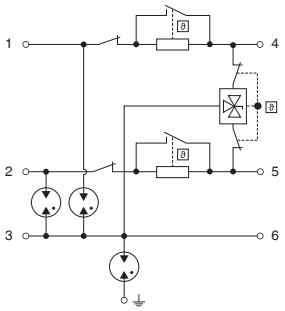
Modular SPD for Industrial Fieldbus Systems

RayDat NSB-3 Series

D1 • C1 • C2 • C3

IEC/EN Category: D1/C1/C2/C3
Voltages: 5, 12, 24, 48 V DC
Frequency Range: 120 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition

Configuration:

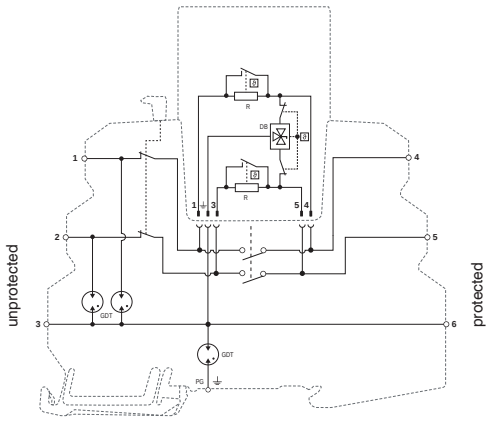


Technical Data

NSB-3 Series			5	12	24	48
Electrical						
Lines Protected				1 (3 Conductors)		
Nominal Operating Voltage (DC)		U_n	5 V	12 V	24 V	48 V
Maximum Continuous Operating Voltage (DC)		U_c	8.5 V	15 V	30 V	54 V
Rated Load Current at 40 °C		I_L		800 mA		
Rated Load Current at 70 °C		I_L		600 mA		
C2 Nominal Discharge Current (8/20 µs)	(Line-Line)	I_n		10 kA		
	(Line-Ground)			10 kA		
C2 Total Nominal Discharge Current (8/20 µs)		I_n		10 kA		
C2 Voltage Protection Level (10 kV/5 kA)	(Line-Line)	U_p	140 V	150 V	170 V	210 V
	(Line-Ground)		1100 V	1100 V	1100 V	1150 V
C3 Voltage Protection Level (1 kV/µs)	(Line-Line)	U_p	24 V	36 V	70 V	130 V
	(Line-Ground)		650 V	660 V	680 V	740 V
D1 Impulse Current (10/350 µs)	(Line-Line)	I_{imp}		2.5 kA		
	(Line-Ground)			2.5 kA		
D1 Total Impulse Current (10/350 µs)		I_{imp}		2.5 kA		
Rated Spark Overvoltage	(Line-Line)		9 V - 25 V	16 V - 33 V	33 V - 51 V	60 V - 81 V
	(Line-Ground)		193 V - 311 V	200 V - 319 V	217 V - 337 V	244 V - 367 V
Response Time Overvoltage Protection		t_A		< 1 ns		
Thermal Protection				Yes		
Insulation Resistance of the Protection	(Line-Line)	R_{iso}	> 170 kΩ	> 7.5 MΩ	> 15 MΩ	> 27 MΩ
Serial Resistance per Path		R		1 Ω		
Capacitance	(Line-Line)	C		typ. 25 pF		
	(Line-Ground)			typ. 10 pF		
Maximum Frequency		f_G		120 MHz		
Mechanical						
Temperature Range				-40 °F to +176 °F [-40 °C to +80 °C]		
Conductor Cross Section (max.)				12 AWG / 4 mm² (solid)		
				14 AWG / 2.5 mm² (flexible)		
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		
Operating State / Fault Indication				Green Flag / Red Flag		
Order Information						
Order Code			5	12	24	48
NSB-3-xx			7088.09	7088.11	7088.13	7088.54
NSB-3-xxM (module)			7088.10	7088.12	7088.14	7088.55

RayDat NSB-3 Series

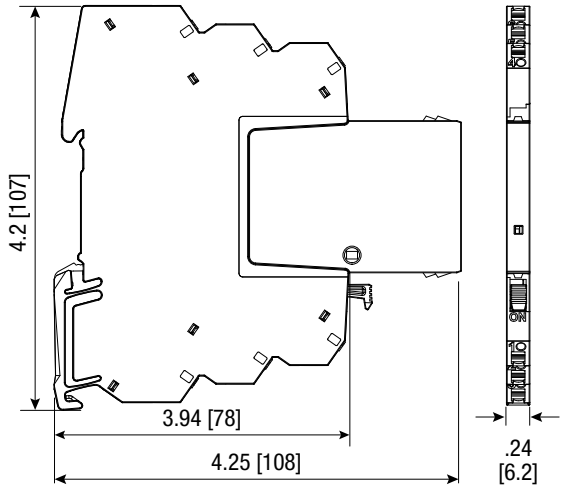
Configuration



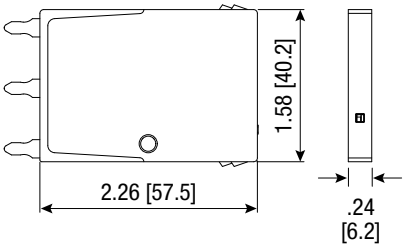
Legend

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

Dimensions & Packaging



NSB-3 Series	5	12	24	48
Dimensions				
Weight per Unit	2.12 oz [60 g]			
Dimensions DIN 43880	.24" [6.2 mm]			
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]			
Minimum Package Quantity	15 pieces			



NSB-3-xxxM Series	5	12	24	48
Dimensions				
Weight per Unit	0.56 oz [16 g]			
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]			
Minimum Package Quantity	15 pieces			

Monitoring Unit Transmitter & Receiver available for all product variants.

inches
[mm]

RoHS COMPLIANT

Notes

Modular Surge Protective Devices (SPDs)
for DC Power Systems in Signaling Applications

DC Power Systems for Signaling Applications

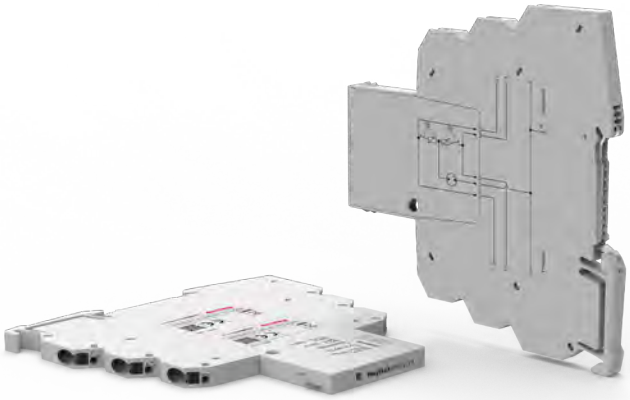
RayDat NPS-2 Series

Special features:

- Narrow form factor - just 6.2 mm wide
- High surge ratings
- Suitable for AC and DC power systems
- The connection lines remain enabled during module replacement (hot swapping)
- Equipped with quick connect terminals for fast wiring

Application:

- PoE - Power supplying lines used for Power over Ethernet signal lines and powerful signal lines



The RayDat Narrow Line series protects DC power lines in protocols that require the protection of both power and signal lines, such as the CAN bus and DeviceNet.

The RayDat NPS-2 Series is designed to protect power supplies. Protection is provided by a combination of gas discharge tube (GDT) and metal oxide varistor (MOV) technologies.

RoHS COMPLIANT CE UL LISTED

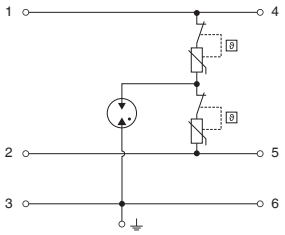
SPD for DC Power Systems

RayDat NPS-2 Series

C1 • C2 • C3

IEC/EN Category: C1/C2/C3
Voltages: 24, 48 V DC
Frequency Range: up to 800 kHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition

Configuration:

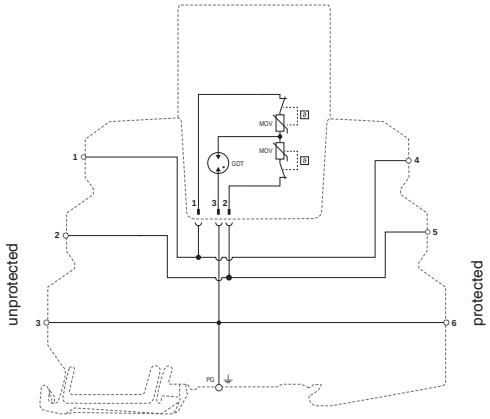


Technical Data

NPS-2 Series			24
Electrical			
Lines Protected			1 (2 Conductors)
Nominal Operating Voltage (DC)		U_n	24 V
Maximum Continuous Operating Voltage (DC)		U_c	38 V
Maximum Continuous Operating Voltage (AC)		U_c	38 V
Rated Load Current at 40 °C		I_L	12 A
Rated Load Current at 70 °C		I_L	10 A
C2 Nominal Discharge Current (8/20 µs)	(Line-Line)	I_n	4 kV / 2 kA
	(Line-Ground)		4 kV / 2 kA
C2 Total Nominal Discharge Current (8/20 µs)		I_n	8 kV / 4 kA
C2 Voltage Protection Level (4 kV / 2 kA)	(Line-Line)	U_p	250 V
	(Line-Ground)		650 V
C3 Voltage Protection Level (1 kV / µs)	(Line-Line)	U_p	200 V
	(Line-Ground)		700 V
Rated Spark Overvoltage	(Line-Line)		84 V - 106 V
	(Line-Ground)		72 V - 160 V
Response Time Overvoltage Protection		t_A	< 25 ns
Thermal Protection			Yes
Insulation Resistance of the Protection	(Line-Line)	R_{iso}	> 10 MΩ
Serial Resistance per Path		R	0.1 Ω
Capacitance	(Line-Line)	C	typ. 5 nF
	(Line-Ground)		typ. 10 pF
Maximum Frequency		f_G	550 kHz
Mechanical			
Temperature Range			-40 °F to +176 °F [-40 °C to +80 °C]
Conductor Cross Section (max.)			12 AWG / 4 mm² (solid)
			14 AWG / 2.5 mm² (flexible)
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
Operating State / Fault Indication			Green Flag / Red Flag
Order Information			
Order Code			**24**
NPS-2-xx			7088.21
NPS-2-xxM (module)			7088.22

RayDat NPS-2 Series

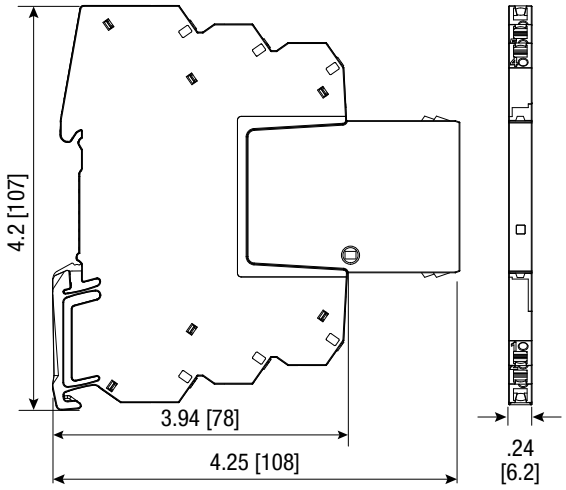
Configuration



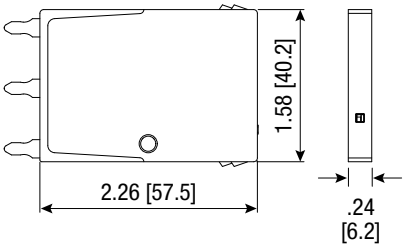
Legend

GDT Gas Discharge Tube
PG Protective Grounding
MOV Metal Oxide Varistor

Dimensions & Packaging



NPS-2 Series	24
Dimensions	
Weight per Unit	2.05 oz [58 g]
Dimensions DIN 43880	.24" [6.2 mm]
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]
Minimum Package Quantity	15 pieces



NPS-2-xxxM Series	24
Dimensions	
Weight per Unit	0.56 oz [16 g]
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]
Minimum Package Quantity	15 pieces

Monitoring Unit Transmitter & Receiver available for all product variants.

inches
[mm]

RoHS COMPLIANT

Notes

Monitoring Units for Surge Protective Devices (SPDs)

Monitoring Units

RayDat NMU Set
RayDat NMU-TX
RayDat NMU-RX

Special features:

- Narrow form factor - just 6.2 mm wide
- Up to 50 SPDs can be monitored with a pair of NMUs
- SPD failures are monitored by the receiving unit
- Each SPD has its own LED indicator for quick identification of any defect
- Used in systems ranging from 6 - 36 V DC
- Equipped with quick connect terminals for fast wiring

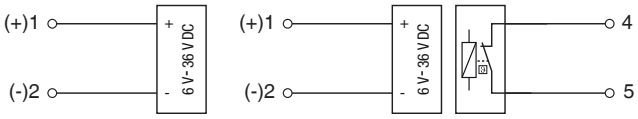
When placed on either end of a Narrow Line stack, the Monitoring Transmitter Unit (NMU-TX) & Receiver Unit (NMU-RX) will check the status of up to 50 surge protective devices in a row.

The monitoring devices have built-in LED indicators. To monitor the status of each SPD, the Transmitter Unit emits a directional light beam that travels through the individual products to the Receiver Unit.

RoHS COMPLIANT CE UL LISTED

Monitoring Unit
RayDat NMU Series

Voltages: 6 - 36 V DC System
Housing: Modular Design
Compliance: IEC/EN 61010-1
IEC/EN 61326-1
UL 497B 4th Edition



RayDat NMU-TX Series *RayDat NMU-RX Series*

Technical Data

NMU-TX Series

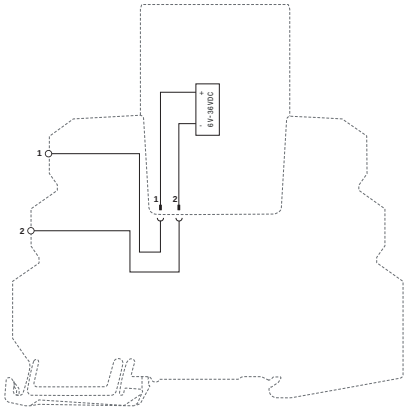
Electrical		
Maximum Number of Controlled SPDs		up to 50
Operation Voltage	U_{min} - U_{max}	6 - 36 V DC
Nominal Voltage	U_N	24 V DC
Operating Current	I	60 mA DC

NMU-RX Series

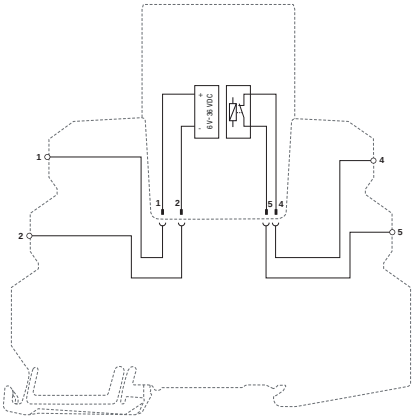
Electrical		
Maximum Number of Controlled SPDs		up to 50
Operation Voltage	U_{min} - U_{max}	6 - 36 V DC
Nominal Voltage	U_N	24 V DC
Operating Current	I	60 mA DC
Output (Remote Contact)	(Line 2 - 4)	max 50 V DC, max. 500 mA DC
Mechanical		
Temperature Range		-40 °F to +176 °F [-40 °C to +80 °C]
Conductor Cross Section (max.)		12 AWG / 4 mm² (solid)
		14 AWG / 2.5 mm² (flexible)
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
Operating State / Fault Indication (NMU-RX)		Green LED / Red LED / RC Contact
Operating State (NMU-TX)		Green LED
Order Information		
Order Code		
NMU Set (Monitoring Unit Set, Transmitter & Receiver)		7088.23
NMU-TX (Monitoring Unit Transmitter)		7088.24
NMU-RX (Monitoring Unit Receiver)		7088.25

RayDat NMU Series

Configuration

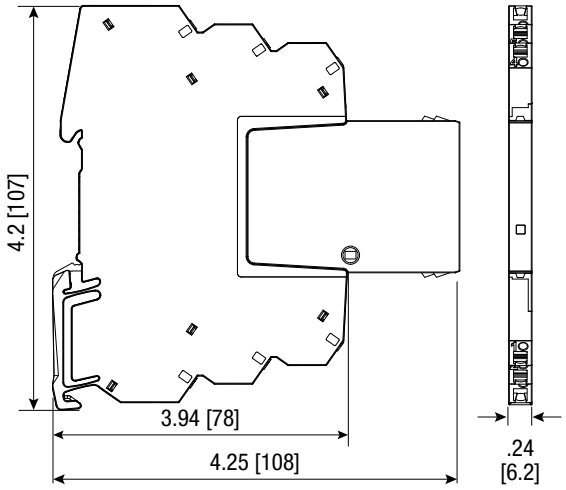


RayDat NMU-TX Series



RayDat NMU-RX Series

Dimensions & Packaging



NMU Set (NMU TX & NMU RX)

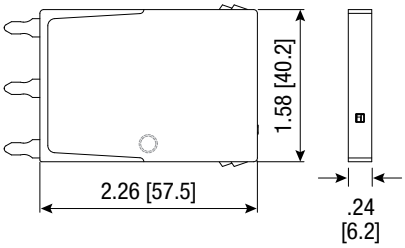
Dimensions	
Weight per Unit	3.60 oz [102 g]
Dimensions DIN 43880	.24" [6.2 mm]
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.73" [113 × 111 × 18.5 mm]
Minimum Package Quantity	9 pieces

NMU-TX Series

Dimensions	
Weight per Unit	1.76 oz [50 g]
Dimensions DIN 43880	.24" [6.2 mm]
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]
Minimum Package Quantity	15 pieces

NMU-RX Series

Dimensions	
Weight per Unit	1.83 oz [52 g]
Dimensions DIN 43880	.24" [6.2 mm]
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]
Minimum Package Quantity	15 pieces



NMU-TXM Series

Dimensions	
Weight per Unit	0.49 oz [14 g]
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]
Minimum Package Quantity	15 pieces

NMU-RXM Series

Dimensions	
Weight per Unit	0.49 oz [14 g]
Packaging Dimensions (Single Unit)	4.45 × 4.37 × 0.43" [113 × 111 × 11 mm]
Minimum Package Quantity	15 pieces

inches
[mm]

RoHS COMPLIANT

Notes

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Raycap Worldwide Locations

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