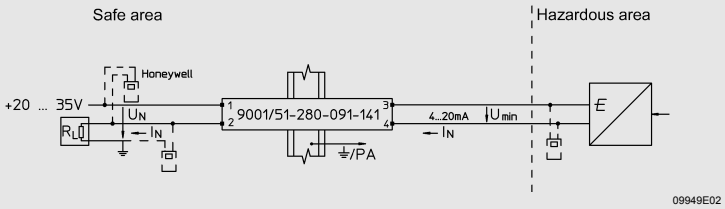
Selection table

Description		Ordering code
Application	**Analog input with transmitter Smart Field circuit grounded**	**9001/51-280-091-141**

Diagram



Nominal values

Operating voltage	U_N = + 20 V ... 35 V	
Operating current	I_N = 3.6 mA ... 22 mA	
Load	R_L ≤ 350 Ω	
Operating voltage of transmitter	U_{min} (I_N= 20 mA)	U_N
	U_N - 9.5 V	≤ 23.5 V
	14 V	> 23.5 V

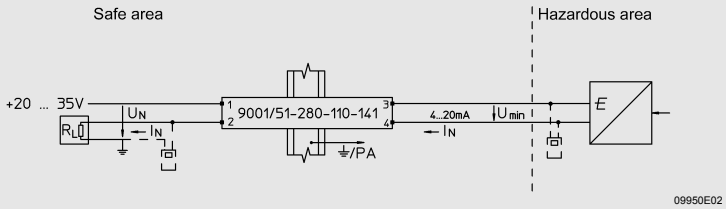
Safety values

Maximum voltage	U_o = 28 V		
Maximum current	I_o = 91 mA		
Maximum permissible external inductance	L_o	IIC 2.2 mH	IIB 14 mH
Maximum permissible external capacitance	C_o	IIC 0.083 µF	IIB 0.65 µF
Maximum power	P_o = 637 mW		
Application note	This safety barrier enables 2-way communication between Smart transmitter to / from a hand held communicator or DCS. Compatible to: • Honeywell DE Protokoll • All HART compatible transmitter		

Selection table

Description		Ordering code
Application	**Analog input with standard transmitter** **Field circuit grounded**	**9001/51-280-110-141**

Diagram



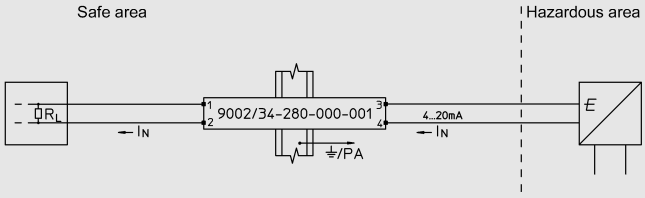
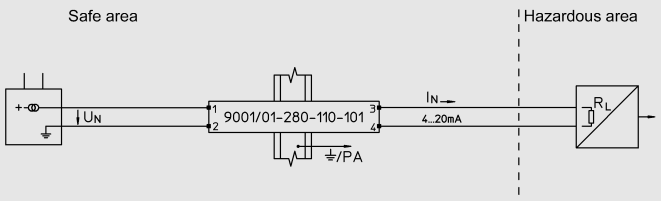
Nominal values

Operating voltage	U_N = + 20 V ... 35 V		
Operating current	I_N = 3.6 mA ... 22 mA		
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 transmitter	U_{min} (I_N= 20 mA) U_N - 8.5 V 15 V	U_N ≤ 23.5 V > 23.5 V	

Safety values

Maximum voltage	U_o = 28 V		
Maximum current	I_o = 110 mA		
Maximum permissible external inductance	L_o	IIC 1.2 mH	IIB 9 mH
Maximum permissible external capacitance	C_o	IIC 0.083 µF	IIB 0.65 µF
Maximum power	P_o = 770 mW		
Application note	With regulated power supply $U_N \leq 26$ V safety barrier 9002/13-280-110-001 can be used. Operating voltage of transmitter is $U_{min} \geq 12.1$ V (at U_N = 24 V; I_N = 20 mA; R_L = 250 Ω). The safety barriers enables 2-way communication from / to a HART transmitter to / from a hand held communicator or DCS. Compatible to all HART transmitters.		

Selection table

Description		Ordering code
Application	**4-wire transmitter** **Field circuit floating**	**9002/34-280-000-001**
Diagram	 09951E02	
Nominal values		
Operating current	I_N = 0 ... 22 mA	
Load	R_L ≤ 750 Ω	
Maximum voltage drop of the safety barrier	$\triangle U_{max}$ ≤ 3.5 V	
Safety values		
Maximum voltage	U_o = 28 V	
Maximum current	I_o = 0 mA	
Maximum permissible external inductance	The inductance is determined by the maximum current of the transmitter	
Maximum permissible external capacitance	C_o IIC 0.083 µF IIB 0.65 µF	
Maximum power	P_o = 0 mW	
Application note	This circuit requires an isolated input. For non-isolated inputs (R_L connected to PA) use the safety barrier 9001/03-280-000-001.	
Application	**Analog output (sourcing) for i/p converter etc.** **Field circuit floating**	**9001/01-280-110-101**
Diagram	 09952E02	
Nominal values		
Operating voltage	U_N = + 24 V	
Operating current	I_N = 0 ... 22 mA	
Maximum voltage drop of the safety barrier	$\triangle U_{max}$ ≤ 6.5 V	
Safety values		
Maximum voltage	U_o = 28 V	
Maximum current	I_o = 110 mA	
Maximum permissible external inductance	L_o IIC 1.2 mH IIB 9 mH	
Maximum permissible external capacitance	C_o IIC 0.08 µF IIB 0.65 µF	
Maximum power	P_o = 770 mW	

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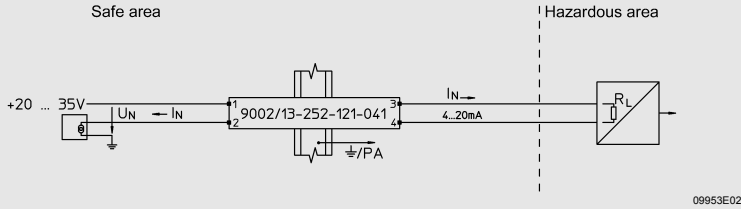
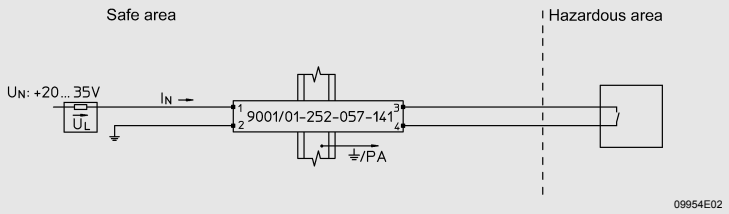
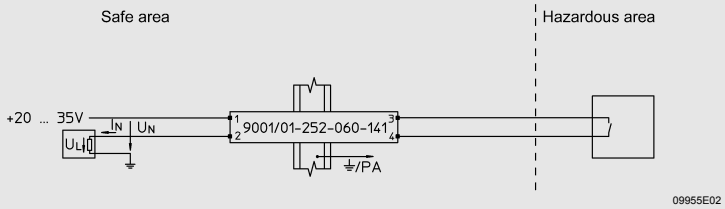
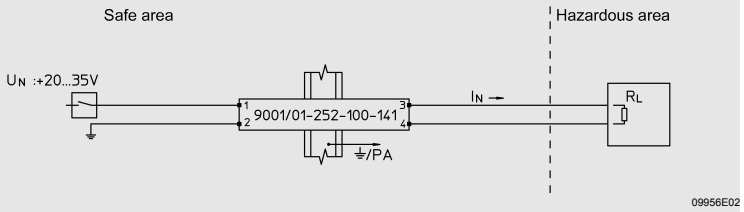
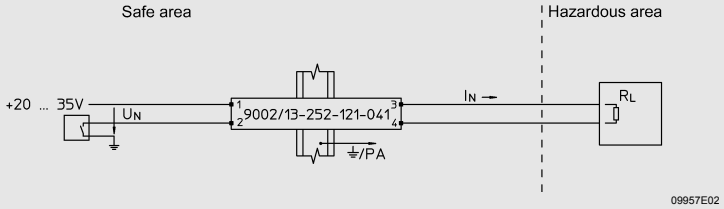
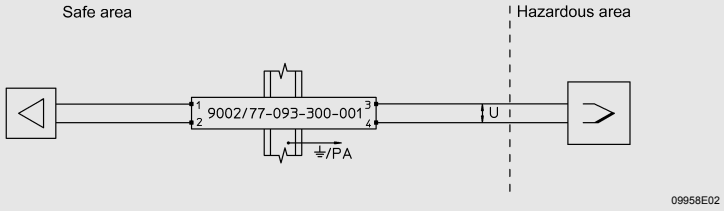
Selection table

Description				Ordering code
Application	**Analog output (sourcing) for i/p converter etc. Field circuit floating**			**9002/13-252-121-041**
Diagram				
Nominal values				
Operating voltage	U_N = + 20 V ... 35 V			
Operating current	I_N = 0 ... 22 mA			
Maximum voltage drop of the safety barrier	$\triangle U_{max} \leq$ 8.9 V			
Safety values				
Maximum voltage	U_o = 25.2 V			
Maximum current	I_o = 121 mA			
Maximum permissible external inductance	L_o	IIC 1.25 mH	IIB 7.35 mH	
Maximum permissible external capacitance	C_o	IIC 0.104 µF	IIB 0.8 µF	
Maximum power	P_o = 763 mW			
Application	**Digital input with switch (load at +) Field circuit grounded**			**9001/01-252-057-141**
Diagram				
Nominal values				
Operating voltage	U_N = + 20 V ... 35 V			
Operating current	I_N = 40 mA			
Voltage at load	$U_L \geq U_N$ - 3 V			
Safety values				
Maximum voltage	U_o = 25.2 V			
Maximum current	I_o = 57 mA			
Maximum permissible external inductance	L_o	IIC 6.3 mH	IIB 25 mH	
Maximum permissible external capacitance	C_o	IIC 0.107 µF	IIB 0.82 µF	
Maximum power	P_o = 359 mW			
Application note	This safety barrier is particularly suited to drive a relay. Also it is possible to drive a digital input (optocoupler) of an automation system as load.			

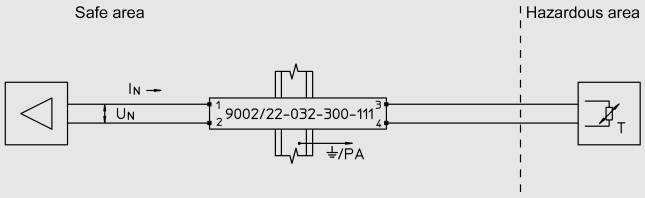
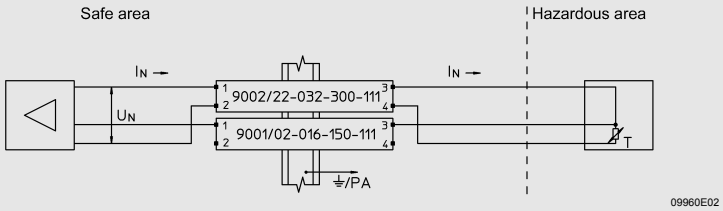
Selection table

Description				Ordering code
Application	**Digital input with switch (load grounded) Field circuit grounded**			**9001/01-252-060-141**
Diagram				
Nominal values				
Operating voltage	U_N = + 20 V ... 35 V			
Operating current	I_N = 40 mA			
Voltage at load	$U_L \geq U_N$ - 3 V			
Safety values				
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 capacitance	C_o	IIC 0.107 µF	IIB 0.82 µF	
Maximum power	P_o = 378 mW			
Application note	This safety barrier is particularly suited to drive a relay. Also it is possible to drive a digital input (optocoupler) of an automation system as load.			
Application	**Digital output (sourcing) for solenoid valves, LED etc. Field circuit grounded**			**9001/01-252-100-141**
Diagram				
Nominal values				
Operating voltage	U_N = + 20 V ... 35 V			
Open circuit output voltage (terminal 3 -> 4, I_N = 0)	$U_L \geq$	$U_N \leq$ 24 V U_N - 3 V	U_N > 24 V 21 V	
Operating current	$I_N = U_L / 268\ \Omega + R_L$			
Safety values				
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 capacitance	C_o	IIC 0.107 µF	IIB 0.82 µF	
Maximum power	P_o = 630 mW			

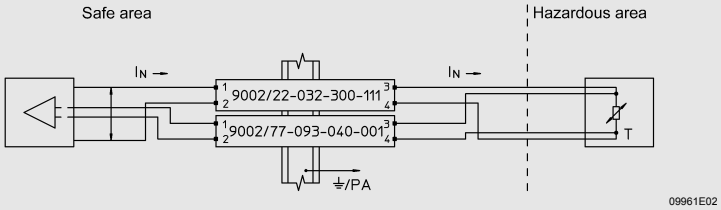
Selection table

Description				Ordering code
Application	**Digital output (sinking) for solenoid valves, LED etc. Field circuit floating**			**9002/13-252-121-041**
Diagram				
Nominal values				
Operating voltage	U_N = + 20 V ... 35 V			
Open circuit output voltage (terminal 3 -> 4, I_N = 0)	$U_L \geq$	$U_N \leq 24$ V U_N - 3.5 V	$U_N > 24$ V 21 V	
Operating current	$I_N = U_L / 243\ \Omega + R_L$			
Safety values				
Maximum voltage	U_o = 25.2 V			
Maximum current	I_o = 121 mA			
Maximum permissible external inductance	L_o	IIC 1.25 mH	IIB 7.35 mH	
Maximum permissible external capacitance	C_o	IIC 0.104 µF	IIB 0.8 µF	
Maximum power	P_o = 760 mW			
Application	**Thermocouples, ac-sensors Field circuit floating**			**9002/77-093-300-001**
Diagram				
Nominal values				
Maximum end-to-end resistance of the safety barrier	R_{max} = 2 x 82.1 Ω			
Voltage of sensor	$U \leq \pm 4\ V_{eff} / 6\ V_{pp}$			
Safety values				
Maximum voltage	U_o = 9.3 V			
Maximum current	I_o = 300 mA			
Maximum permissible external inductance	L_o	IIC 0.2 mH	IIB 1.8 mH	
Maximum permissible external capacitance	C_o	IIC 4.1 µF	IIB 31 µF	

Selection table

Description				Ordering code
Application	**Pt100, 2-wire-connection Field circuit floating**			**9002/22-093-300-001 9002/22-032-300-111**
Diagram	 09959E02			
Nominal values				
Operating voltage	$U_N \leq 1.4$ V			
End-to-end resistance of the safety barrier	R = 2 x (20 Ω ± 0.1 Ω)			
Measuring range	≤ 400 °C ($I_N \leq 5$ mA) ≤ 850 °C ($I_N \leq 3$ mA)			
Safety values				
Maximum voltage	U_o = 3.2 V			
Maximum current	I_o = 300 mA			
Maximum permissible external inductance	L_o	IIC 0.2 mH	IIB 1.8 mH	
Maximum permissible external capacitance	C_o	IIC 100 µF	IIB 1000 µF	
Application	**Pt100, 3-wire-connection Field circuit floating**			**9002/22-032-300-111 9001/02-016-150-111**
Diagram	 09960E02			
Nominal values				
Operating voltage	$U_N \leq 1.4$ V			
End-to-end resistance of the safety barrier	R = 2 x (20 Ω ± 0.1 Ω)			
Measurement range	≤ 400 °C ($I_N \leq 5$ mA) ≤ 850 °C ($I_N \leq 3$ mA)			
Safety values				
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 capacitance	C_o	IIC 100 µF	IIB 1000 µF	

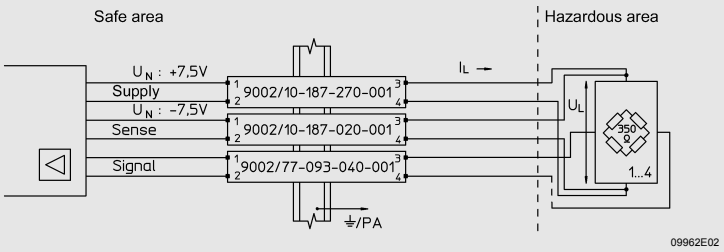
Selection table

Description		Ordering code
Application	**Pt100, 4-wire-connection** **Field circuit floating**	**9002/22-032-300-111** **9002/77-093-040-001**
Diagram		
Nominal values		
Operating voltage	$U_N \leq 1.4$ V	
End-to-end resistance of the safety barrier	R = 2 x (20 Ω ± 0.1 Ω)	
Measurement range	≤ 400 °C ($I_N \leq 5$ mA) ≤ 850 °C ($I_N \leq 3$ mA)	
Safety values		
Maximum voltage	U_o = 10.9 V	
Maximum current	I_o = 340 mA	
Maximum permissible external inductance	L_o IIC 0.18 mH IIB 1.45 mH	
Maximum permissible external capacitance	C_o IIC 2.05 µF IIB 14.4 µF	

Selection table

Description		Ordering code
Application	**Strain gauge load cell 350 Ω or 700 Ω 6 wire ± 7.5 V (15 V) field circuit floating**	**9002/10-187-270-001 9002/10-187-020-001 9002/77-093-040-001**

Diagram



Nominal values

Operating voltage	$U_N \leq \pm 7.5$ V (15 V)
Voltage for strain gauge load cell and wire	U_L (at $U_N \leq \pm 7.5$ V)
Current for strain gauge load cell	I_L (at $U_N \leq \pm 7.5$ V) Strain gauge load cell

Number	Resistance R_L 350 Ω		700 Ω	
	U_L (V)	I_L (mA)	U_L (V)	I_L (mA)
1	11.6	35	13.2	19
2	9.6	55	11.6	35
3	8	70	10.6	45
4	7	80	9.6	55

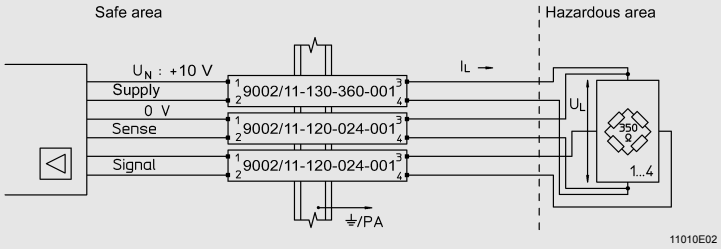
Safety values

Maximum voltage	U_o = 18.7 V		
Maximum current	I_o = 330 mA		
Maximum permissible external inductance	L_o	IIC 0.18 mH	IIB 1.45 mH
Maximum permissible external capacitance	C_o	IIC 0.270 µF	IIB 1.64 µF
Maximum power	P_o = 1.45 W		
Application note	With 4-wire connection (without sense) the respective safety barrier is not needed. Nominal values remain unchanged; safety maximum current is reduced to I_o = 310 mA and maximum power to P_o = 1.36 W.		

Selection table

Description		Ordering code
Application	**Strain gauge load cell 350 Ω** **6 wire + 10 V field circuit floating**	**9002/11-130-360-001** **9002/11-120-024-001**

Diagram



Nominal values

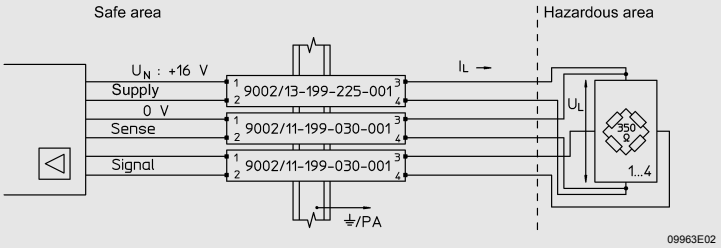
Operating voltage	$U_N \leq +10$ V
Voltage for strain gauge load cell and wire	U_L (at $U_N = +10$ V)
Current for strain gauge load cell	I_L (bei $U_N = +10$ V) Strain gauge load cell

Number	Resistance R_L 350 Ω	
	U_L (V)	I_L (mA)
1	7.7	22
2	6.2	35
3	5.2	44,5
4	4.5	51

Safety values

Maximum voltage	$U_o = 13$ V		
Maximum current	$I_o = 408$ mA		
Maximum permissible external inductance	L_o	IIC 0.18 mH	IIB 0.7 mH
Maximum permissible external capacitance	C_o	IIC 1.0 µF	IIB 6.2 µF
Maximum power	$P_o = 1.2$ W		
Application note	With 4-wire connection (without sense) the respective safety barrier is not needed. Nominal values remain unchanged; safety maximum current is reduced to $I_o = 384$ mA, and maximum power to $P_o = 1.13$ W.		

Selection table

Description		Ordering code
Application	**Strain gauge load cell 350 Ω or 700 Ω 6 wire + 16 V field circuit floating**	**9002/13-199-225-001** **9002/11-199-030-001**
Diagram		

Nominal values

Operating voltage	$U_N \leq +16$ V				
Voltage for strain gauge load cell and wire	U_L (at $U_N = +16$ V)				
Current for strain gauge load cell	I_L (at $U_N = +16$ V) Strain gauge load cell				
	Number	Resistance R_L			
		350 Ω		700 Ω	
		U_L (V)	I_L (mA)	U_L (V)	I_L (mA)
	1	10.4	30	12.1	17
	2	8.3	47	10.4	30
	3	6.9	60	9.5	41
	4	5.9	67	8.3	47

Safety values

Maximum voltage	$U_o = 19.9$ V		
Maximum current	$I_o = 285$ mA		
Maximum permissible external inductance	L_o	IIC 0.2 mH	IIB 1.8 mH
Maximum permissible external capacitance	C_o	IIC 0.223 µF	IIB 1.42 µF
Maximum power	$P_o = 1.42$ W		
Application note	With 4-wire connection (without sense) the respective safety barrier is not needed. Nominal values remain unchanged; safety maximum current is reduced to $I_o = 255$ mA and maximum power to $P_o = 1.3$ W.		