

# Surge Protection Barrier

## M-LB-Ex-2144.SP

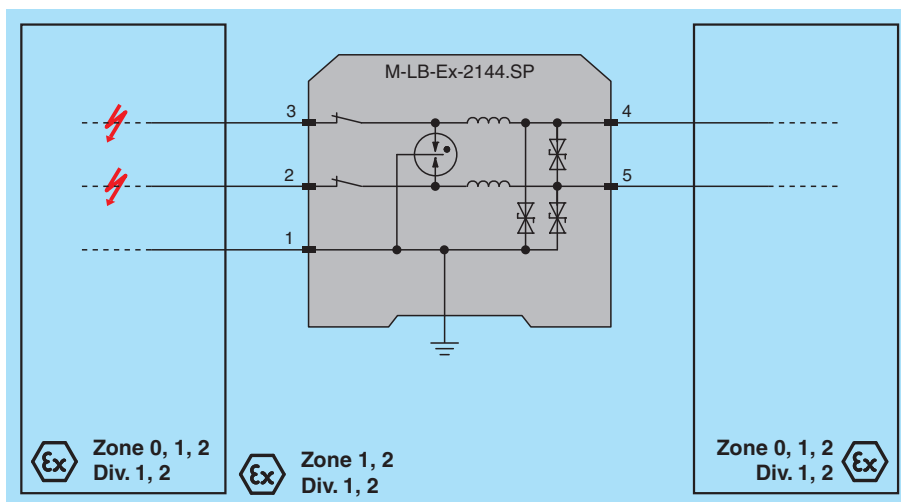
- Surge protection barrier for 2 signal lines
- Nominal voltage 24 V DC
- Surge protection barrier for grounded signal lines
- Max. surge current (8/20  $\mu$ s) 20 kA
- Connection via spring terminals with push-in connection technology
- DIN rail mountable
- Up to SIL 3 acc. to IEC/EN 61508



### Function

The device limits induced transients of different causes, e. g. lightning or switching operations. The limitation is achieved by diverting the current to earth and limiting the signal loop voltage during the duration of the overvoltage pulse.  
 The device is used for intrinsic safety applications.  
 The device is HART transparent.  
 The device is mounted on a 35 mm DIN mounting rail according to EN 60715.

### Connection



### Technical Data

General specifications	
Number of protected signal lines	2
Topology	grounded
Functional safety related parameters	
Safety Integrity Level (SIL)	SIL 3
Electrical specifications	
Connection	protected area: terminals 4, 5 unprotected area: terminals 2, 3 shielding/grounding: terminal 1 (optional)
Rated current	$I_r$ 500 mA , restrictions see derating tables UL : 400 mA , restrictions see control drawing
Leakage current	< 6 $\mu$ A at 24 V and 25 °C (77 °F) , line-line

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

## Technical Data

Nominal voltage		24 V DC
Maximum continuous operating voltage	$U_c$	30 V DC
Series resistance		$\leq 3 \Omega$ per line
Impulse rating		1 kV/0.5 kA (category C1) 10 kV/5 kA (category C2) 1 kA (category D1)
Impulse discharge current (10/350 $\mu$ s)	$I_{imp}$	1 kA per line (2x)
Nominal discharge current (8/20 $\mu$ s)	$I_n$	5 kA per line (10x)
Total discharge current (8/20 $\mu$ s)	$I_{total}$	20 kA (1x) , overstressed fault mode 3 acc. to IEC 61643-21
Voltage protection level	$U_p$	max. 45 V line-line for nominal discharge current $I_n$ max. 60 V line-earth for nominal discharge current $I_n$
Impulse reset time		< 500 ms
Insertion loss		$\leq 3$ dB at 0 ... 700 kHz in 100 $\Omega$ system
<b>Conformity</b>		
Electromagnetic compatibility		EN 61326-3-1:2017
Degree of protection		IEC 60529:2013
Functional safety		IEC/EN 61508:2010
Surge protective devices for low voltage		IEC 61643-21:2000+A1:2008+A2:2012
<b>Ambient conditions</b>		
Ambient temperature		-40 ... 80 °C (-40 ... 176 °F) Observe the temperature range limited by derating, see section derating.
Storage temperature		-40 ... 85 °C (-40 ... 185 °F)
Relative humidity		max. 95 % , without condensation
<b>Mechanical specifications</b>		
Degree of protection		IP20 , after mounting of the insulation spacer
Connection		spring terminals , max. core cross section 1 x 2.5 mm <sup>2</sup>
Material		Polyamide (PA)
Mass		approx. 32 g
Dimensions		6.2 x 93 x 72.4 mm (0.24 x 3.7 x 2.8 inch) (W x H x D)
Mounting		on 35 mm DIN mounting rail acc. to EN 60715:2001
<b>Data for application in connection with hazardous areas</b>		
EU-type examination certificate		KIWA 19 ATEX 0003 X
Marking		Ⓢ II 2(1)G Ex ia [ia Ga] IIC T6...T4 Gb Ⓢ II (1)D [Ex ia Da] IIIC Ⓢ I (M1) [Ex ia Ma] I
Temperature class		T6, T5 or T4 , restrictions see derating tables
Voltage	$U_i$	30 V
Current	$I_i$	500 mA , restrictions see derating tables
Internal capacitance	$C_i$	negligible
Internal inductance	$L_i$	20 $\mu$ H
<b>Directive conformity</b>		
Directive 2014/34/EU		EN IEC 60079-0:2018+AC:2020 , EN 60079-11:2012
<b>International approvals</b>		
UL approval		E501704 E501881
Control drawing		116-0479
Current	$I_i$	400 mA , restrictions see control drawing
Breakdown voltage	$U_{BR}$	30 ... 45 V line-line at 100 V/s acc. to UL 497B 30 ... 45 V line-earth at 100 V/s acc. to UL 497B < 1000 V at 100 V/ $\mu$ s acc. to UL 497B
<b>IECEx approval</b>		
IECEx certificate		IECEx KIWA 19.0003X
IECEx marking		Ex ia [ia Ga] IIC T6...T4 Gb [Ex ia Da] IIIC [Ex ia Ma] I
<b>General information</b>		

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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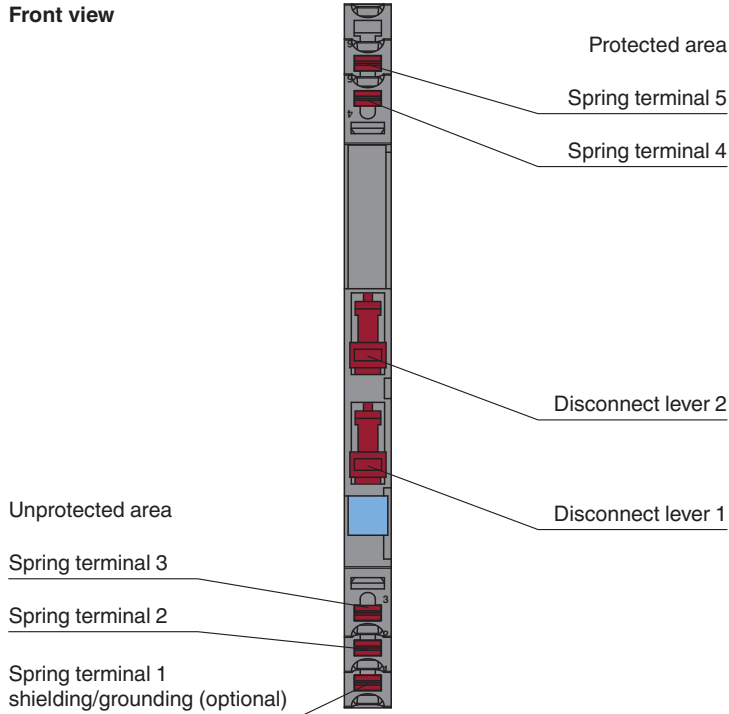
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**Technical Data**

Supplementary information	Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> .
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**Assembly**


Front view



**Matching System Components**

<b>USLKG6N</b>	Terminal block for equipotential bonding
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**Accessories**

	<b>M-LB-2800</b>	Insulation spacer for surge protection system M-LB-2000
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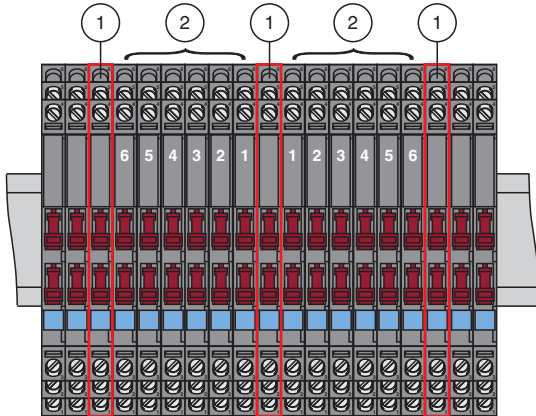
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**Operation**

**Derating of the Rated Current**

This derating is valid for mounting in areas requiring explosion protection level Gb or Gc and temperature class T4 or in a non-hazardous area under following special conditions:

The increased rated current of 0.5 A is only applicable for a device (1) if the current in at least 6 adjacent devices (2) from both sides of the device is < 80 % of the increased current, see figure.



<b>Max. ambient temperature</b>	30 °C	40 °C	50 °C	60 °C	70 °C	80 °C
<b>I<sub>i</sub> (I<sub>r</sub>)</b>	500 mA	420 mA	340 mA	260 mA	180 mA	100 mA

Linear interpolation allowed, extrapolation not allowed.

This derating is valid for mounting in areas requiring explosion protection level Gb or Gc and temperature class T4 or in a non-hazardous area.

<b>Max. ambient temperature</b>	30 °C	40 °C	50 °C	60 °C	70 °C	80 °C
<b>I<sub>i</sub> (I<sub>r</sub>)</b>	400 mA	340 mA	280 mA	220 mA	160 mA	100 mA

Linear interpolation allowed, extrapolation not allowed.

This derating is valid for mounting in areas requiring explosion protection level Gb or Gc and temperature class T5 or T6.

<b>Max. ambient temperature</b>	30 °C	40 °C	50 °C	60 °C	70 °C	80 °C
<b>I<sub>i</sub> (I<sub>r</sub>)</b>	280 mA	224 mA	168 mA	112 mA	56 mA	0 mA

Linear interpolation allowed, extrapolation not allowed.



*In the case of a short circuit, the rated current must not be exceeded.*

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