- For the intrinsically safe operation of a wide range of devices, such as HART transmitters, solenoid valves, sensors, zero-potential contacts and many more
- Compact, space-saving devices that are easy to install on a DIN rail
- Quick and efficient installation as barriers can be simultaneously snapped onto DIN rail and connected to ground (ISA - RPI12.06)
- Convenient maintenance and repair through back-up fuse feature

MY R. STAHL **9001A**

The 9001 series INTRINSPAK single-channel zener barriers enable the intrinsically safe operation of virtually all field devices. The comprehensive portfolio and the combination of zener barriers cover a wide variety of signals. The devices are incredibly robust and require little space. The back-up fuse is a convenient feature as it is standardized for all variants.

	NEC® 500 CE Code Appendix J					
	Class I		Class II		Class III	
Division	1	2	1	2	1	2
Ex interface	•	•	•	•	•	•
Installation in		•		•		•

	CE Code Section 18					
	NEC® 505 Class I			NEC® 506		
Zone	0	1	2	20	21	22
Ex interface	•	•	•			
Installation in			•			

	IECEx / ATEX					
Zone	0	1	2	20	21	22
Ex interface	•	•	•	•	•	•
Installation in			•			

Selection Table

Product variant	Series 9001/00, single-channel safety barrier for negative potential							
Nominal voltage V_{nom}	Min. resistance R_{min}	Maximum resistance R_{max}	Max. voltage U_o/V_{oc}	Max. current I_o/I_{sc}	Max. power P_o	Product Type	Art. No.	Weight lb
6 V DC	24 Ω	29 Ω	8.3 V	442 mA	917.2 mW	**9001/00-083-442-101**	158333	0.24 lb
	28 Ω	33 Ω	8.6 V	390 mA	839 mW	**9001/00-086-390-101**	158434	0.24 lb
24 V DC	287 Ω	320 Ω	28 V	100 mA	700 mW	**9001/00-280-100-101**	158356	0.24 lb
	340 Ω	375 Ω	28 V	85 mA	595 mW	**9001/00-280-085-101**	158344 ▲	0.24 lb
	599 Ω	666 Ω	28 V	50 mA	350 mW	**9001/00-280-050-101**	158660	0.24 lb
	1435 Ω	1590 Ω	28 V	20 mA	140 mW	**9001/00-280-020-101**	158650	0.24 lb
Product variant	Series 9001/01, single-channel safety barrier for positive potential							
Nominal voltage V_{nom}	Min. resistance R_{min}	Maximum resistance R_{max}	Max. voltage U_o/V_{oc}	Max. current I_o/I_{sc}	Max. power P_o	Product Type	Art. No.	Weight lb
6 V DC	24 Ω	29 Ω	8.3 V	442 mA	917.2 mW	**9001/01-083-442-101**	158338 ▲	0.24 lb
	28 Ω	33 Ω	8.6 V	390 mA	839 mW	**9001/01-086-390-101**	158439	0.24 lb
	39 Ω	45 Ω	8.6 V	270 mA	580.5 mW	**9001/01-086-270-101**	158428	0.24 lb
	65 Ω	73 Ω	8.6 V	150 mA	322.5 mW	**9001/01-086-150-101**	158418 ▲	0.24 lb
	129 Ω	145 Ω	8.6 V	75 mA	161.3 mW	**9001/01-086-075-101**	158391 ▲	0.24 lb
8 V DC	93 Ω	106 Ω	12.6 V	150 mA	473 mW	**9001/01-126-150-101**	158502	0.24 lb

▲ Preferred products – in stock or available at short notice

Single-Channel Zener Barriers
Series 9001

08 b

Selection Table

Product variant			Series 9001/01, single-channel safety barrier for positive potential					
Nominal voltage V_{nom}	Min. resistance R_{min}	Maximum resistance R_{max}	Max. voltage U_o/V_{oc}	Max. current I_o/I_{sc}	Max. power P_o	Product Type	Art. No.	Weight lb
12 V DC	50 Ω	57 Ω	15.8 V	390 mA	1541 mW	**9001/01-158-390-101**	158509 ▲	0.24 lb
	120 Ω	135 Ω	15.8 V	150 mA	593 mW	**9001/01-158-150-101**	158535 ▲	0.24 lb
	235 Ω	262 Ω	16.8 V	75 mA	315 mW	**9001/01-168-075-101**	158568	0.24 lb
	871 Ω	966 Ω	16.8 V	20 mA	84 mW	**9001/01-168-020-101**	158555	0.24 lb
16 V DC	216 Ω	241 Ω	19.9 V	100 mA	498 mW	**9001/01-199-100-101**	158632 ▲	0.24 lb
	415 Ω	462 Ω	19.9 V	50 mA	249 mW	**9001/01-199-050-101**	158616	0.24 lb
20 to 35 V DC	259 Ω	268 Ω	25.2 V	100 mA	630 mW	**9001/01-252-100-141**	158697 ▲	0.24 lb
	455 Ω	506 Ω	25.2 V	60 mA	378 mW	**9001/01-252-060-141**	158693 ▲	0.24 lb
24 V DC	115 Ω	128 Ω	28 V	280 mA	1960 mW	**9001/01-280-280-101**	158722 ▲	0.24 lb
	177 Ω	198 Ω	28 V	165 mA	1155 mW	**9001/01-280-165-101**	158392	0.24 lb
	263 Ω	294 Ω	28 V	110 mA	770 mW	**9001/01-280-110-101**	158380 ▲	0.24 lb
	287 Ω	320 Ω	28 V	100 mA	700 mW	**9001/01-280-100-101**	158365 ▲	0.24 lb
	340 Ω	375 Ω	28 V	85 mA	595 mW	**9001/01-280-085-101**	158351	0.24 lb
	415 Ω	462 Ω	28 V	75 mA	525 mW	**9001/01-280-075-101**	158339	0.24 lb
	599 Ω	666 Ω	28 V	50 mA	350 mW	**9001/01-280-050-101**	158665 ▲	0.24 lb
	1435 Ω	1590 Ω	28 V	20 mA	140 mW	**9001/01-280-020-101**	158655	0.24 lb
Product variant			Series 9001/02, single-channel safety barrier for alternating potential					
Nominal voltage V_{nom}	Min. resistance R_{min}	Maximum resistance R_{max}	Max. voltage U_o/V_{oc}	Max. current I_o/I_{sc}	Max. power P_o	Product Type	Art. No.	Weight lb
± 0.7 V AC+DC	19.9 Ω	20.1 Ω	1.6 V	150 mA	60 mW	**9001/02-016-150-111**	158685 ▲	0.24 lb
	37 Ω	40 Ω	1.6 V	50 mA	20 mW	**9001/02-016-050-111**	158677	0.24 lb
	120 Ω	134 Ω	1.6 V	15 mA	6 mW	**9001/02-016-015-101**	158669	0.24 lb
± 6 V AC+DC	31 Ω	36 Ω	9.3 V	390 mA	906.8 mW	**9001/02-093-390-101**	158755 ▲	0.24 lb
	319 Ω	355 Ω	9.3 V	30 mA	69.8 mW	**9001/02-093-030-101**	158743 ▲	0.24 lb
	3141 Ω	3473 Ω	9.3 V	3 mA	6.975 mW	**9001/02-093-003-101**	158741	0.24 lb
± 10 V AC+DC	102 Ω	115 Ω	13.3 V	150 mA	498.8 mW	**9001/02-133-150-101**	158758	0.24 lb
± 12 V AC+DC	198 Ω	223 Ω	17.5 V	100 mA	437.5 mW	**9001/02-175-100-101**	158301 ▲	0.24 lb
± 24 V AC+DC	320 Ω	357 Ω	28 V	90 mA	630 mW	**9001/02-280-090-101**	158317	0.24 lb
Product variant			Series 9001/02, Single-channel safety barriers for alternating polarity					
Nominal voltage V_{nom}	Min. resistance R_{min}	Maximum resistance R_{max}	Max. voltage U_o/V_{oc}	Max. current I_o/I_{sc}	Max. power P_o	Product Type	Art. No.	Weight lb
± 6 V AC+DC	148 Ω	166 Ω	9.3 V	75 mA	174.4 mW	**9001/02-093-075-101**	158749	0.24 lb
Product variant			Series 9001/03, single-channel evaluation barrier for positive potential					
Nominal voltage V_{nom}	Min. resistance R_{min}	Maximum resistance R_{max}	Max. voltage U_o/V_{oc}	Max. current I_o/I_{sc}	Max. power P_o	Product Type	Art. No.	Weight lb
16 V DC	–	–	19.9 V	–	–	**9001/03-199-000-101**	158475	0.24 lb
24 V DC	–	–	28 V	–	–	**9001/03-280-000-101**	158486	0.24 lb
Product variant			Series 9001/51, single-channel safety barrier for transmitters					
Nominal voltage V_{nom}	Min. resistance R_{min}	Maximum resistance R_{max}	Max. voltage U_o/V_{oc}	Max. current I_o/I_{sc}	Max. power P_o	Product Type	Art. No.	Weight lb
20 to 35 V DC	–	–	28 V	91 mA	637 mW	**9001/51-280-091-141**	158524 ▲	0.24 lb
	–	–	28 V	110 mA	770 mW	**9001/51-280-110-141**	158530 ▲	0.24 lb

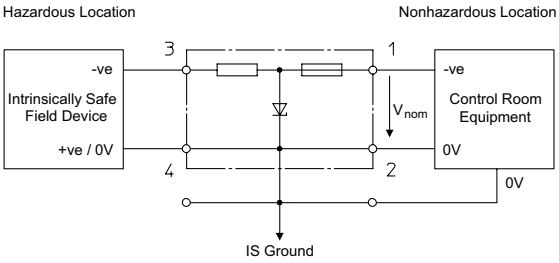
Schematics of the zener barriers available at r-stahl.com

▲ Preferred products – in stock or available at short notice

Technical Data	
Variant	**Single-channel safety barriers Series 9001**
Explosion Protection	
FMus certificate	3011002
Certificate ULus	E81680V1S3
cCSA certificate	1284547
Marking FMus	NONINCENDIVE FOR, Class I, Div. 2, Groups A,B,C,D; T4; Class I, Zone 2, Group IIC T4 IS connections for Class I,II,III, Div. 1, Groups A,B,C,D,E,F,G; Class I, Zone 0, Groups IIC/IIB Hazardous location when inst. per doc. 90 016 11 31 1
Marking ULus	For use in Hazardous location, Class I, Div. 2, Groups A,B,C,D; T4 Providing IS circuits for Class I,II,III, GROUPS A,B,C,D,E,F,G; per doc. 90 016 11 31 3
Marking cCSA	Associated equipment [Ex ia], Class I, Div. 2, Groups A,B,C,D; Provides IS circuits for Class I,II,III, Class I, Zone 0, Groups IIC/IIB For applicable grps per inst. doc. 90 016 11 31 2
IECEx gas explosion protection	Ex ec [ia Ga] IIC T4 Gc
IECEx dust explosion protection	[Ex ia Da] IIIC
Certificates	ATEX (PTB), Brazil (ULB), Canada (CSA), Canada (FM), China (NEPSI), IECEx (PTB), India (PESO), Japan (CML), Korea (KGS), USA (FM), USA (UL)
Installation	in Zone 2, Class I, Div. 2, and Class I, Zone 2 and in safe area
Further information	see respective certificate and operating instructions
Electrical Data	
I_{leak} leakage current for U_n	≤ 2 µA
Output	
Temperature influence	≤ 0,25 %/10K
Ambient Conditions	
Ambient temperature °F	-4°F ... +140°F
Ambient temperature °C	-20 °C ... 60 °C
Storage temperature °F	-4°F ... +167°F
Storage temperature °C	-20 °C ... 75 °C
Max. relative humidity	95% average, no condensation
Mechanical Data	
Degree of protection (IP)	IP40
Degree of protection note	according to IEC 60529
Degree of protection (IP) terminals	IP20
Enclosure material	Polyamide 6GF
Number of connection terminals	4
Type of connection cable	Finely stranded Solid
Max. conductor cross section AWG	16 AWG
Connection cross-section max.	1.5 mm²
Weight	110 g
Mounting / Installation	
Connection type	2 PA
Earthing conductor cross-section AWG	12 AWG
Earthing connection cross-section	4 mm²
Min. torque, lb/in	4.43 lb/in
Min. torque, Nm	0.5 Nm
Max. torque, lb/in	5.31 lb/in
Max. torque, Nm	0.6 Nm

08 b

Negative Polarity



- Grounded circuit
- Allows the connection of regulated power supplies, V_{nom}, as listed in the table below
- Various safety and operational characteristics as listed in the table below
- Approved for installation in hazardous areas (refer to certificate).

FM / UL Information – Ex Interface to Class I, II, III, Division 1 or Class I, Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E or IIC	C_o/C_a for A,B,E or IIC	L_o/L_a for C, D, F, G or IIB, IIA	C_o/C_a for C, D, F, G or IIB, IIA	
9001/00-083-442-101	6 V DC	24 Ω	29 Ω	110 mA	8.3 V	442 mA	917.2 mW	0.12 mH	7.2 µF	0.5 mH	73 µF	158333
9001/00-086-390-101	6 V DC	28 Ω	33 Ω	110 mA	8.6 V	390 mA	838.5 mW	0.16 mH	6.2 µF	0.89 mH	55 µF	158434
9001/00-280-020-101	24 V DC	1435 Ω	1590 Ω	15 mA	28 V	20 mA	140 mW	50 mH	0.083 µF	50 mH	0.65 µF	158650
9001/00-280-050-101	24 V DC	599 Ω	666 Ω	36 mA	28 V	50 mA	350 mW	8.5 mH	0.083 µF	25 mH	0.65 µF	158660
9001/00-280-085-101	24 V DC	340 Ω	375 Ω	64 mA	28 V	85 mA	595 mW	2.4 mH	0.083 µF	16 mH	0.65 µF	158344 ▲
9001/00-280-100-101	24 V DC	287 Ω	320 Ω	75 mA	28 V	100 mA	700 mW	1.6 mH	0.083 µF	11 mH	0.65 µF	158356

CSA Information – Ex Interface to Class I, II, III, Division 1

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E	C_o/C_a for A, B, E	L_o/L_a for C, D, F, G	C_o/C_a for C, D, F, G	
9001/00-083-442-101	6 V DC	24 Ω	29 Ω	110 mA	8.3 V	442 mA	917.2 mW	0.19 mH	6.9 µF	0.8 mH	20.8 µF	158333
9001/00-086-390-101	6 V DC	28 Ω	33 Ω	110 mA	8.6 V	390 mA	838.5 mW	0.16 mH	5.9 µF	1 mH	17.6 µF	158434
9001/00-280-020-101	24 V DC	1435 Ω	1590 Ω	15 mA	28 V	20 mA	140 mW	85 mH	0.14 µF	306 mH	0.43 µF	158650
9001/00-280-050-101	24 V DC	599 Ω	666 Ω	36 mA	28 V	50 mA	350 mW	15.1 mH	0.14 µF	57 mH	0.43 µF	158660
9001/00-280-085-101	24 V DC	340 Ω	375 Ω	64 mA	28 V	85 mA	595 mW	5 mH	0.14 µF	19.3 mH	0.43 µF	158344 ▲
9001/00-280-100-101	24 V DC	287 Ω	320 Ω	75 mA	28 V	100 mA	700 mW	3.6 mH	0.14 µF	13.9 mH	0.43 µF	158356

CSA Information – Ex Interface to Class I, Zone 0

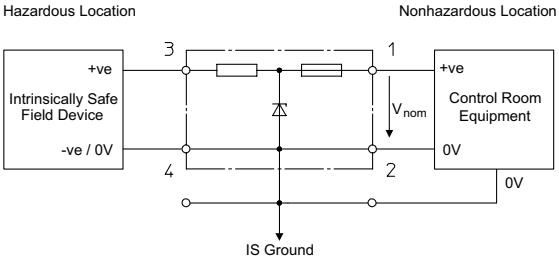
Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIA, IIB	C_o/C_a for IIA, IIB	
9001/00-083-442-101	6 V DC	22 Ω	29 Ω	110 mA	8.3 V	442 mA	917.2 mW	0.12 mH	7.2 µF	0.5 mH	73 µF	158333
9001/00-086-390-101	6 V DC	24 Ω	33 Ω	110 mA	8.6 V	390 mA	838.5 mW	0.16 mH	6.2 µF	0.89 mH	55 µF	158434
9001/00-280-020-101	24 V DC	1500 Ω	1590 Ω	15 mA	28 V	20 mA	140 mW	50 mH	0.083 µF	50 mH	0.65 µF	158650
9001/00-280-050-101	24 V DC	620 Ω	666 Ω	36 mA	28 V	50 mA	350 mW	8.5 mH	0.083 µF	25 mH	0.65 µF	158660
9001/00-280-085-101	24 V DC	349 Ω	375 Ω	64 mA	28 V	85 mA	595 mW	2.4 mH	0.083 µF	16 mH	0.65 µF	158344 ▲
9001/00-280-100-101	24 V DC	300 Ω	320 Ω	75 mA	28 V	100 mA	700 mW	1.6 mH	0.083 µF	11 mH	0.65 µF	158356

▲ Preferred products – in stock or available at short notice

ATEX Information – Ex Interface to Zone 0												
Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIB	C_o/C_a for IIB	
9001/00-083-442-101	6 V DC	24 Ω	29 Ω	110 mA	8.3 V	442 mA	917.2 mW	0.1 mH	7.2 µF	0.5 mH	73 µF	158333
9001/00-086-390-101	6 V DC	28 Ω	33 Ω	110 mA	8.6 V	390 mA	839 mW	0.16 mH	6.2 µF	0.89 mH	55 µF	158434
9001/00-280-020-101	24 V DC	1435 Ω	1590 Ω	15 mA	28 V	20 mA	140 mW	50 mH	0.083 µF	50 mH	0.65 µF	158650
9001/00-280-050-101	24 V DC	599 Ω	666 Ω	36 mA	28 V	50 mA	350 mW	8.5 mH	0.083 µF	25 mH	0.65 µF	158660
9001/00-280-085-101	24 V DC	340 Ω	375 Ω	64 mA	28 V	85 mA	595 mW	2.4 mH	0.083 µF	16 mH	0.65 µF	158344 ▲
9001/00-280-100-101	24 V DC	287 Ω	320 Ω	75 mA	28 V	100 mA	700 mW	1.6 mH	0.083 µF	11 mH	0.65 µF	158356

08 b

Positive Polarity Passive



- Grounded circuit
- Allows the connection of regulated power supplies, V_{nom}, as listed in the table below
- Various safety and operational characteristics as listed in the table below
- Approved for installation in hazardous areas (refer to certificate).

Technical tips

- T_a = 140 °F (60 °C) except for 9001/01-280-165-101 in FM / UL installations where T_a = 122 °F (50 °C)
- 9001/01-280-165-101 is not allowed to interface to field devices in Gas Groups A, B, E and IIC

FM / UL Information – Ex Interface to Class I, II, III, Division 1 or Class I, Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E or IIC	C_o/C_a for A,B,E or IIC	L_o/L_a for C, D, F, G or IIB, IIA	C_o/C_a for C, D, F, G or IIB, IIA	
9001/01-083-442-101	6 V DC	24 Ω	29 Ω	110 mA	8.3 V	442 mA	917.2 mW	0.12 mH	7.2 µF	0.5 mH	73 µF	158338 ▲
9001/01-086-050-101	6 V DC	196 Ω	218 Ω	27 mA	8.6 V	50 mA	107.5 mW	15 mH	6.2 µF	56 mH	55 µF	158379
9001/01-086-075-101	6 V DC	129 Ω	145 Ω	41 mA	8.6 V	75 mA	161.3 mW	6.7 mH	6.2 µF	25 mH	55 µF	158391 ▲
9001/01-086-150-101	6 V DC	65 Ω	73 Ω	82 mA	8.6 V	150 mA	322.5 mW	1.3 mH	6.2 µF	7 mH	55 µF	158418 ▲
9001/01-086-270-101	6 V DC	39 Ω	45 Ω	110 mA	8.6 V	270 mA	580.5 mW	0.23 mH	6.2 µF	2.2 mH	55 µF	158428
9001/01-086-390-101	6 V DC	28 Ω	33 Ω	110 mA	8.6 V	390 mA	838.5 mW	0.16 mH	6.2 µF	0.89 mH	55 µF	158439
9001/01-126-150-101	8 V DC	93 Ω	106 Ω	75 mA	12.6 V	150 mA	472.5 mW	1.3 mH	1.15 µF	7 mH	7.4 µF	158502
9001/01-158-150-101	12 V DC	120 Ω	135 Ω	88 mA	15.8 V	150 mA	592.5 mW	1.3 mH	0.478 µF	7 mH	2.88 µF	158535 ▲
9001/01-158-390-101	12 V DC	50 Ω	57 Ω	< 100 mA	15.8 V	390 mA	1541 mW	0.16 mH	0.478 µF	0.89 mH	2.88 µF	158509 ▲
9001/01-168-020-101	12 V DC	871 Ω	966 Ω	12 mA	16.8 V	20 mA	84 mW	90 mH	0.39 µF	330 mH	2.29 µF	158555
9001/01-168-075-101	12 V DC	235 Ω	262 Ω	45 mA	16.8 V	75 mA	315 mW	6.7 mH	0.39 µF	25 mH	2.29 µF	158568
9001/01-199-050-101	16 V DC	415 Ω	462 Ω	34 mA	19.9 V	50 mA	248.8 mW	15 mH	0.223 µF	56 mH	1.42 µF	158616
9001/01-199-100-101	16 V DC	216 Ω	241 Ω	66 mA	19.9 V	100 mA	497.5 mW	4 mH	0.223 µF	15 mH	1.42 µF	158632 ▲
9001/01-280-020-101	24 V DC	1435 Ω	1590 Ω	15 mA	28 V	20 mA	140 mW	50 mH	0.083 µF	50 mH	0.65 µF	158655
9001/01-280-050-101	24 V DC	599 Ω	666 Ω	36 mA	28 V	50 mA	350 mW	8.5 mH	0.083 µF	25 mH	0.65 µF	158665 ▲
9001/01-280-075-101	24 V DC	415 Ω	462 Ω	51 mA	28 V	75 mA	525 mW	3.3 mH	0.083 µF	21 mH	0.65 µF	158339
9001/01-280-085-101	24 V DC	340 Ω	375 Ω	64 mA	28 V	85 mA	595 mW	2.4 mH	0.083 µF	16 mH	0.65 µF	158351
9001/01-280-100-101	24 V DC	287 Ω	320 Ω	75 mA	28 V	100 mA	700 mW	1.6 mH	0.083 µF	11 mH	0.65 µF	158365 ▲
9001/01-280-110-101	24 V DC	263 Ω	294 Ω	81 mA	28 V	110 mA	770 mW	1.2 mH	0.083 µF	9 mH	0.65 µF	158380 ▲
9001/01-280-165-101	24 V DC	177 Ω	198 Ω	110 mA	28 V	165 mA	1155 mW			3.5 mH	0.65 µF	158392

▲ Preferred products – in stock or available at short notice

CSA Information – Ex Interface to Class I, II, III, Division 1												
Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E	C_o/C_a for A, B, E	L_o/L_a for C, D, F, G	C_o/C_a for C, D, F, G	
9001/01-083-442-101	6 V DC	24 Ω	29 Ω	110 mA	8.3 V	442 mA	917.2 mW	0.19 mH	6.9 µF	0.8 mH	20.8 µF	158338 ▲
9001/01-086-050-101	6 V DC	196 Ω	218 Ω	27 mA	8.6 V	50 mA	107.5 mW	18 mH	5.9 µF	67.6 mH	17.6 µF	158379
9001/01-086-075-101	6 V DC	129 Ω	145 Ω	41 mA	8.6 V	75 mA	161.3 mW	7.2 mH	5.9 µF	27.5 mH	17.6 µF	158391 ▲
9001/01-086-150-101	6 V DC	65 Ω	73 Ω	82 mA	8.6 V	150 mA	322.5 mW	1.7 mH	5.9 µF	6.7 mH	17.6 µF	158418 ▲
9001/01-086-270-101	6 V DC	39 Ω	45 Ω	110 mA	8.6 V	270 mA	580.5 mW	0.26 mH	5.9 µF	2.4 mH	17.6 µF	158428
9001/01-086-390-101	6 V DC	28 Ω	33 Ω	110 mA	8.6 V	390 mA	838.5 mW	0.16 mH	5.9 µF	1 mH	17.6 µF	158439
9001/01-126-150-101	8 V DC	93 Ω	106 Ω	75 mA	12.6 V	150 mA	472.5 mW	1.3 mH	1.4 µF	6.8 mH	4.1 µF	158502
9001/01-158-150-101	12 V DC	120 Ω	135 Ω	88 mA	15.8 V	150 mA	592.5 mW	1.6 mH	0.67 µF	7.5 mH	2 µF	158535 ▲
9001/01-158-390-101	12 V DC	50 Ω	57 Ω	< 100 mA	15.8 V	390 mA	1541 mW	0.15 mH	0.67 µF	0.9 mH	2 µF	158509 ▲
9001/01-168-020-101	12 V DC	871 Ω	966 Ω	12 mA	16.8 V	20 mA	84 mW	93.9 mH	0.55 µF	337 mH	1.7 µF	158555
9001/01-168-075-101	12 V DC	235 Ω	262 Ω	45 mA	16.8 V	75 mA	315 mW	6.4 mH	0.55 µF	24.8 mH	1.7 µF	158568
9001/01-199-050-101	16 V DC	415 Ω	462 Ω	34 mA	19.9 V	50 mA	248.8 mW	14.4 mH	0.34 µF	54.4 mH	1 µF	158616
9001/01-199-100-101	16 V DC	216 Ω	241 Ω	66 mA	19.9 V	100 mA	497.5 mW	3.9 mH	0.34 µF	15.2 mH	1 µF	158632 ▲
9001/01-280-020-101	24 V DC	1435 Ω	1590 Ω	15 mA	28 V	20 mA	140 mW	85 mH	0.14 µF	306 mH	0.43 µF	158655
9001/01-280-050-101	24 V DC	599 Ω	666 Ω	36 mA	28 V	50 mA	350 mW	15.1 mH	0.14 µF	57 mH	0.43 µF	158665 ▲
9001/01-280-075-101	24 V DC	415 Ω	462 Ω	51 mA	28 V	75 mA	525 mW	7.4 mH	0.14 µF	28.4 mH	0.43 µF	158339
9001/01-280-085-101	24 V DC	340 Ω	375 Ω	64 mA	28 V	85 mA	595 mW	5 mH	0.14 µF	19.3 mH	0.43 µF	158351
9001/01-280-100-101	24 V DC	287 Ω	320 Ω	75 mA	28 V	100 mA	700 mW	3.6 mH	0.14 µF	13.9 mH	0.43 µF	158365 ▲
9001/01-280-110-101	24 V DC	263 Ω	294 Ω	81 mA	28 V	110 mA	770 mW	3.6 mH	0.14 µF	11.7 mH	0.43 µF	158380 ▲
9001/01-280-165-101	24 V DC	177 Ω	198 Ω	110 mA	28 V	165 mA	1155 mW	-	-	5.4 mH	0.43 µF	158392

08 b

CSA Information – Ex Interface to Class I, Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIA, IIB	C_o/C_a for IIA, IIB	
9001/01-083-442-101	6 V DC	22 Ω	29 Ω	110 mA	8.3 V	442 mA	917.2 mW	0.12 mH	7.2 µF	0.5 mH	73 µF	158338 ▲
9001/01-086-050-101	6 V DC	200 Ω	218 Ω	27 mA	8.6 V	50 mA	107.5 mW	15 mH	6.2 µF	56 mH	55 µF	158379
9001/01-086-075-101	6 V DC	130 Ω	145 Ω	41 mA	8.6 V	75 mA	161.3 mW	6.7 mH	6.2 µF	25 mH	55 µF	158391 ▲
9001/01-086-150-101	6 V DC	62 Ω	73 Ω	82 mA	8.6 V	150 mA	322.5 mW	1.3 mH	6.2 µF	7 mH	55 µF	158418 ▲
9001/01-086-270-101	6 V DC	36 Ω	45 Ω	110 mA	8.6 V	270 mA	580.5 mW	0.23 mH	6.2 µF	2.2 mH	55 µF	158428
9001/01-086-390-101	6 V DC	24 Ω	33 Ω	110 mA	8.6 V	390 mA	838.5 mW	0.16 mH	6.2 µF	0.89 mH	55 µF	158439
9001/01-126-150-101	8 V DC	91 Ω	106 Ω	75 mA	12.6 V	150 mA	472.5 mW	1.3 mH	1.15 µF	7 mH	7.4 µF	158502
9001/01-158-150-101	12 V DC	120 Ω	135 Ω	88 mA	15.8 V	150 mA	592.5 mW	1.3 mH	0.478 µF	7 mH	2.88 µF	158535 ▲
9001/01-158-390-101	12 V DC	43 Ω	57 Ω	< 100 mA	15.8 V	390 mA	1541 mW	0.16 mH	0.478 µF	0.89 mH	2.88 µF	158509 ▲
9001/01-168-020-101	12 V DC	909 Ω	966 Ω	12 mA	16.8 V	20 mA	84 mW	90 mH	0.39 µF	330 mH	2.29 µF	158555
9001/01-168-075-101	12 V DC	240 Ω	262 Ω	45 mA	16.8 V	75 mA	315 mW	6.7 mH	0.39 µF	25 mH	2.29 µF	158568
9001/01-199-050-101	16 V DC	430 Ω	462 Ω	34 mA	19.9 V	50 mA	248.8 mW	15 mH	0.223 µF	56 mH	1.42 µF	158616
9001/01-199-100-101	16 V DC	220 Ω	241 Ω	66 mA	19.9 V	100 mA	497.5 mW	4 mH	0.223 µF	15 mH	1.42 µF	158632 ▲
9001/01-280-020-101	24 V DC	1500 Ω	1590 Ω	15 mA	28 V	20 mA	140 mW	50 mH	0.083 µF	50 mH	0.65 µF	158655
9001/01-280-050-101	24 V DC	620 Ω	666 Ω	36 mA	28 V	50 mA	350 mW	8.5 mH	0.083 µF	25 mH	0.65 µF	158665 ▲
9001/01-280-075-101	24 V DC	430 Ω	462 Ω	51 mA	28 V	75 mA	525 mW	3.3 mH	0.083 µF	21 mH	0.65 µF	158339
9001/01-280-085-101	24 V DC	349 Ω	375 Ω	64 mA	28 V	85 mA	595 mW	2.4 mH	0.083 µF	16 mH	0.65 µF	158351
9001/01-280-100-101	24 V DC	300 Ω	320 Ω	75 mA	28 V	100 mA	700 mW	1.6 mH	0.083 µF	11 mH	0.65 µF	158365 ▲
9001/01-280-110-101	24 V DC	270 Ω	294 Ω	81 mA	28 V	110 mA	770 mW	1.2 mH	0.083 µF	9 mH	0.65 µF	158380 ▲
9001/01-280-165-101	24 V DC	180 Ω	198 Ω	110 mA	28 V	165 mA	1155 mW	-	-	3.5 mH	0.65 µF	158392

▲ Preferred products – in stock or available at short notice

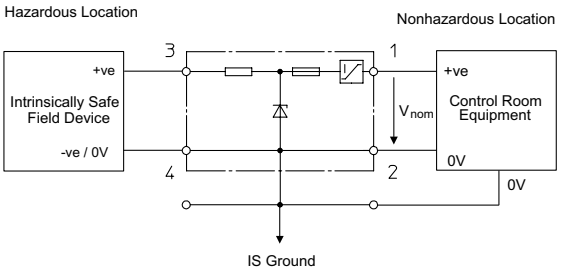
ATEX Information – Ex Interface to Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIB	C_o/C_a for IIB	
9001/01-083-442-101	6 V DC	24 Ω	29 Ω	110 mA	8.3 V	442 mA	917.2 mW	0.1 mH	7.2 µF	0.5 mH	73 µF	158338▲
9001/01-086-050-101	6 V DC	196 Ω	218 Ω	27 mA	8.6 V	50 mA	107.5 mW	15 mH	6.2 µF	56 mH	55 µF	158379
9001/01-086-075-101	6 V DC	129 Ω	145 Ω	41 mA	8.6 V	75 mA	161.3 mW	6.6 mH	6.2 µF	25 mH	55 µF	158391▲
9001/01-086-150-101	6 V DC	65 Ω	73 Ω	82 mA	8.6 V	150 mA	322.5 mW	1.3 mH	6.2 µF	7 mH	55 µF	158418▲
9001/01-086-270-101	6 V DC	39 Ω	45 Ω	110 mA	8.6 V	270 mA	580.5 mW	0.23 mH	6.2 µF	2.2 mH	55 µF	158428
9001/01-086-390-101	6 V DC	28 Ω	33 Ω	110 mA	8.6 V	390 mA	839 mW	0.16 mH	6.2 µF	1 mH	55 µF	158439
9001/01-126-150-101	8 V DC	93 Ω	106 Ω	75 mA	12.6 V	150 mA	473 mW	1.3 mH	1.15 µF	7 mH	7.4 µF	158502
9001/01-158-150-101	12 V DC	120 Ω	135 Ω	88 mA	15.8 V	150 mA	593 mW	1.3 mH	0.478 µF	7 mH	2.88 µF	158535▲
9001/01-158-390-101	12 V DC	50 Ω	57 Ω	< 100 mA	15.8 V	390 mA	1541 mW	0.16 mH	0.478 µF	0.89 mH	2.88 µF	158509▲
9001/01-168-020-101	12 V DC	871 Ω	966 Ω	12 mA	16.8 V	20 mA	84 mW	90 mH	0.39 µF	330 mH	2.29 µF	158555
9001/01-168-075-101	12 V DC	235 Ω	262 Ω	45 mA	16.8 V	75 mA	315 mW	6.6 mH	0.39 µF	25 mH	2.29 µF	158568
9001/01-199-050-101	16 V DC	415 Ω	462 Ω	34 mA	19.9 V	50 mA	249 mW	15 mH	0.223 µF	56 mH	1.42 µF	158616
9001/01-199-100-101	16 V DC	216 Ω	241 Ω	66 mA	19.9 V	100 mA	498 mW	4 mH	0.223 µF	15 mH	1.42 µF	158632▲
9001/01-280-020-101	24 V DC	1435 Ω	1590 Ω	15 mA	28 V	20 mA	140 mW	50 mH	0.083 µF	50 mH	0.65 µF	158655
9001/01-280-050-101	24 V DC	599 Ω	666 Ω	36 mA	28 V	50 mA	350 mW	8.5 mH	0.083 µF	25 mH	0.65 µF	158665▲
9001/01-280-075-101	24 V DC	415 Ω	462 Ω	51 mA	28 V	75 mA	525 mW	3.3 mH	0.083 µF	21 mH	0.65 µF	158339
9001/01-280-085-101	24 V DC	340 Ω	375 Ω	64 mA	28 V	85 mA	595 mW	2.4 mH	0.083 µF	16 mH	0.65 µF	158351
9001/01-280-100-101	24 V DC	287 Ω	320 Ω	75 mA	28 V	100 mA	700 mW	1.6 mH	0.083 µF	11 mH	0.65 µF	158365▲
9001/01-280-110-101	24 V DC	263 Ω	294 Ω	81 mA	28 V	110 mA	770 mW	1.2 mH	0.083 µF	9 mH	0.65 µF	158380▲
9001/01-280-165-101	24 V DC	177 Ω	198 Ω	110 mA	28 V	165 mA	1155 mW			3.5 mH	0.65 µF	158392

▲ Preferred products – in stock or available at short notice

08 b

Positive Polarity Current Limitation



- Grounded circuit
- Current limitation to < 100 mA
- Various safety and operational characteristics as listed in the table below
- Approved for installation in hazardous areas (refer to certificate).

Technical tips

- 9001/01-199-390-101 and 9001/01-280-280-101 are not allowed for interfacing to field devices in Gas Groups A, B, E and IIC
- T_a = 140 °F (60 °C) except for 9001/01-280-280-101 in FM / UL / ATEX installations where T_a = 122 °F (50 °C)

FM / UL Information – Ex Interface to Class I, II, III, Division 1 or Class I, Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E or IIC	C_o/C_a for A,B,E or IIC	L_o/L_a for C, D, F, G or IIB, IIA	C_o/C_a for C, D, F, G or IIB, IIA	
9001/01-158-270-101	12 V DC	69 Ω	78 Ω	< 100 mA	15.8 V	270 mA	1067 mW	0.23 mH	0.478 µF	2.2 mH	2.88 µF	158503
9001/01-158-390-101	12 V DC	50 Ω	57 Ω	< 100 mA	15.8 V	390 mA	1541 mW	0.16 mH	0.478 µF	0.89 mH	2.88 µF	158509▲
9001/01-199-390-101	16 V DC	62 Ω	71 Ω	< 100 mA	19.9 V	390 mA	1940 mW			0.89 mH	1.42 µF	158519
9001/01-280-280-101	24 V DC	115 Ω	128 Ω	< 100 mA	28 V	280 mA	1960 mW			0.6 mH	0.65 µF	158722▲

CSA Information – Ex Interface to Class I, II, III, Division 1

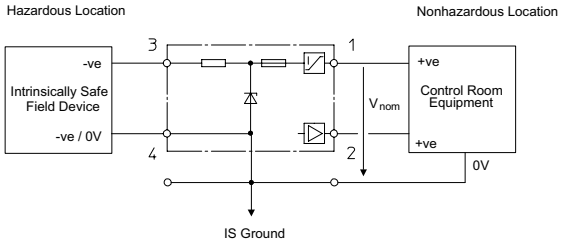
Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E	C_o/C_a for A, B, E	L_o/L_a for C, D, F, G	C_o/C_a for C, D, F, G	
9001/01-158-270-101	12 V DC	69 Ω	78 Ω	< 100 mA	15.8 V	270 mA	1067 mW	0.23 mH	0.67 µF	2.1 mH	2 µF	158503
9001/01-158-390-101	12 V DC	50 Ω	57 Ω	< 100 mA	15.8 V	390 mA	1541 mW	0.15 mH	0.67 µF	0.9 mH	2 µF	158509▲
9001/01-199-390-101	16 V DC	62 Ω	71 Ω	< 100 mA	19.9 V	390 mA	1940 mW	-	-	0.9 mH	1.03 µF	158519
9001/01-280-280-101	24 V DC	115 Ω	128 Ω	< 100 mA	28 V	280 mA	1960 mW	-	-	2.1 mH	0.43 µF	158722▲

CSA Information – Ex Interface to Class I, Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIA, IIB	C_o/C_a for IIA, IIB	
9001/01-158-270-101	12 V DC	62 Ω	78 Ω	< 100 mA	15.8 V	270 mA	1067 mW	0.23 mH	0.478 µF	2.2 mH	2.88 µF	158503
9001/01-158-390-101	12 V DC	43 Ω	57 Ω	< 100 mA	15.8 V	390 mA	1541 mW	0.16 mH	0.478 µF	0.89 mH	2.88 µF	158509▲
9001/01-199-390-101	16 V DC	54.5 Ω	71 Ω	< 100 mA	19.9 V	390 mA	1940 mW	-	-	0.89 mH	1.42 µF	158519
9001/01-280-280-101	24 V DC	110 Ω	128 Ω	< 100 mA	28 V	280 mA	1960 mW	-	-	0.6 mH	0.65 µF	158722▲

ATEX Information – Ex Interface to Zone 0												
Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIB	C_o/C_a for IIB	
9001/01-158-270-101	12 V DC	69 Ω	78 Ω	< 100 mA	15.8 V	270 mA	1067 mW	0.23 mH	0.478 µF	2.2 mH	2.88 µF	158503
9001/01-158-390-101	12 V DC	50 Ω	57 Ω	< 100 mA	15.8 V	390 mA	1541 mW	0.16 mH	0.478 µF	0.89 mH	2.88 µF	158509▲
9001/01-199-390-101	16 V DC	62 Ω	71 Ω	< 100 mA	19.9 V	390 mA	1940 mW			0.89 mH	1.42 µF	158519
9001/01-280-280-101	24 V DC	115 Ω	128 Ω	< 100 mA	28 V	280 mA	1960 mW			600 mH	0.65 µF	158722▲

Positive Polarity Current Limitation + Mirror - Digital



- Application specific for the connection of volt free contacts
- Operational current limited to < 40 mA
- Grounded field device
- Input to control system elevated above 0 V
- Allows the connection of unregulated power supplies, V_{nom} between +20 to 35 V DC
- Approved for installation in hazardous areas (refer to certificate).

Technical tips

- As terminal 4 is connected to ground, this barrier should not be used for fail safe applications. Use the 9002/13-252-121-041 instead.
- Maximum leakage current (terminal 1 to ground (0 V)) < 100 µA

FM / UL Information – Ex Interface to Class I, II, III, Division 1 or Class I, Zone 0												
Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E or IIC	C_o/C_a for A,B,E or IIC	L_o/L_a for C, D, F, G or IIB, IIA	C_o/C_a for C, D, F, G or IIB, IIA	
9001/01-252-060-141	20 to 35 V DC	455 Ω	506 Ω	40 mA	25.2 V	60 mA	378 mW	6.2 mH	0.107 µF	25 mH	0.82 µF	158693▲

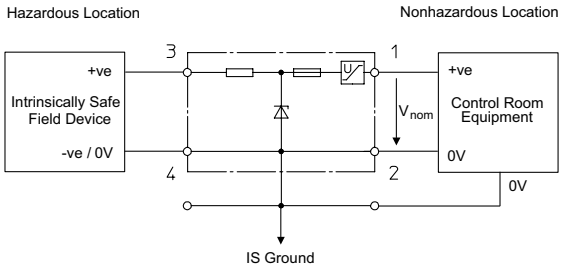
CSA Information – Ex Interface to Class I, II, III, Division 1												
Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E	C_o/C_a for A, B, E	L_o/L_a for C, D, F, G	C_o/C_a for C, D, F, G	
9001/01-252-060-141	20 to 35 V DC	455 Ω	506 Ω	40 mA	25.2 V	60 mA	378 mW	10.8 mH	0.18 µF	41.1 mH	0.55 µF	158693▲

CSA Information – Ex Interface to Class I, Zone 0												
Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIA, IIB	C_o/C_a for IIA, IIB	
9001/01-252-060-141	20 to 35 V DC	470 Ω	506 Ω	40 mA	25.2 V	60 mA	378 mW	6.2 mH	0.107 µF	25 mH	0.82 µF	158693▲

ATEX Information – Ex Interface to Zone 0												
Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIB	C_o/C_a for IIB	
9001/01-252-060-141	20 to 35 V DC	455 Ω	506 Ω	40 mA	25.2 V	60 mA	378 mW	6.2 mH	0.107 µF	25 mH	0.82 µF	158693▲

08 b

Positive Polarity Voltage Limitation



- Application specific for the connection of solenoid valves, LEDs or audible alarms
- Grounded circuit
- Allows the connection of unregulated power supplies, V_{nom} between +20 to 35 V DC
- Approved for installation in hazardous areas (refer to certificate).

Technical tips

- Maximum leakage current at 24 V (terminal 1 to ground (0 V)) = 1 mA
- Maximum leakage current at 35 V (terminal 1 to ground (0 V)) = 10 mA

FM / UL Information – Ex Interface to Class I, II, III, Division 1 or Class I, Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E or IIC	C_o/C_a for A,B,E or IIC	L_o/L_a for C, D, F, G or IIB, IIA	C_o/C_a for C, D, F, G or IIB, IIA	
9001/01-252-100-141	20 to 35 V DC	259 Ω	268 Ω	78 mA	25.2 V	100 mA	630 mW	2 mH	0.107 µF	11 mH	0.82 µF	158697 ▲

CSA Information – Ex Interface to Class I, II, III, Division 1

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E	C_o/C_a for A, B, E	L_o/L_a for C, D, F, G	C_o/C_a for C, D, F, G	
9001/01-252-100-141	20 to 35 V DC	259 Ω	268 Ω	78 mA	25.2 V	100 mA	630 mW	3.5 mH	0.18 µF	13.9 mH	0.55 µF	158697 ▲

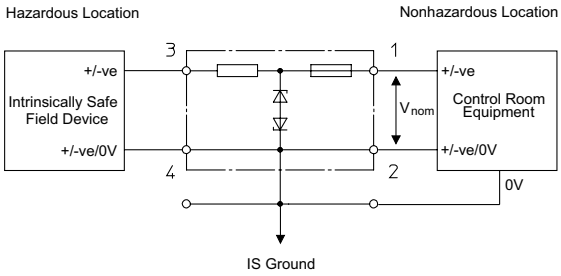
CSA Information – Ex Interface to Class I, Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIA, IIB	C_o/C_a for IIA, IIB	
9001/01-252-100-141	20 to 35 V DC	255 Ω	268 Ω	78 mA	25.2 V	100 mA	630 mW	2 mH	0.107 µF	11 mH	0.82 µF	158697 ▲

ATEX Information – Ex Interface to Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIB	C_o/C_a for IIB	
9001/01-252-100-141	20 to 35 V DC	259 Ω	268 Ω	78 mA	25.2 V	100 mA	630 mW	2 mH	0.107 µF	11 mH	0.82 µF	158697 ▲

Alternating Polarity



- Grounded circuit
- Suitable for AC and DC circuits
- Various safety and operational characteristics as listed in the table below
- Approved for installation in hazardous areas (refer to certificate).

Technical tips

- 9001/02-412-095-101 not allowed for interfacing to field devices in Gas Groups A, B, E and IIC
- 9001/02-016-...-1.1 - Maximum leakage current (terminal 1 to ground (0V)) < 10 µA
- 9001/02-016-...-111 - Tolerance = +0.5 %

FM / UL Information – Ex Interface to Class I, II, III, Division 1 or Class I, Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E or IIC	C_o/C_a for A,B,E or IIC	L_o/L_a for C, D, F, G or IIB, IIA	C_o/C_a for C, D, F, G or IIB, IIA	
9001/02-016-015-101	± 0.7 V AC+DC	120 Ω	134 Ω	5 mA	1.6 V	15 mA	6 mW	160 mH	100 µF	560 mH	1000 µF	158669
9001/02-016-050-111	± 0.7 V AC+DC	37 Ω	40 Ω	17 mA	1.6 V	50 mA	20 mW	15 mH	100 µF	56 mH	1000 µF	158677
9001/02-016-150-111	± 0.7 V AC+DC	19.9 Ω	20.1 Ω	35 mA	1.6 V	150 mA	60 mW	1.3 mH	100 µF	7 mH	1000 µF	158685▲
9001/02-016-320-101	± 0.7 V AC+DC	11 Ω	14 Ω	50 mA	1.6 V	320 mA	128 mW	0.19 mH	100 µF	1.6 mH	1000 µF	158497
9001/02-093-003-101	± 6 V AC+DC	3141 Ω	3473 Ω	1.7 mA	9.3 V	3 mA	6.975 mW	1000 mH	4.1 µF	1000 mH	31 µF	158741
9001/02-093-030-101	± 6 V AC+DC	319 Ω	355 Ω	16 mA	9.3 V	30 mA	69.75 mW	40 mH	4.1 µF	150 mH	31 µF	158743▲
9001/02-093-390-101	± 6 V AC+DC	31 Ω	36 Ω	110 mA	9.3 V	390 mA	906.8 mW	0.16 mH	4.1 µF	0.89 mH	31 µF	158755▲
9001/02-133-150-101	± 10 V AC+DC	102 Ω	115 Ω	86 mA	13.3 V	150 mA	498.8 mW	1.3 mH	0.91 µF	7 mH	5.6 µF	158758
9001/02-175-100-101	± 12 V AC+DC	198 Ω	223 Ω	53 mA	17.5 V	100 mA	437.5 mW	4 mH	0.339 µF	15 mH	1.97 µF	158301▲
9001/02-280-090-101	± 24 V AC+DC	320 Ω	357 Ω	67 mA	28 V	90 mA	630 mW	2.2 mH	0.083 µF	14 mH	0.65 µF	158317
9001/02-412-095-101	± 36 V AC+DC	456 Ω	508 Ω	70 mA	41.2 V	95 mA	978.5 mW			9 mH	0.287 µF	158329

08 b

CSA Information – Ex Interface to Class I, II, III, Division 1

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E	C_o/C_a for A, B, E	L_o/L_a for C, D, F, G	C_o/C_a for C, D, F, G	
9001/02-016-015-101	± 0.7 V AC+DC	120 Ω	134 Ω	5 mA	1.6 V	15 mA	6 mW	172 mH	1000 µF	608 mH	3000 µF	158669
9001/02-016-050-111	± 0.7 V AC+DC	37 Ω	40 Ω	17 mA	1.6 V	50 mA	20 mW	13.8 mH	1000 µF	52 mH	3000 µF	158677
9001/02-016-150-111	± 0.7 V AC+DC	19.9 Ω	20.1 Ω	35 mA	1.6 V	150 mA	60 mW	2.2 mH	1000 µF	8.7 mH	3000 µF	158685 ▲
9001/02-016-320-101	± 0.7 V AC+DC	11 Ω	14 Ω	50 mA	1.6 V	320 mA	128 mW	0.19 mH	1000 µF	1.6 mH	3000 µF	158497
9001/02-093-003-101	± 6 V AC+DC	3141 Ω	3473 Ω	1.7 mA	9.3 V	3 mA	6.975 mW	1000 mH	3.7 µF	1000 mH	11.2 µF	158741
9001/02-093-030-101	± 6 V AC+DC	319 Ω	355 Ω	16 mA	9.3 V	30 mA	69.75 mW	39.1 mH	3.7 µF	143 mH	11.2 µF	158743 ▲
9001/02-093-390-101	± 6 V AC+DC	31 Ω	36 Ω	110 mA	9.3 V	390 mA	906.8 mW	0.16 mH	3.7 µF	1 mH	11.2 µF	158755 ▲
9001/02-133-150-101	± 10 V AC+DC	102 Ω	115 Ω	86 mA	13.3 V	150 mA	498.8 mW	1.3 mH	1.1 µF	7 mH	3.2 µF	158758
9001/02-175-100-101	± 12 V AC+DC	198 Ω	223 Ω	53 mA	17.5 V	100 mA	437.5 mW	4 mH	0.47 µF	15.7 mH	1.4 µF	158301 ▲
9001/02-280-090-101	± 24 V AC+DC	320 Ω	357 Ω	67 mA	28 V	90 mA	630 mW	4.3 mH	0.14 µF	16.9 mH	0.42 µF	158317
9001/02-412-095-101	± 36 V AC+DC	456 Ω	508 Ω	70 mA	41.2 V	95 mA	978.5 mW	-	-	15.7 mH	0.18 µF	158329

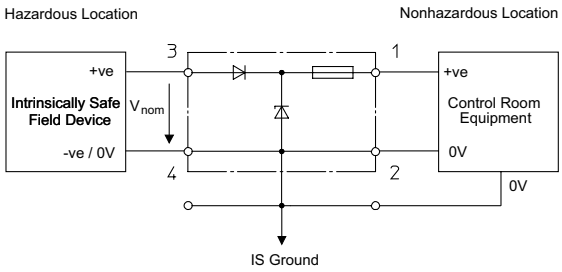
CSA Information – Ex Interface to Class I, Zone 0

Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIA, IIB	C_o/C_a for IIA, IIB	
9001/02-016-015-101	± 0.7 V AC+DC	121 Ω	134 Ω	5 mA	1.6 V	15 mA	6 mW	160 mH	100 µF	560 mH	1000 µF	158669
9001/02-016-050-111	± 0.7 V AC+DC	33.2 Ω	40 Ω	17 mA	1.6 V	50 mA	20 mW	15 mH	100 µF	56 mH	1000 µF	158677
9001/02-016-150-111	± 0.7 V AC+DC	13 Ω	20.1 Ω	35 mA	1.6 V	150 mA	60 mW	1.3 mH	100 µF	7 mH	1000 µF	158685 ▲
9001/02-016-320-101	± 0.7 V AC+DC	5.6 Ω	14 Ω	50 mA	1.6 V	320 mA	128 mW	0.19 mH	100 µF	1.6 mH	1000 µF	158497
9001/02-093-003-101	± 6 V AC+DC	3320 Ω	3473 Ω	1.7 mA	9.3 V	3 mA	6.975 mW	1000 mH	4.1 µF	1000 mH	31 µF	158741
9001/02-093-030-101	± 6 V AC+DC	332 Ω	355 Ω	16 mA	9.3 V	30 mA	69.75 mW	40 mH	4.1 µF	150 mH	31 µF	158743 ▲
9001/02-093-390-101	± 6 V AC+DC	27 Ω	36 Ω	110 mA	9.3 V	390 mA	906.8 mW	0.16 mH	4.1 µF	0.89 mH	31 µF	158755 ▲
9001/02-133-150-101	± 10 V AC+DC	100 Ω	115 Ω	86 mA	13.3 V	150 mA	498.8 mW	1.3 mH	0.91 µF	7 mH	5.6 µF	158758
9001/02-175-100-101	± 12 V AC+DC	200 Ω	223 Ω	53 mA	17.5 V	100 mA	437.5 mW	4 mH	0.339 µF	15 mH	1.97 µF	158301 ▲
9001/02-280-090-101	± 24 V AC+DC	330 Ω	357 Ω	67 mA	28 V	90 mA	630 mW	2.2 mH	0.083 µF	14 mH	0.65 µF	158317
9001/02-412-095-101	± 36 V AC+DC	470 Ω	508 Ω	70 mA	41.2 V	95 mA	978.5 mW	-	-	9 mH	0.287 µF	158329

▲ Preferred products – in stock or available at short notice

ATEX Information – Ex Interface to Zone 0												
Product Type	Operational Characteristics				Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	R_{max}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIB	C_o/C_a for IIB	
9001/02-016-015-101	± 0.7 V AC+DC	120 Ω	134 Ω	5 mA	1.6 V	15 mA	6 mW	160 mH	100 µF	560 mH	1000 µF	158669
9001/02-016-050-111	± 0.7 V AC+DC	37 Ω	40 Ω	17 mA	1.6 V	50 mA	20 mW	15 mH	100 µF	56 mH	1000 µF	158677
9001/02-016-150-111	± 0.7 V AC+DC	19.9 Ω	20.1 Ω	35 mA	1.6 V	150 mA	60 mW	1.3 mH	100 µF	7 mH	1000 µF	158685▲
9001/02-016-320-101	± 0.7 V AC+DC	11 Ω	14 Ω	50 mA	1.6 V	320 mA	128 mW	0.19 mH	100 µF	1.6 mH	1000 µF	158497
9001/02-093-003-101	± 6 V AC+DC	3141 Ω	3473 Ω	1.7 mA	9.3 V	3 mA	6.975 mW	1000 mH	4.1 µF	1000 mH	31 µF	158741
9001/02-093-030-101	± 6 V AC+DC	319 Ω	355 Ω	16 mA	9.3 V	30 mA	69.8 mW	40 mH	4.1 µF	150 mH	31 µF	158743▲
9001/02-093-390-101	± 6 V AC+DC	31 Ω	36 Ω	110 mA	9.3 V	390 mA	906.8 mW	0.16 mH	4.1 µF	0.89 mH	31 µF	158755▲
9001/02-133-150-101	± 10 V AC+DC	102 Ω	115 Ω	86 mA	13.3 V	150 mA	498.8 mW	1.3 mH	0.91 µF	7 mH	5.6 µF	158758
9001/02-175-100-101	± 12 V AC+DC	198 Ω	223 Ω	53 mA	17.5 V	100 mA	437.5 mW	4 mH	0.339 µF	15 mH	1.97 µF	158301▲
9001/02-280-090-101	± 24 V AC+DC	320 Ω	357 Ω	67 mA	28 V	90 mA	630 mW	2.2 mH	0.083 µF	14 mH	0.65 µF	158317
9001/02-412-095-101	± 36 V AC+DC	456 Ω	508 Ω	70 mA	41.2 V	95 mA	979 mW			9 mH	0.287 µF	158329

Diode Return Barriers for Positive Polarity



- Grounded circuit
- For DC current signal returns
- Current limitation to < $I_{max.}$
- Various safety and operational characteristics as listed in the table below
- Approved for installation in hazardous areas (refer to certificate).
- Return diode causes a 3.5 voltage drop

Technical tips

- Not short circuit proof
- T_a = 140 °F (60 °C) except for 9001/03-280-000-101 in FM / UL / ATEX installations where T_a = 122 °F (50 °C)

FM / UL Information – Ex Interface to Class I, II, III, Division 1 or Class I, Zone 0										
Product Type	Operational Characteristics		Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E or IIC	C_o/C_a for A,B,E or IIC	L_o/L_a for C, D, F, G or IIB, IIA	C_o/C_a for C, D, F, G or IIB, IIA	
9001/03-199-000-101	16 V DC	< 100 mA	19.9 V	0 mA	0 mW	1000 mH	0.223 µF	1000 mH	1.42 µF	158475
9001/03-280-000-101	24 V DC	< 100 mA	28 V	0 mA	0 mW	50 mH	0.083 µF	50 mH	0.65 µF	158486

08 b

CSA Information – Ex Interface to Class I, II, III, Division 1

Product Type	Operational Characteristics		Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E	C_o/C_a for A, B, E	L_o/L_a for C, D, F, G	C_o/C_a for C, D, F, G	
9001/03-199-000-101	16 V DC	< 100 mA	19.9 V	0 mA	0 mW	1000 mH	0.34 µF	1000 mH	1.02 µF	158475
9001/03-280-000-101	24 V DC	< 100 mA	28 V	0 mA	0 mW	1000 mH	0.14 µF	1000 mH	0.43 µF	158486

CSA Information – Ex Interface to Class I, Zone 0

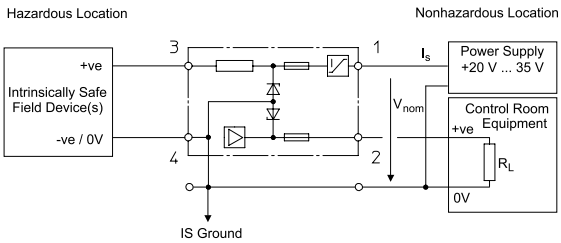
Product Type	Operational Characteristics			Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIA, IIB	C_o/C_a for IIA, IIB	
9001/03-199-000-101	16 V DC	Diode *	< 100 mA	19.9 V	0 mA	0 mW	1000 mH	0.223 µF	1000 mH	1.42 µF	158475
9001/03-280-000-101	24 V DC	Diode *	< 100 mA	28 V	0 mA	0 mW	50 mH	0.083 µF	50 mH	0.65 µF	158486

ATEX Information – Ex Interface to Zone 0

Product Type	Operational Characteristics		Entity Parameters	Gas Group Cable Parameters				Art. No.
	V_{nom}	I_{max}	U_o/V_{oc}	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIB	C_o/C_a for IIB	
9001/03-199-000-101	16 V DC	< 100 mA	19.9 V	1000 mH	0.223 µF	1000 mH	1.42 µF	158475
9001/03-280-000-101	24 V DC	< 100 mA	28 V	50 mH	0.083 µF	50 mH	0.65 µF	158486

Diode*: designates diode return

Zener Barriers for HART / SMART Transmitter



- Application specific for HART / SMART transmitters
- Grounded field device
- Input to control system elevated above 0 V
- Allows the connection of unregulated power supplies, V_{nom} between +20 to 35 V DC
- Approved for installation in hazardous areas (refer to certificate).

Technical tips
- $R_L \leq 350\ \Omega$
- Transmitter supply voltage = 14 V when $V_{nom} > 23.5$ V
- Transmitter supply voltage = V_{nom} -9.5 V when $V_{nom} \leq 23.5$ V

FM / UL Information – Ex Interface to Class I, II, III, Division 1 or Class I, Zone 0

Product Type	Operational Characteristics		Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E or IIC	C_o/C_a for A,B,E or IIC	L_o/L_a for C, D, F, G or IIB, IIA	C_o/C_a for C, D, F, G or IIB, IIA	
9001/51-280-091-141	20 to 35 V DC	< 91 mA	28 V	91 mA	637 mW	2.2 mH	0.083 µF	14 mH	0.65 µF	158524 ▲

CSA Information – Ex Interface to Class I, II, III, Division 1

Product Type	Operational Characteristics		Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E	C_o/C_a for A, B, E	L_o/L_a for C, D, F, G	C_o/C_a for C, D, F, G	
9001/51-280-091-141	20 to 35 V DC	< 91 mA	28 V	91 mA	637 mW	4.5 mH	0.14 µF	17.6 mH	0.43 µF	158524 ▲

▲ Preferred products – in stock or available at short notice

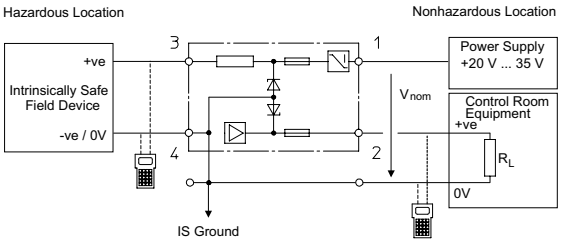
CSA Information – Ex Interface to Class I, Zone 0

Product Type	Operational Characteristics			Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	R_{min}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIA, IIB	C_o/C_a for IIA, IIB	
9001/51-280-091-141	20 to 35 V DC	320 Ω	< 91 mA	28 V	91 mA	637 mW	2.2 mH	0.083 µF	14 mH	0.65 µF	158524 ▲

ATEX Information – Ex Interface to Zone 0

Product Type	Operational Characteristics		Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIB	C_o/C_a for IIB	
9001/51-280-091-141	20 to 35 V DC	< 91 mA	28 V	91 mA	637 mW	2.2 mH	0.083 µF	14 mH	0.65 µF	158524 ▲

Zener Barriers for HART Transmitter



- Application specific for HART transmitters
- Grounded field device
- Input to control system elevated above 0 V
- Allows the connection of unregulated power supplies, V_{nom} between +20 to 35 V DC
- Approved for installation in hazardous areas (refer to certificate).

Technical tips

- R_L ≤ 500 Ω when V_{nom} ≤ 23.5 V
- R_L ≤ 750 Ω when V_{nom} > 23.5 V
- Transmitter supply voltage = 15 V when V_{nom} > 23.5 V
- Transmitter supply voltage = V_{nom} -8.5 V when V_{nom} ≤ 23.5 V
- T_a = 104 °F (40 °C) for FM / UL installations

FM / UL Information – Ex Interface to Class I, II, III, Division 1 or Class I, Zone 0

Product Type	Operational Characteristics		Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E or IIC	C_o/C_a for A,B,E or IIC	L_o/L_a for C, D, F, G or IIB, IIA	C_o/C_a for C, D, F, G or IIB, IIA	
9001/51-280-110-141	20 to 35 V DC	< 110 mA	28 V	110 mA	770 mW	1.2 mH	0.083 µF	9 mH	0.65 µF	158530 ▲

CSA Information – Ex Interface to Class I, II, III, Division 1

Product Type	Operational Characteristics		Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for A, B, E	C_o/C_a for A, B, E	L_o/L_a for C, D, F, G	C_o/C_a for C, D, F, G	
9001/51-280-110-141	20 to 35 V DC	< 110 mA	28 V	110 mA	770 mW	3.2 mH	0.14 µF	12.4 mH	0.43 µF	158530 ▲

CSA Information – Ex Interface to Class I, Zone 0

Product Type	Operational Characteristics		Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIA, IIB	C_o/C_a for IIA, IIB	
9001/51-280-110-141	20 to 35 V DC	< 110 mA	28 V	110 mA	770 mW	1.2 mH	0.083 µF	9 mH	0.65 µF	158530 ▲

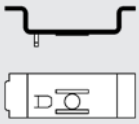
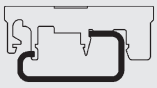
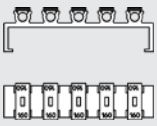
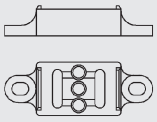
08 b

ATEX Information – Ex Interface to Zone 0

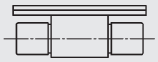
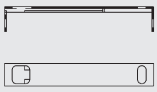
Product Type	Operational Characteristics		Entity Parameters			Gas Group Cable Parameters				Art. No.
	V_{nom}	I_{max}	U_o/V_{oc}	I_o/I_{sc}	P_o	L_o/L_a for IIC	C_o/C_a for IIC	L_o/L_a for IIB	C_o/C_a for IIB	
9001/51-280-110-141	20 to 35 V DC	< 110 mA	28 V	110 mA	770 mW	1.2 mH	0.083 µF	9 mH	0.65 µF	158530 ▲

Schematics of the zener barriers available at r-stahl.com

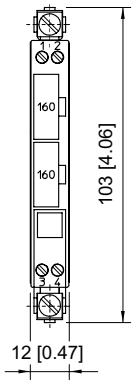
Accessories

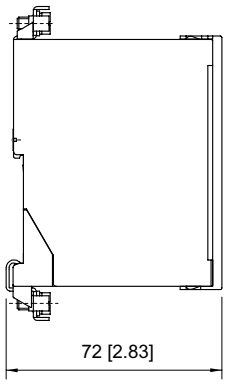
Figure	Description	Product Type	Art. No.	Weight lb
Adaptor				
	The adaptor enables a zener barrier to be installed on a clamping base (Art. No. 165283) or mounting plate from a previous series.	IS-barrier mounting adaptor for universa	158826	0.01
Clamping base, moulded material				
	Enables mounting of zener barrier on a G-rail. The safety barrier is mounted using the adapter (Art. No. 158826).	mounting attachment (plastic)	165283	0.01
Fuse holder				
	Fuse holder is snapped onto the side of the zener barrier and can be equipped with up to 5 back-up fuses (replacement).	Fuse holder for 9001,9002+9004	158834	0.04
Insulation and fastening material				
	Suitable for the NS 35/15 DIN rail, makes it possible to install the DIN rail such that it is electrically insulated from the mounting plate.	Holder part for rail NS 35/15	158828	0.05

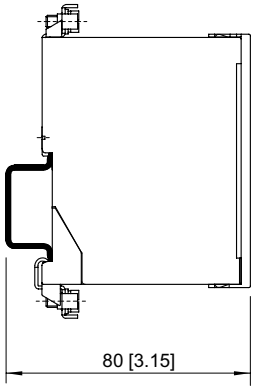
Spare Parts

Figure	Description	Product Type	Art. No.	Weight lb
Back-up fuse				
	For all zener barriers Series 9001, 9002 and 9004 unit: 5 pcs.	Five Fuses for safety barriers M0.16/250	158964 ▲	0.02
Label carrier				
	Transparent cover for the label	Holder for label	158977	–

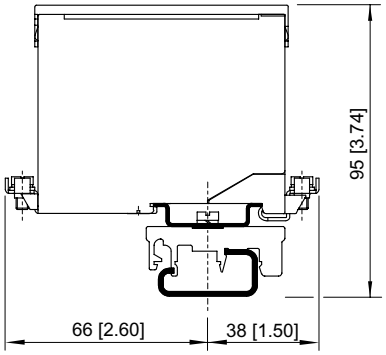
Dimensional Drawings (All Dimensions in mm [inches]) – Subject to Alterations



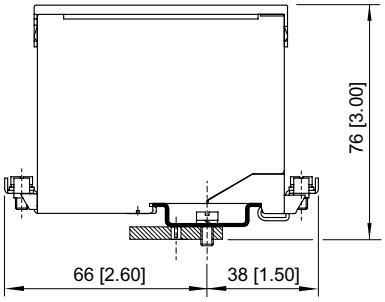




Mounting on DIN rail NS 35/15



Mounting on DIN rail NS 32 by means of adaptor and mounting attachment, moulded plastic



Mounting on mounting plate by means of adaptor