Single-Channel Safety Barriers
Series 9001

09965E00

- Broad product range for all standard applications in the world of automation
- Flexible and space saving single and dual channel versions available
- Time saving installation due to
  - simple snap on DIN-Rail and
  - connection to PE and ground at the same time
- Reduced inventory due to uniform exchangeable fuse

R.STAHL safety barriers INTRINSPAK series 9001 are used for various applications in the arena of automation. Based on the broad range of versions and the possibility of various interconnections it offers for almost all tasks.
The safety barriers enable the intrinsic safe operation of HART transmitter, proximity switches, potential-free contacts and temperature sensors, strain gauge, solenoid valves, indicators e.t.c. The compact design allows a space saving and flexible installation in the cabinet. The mounting is very comfortable and easy due to the fact that installation on the DIN-rail and the contact to the potential equalization is made in one step.

	ATEX / IECEX					
Zone	0	1	2	20	21	22
Ex i interfaces	x	x	x	x	x	x
Installation in			x			x

	NEC 505 Class I			NEC 506		
Zone	0	1	2	20	21	22
Ex i interfaces						
Installation in			x			x

	NEC 500					
	Class I		Class II		Class III	
Division	1	2	1	2	1	2
Ex i interfaces	x	x	x	x	x	x
Installation in		x		x		x

WebCode 9001A

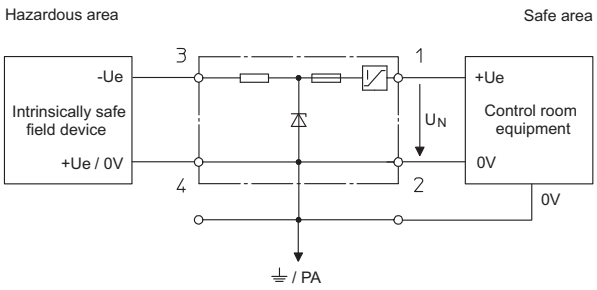
Explosion Protection	
Global (IECEx)	
Gas and dust	IECEx PTB 09.0001X Ex nA [ia Ga] IIC T4 Gc [Ex ia Da] IIIC
Europe (ATEX)	
Gas and dust	PTB 01 ATEX 2088 X Ⓔx II 3 (1) G Ex nA [ia Ga] IIC/IIB T4 Gc Ⓔx II (1) D [Ex ia Da] IIIC
USA (NEC)	
Gas and dust	3011002 (FM) CL. I, DIV.2, GP. A,B,C,D, T4 AND CL. I, ZONE 2, GP. IIC/IIB T4, INTRINSICALLY SAFE CONNECTIONS FOR CL. I,II,III, DIV. 1, GP. A,B,C,D,E,F,G AND CL. I, ZONE 0, GP. IIC/IIB E81680 (UL) CLASS I, DIV. 2, GROUPS A,B,C,D CLASS II, DIV. 2, GROUPS F,G CLASS III
Certificates and approvals	
Certificates	IECEx, ATEX, Canada (CSA), Kazakhstan (TR), Russia (TR), Serbia (SRPS), Ukraine (TR), Belarus (TR)
Further parameters	
Installation	in Zone 2, Division 2 and in safe area
Further information	see respective certifcate and operating instructions

Technical data	
Electrical data	
Transmission characteristic	
Leakage current at U_N	≤ 2 µA (if not stated otherwise)
Temperature effect	≤ 0.25 % / 10 K
Transmission frequency	
At resistive current limitation	
I_m ≤ 50 mA	≤ 50 kHz
I_m ≥ 50 mA	≤ 100 kHz
At electronic current limitation	≤ 10 kHz
Ambient conditions	
Ambient temperature	-20 ... +60 °C / -4 ... +140 °F
Storage temperature	-20 ... +75 °C / -4 ... +167 °F
Maximum relative humidity	95 % mean, no dewing
Mechanical data	
Ingress protection	
	according to IEC 60529
terminal enclosure	IP20
Casing	IP40
Enclosure material	Polyamide 6 GF
Connection	4 cage terminals, each maximum 1.5 mm^2 flexible / solid 2 PA-terminals, each maximum 4 mm^2 flexible / solid
Weight	approx. 0.115 kg

Selection Table

Version	Description	Type	Page
Single-channel barriers	• Earthed electric circuit • Current limiting to < 100 mA	**9001/01**	4
	• Earthed electric circuit • Connection to regulated power supply U_N	**9001/01**	5
	• Application for floating contacts • Nominal current limited to < 40 mA • Earthed electric circuit • Connection to unregulated power supply U_N between + 20 and 35 V DC	**9001/01**	7
	• Application for floating contacts • Nominal current limited to < 40 mA • Earthed field device • Connection to unregulated power supply U_N between + 20 and 35 V DC	**9001/01**	8
	• Application for solenoid valves, LEDs or audible signals • Earthed electric circuit • Connection to unregulated power supply U_N between + 20 and 35 V DC	**9001/01**	9
	• Earthed electric circuit • Connection to regulated power supply U_N	**9001/00**	10
	• Earthed electric circuit • Suitable for alternating current and direct current	**9001/02**	11
	• Earthed electric circuit • Suitable for alternating current and direct current • Current limiting to < I_{max}	**9001/02**	13
	• Earthed electric circuit • For the evaluation of direct current signals • Current limiting to < I_{max}	**9001/03**	14
	• Application for HART transmitters • Earthed field device • Connection to unregulated power supply U_N between + 20 and 35 V DC	**9001/51**	15

Single-Channel Safety Barriers for Positive Potential



- Earthed electric circuit
- Installation possible in Division 2 and Zone 2
- Can be used as intrinsically safe supply

Selection Table

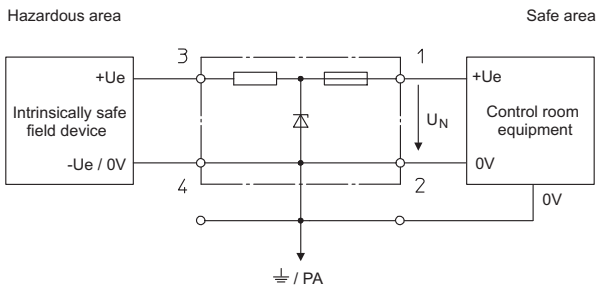
U_N	R_{min}	R_{max}	I_{max}	ΔU	Safety values							Order number
					U_o	I_o	P_o	IIC		IIB		
								L_o	C_o	L_o	C_o	
V	Ω	Ω	mA	V	V	mA	mW	mH	µF	mH	µF	
12	69	78	< 100	< 1.4	15.8	270	1067	0.23	0.478	2.2	2.88	**9001/01-158-270-101**
	50	57	< 100	< 1.4	15.8	390	1541	0.16	0.478	0.89	2.88	**9001/01-158-390-101**
16	62	71	< 100	< 1.4	19.9	390	1940	– –	– –	0.89	1.42	**9001/01-199-390-101**
24	115	128	< 100	< 1.4	28	280	1960	– –	– –	0.6	0.65	**9001/01-280-280-101** *)

*) Ambient temperature - 20 ... + 50 °C

Functional Data and Safety-Relevant Maximum Values

U_N	Nominal voltage	I_{max}	Maximum output current	P_o	Maximum power
I_N	Nominal current $I_N = \frac{U_N - \Delta U}{R_{max} + R_L}$	ΔU	Additional voltage drop across the safety barrier	L_o	max. permissible external inductance
R_{min}	Minimum resistance of the safety barriers	U_o	Maximum voltage	C_o	max. permissible external capacity
R_{max}	Maximum resistance of the safety barriers	I_o	Maximum current	R_L	max. resistance of the field device

Single-Channel Safety Barriers for Positive Polarity



05438E02

- Grounded cicuit
- Allows the connection of regulated power supplies, U_N
- Approved for installation in Division 2 and Zone 2

Selection Table

U_N	R_{min}	R_{max}	I_{max}	Safety values							Order number
				U_o	I_o	P_o	IIC L_o	IIC C_o	IIB L_o	IIB C_o	
V	Ω	Ω	mA	V	mA	mW	mH	µF	mH	µF	
1 ... 3	42	49	20...61	5	150	187.5	1.3	100	7	1000	**9001/01-050-150-101**
6	24	28	110	8.3	442	917.2	0.12	7.2	0.5	73	**9001/01-083-442-101**
	870	964	6	8.6	10	21.5	300	6.2	1000	55	**9001/01-086-010-101**
	452	502	11	8.6	20	43	90	6.2	330	55	**9001/01-086-020-101**
	196	218	27	8.6	50	107.5	15	6.2	56	55	**9001/01-086-050-101**
	129	145	41	8.6	75	161.3	6.7	6.2	25	55	**9001/01-086-075-101**
	65	73	82	8.6	150	322.5	1.3	6.2	7	55	**9001/01-086-150-101**
	39	45	110	8.6	270	580.5	0.23	6.2	2.2	55	**9001/01-086-270-101**
	28	32	110	8.6	390	839	0.16	6.2	1	55	**9001/01-086-390-101**
8	681	698	11	12.6	20	63	90	1.15	330	7.4	**9001/01-126-020-101**
	178	199	40	12.6	75	236.3	6.7	1.15	25	7.4	**9001/01-126-075-101**
	93	106	75	12.6	150	473	1.3	1.15	7	7.4	**9001/01-126-150-101**
10	215	240	41	13.7	65	222.6	8.8	0.79	34	5	**9001/01-137-065-101**
12	120	135	88	15.8	150	593	1.3	0.478	7	2.88	**9001/01-158-150-101**
	871	966	12	16.8	20	84	90	0.39	330	2.29	**9001/01-168-020-101**
	377	420	28	16.8	50	210	15	0.39	56	2.29	**9001/01-168-050-101**
	235	262	45	16.8	75	315	6.7	0.39	25	2.29	**9001/01-168-075-101**
16	2097	2320	6	19.9	10	50	330	0.223	1000	1.42	**9001/01-199-010-101**
	1052	1165	13	19.9	20	100	90	0.223	330	1.42	**9001/01-199-020-101**
	539	598	26	19.9	38	189.1	26	0.223	95	1.42	**9001/01-199-038-101**
	415	462	34	19.9	50	249	15	0.223	56	1.42	**9001/01-199-050-101**
	216	241	66	19.9	100	498	4	0.223	15	1.42	**9001/01-199-100-101**
	149	168	95	19.9	150	746.3	1.3	0.223	7	1.42	**9001/01-199-150-101**
20	379	422	47	25.2	70	441	4.5	0.107	25	0.82	**9001/01-252-070-101**
24	1435	1590	15	28	20	140	50	0.083	50	0.65	**9001/01-280-020-101**
	599	666	36	28	50	350	8.5	0.083	25	0.65	**9001/01-280-050-101**
	415	462	51	28	75	525	3.3	0.083	21	0.65	**9001/01-280-075-101**
	340	375	64	28	85	595	2.4	0.083	16	0.65	**9001/01-280-085-101**
	287	320	75	28	100	700	1.6	0.083	11	0.65	**9001/01-280-100-101**
	263	294	81	28	110	770	1.2	0.083	9	0.65	**9001/01-280-110-101**
	177	198	110	28	165	1155	– –	– –	3.5	0.65	**9001/01-280-165-101**

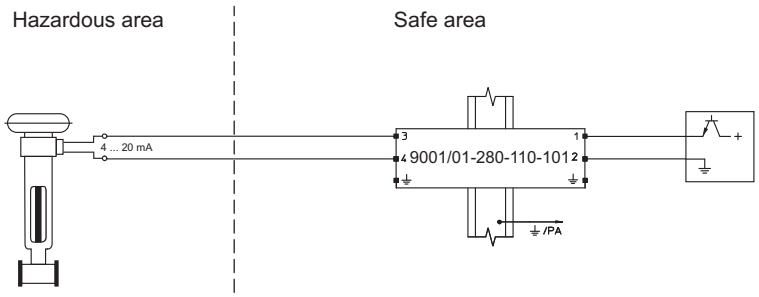
Functional and Maximum Safety Values

U_N	Nominal voltage	I_{max}	Maximum current through the safety barrier	P_o	Maximum power
R_{min}	Minimum resistance of the safety barrier	U_o	Maximum voltage	L_o	Maximum permissible external inductance
R_{max}	Maximum resistance of the safety barrier	I_o	Maximum current	C_o	Maximum permissible external capacity

Application 9001/01-280-110-101

Analog output (current source) with I/P converter etc. Field circuit earthed

Schematic



11331E01

Operating data

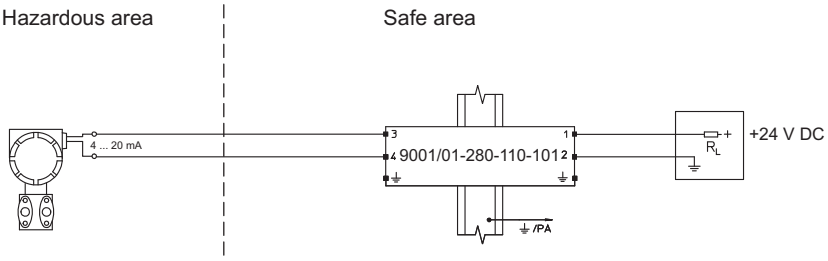
Operating voltage	U_N = + 24 V		
Operating current	I_N = 0 ... 22 mA		
Maximum voltage drop at the safety barrier	ΔU_{max} ≤6.5 V		

Safety data

Maximum voltage	U_o = 28 V		
Maximum current	I_o = 110 mA		
Maximum permissible external inductance	L_o	IIC 2.2 mH	IIB 9 mH
Maximum permissible external capacity	C_o	IIC 0.08 µF	IIB 0.65 µF
Maximum power	P_o = 770 mW		

2-wire 4/20 mA transmitter - Standard

Schematic



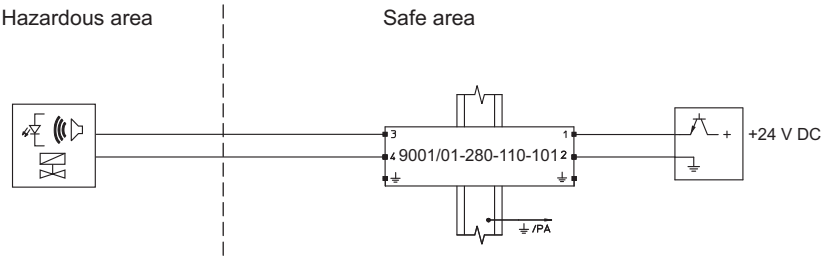
09952E01

Application note

This safety barrier is used if the control system measures the current in the supply line.
The transmitter and the control system are earthed, regulated power supply must be used.

Discrete 2-wire output for magnet reed switches, LEDs and audible alarm indicators

Schematic



06603E01

Application note

This barrier is suitable for use with regulated power supplies and earthed return circuits.
The rated voltage is 24 V. 9001/01-280-165-101 and 9001/01-280-280-101 should be used for applications which require higher power and for use exclusively in gas groups IIB and IIA.

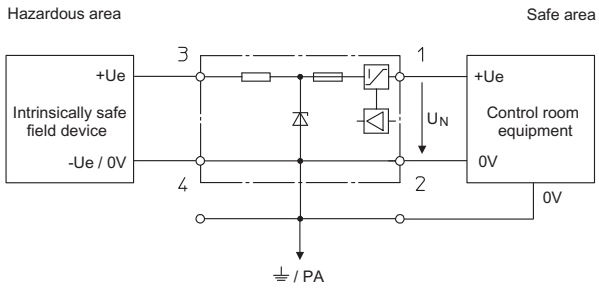
Single-Channel Safety Barriers for Positive Potential
Series 9001/01

INTRINSPAK

STAHL

A2

Single-Channel Safety Barriers for Positive Polarity



05494E02

- Application specific for the connection of volt free contacts
- Operational current limited to < 40 mA
- Grounded circuit
- Allows the connection of unregulated power supplies, U_N between + 20 to 35 V DC
- Approved for installation in Division 2 and Zone 2

Selection Table

U_N	R_{min}	R_{max}	I_{max}	Safety values							Order number
				U_o	I_o	P_o	IIC		IIB		
							L_o	C_o	L_o	C_o	
V	Ω	Ω	mA	V	mA	mW	mH	µF	mH	µF	
20 ... 35	455	506	40	25.2	57	359.1	6.3	0.107	25	0.82	**9001/01-252-057-141** *)

*) Maximum leakage (terminal 1 -> PA/⏚) I_{leak} ≤ 100 µA

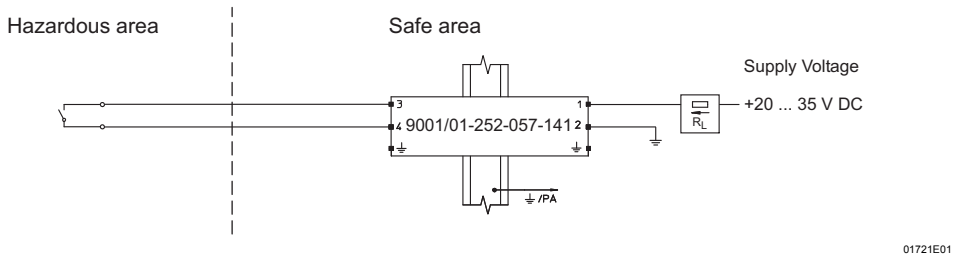
Functional Data and Safety-Relevant Maximum Values

U_N	Nominal voltage	ΔU	Additional voltage drop across the safety barrier	L_o	max. permissible external inductance
R_{min}	Minimum resistance of the safety barriers	U_o	Maximum voltage	C_o	max. permissible external capacity
R_{max}	Maximum resistance of the safety barriers	I_o	Maximum current	R_L	max. resistance of the field device
I_{max}	Maximum output current	P_o	Maximum power		

Application

Binary input with switch (load to +) Field circuit earthed

Schematic



01721E01

Operating data

Operating voltage: U_N = + 20 ... 35 V

Open-circuit output voltage (3 -> 4, I_n = 0)

	U_N ≤24 V	U_N > 24 V
UL ≥	U_N - 3 V	21 V

Operating current: $I_N = U_L / 505\ \Omega + R_L$

Safety data

Maximum voltage: U_o = 25.2 V

Maximum current: I_o = 57 mA

		IIC	IIB
Maximum permissible external inductance	L_o	6.3 mH	25 mH
Maximum permissible external capacity	C_o	IIC 0.107 µF	IIB 0.82 µF

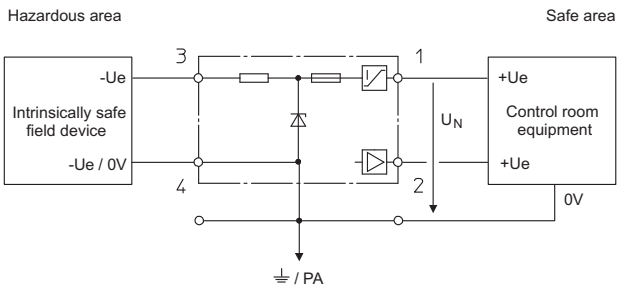
Maximum power: P_o = 359 mW

Application note

This safety barrier is particularly suitable for relay control.
A binary input (optocoupler) of an automation device can be used as load.

Single-Channel Safety Barriers for Positive Potential
Series 9001/01

Single-Channel Safety Barriers for Positive Polarity



- Application specific for the connection of volt free contacts
- Operational current limited < 40 mA
- Grounded field device
- Allows the connection of unregulated power supplies, U_N between + 20 to 35 V DC
- Approved for installation in Division 2 and Zone 2

Selection Table

U_N	R_{min}	R_{max}	I_{max}	Safety values							Order number
				U_o	I_o	P_o	IIC		IIB		
							L_o	C_o	L_o	C_o	
V	Ω	Ω	mA	V	mA	mW	mH	µF	mH	µF	
20 ... 35	455	506	40	25.2	60	378	6.2	0.107	25	0.82	**9001/01-252-060-141** *)

*) Maximum leakage (terminal 1 -> PA/⏚) I_{leak} ≤ 100 µA

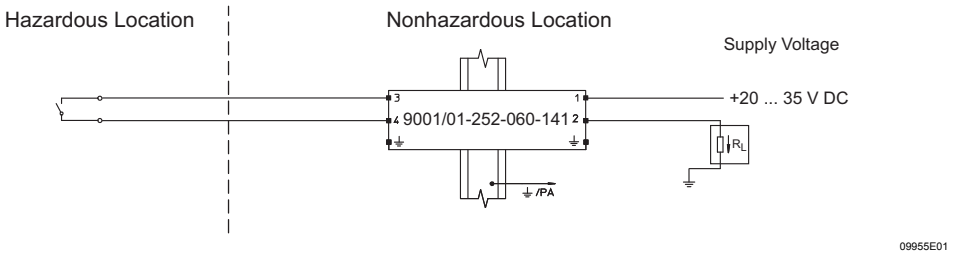
Functional Data and Safety-Relevant Maximum Values

U_N	Nominal voltage	ΔU	Additional voltage drop across the safety barrier	L_o	max. permissible external inductance
R_{min}	Minimum resistance of the safety barriers	U_o	Maximum voltage	C_o	max. permissible external capacity
R_{max}	Maximum resistance of the safety barriers	I_o	Maximum current	R_L	max. resistance of the field device
I_{max}	Maximum output current	P_o	Maximum power		

Application

Binary input with switch (load on ground) Field circuit earthed

Schematic



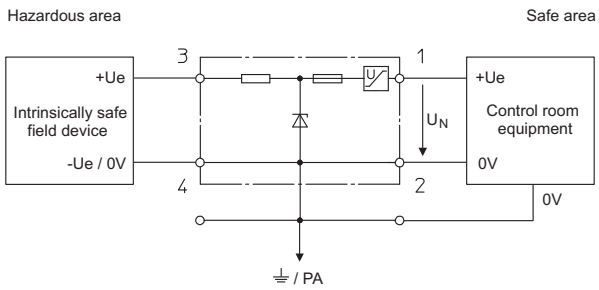
Operating data

Operating voltage	U_N = + 20 ... 35 V
Open-circuit output voltage (3 -> 4, I_n = 0)	UL ≥ U_N - 3 V
Operating current	I_N ≤ 40 mA

Safety data

Maximum voltage	U_o = 25.2 V		
Maximum current	I_o = 60 mA		
Maximum permissible external inductance	L_o	IIC 6.2 mH	IIB 25 mH
Maximum permissible external capacity	C_o	IIC 0.107 µF	IIB 0.82 µF
Maximum power	P_o = 378 mW		
Application note	This safety barrier is particularly suitable for relay control. A binary input (optocoupler) of an automation device can be used as load.		

Single-Channel Safety Barriers for Positive Polarity



05501E02

- Application specific for the connection of solenoid valves, LEDs or audible alarms
- Grounded circuit
- Allows the connection of unregulated power supplies, U_N between + 20 to 35 V DC
- Approved for installation in Division 2 and Zone 2

Selection Table

U_N	R_{min}	R_{max}	I_{max}	Safety values							Order number
				U_o	I_o	P_o	IIC		IIB		
							L_o	C_o	L_o	C_o	
V	Ω	Ω	mA	V	mA	mW	mH	µF	mH	µF	
20 ... 35	259	268	78	25.2	100	630	2	0.107	11	0.82	**9001/01-252-100-141** *)

*) Maximum leakage (terminal 1 -> PA/⏚) at 24 V / 35 V I_{leak} ≤ 1 mA / 10 mA

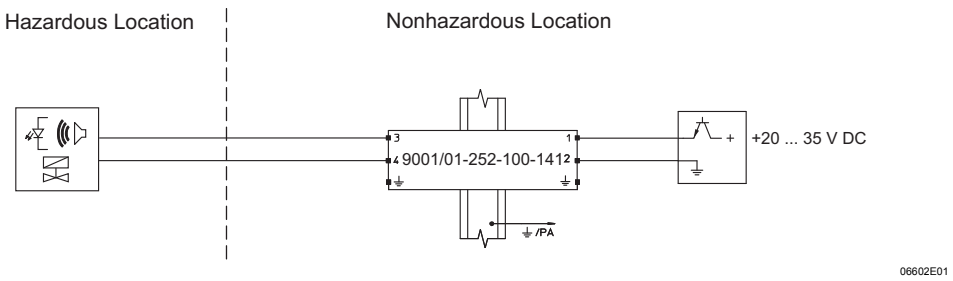
Functional and Maximum Safety Values

U_N	Nominal voltage	I_{max}	Maximum current through the safety barrier	P_o	Maximum power
R_{min}	Minimum resistance of the safety barrier	U_o	Maximum voltage	L_o	Maximum permissible external inductance
R_{max}	Maximum resistance of the safety barrier	I_o	Maximum current	C_o	Maximum permissible external capacity

Application

Binary output (current source) for valves, LEDs etc. Field circuit earthed

Schematic



06602E01

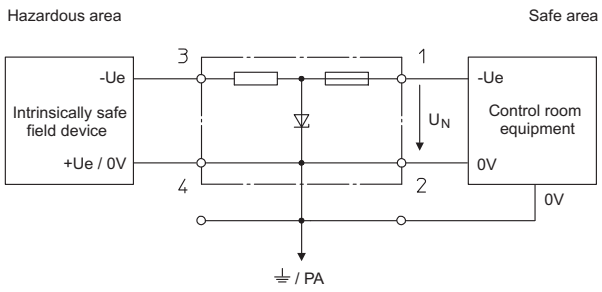
Operating data

Operating voltage	U_N = + 20 ... 35 V		
Open-circuit output voltage (3 -> 4, I_n = 0)		U_N ≤24 V	U_N > 24 V
	UL ≥	U_N - 3 V	21 V
Operating current	$I_N = U_L$ / 268 Ω+ R_L		

Safety data

Maximum voltage	U_o = 25.2 V		
Maximum current	I_o = 100 mA		
Maximum permissible external inductance	L_o	IIC 2 mH	IIB 11 mH
Maximum permissible external capacity	C_o	IIC 0.107 µF	IIB 0.82 µF
Maximum power	P_o = 630 mW		

Single-Channel Safety Barriers for Negative Polarity



- Grounded cicuit
- Allows the connection of regulated power supplies, U_N
- Approved for installation in Division 2 and Zone 2

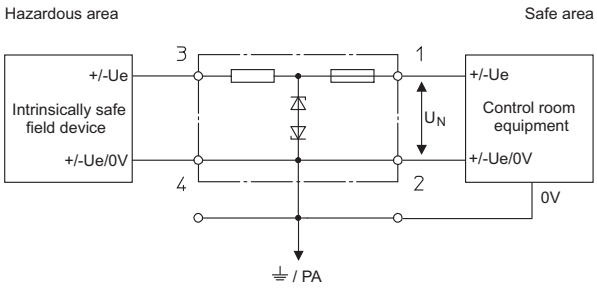
Selection Table

U_N	R_{min}	R_{max}	I_{max}	Safety values							Order number
				U_o	I_o	P_o	IIC		IIB		
							L_o	C_o	L_o	C_o	
V	Ω	Ω	mA	V	mA	mW	mH	µF	mH	µF	
1 ... 3	42	49	20...61	5	150	187.5	1.3	100	7	1000	**9001/00-050-150-101**
6	24	28	110	8.3	442	917.2	0.1	7.2	0.5	73	**9001/00-083-442-101**
	870	964	6	8.6	10	21.5	300	6.2	1000	55	**9001/00-086-010-101**
	452	502	11	8.6	20	43	90	6.2	330	55	**9001/00-086-020-101**
	196	218	27	8.6	50	107.5	15	6.2	56	55	**9001/00-086-050-101**
	92	104	57	8.6	100	215	4	6.2	15	55	**9001/00-086-100-101**
	65	73	82	8.6	150	322.5	1.3	6.2	7	55	**9001/00-086-150-101**
	39	45	110	8.6	270	580.5	0.23	6.2	2.2	55	**9001/00-086-270-101**
	28	32	110	8.6	390	839	0.16	6.2	0.89	55	**9001/00-086-390-101**
12	120	135	88	15.8	150	593	1	0.478	7	2.88	**9001/00-158-150-101**
16	1052	1165	13	19.9	20	100	90	0.223	330	1.42	**9001/00-199-020-101**
	539	598	26	19.9	38	189	26	0.223	95	1.42	**9001/00-199-038-101**
	149	168	95	19.9	150	746	1.3	0.223	7	1.42	**9001/00-199-150-101**
24	1435	1590	15	28	20	140	50	0.083	50	0.65	**9001/00-280-020-101**
	599	666	36	28	50	350	8.5	0.083	25	0.65	**9001/00-280-050-101**
	340	375	64	28	85	595	2.4	0.083	16	0.65	**9001/00-280-085-101**
	287	320	75	28	100	700	1.6	0.083	11	0.65	**9001/00-280-100-101**
	263	294	81	28	110	770	1.2	0.083	9	0.65	**9001/00-280-110-101**
	177	198	110	28	165	1155	– –	– –	3.5	0.65	**9001/00-280-165-101**

Functional and Maximum Safety Values

U_N	Nominal voltage	I_{max}	Maximum current through the safety barrier	P_o	Maximum power
R_{min}	Minimum resistance of the safety barrier	U_o	Maximum voltage	L_o	Maximum permissible external inductance
R_{max}	Maximum resistance of the safety barrier	I_o	Maximum current	C_o	Maximum permissible external capacity

Single-Channel Safety Barriers for Alternating Polarity



05502E02

- Grounded circuit
- Suitable for AC and DC circuits
- Approved for installation in Division 2 and Zone 2

Selection Table

U_N	R_{min}	R_{max}	I_{max}	Safety values							Order number
				U_o	I_o	P_o	IIC		IIB		
							L_o	C_o	L_o	C_o	
V	Ω	Ω	mA	V	mA	mW	mH	µF	mH	µF	
± 0.7	120	134	5	1.6	15	6	160	100	560	1000	**9001/02-016-015-101** *)
	38	43	16	1.6	50	20	15	100	56	1000	**9001/02-016-050-101** *)
	39.8	40.2	17	1.6	50	20	15	100	56	1000	**9001/02-016-050-111** *)
	17	21	35	1.6	150	60	1.3	100	7	1000	**9001/02-016-150-101** *)**)
	19.9	20.1	35	1.6	150	60	1.3	100	7	1000	**9001/02-016-150-111** *)
	11	14	50	1.6	320	128	0.19	100	1.6	1000	**9001/02-016-320-101** *)**)
± 6	3141	3473	1,7	9.3	3	6.975	1000	4.1	1000	31	**9001/02-093-003-101**
	319	355	16	9.3	30	69.8	40	4.1	150	31	**9001/02-093-030-101**
	196	218	27	9.3	50	116.3	15	4.1	56	31	**9001/02-093-050-101**
	148	166	36	9.3	75	174.4	6.7	4.1	25	31	**9001/02-093-075-101**
	70	80	75	9.3	150	348.8	1.3	4.1	7	31	**9001/02-093-150-101**
	31	36	110	9.3	390	906.8	0.16	4.1	0.89	31	**9001/02-093-390-101**
± 10	102	115	86	13.3	150	498.8	1.3	0.91	7	5.6	**9001/02-133-150-101**
± 12	379	422	28	17.5	50	219	15	0.339	56	1.97	**9001/02-175-050-101**
	198	223	53	17.5	100	437.5	4	0.339	15	1.97	**9001/02-175-100-101**
	101	114	105	17.5	200	875	0.5	0.339	4	1.97	**9001/02-175-200-101**
± 16	149	167	95	19.6	150	735	1.3	0.235	7	1.47	**9001/02-196-150-101**
± 24	320	357	67	28	90	630	2.2	0.083	14	0.65	**9001/02-280-090-101**
± 36	456	508	70	41.2	95	979	– –	– –	9	0.287	**9001/02-412-095-101**

*) Maximum leakage $I_{leak} \leq 10$ µA
**) Tolerance ± 0.5 %

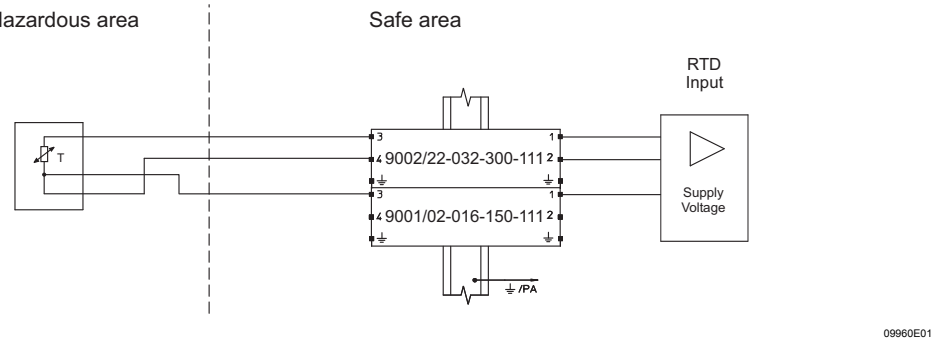
Functional and Maximum Safety Values

U_N	Nominal voltage	I_{max}	Maximum current through the safety barrier	P_o	Maximum power
R_{min}	Minimum resistance of the safety barrier	U_o	Maximum voltage	L_o	Maximum permissible external inductance
R_{max}	Maximum resistance of the safety barrier	I_o	Maximum current	C_o	Maximum permissible external capacity

Application

Pt100, 3-wire circuit Field circuit unearthed

Schematic



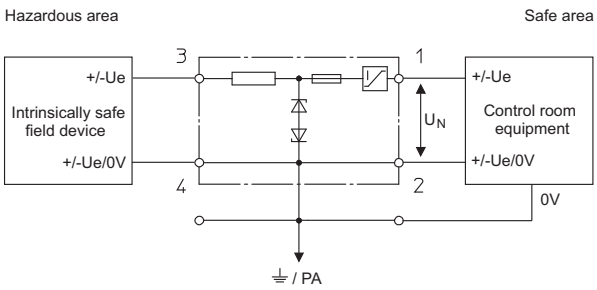
Operating data

Operating voltage	$U_N \leq 1.4$ V		
Series resistance of the safety barriers	R = 3 x (20 Ω ±0.1 Ω)		
Measuring range	≤ 400 °C ($I_N \leq 5$ mA) ≤ 850 °C ($I_N \leq 3$ mA)		

Safety data

Maximum voltage	U_o = 3.2 V		
Maximum current	I_o = 450 mA		
Maximum permissible external inductance	L_o	IIC 0.12 mH	IIB 0.5 mH
Maximum permissible external capacity	C_o	IIC 0.10 µF	IIB 1000 µF

Single-Channel Safety Barriers for Alternating Polarity



05526E02

- Grounded circuit
- Suitable for AC and DC circuits
- Current limitation to < I_{max}
- Approved for installation in Division 2 and Zone 2

Selection Table

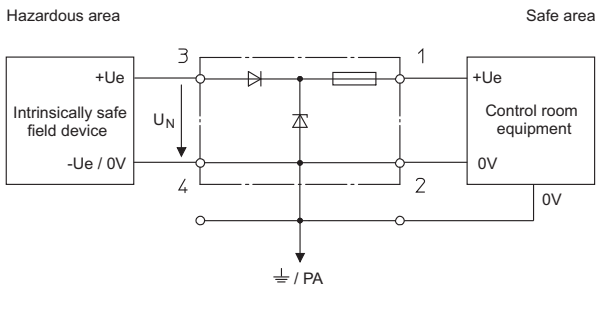
U_N	R_{min}	R_{max}	I_{max}	ΔU	Safety values							Order number
					U_o	I_o	P_o	IIC		IIB		
								L_o	C_o	L_o	C_o	
V	Ω	Ω	mA	V	V	mA	mW	mH	µF	mH	µF	
± 16	68	77	< 80	< 1.4	21.7	390	2116	– –	– –	0.89	1.17	**9001/02-217-390-101**
± 24	149	168	< 65	< 1.4	30.8	230	1771	– –	– –	0.7	0.524	**9001/02-308-230-101**

Functional data and safety-relevant maximum values

U_N	Nominal voltage	I_{max}	Maximum output current	P_o	Maximum power
I_N	Nominal current $I_N = \frac{U_N - \Delta U}{R_{max} + R_L}$	ΔU	Additional voltage drop across the safety barrier	L_o	max. permissible external inductance
R_{min}	Minimum resistance of the safety barriers	U_o	Maximum voltage	C_o	max. permissible external capacity
R_{max}	Maximum resistance of the safety barriers	I_o	Maximum current		

Single-Channel Diode Return Barriers for Positive Polarity
Series 9001/03

Single-Channel Diode Return Barriers for Positive Polarity



- Grounded circuit
- For DC current signal returns
- Approved for installation in Division 2 and Zone 2

Selection Table

U_N	I_{max}	ΔU	Safety values							Order number
			U_o	I_o	P_o	IIC		IIB		
						L_o	C_o	L_o	C_o	
V	mA	V	V	mA	mW	mH	µF	mH	µF	
6	< 150	3.5	8.6	0	0	1000	6.2	1000	55	**9001/03-086-000-101** *)
12	< 100	3.5	16.8	0	0	1000	0.39	1000	2.29	**9001/03-168-000-101** *)
16	< 100	3.5	19.9	0	0	1000	0.223	1000	1.42	**9001/03-199-000-101** *)
24	< 100	3.5	28	0	0	50	0.083	50	0.65	**9001/03-280-000-101** *) **)

*) Short circuit rating not short circuit proof

**) Ambient temperature - 20 °C ... + 50 °C

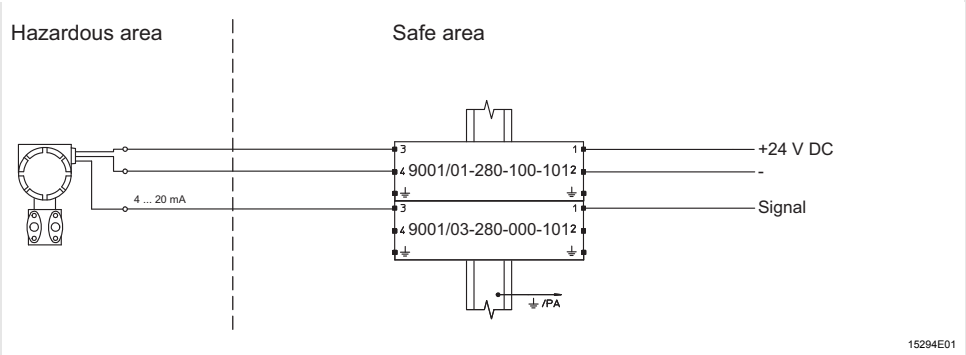
Functional data and safety-relevant maximum values

U_N	Nominal voltage	ΔU	Additional voltage drop across the safety barrier	P_o	Maximum power
I_N	Nominal current $I_N = \frac{U_N - \Delta U}{R_{max} + R_L}$	U_o	Maximum voltage	L_o	max. permissible external inductance
I_{max}	Maximum output current	I_o	Maximum current	C_o	max. permissible external capacity

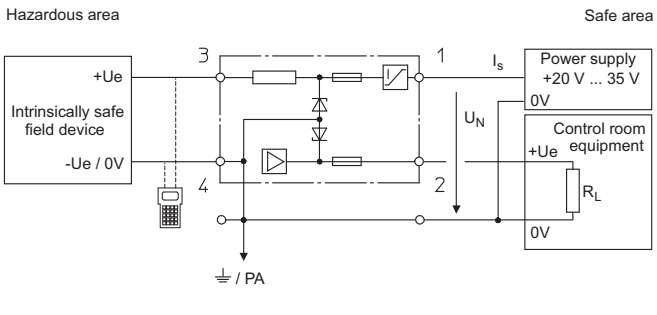
Application

3-wire 4 ... 20 mA transmitter

Schematic



Single-Channel Safety Barriers for Transmitters



- Application for HART transmitters
- Earthed electric circuit
- Connection to unregulated power supply U_N between + 20 and 35 V DC
- Installation possible in Division 2 and Zone 2
- The PA and OV of the control system must have equal potentials

A2

Selection Table

U_N	Safety values							Order number
	U_o	I_o	P_o	IIC		IIB		
				L_o	C_o	L_o	C_o	
V	V	mA	mW	mH	µF	mH	µF	
20 ... 35	28	91	637	2.2	0.083	14	0.65	**9001/51-280-091-141**
20 ... 35	28	110	770	1.2	0.083	9	0.65	**9001/51-280-110-141**

Technical data

Version	**9001/51-280-091-141**		**9001/51-280-110-141**	
Supply current	$I_s \leq 50$ mA		$I_s \leq 50$ mA	
Accuracy	± 0.05 %		± 0.05 %	
Temperature influence	± 0.1 % / 10 K		± 0.1 % / 10 K	
Longterm drift	± 0.05 %		± 0.05 %	
Rated operational current	I_N = 3.6 mA ... 22 mA		I_N = 3.6 mA ... 22 mA	
Load	$R_L \leq 350$ Ω		$R_L \leq 500$ Ω ($U_N \leq 23.5$ V) $R_L \leq 750$ Ω ($U_N > 23.5$ V)	
Transmitter supply voltage	U_{min} (I_N = 20 mA) U_N - 9.5 V 14 V	U_N ≤ 23.5 V > 23.5 V	U_{min} (I_N = 20 mA) U_N - 8.5 V 15 V	U_N ≤ 23.5 V > 23.5 V

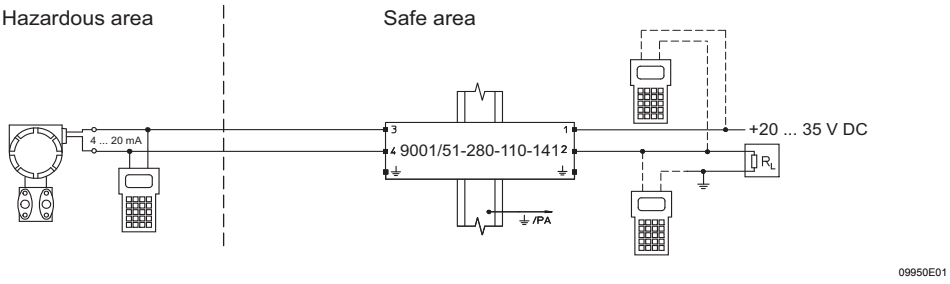
Functional and Maximum Safety Values

U_N	Nominal voltage	P_o	Maximum power		
U_o	Maximum voltage	L_o	Maximum permissible external inductance		
I_o	Maximum current	C_o	Maximum permissible external capacity		

Application

Analog input with standard transmitter Field circuit earthed

Schematic



Operating data

Operating voltage: U_N = + 20 ... 35 V

Load: $R_L \leq 500\ \Omega$ ($U_N \leq 23.5$ V)
$R_L \leq 750\ \Omega$ ($U_N > 23.5$ V)

Operating voltage of the transmitter

U_{min} (I_N = 20 mA)	U_N
U_N - 8.5 V	≤ 23.5 V
15 V	> 23.5 V

Safety data

Maximum voltage: U_o = 28 V

Maximum current: I_o = 110 mA

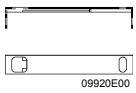
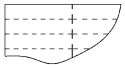
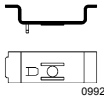
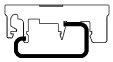
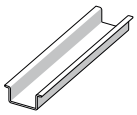
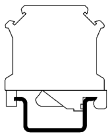
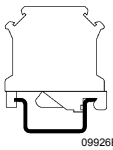
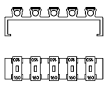
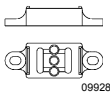
		IIC	IIB
Maximum permissible external inductance	L_o	1.2 mH	9 mH
Maximum permissible external capacity	C_o	0.083 µF	0.65 µF

Maximum power: P_o = 770 mW

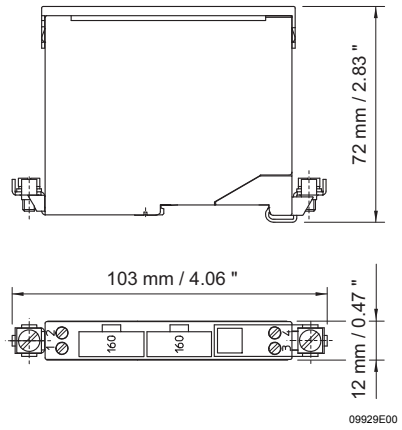
Application note

The safety barriers 9002/13-280-110-001 can be used with stabilised voltages $U_N \leq 26$ V.
In this case the operating voltage of the transmitter is $U_{min} \geq 12.1$ V
(with U_N = 24 V; I_N = 20 mA; R_L = 250 Ω)

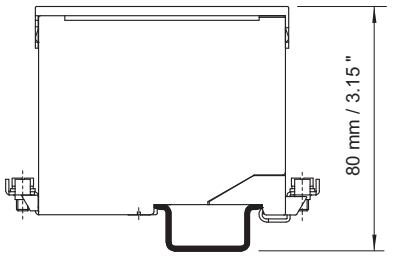
Accessories and Spare Parts

Designation	Figure	Description	Art. no.	Weight kg / lbs
Back-up fuse	 09919E00	for all safety barriers Series 9001, 9002 and 9004 unit: 5 pcs.	**158964**	0.008 / 0.018
Holder for labels	 09920E00		**158977**	0.002 / 0.004
Labelling paper	 09921E00	perforated, for typing Format: DIN A4	**158973**	0.005 / 0.011
Adaptor	 09922E00		**158826**	0.006 / 0.013
Mounting attachment moulded plastic	 09924E00		**165283**	0.004 / 0.009
DIN rail	 03856E00	NS 35 / 15 (meter length)	**103714**	1.410 / 3.109
Earth terminal	 09926E00	USLKG 5 (wire range≤ 4 mm^2)	**112760**	0.012 / 0.026
Earth terminal	 09926E00	USLKG 6 N (wire range≤ 6 mm^2)	**112599**	0.030 / 0.066
Fuse holder	 09927E00		**158834**	0.020 / 0.044
Insulating stand off	 09928E00	for rail NS 35/15	**158828**	0.023 / 0.051

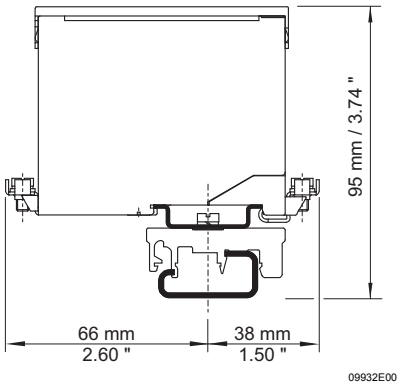
Dimensional Drawings (All Dimensions in mm / inches) - Subject to Alterations



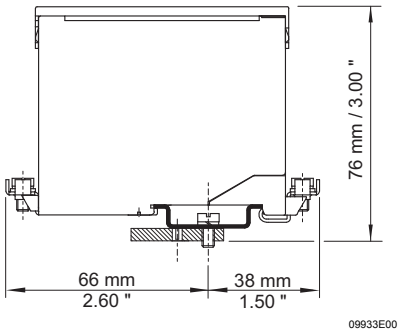
Safety barriers 9001, 9002, 9004



Safety barriers 9001, 9002, 9004
mounting on DIN rail NS 35/15



Safety barriers 9001, 9002, 9004
mounting on DIN rail NS 32 by means of adaptor and mounting attachment, moulded plastic



Safety barriers 9001, 9002, 9004
mounting on
mounting plate by means of adaptor

We reserve the right to make alterations to the technical data, dimensions, weights, designs and products available without notice. The illustrations cannot be considered binding.