

Surge Protective Devices (SPDs) for Explosive Environments



Ex Protection

Special features:

- Very high surge ratings
- High density – up to 4 protected lines
- Version for DIN rail mounting available
- Version in metal (Stainless steel) housing available

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



Symbol Legend:



*DIN Rail
Mounting*



*Screw Connect
Terminals*



Compact Design



Modular Design



Wire Connection



*Shield Directly
Grounded*



Ex Certificate

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 the ATEX directive. The protection module should be located as close as possible to the end-user equipment being protected. 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 (GDT), while fine protection is provided using a high-speed bi-directional silicon stage. Care is taken between these two stages to ensure coordination without voltage or surge current blind spots occurring.

RoHS
COMPLIANT



DATA SHEET

SPD for Explosive Environments

RayDat Ex-2 Series

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
Surge Discharge Ratings: I_n : 5 kA, I_{max} : 10 kA, I_{imp} : 1 kA
Voltages: 12, 24 V DC

Max. Operating Voltage: U_c : 15, 28 VDC

Terminals: Stranded to 4 mm²

Housing: Modular Design

Compliance: IIEC/EN 61643-21

IEC 60079-0:2011

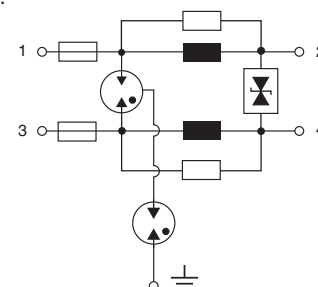
IEC 60079-11:2011

EN 60079-0:2012+A11:2013

EN 60079-11:2012



Configuration:



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

Technical Data

Ex-2 Series

12

24

Type

Intrinsic Safety Parameters

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	500mA	
Maximum Input Power	P_i	2W	
Maximum Internal Capacitance	C_i	10nF	
Maximum Internal Inductance	L_i	0.11mH	
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	500mA	
Nominal Discharge Current (8/20 μs)	I_n	5kA	
Maximum Discharge Current (8/20 μs)	I_{max}	10kA	
D1 Impulse Current (10/350 μs)	I_{imp}	1kA	
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	< 1ns	
Insulation Resistance at U_c	R_{iso}	≥ 15MΩ	≥ 28MΩ
Insulation Resistance at 500VDC (Line-Ground)		> 1GΩ	
Serial Resistance per Path	R	< 1Ω	
Transverse Capacitance	C	< 10pF	
Cut-off Frequency	f_G	3MHz	

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	IP 20 (built-in)
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715	35mm DIN Rail

Order Information

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

Raycap

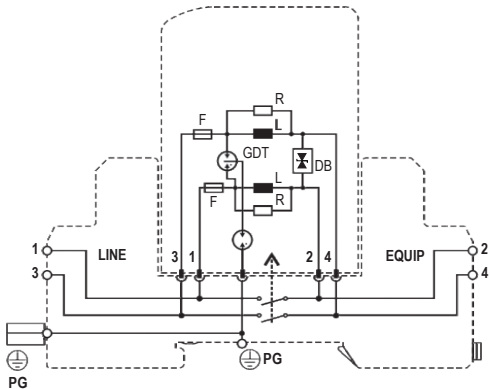
www.raycap.com

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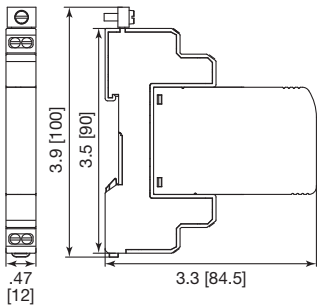
RayDat Ex-2 Series

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	

inches
[mm]

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SPD for Explosive Environments

RayDat PLP Ex Series

D1 • C1 • C2 • C3



IEC/EN Category: D1/C1/C2/C3
 Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA, I_{imp} : 2.0 kA
 Voltages: 24, 48, 24/5V DC
 Max. Operating Voltage: U_c : 33, 54, 33/7.5V DC
 Frequency Range: 30 MHz

Enclosure: Stainless Steel IP54
 Terminals: Connecting Cables 1 mm², 250 mm length
 Housing: Conduit Fitting
 Compliance: IEC/EN 61643-21



IEC 60079-0:2011
 IEC 60079-11:2011
 EN 60079-0:2012+A11:2013
 EN 60079-11:2012



UL 60079-0, 6th Edition
 UL 60079-11, 6th Edition
 CAN/CSA C22.2 No. 60079-0:2015
 CAN/CSA C22.2 No. 60079-11:2014

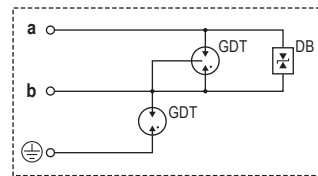
Technical Data

PLPEx		PLP-24Ex	PLP2-24Ex	PLP2-48Ex	PLP-24/5Ex	PLP3L-24Ex
Type						
Intrinsic Safety Parameters						
IECEX BAS 14.0167X	Ex ia IIC T6 Ga (-30°C ≤ 50°C), Ex ia IIIC T85°C Da (-30°C ≤ 50°C)					
Basefa14ATEX0364X	II 1G Ex ia IIC T6 Ga (-30°C ≤ 50°C), II 1D Ex ia IIIC T85°C Da (-30°C ≤ 50°C)					
SGSNA/18/BAS/00003	Class I, Zone 0 AEx ia IIC T6 Ga (-30°C ≤ 50°C), Ex ia IIC T6 Ga (-30°C ≤ 50°C), Zone 20 AEx ia IIIC T85°C Da (-30°C ≤ 50°C), Ex ia IIIC T85°C Da (-30°C ≤ 50°C)					
Maximum Input Voltage	U _i	50V				
Maximum Input Current	I _i	800mA				
Maximum Input Power	P _i	2W				
Maximum Internal Inductance	L _i	60μH				
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)	584-864 V	584-864 V	584-864 V	584-864 V	584-864 V
	(Line-Line)	36-44V	36-44V	58-68V	36-44V, 9-13V	36-44V
Total Nominal Discharge Current (8/20μs)	I _n	5kA	10 kA	10kA	10kA	7.5 kA
Total Discharge Current (8/20μs)	I _{max}	10kA	20 kA	20kA	20 kA	15 kA
Total Impulse Current (10/350μs)	I _{imp}	1.0kA	2.0kA	2.0kA	2.0kA	1.5 kA
Residual Voltage at I _{max} (8/20μs)	(Line-Ground) U _{res}	<1.3kV	<1.3kV	<1.3kV	<1.3kV	<1.3kV
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 mm² × 250 mm]				
Degree of Protection IEC/EN 60529	IP 54					
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

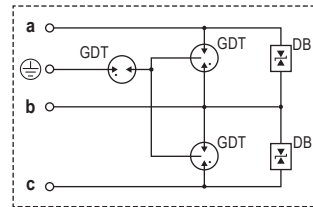
RayDat PLP Ex Series

Internal Configuration

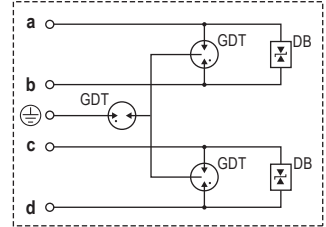
Legend
 DB Diode Block
 GDT Gas Discharge Tube



PLP-24Ex

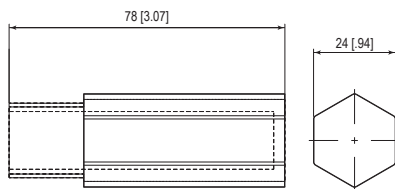


PLP3L-24Ex



PLP2-24Ex
 PLP2-48Ex
 PLP-24/5Ex

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

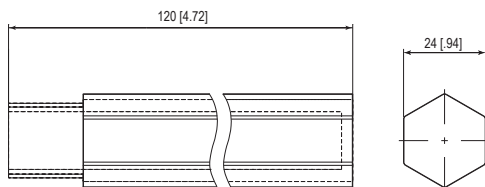
5.99 oz [170 g]

Packaging Dimensions (Single Unit)

1.34 x 1.34 x 4.25" [34 x 34 x 108 mm]

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

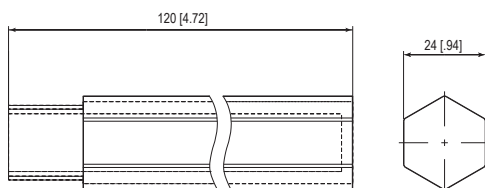
10.22 oz [290 g]

Packaging Dimensions (Single Unit)

1.34 x 1.34 x 5.43" [34 x 34 x 138 mm]

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 [290 g]

Packaging Dimensions (Single Unit)

1.34 x 1.34 x 5.43" [34 x 34 x 138 mm]

Minimum Package Quantity

6 pieces

inches
 [mm]

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