

The background of the entire page is a vibrant, futuristic cityscape at night. It features several tall, illuminated skyscrapers with glowing windows. Overlaid on the city are numerous vertical lines of light in shades of blue, purple, and pink, each topped with a small, glowing sphere, resembling a digital network or data flow. The overall aesthetic is high-tech and modern.

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.



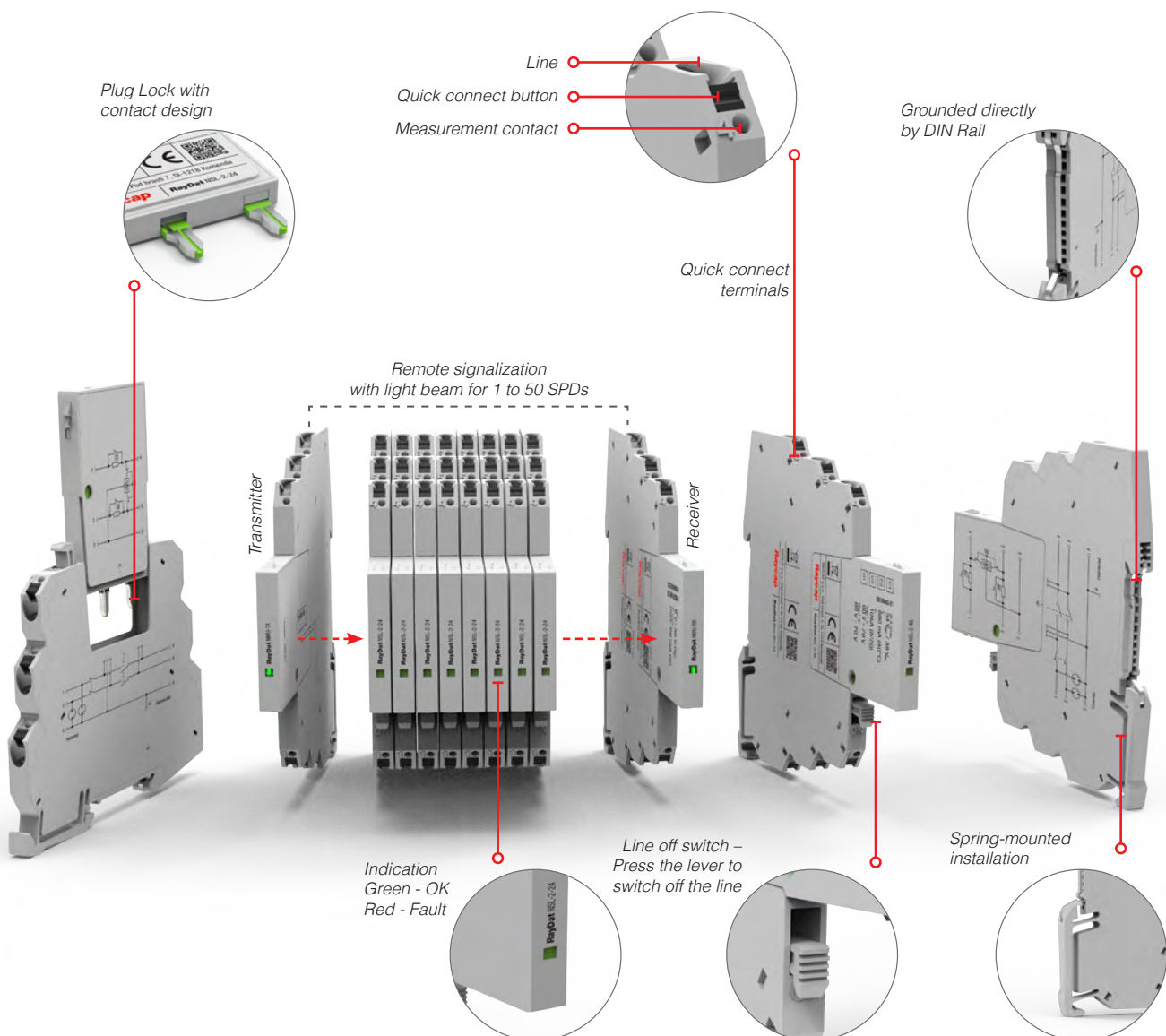
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RayDat Narrow Modular Features

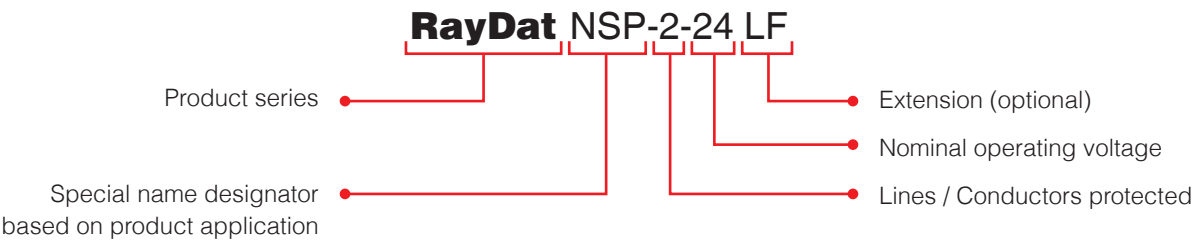
RayDat surge protection for data and signal line systems provides unsurpassed electrical protection for signal power applications. These products meet the diverse requirements of industrial and commercial signal protection applications. RayDat products are available in a variety of operating voltages 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

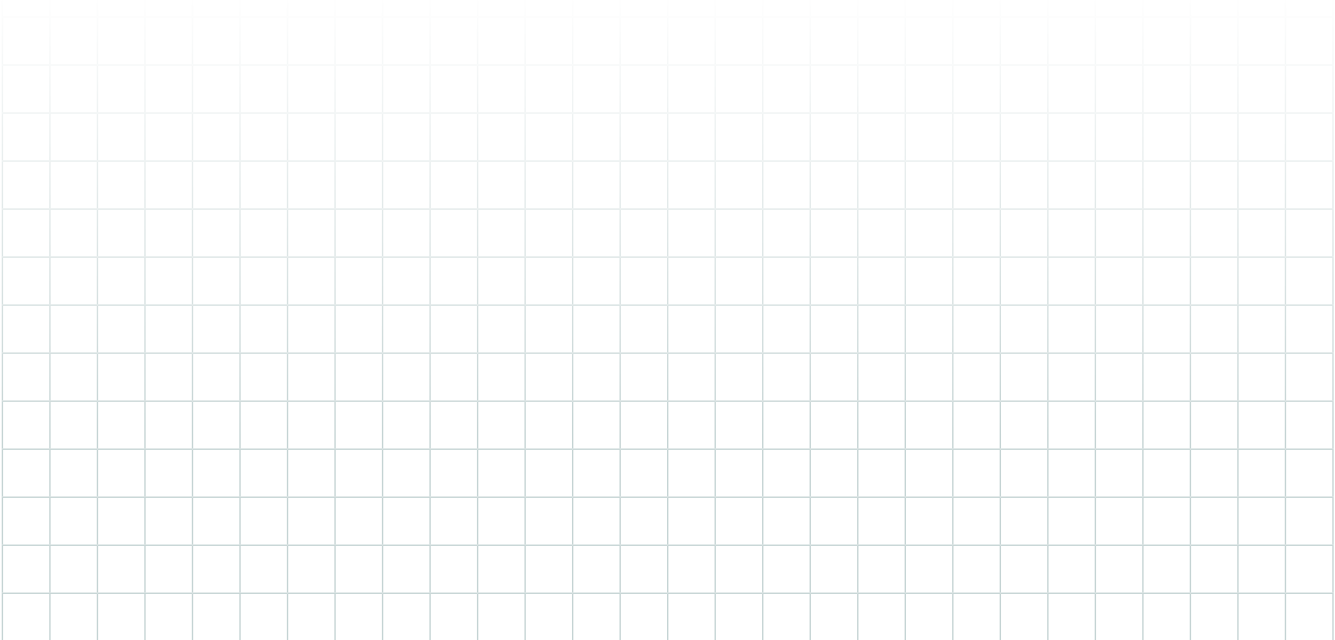




Naming Convention



- 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

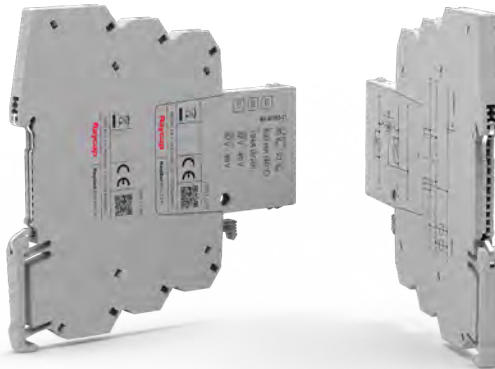
RayDat NSL-2 Series

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.

Modular SPD for Single Pair

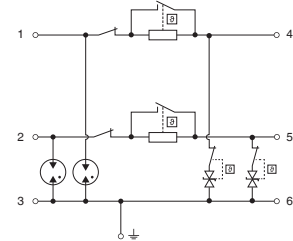
RayDat NSL-2 LF Series

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Voltages: 5, 12, 24V 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

Electrical

		5	12	24
Lines Protected		1 (2 Conductors)		
Nominal Operating Voltage (DC)	U_n	5V	12V	24V
Maximum Continuous Operating Voltage (DC)	U_c	8.5V	15V	30V
Rated Load Current at 40 °C	I_L		800 mA	
Rated Load Current at 70 °C	I_L		600 mA	
C2 Nominal Discharge Current (8/20µs)	(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 (10kV/5kA)	(Line-Line) U_p	80V	100V	160V
	(Line-Ground)	100V	110V	140V
C3 Voltage Protection Level (1 kV/µs)	(Line-Line) U_p	48V	60V	120V
	(Line-Ground)	24V	30V	60V
D1 Impulse Current (10/350µs)	(Line-Line) I_{imp}		2.5 kA	
	(Line-Ground)		2.5 kA	
D1 Total Impulse Current (10/350µs)	I_{imp}		5 kA	
Rated Spark Overvoltage	(Line-Line)	18V - 46V	32V - 62V	66V - 98V
	(Line-Ground)	9V - 23V	16V - 31V	33V - 49V
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 mm ² (solid)
	14 AWG / 2.5 mm ² (flexible)
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
Operating State / Fault Indication	Green Flag / Red Flag

Order Information

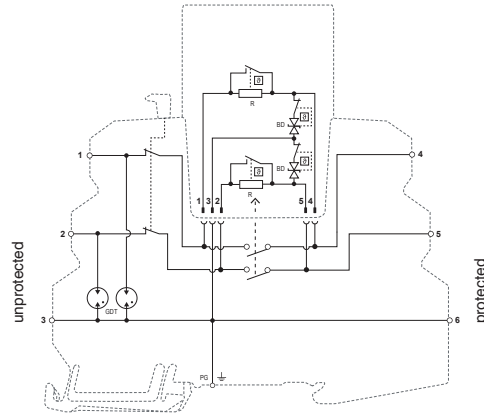
Order Code	5	12	24
NSL-2-xx LF	7088.32	7088.34	7088.36
NSL-2-xxM LF (module)	7088.33	7088.35	7088.37

RayDat NSL-2 LF Series

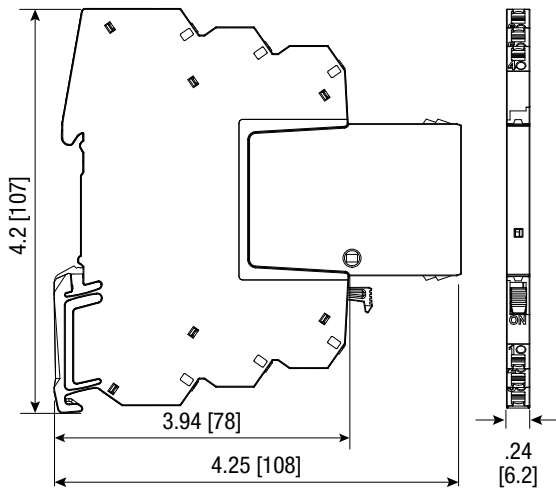
Configuration

Legend

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



Dimensions & Packaging



NSL-2-xx LF Series

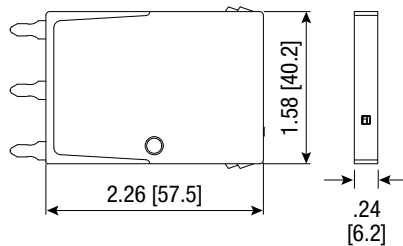
5

12

24

Dimensions

Weight per Unit	2.12 oz [60g]
Dimensions DIN 43880	.24" [6.2mm]
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 [16g]
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]

Modular SPD for Single Pair

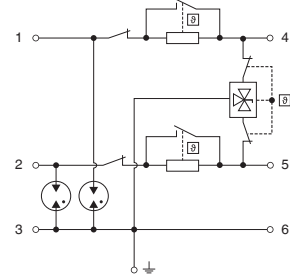
RayDat NSL-2 Series

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

Electrical

		5	12	24	48
Lines Protected		1 (2 Conductors)			
Nominal Operating Voltage (DC)	U_n	5V	12V	24V	48V
Maximum Continuous Operating Voltage (DC)	U_c	8.5V	15V	30V	54V
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 μ s)	(Line-Line) I_n	10 kA			
	(Line-Ground)	10 kA			
C2 Total Nominal Discharge Current (8/20 μ s)	I_n	20 kA			
C2 Voltage Protection Level (10 kV/5 kA)	(Line-Line) U_p	140V	150V	170V	210V
	(Line-Ground)	260V	270V	290V	300V
C3 Voltage Protection Level (1 kV/ μ s)	(Line-Line) U_p	24V	36V	70V	130V
	(Line-Ground)	24V	36V	70V	130V
D1 Impulse Current (10/350 μ s)	(Line-Line) I_{imp}	2.5 kA			
	(Line-Ground)	2.5 kA			
D1 Total Impulse Current (10/350 μ s)	I_{imp}	5 kA			
Rated Spark Overvoltage	(Line-Line)	9V - 25V	16V - 33V	33V - 51V	60V - 81V
	(Line-Ground)	9V - 25V	16V - 33V	33V - 51V	60V - 81V
Response Time Overvoltage Protection	t_A	< 1 ns			
Thermal Protection		Yes			
Insulation Resistance of the Protection	(Line-Line) R_{iso}	> 170 k Ω	> 7.5 M Ω	> 15 M Ω	> 27 M Ω
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 mm ² (solid)
	14 AWG / 2.5 mm ² (flexible)
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
Operating State / Fault Indication	Green Flag / Red Flag

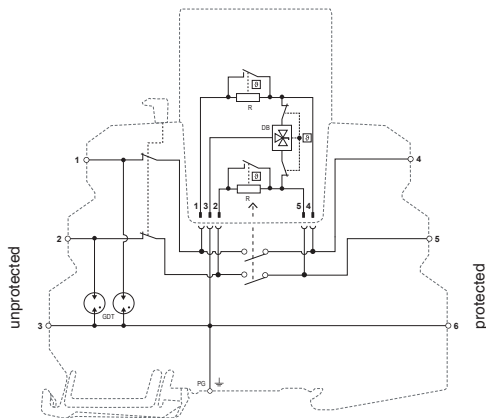
Order Information

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

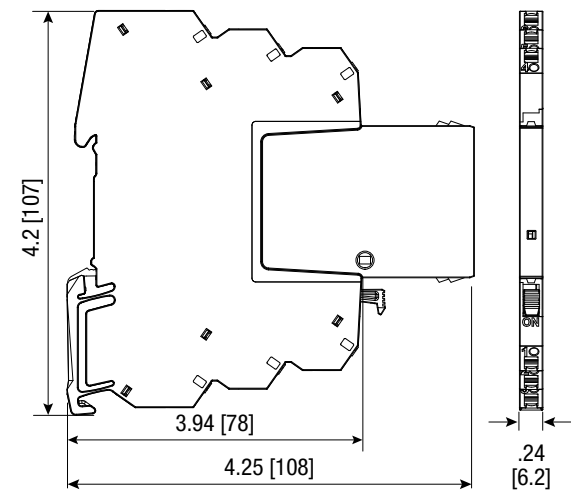
RayDat NSL-2 Series

Configuration

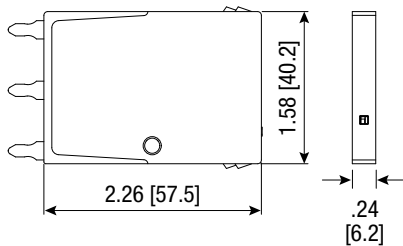
- Legend
- DB Diode Block
 - GDT Gas Discharge Tube
 - PG Protective Grounding
 - R Resistor



Dimensions & Packaging



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



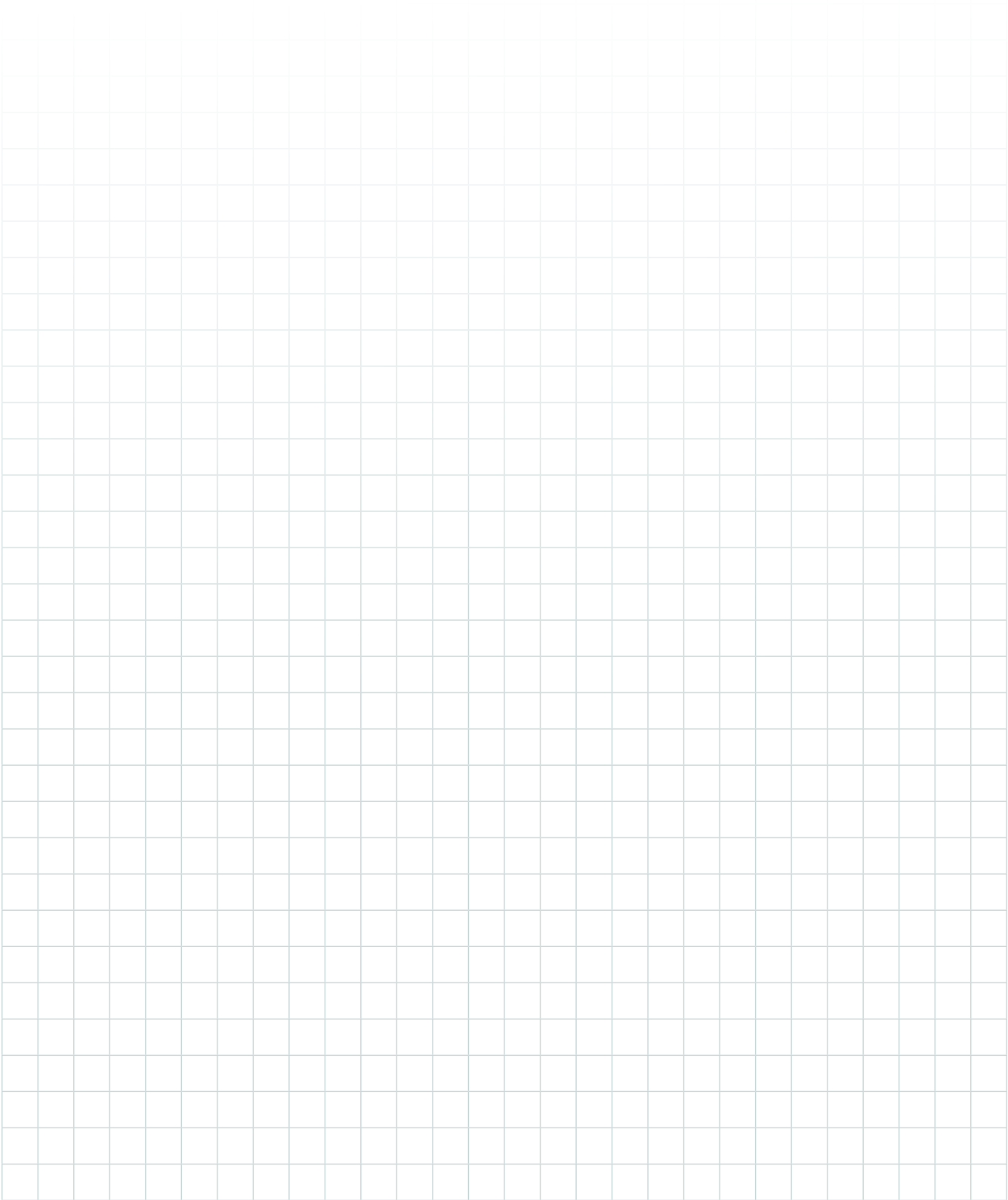
NSL-2-xxxM Series	5	12	24	48
Dimensions				
Weight per Unit	0.56 oz [16g]			
Packaging Dimensions (Single Unit)	4.45×4.37×0.43" [113×111×11 mm]			
Minimum Package Quantity	15 pieces			



Monitoring Unit
Transmitter
& Receiver
available for all
product variants.

inches
[mm]

Notes

A large grid of squares, resembling graph paper, intended for taking notes. The grid consists of 20 columns and 30 rows of squares. A solid dark gray rectangle is positioned to the left of the grid, spanning its full height.

Modular Surge Protective Devices (SPDs) for Single Pair Systems



Single Pair Systems

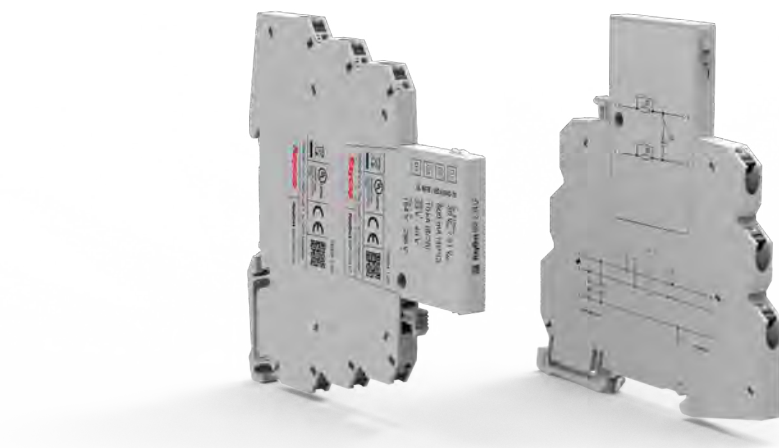
RayDat NSP-2 LF Series
RayDat NSP-2 Series

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:

- 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]

Modular Low Frequency SPD for Single Pair

RayDat NSP-2 LF Series

D1 • C1 • C2 • C3



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

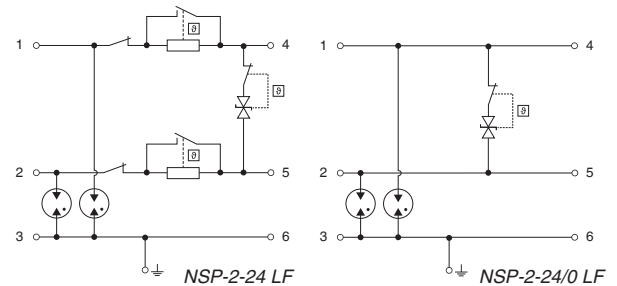
Voltages: 24, 24/0 V DC

Frequency Range: 1.5 MHz

Housing: Modular Design

Compliance: IEC/EN 61643-21, UL 497B 4th Edition

Configuration:



Technical Data

NSP-2 LF Series

Electrical

		24	24/0
Lines Protected		1 (2 Conductors)	
Nominal Operating Voltage (DC)	U_n	24V	24V
Maximum Continuous Operating Voltage (DC)	U_c	30V	30V
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 μ s)	(Line-Line) I_n	10 kA	250 A
	(Line-Ground)	10 kA	
C2 Total Nominal Discharge Current (8/20 μ s)	I_n	20 kA	
C2 Voltage Protection Level (10 kV/5 kA)	(Line-Line) U_p	140V	-
	(Line-Ground)	950V	950V
C3 Voltage Protection Level (1 kV/ μ s)	(Line-Line) U_p	60V	60V
	(Line-Ground)	650V	
D1 Impulse Current (10/350 μ s)	(Line-Line) I_{imp}	2.5 kA	
	(Line-Ground)	2.5 kA	
D1 Total Impulse Current (10/350 μ s)	I_{imp}	5 kA	
Rated Spark Overvoltage	(Line-Line)	33V - 49V	33V - 51V
	(Line-Ground)	184V - 286V	184V - 286V
Response Time Overvoltage Protection	t_A	< 1 ns	
Thermal Protection		Yes	
Insulation Resistance of the Protection	(Line-Line) R_{iso}	> 15 M Ω	
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 mm ² (solid)
	14 AWG / 2.5 mm ² (flexible)
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
Operating State / Fault Indication	Green Flag / Red Flag

Order Information

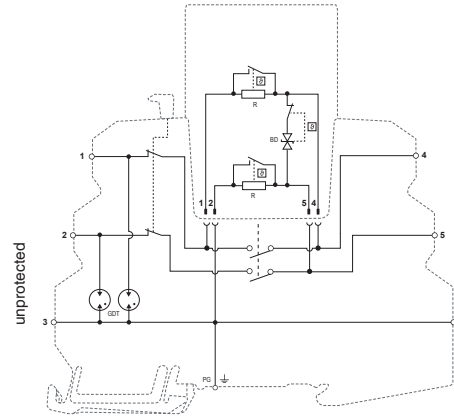
Order Code	24	24/0
NSP-2-xx LF	7088.03	7088.60
NSL-2-xxM LF (module)	7088.04	7088.61

RayDat NSP-2 LF Series

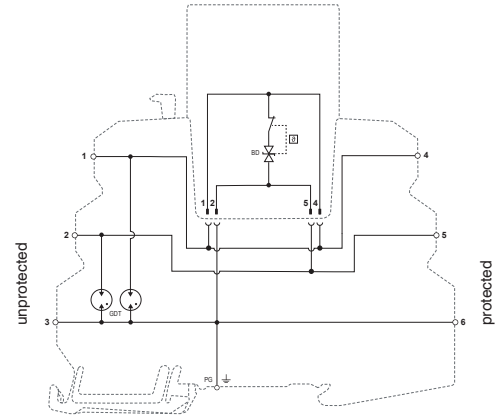
Configuration

Legend

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

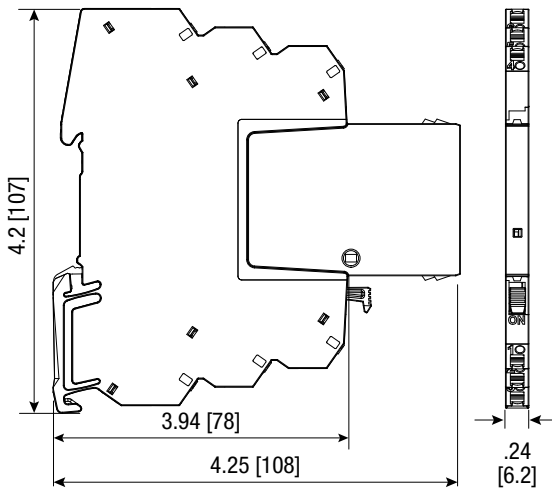


NSP-2-24 LF



NSP-2-24/0 LF

Dimensions & Packaging



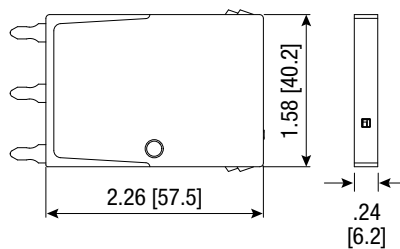
NSP-2 LF Series

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]

Modular SPD for Single Pair

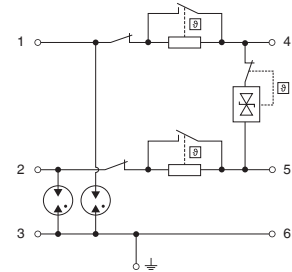
RayDat NSP-2 Series

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	24V	110V
Maximum Continuous Operating Voltage (DC)	U_c	30V	170V
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 μ s)	(Line-Line) I_n	10 kA	
	(Line-Ground)	10 kA	
C2 Total Nominal Discharge Current (8/20 μ s)	I_n	20 kA	
C2 Voltage Protection Level (10kV/5kA)	(Line-Line) U_p	180V	400V
	(Line-Ground)	950V	980V
C3 Voltage Protection Level (1 kV/ μ s)	(Line-Line) U_p	70V	300V
	(Line-Ground)	650V	
D1 Impulse Current (10/350 μ s)	(Line-Line) I_{imp}	2.5 kA	
	(Line-Ground)	2.5 kA	
D1 Total Impulse Current (10/350 μ s)	I_{imp}	5 kA	
Rated Spark Overvoltage	(Line-Line)	33V - 51V	188V - 255V
	(Line-Ground)	184V - 286V	184V - 276V
Response Time Overvoltage Protection	t_A	< 1 ns	
Thermal Protection		Yes	
Insulation Resistance of the Protection	(Line-Line) R_{iso}	> 15 M Ω	> 85 M Ω
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 mm ² (solid)		
	14 AWG / 2.5 mm ² (flexible)		
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		
Operating State / Fault Indication	Green Flag / Red Flag		

Order Information

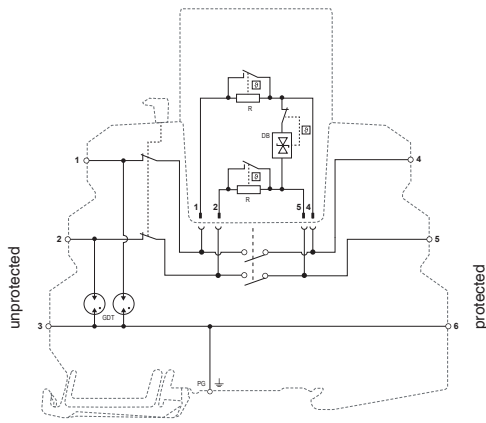
Order Code	24	110*
NSP-2-xx	7088.05	7088.07
NSP-2-xxM (module)	7088.06	7088.08

*No UL Certification.

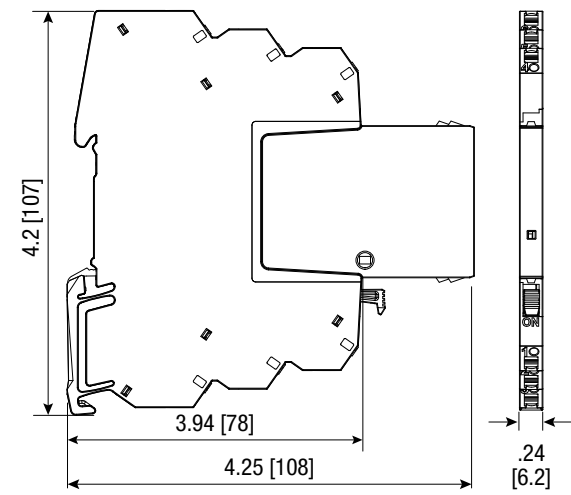
RayDat NSP-2 Series

Configuration

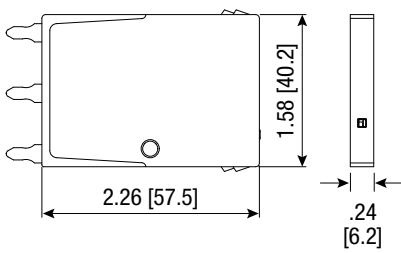
- Legend
- DB Diode Block
 - GDT Gas Discharge Tube
 - PG Protective Grounding
 - R Resistor



Dimensions & Packaging



NSP-2 Series	24	110*
Dimensions		
Weight per Unit	2.12 oz [60g]	
Dimensions DIN 43880	.24" [6.2mm]	
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 [16g]	
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]

Notes

Surge Protective Devices (SPDs) for Bus Systems



Bus Systems

RayDat NSB-3 LF Series
RayDat NSB-3 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:

- 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.

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

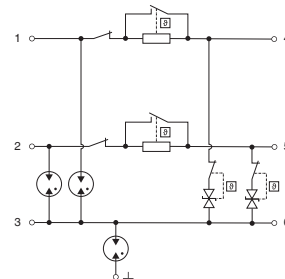
Frequency Range: up to 4 MHz

Housing: Modular Design

Compliance: IEC/EN 61643-21

UL 497B 4th Edition

Configuration:



Technical Data

NSB-3 LF Series

Electrical

		5	12	24
Lines Protected		1 (3 Conductors)		
Nominal Operating Voltage (DC)	U_n	5V	12V	24V
Maximum Continuous Operating Voltage (DC)	U_c	8.5V	15V	30V
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	80V	100V	160V
	(Line-Ground)	1100V	1100V	1100V
C3 Voltage Protection Level (1 kV/μs)	(Line-Line) U_p	48V	60V	120V
	(Line-Ground)	650V	660V	680V
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)	18V - 46V	32V - 62V	66V - 98V
	(Line-Ground)	193V - 334V	200V - 354V	217V - 360V
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 mm ² (solid)
	14 AWG / 2.5 mm ² (flexible)
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
Operating State / Fault Indication	Green Flag / Red Flag

Order Information

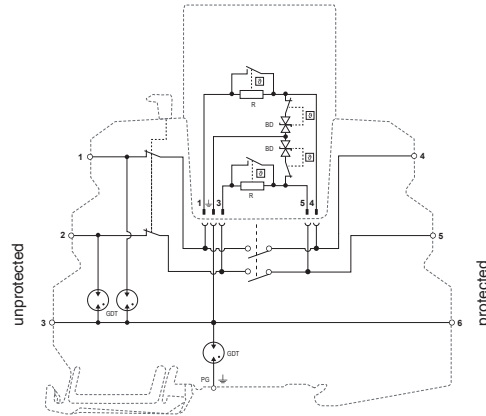
Order Code	5	12	24
NSB-3-xx LF	7088.15	7088.17	7088.19
NSB-3-xxM LF (module)	7088.16	7088.18	7088.20

RayDat NSB-3 LF Series

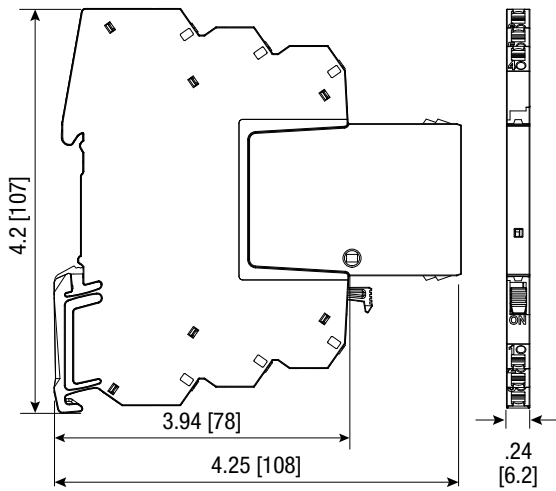
Configuration

Legend

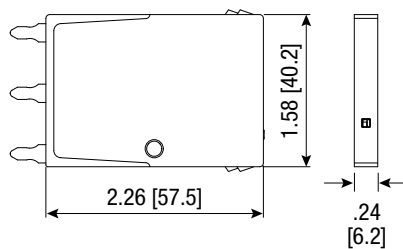
- BD Bi-directional TVS Diode
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor



Dimensions & Packaging



NSB-3 LF Series	5	12	24
Dimensions			
Weight per Unit	2.12 oz [60g]		
Dimensions DIN 43880	.24" [6.2mm]		
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 [16g]		
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]

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

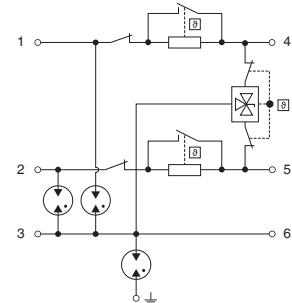
Frequency Range: 120 MHz

Housing: Modular Design

Compliance: IEC/EN 61643-21

UL 497B 4th Edition

Configuration:



Technical Data

NSB-3 Series

Electrical

		5	12	24	48
Lines Protected		1 (3 Conductors)			
Nominal Operating Voltage (DC)	U_n	5V	12V	24V	48V
Maximum Continuous Operating Voltage (DC)	U_c	8.5V	15V	30V	54V
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	140V	150V	170V	210V
	(Line-Ground)	1100V	1100V	1100V	1150V
C3 Voltage Protection Level (1 kV/μs)	(Line-Line) U_p	24V	36V	70V	130V
	(Line-Ground)	650V	660V	680V	740V
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)	9V-25V	16V-33V	33V-51V	60V-81V
	(Line-Ground)	193V-311V	200V-319V	217V-337V	244V-367V
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 mm ² (solid)
	14 AWG / 2.5 mm ² (flexible)
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
Operating State / Fault Indication	Green Flag / Red Flag

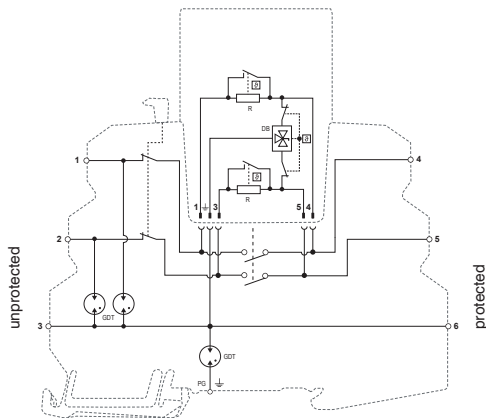
Order Information

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

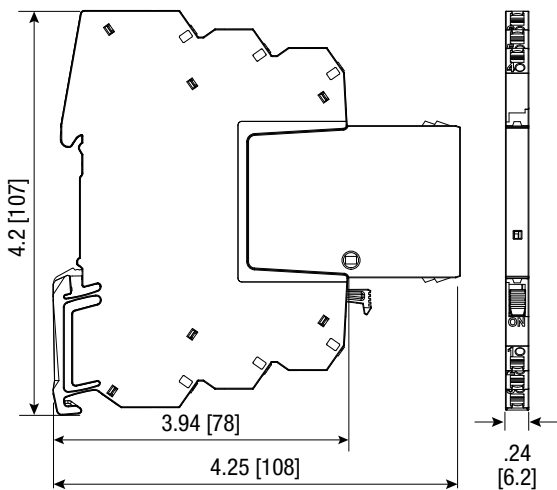
RayDat NSB-3 Series

Configuration

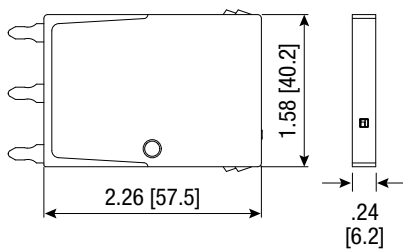
- Legend
- DB Diode Block
 - GDT Gas Discharge Tube
 - PG Protective Grounding
 - R Resistor



Dimensions & Packaging



NSB-3 Series	5	12	24	48
Dimensions				
Weight per Unit	2.12 oz [60g]			
Dimensions DIN 43880	.24" [6.2mm]			
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 [16g]			
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]

Notes

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

DC Power Systems for Signaling Applications

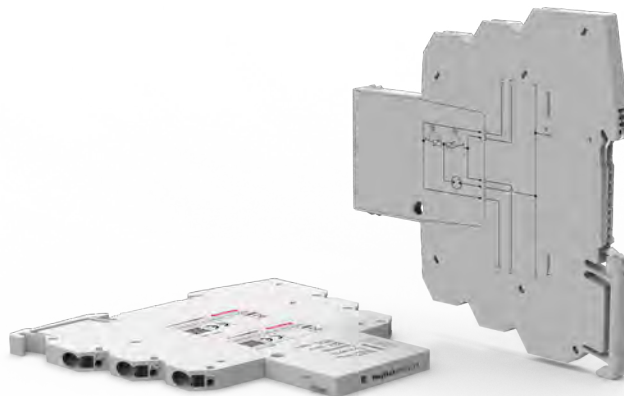
RayDat NPS-2 Series

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.

SPD for DC Power Systems

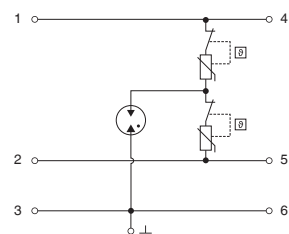
RayDat NPS-2 Series

C1 • C2 • C3



IEC/EN Category: C1/C2/C3
 Voltages: 24 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	24V
Maximum Continuous Operating Voltage (DC)	U_c	38V
Maximum Continuous Operating Voltage (AC)	U_c	38V
Rated Load Current at 40 °C	I_L	12A
Rated Load Current at 70 °C	I_L	10A
C2 Nominal Discharge Current (8/20µs)	(Line-Line) I_n	4 kV/2 kA
	(Line-Ground)	4 kV/2 kA
C2 Total Nominal Discharge Current (8/20µs)	I_n	8 kV/4 kA
C2 Voltage Protection Level (4 kV/2 kA)	(Line-Line) U_p	250V
	(Line-Ground)	650V
C3 Voltage Protection Level (1 kV/µs)	(Line-Line) U_p	200V
	(Line-Ground)	700V
Rated Spark Overvoltage	(Line-Line)	84V - 106V
	(Line-Ground)	72V - 160V
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 mm ² (solid)
	14 AWG / 2.5 mm ² (flexible)
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
Operating State / Fault Indication	Green Flag / Red Flag

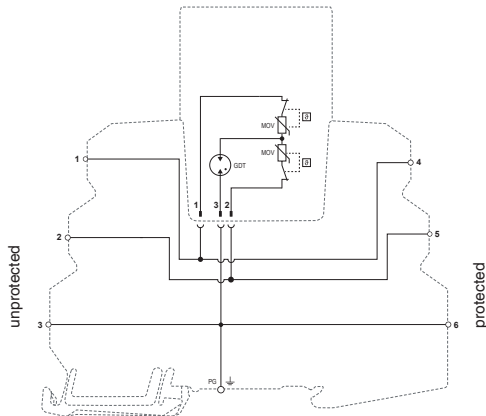
Order Information

Order Code	24
NPS-2-xx	7088.21
NPS-2-xxM (module)	7088.22

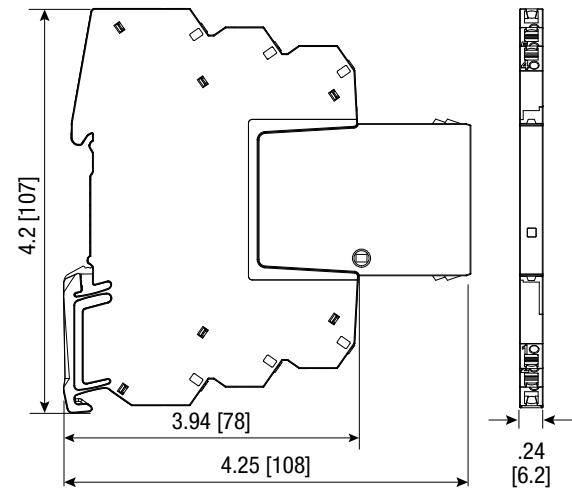
RayDat NPS-2 Series

Configuration

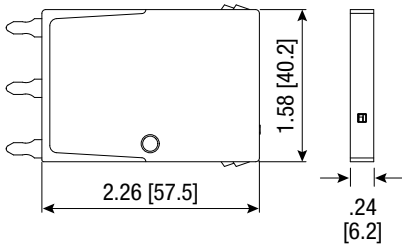
- Legend
- GDT Gas Discharge Tube
 - PG Protective Grounding
 - MOV Metal Oxide Varistor



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]

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 6-36V DC
- Equipped with quick connect terminals for fast wiring



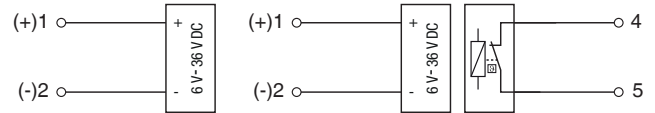
When placed on either end of a Narrow Line stack, the Monitoring Transmitter Unit (NMU-TX) & Receiver Unit (NMU-RX) will check the status of up to 50 surge protective devices in a row.

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.

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 - 36V DC
Nominal Voltage	U_N	24V DC
Operating Current	I	60mA DC

NMU-RX Series

Electrical

Maximum Number of Controlled SPDs		up to 50
Operation Voltage	$U_{\min} - U_{\max}$	6 - 36V DC
Nominal Voltage	U_N	24V DC
Operating Current	I	60mA DC
Output (Remote Contact)	(Line 2-4)	max 50V DC, max. 500mADC

Mechanical

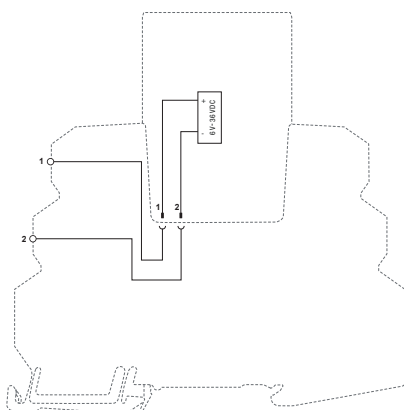
Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]
Conductor Cross Section (max.)	12 AWG / 4 mm ² (solid) 14 AWG / 2.5 mm ² (flexible)
Degree of Protection IEC/EN 60529	IP20 (built-in)
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715	35mm DIN Rail
Operating State / Fault Indication (NMU-RX)	Green LED / Red LED / RC Contact
Operating State (NMU-TX)	Green LED

Order Information

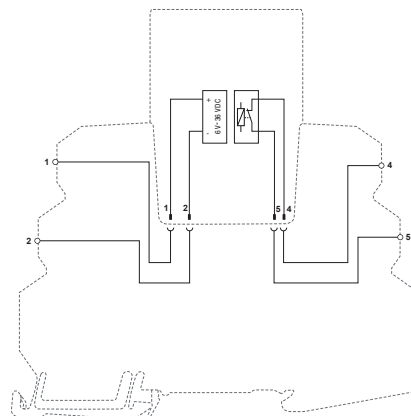
Order Code	
NMU Set (Monitoring Unit Set, Transmitter & Receiver)	7088.23
NMU-TX (Monitoring Unit Transmitter)	7088.24
NMU-RX (Monitoring Unit Receiver)	7088.25

RayDat NMU Series

Configuration

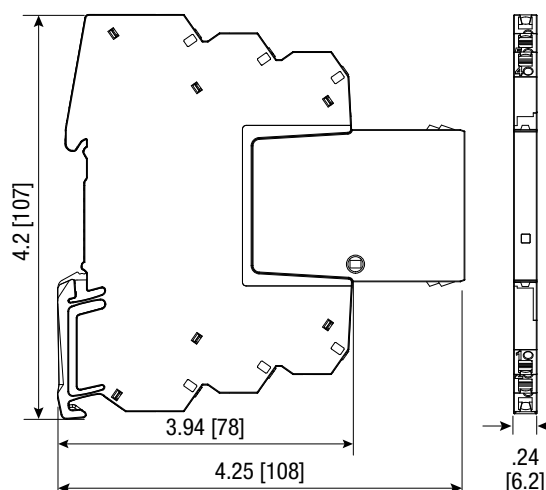


RayDat NMU-TX Series



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

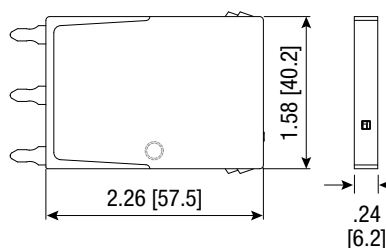
Dimensions

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]

Notes

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	RayDat NSL-2-12M	7088.29	RayDat SLH-2-12M	7086.41	10
	RayDat NSL-2-24M	7088.02	Module SLH-2-24M	7086.43	10
	RayDat NSL-2-48M	7088.31	RayDat SLH-2-48M	7086.44	10
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	RayDat NMU-TX	7088.24			30
	RayDat NMU-RX	7088.25			30



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