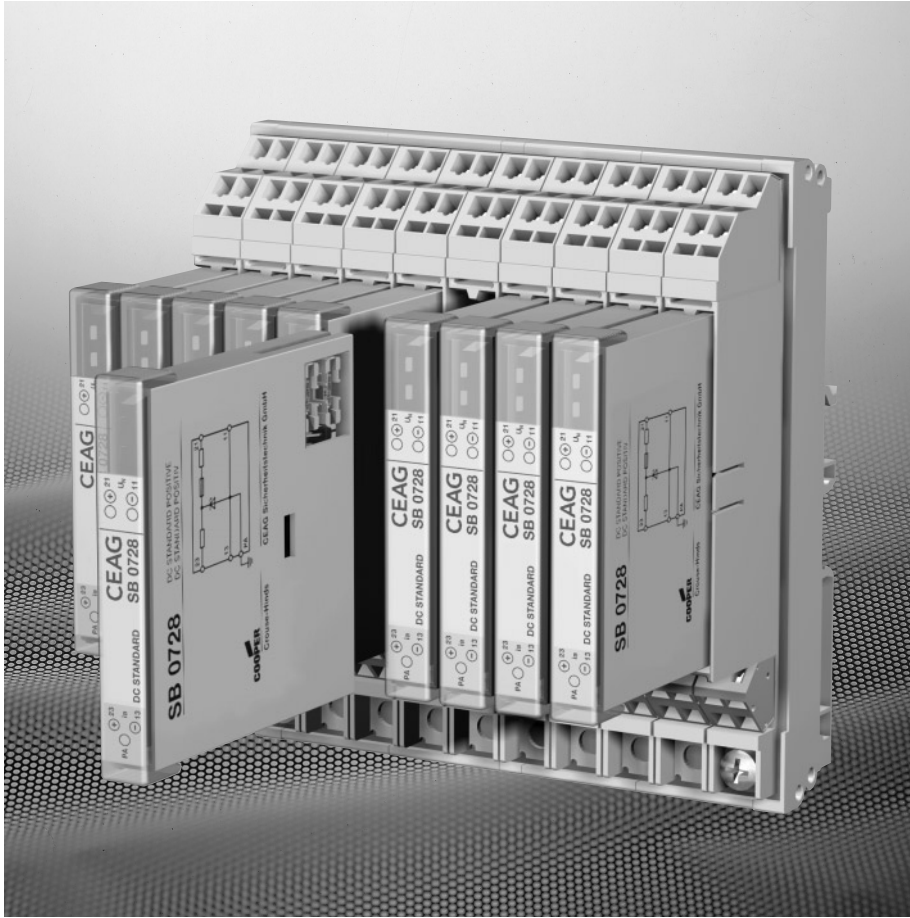


Safety Barriers



Description

Safety barriers limit the energy fed to an intrinsically safe circuit so that neither sparks nor thermal effects (hot surfaces) can cause an explosion.

CEAG safety barriers can be used for all kinds of instrumentation applications.

- Digital inputs
- Digital outputs
- Analog inputs
- Analog outputs
- Temperature sensors
- Pressure transmitters
- etc.

Safety or zener barriers generally have to be connected to equipotential earth. Each barrier connects to this high integrity ground. The new plug type barrier has a back plane for 10 modules with a single connection to equipotential earth. By plugging the barriers into the back plane, each of them will automatically be earthed. The new safety barriers are fitted with replaceable upstream fuses. Should the polarity be confused or the operating voltage be inadmissibly high, the upstream fuse is there to protect the internal fuse and thus the valuable barrier from being destroyed. The upstream fuse may be replaced during operation. Supply barriers are fitted with an LED which indicates the proper state of the barrier. When installing the barrier, care has to be taken that the polarity of the chosen barrier matches the circuit. The rated voltage must not be exceeded in operation, since that would result in measuring faults. Account has to be taken of the voltage drop over the end to end resistor of the barrier. A correct transmission of voltage signals can only be achieved with purely ohmic end to end resistors. For safety reasons, the maximum values for current, voltage, inductance and capacitance of the barrier have to be checked to match the data of the connected intrinsically safe circuit.

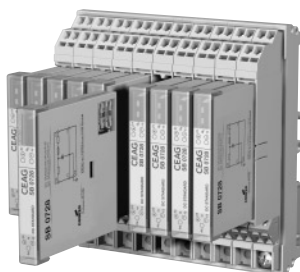
- Plug in barrier to be installed on a backplane
- Backplane snaps on standard 35 mm DIN rail
- Optional replaceable fuses
- LEDs show barrier status
- Cage clamp connections need no screws
- Easy installation
- General purpose and customized backplanes for easy installation
- Large tagging areas for easy circuit identification
- Mounts horizontally or vertically
- International approvals



Safety barrier



Single barrier socket



10 fold backplane segment

Product features

Simple wiring

- save wiring through backplane technology
- the PCB connects all barriers to equipotential earth
- Explosion protection EEx ia/ib IIC

Simple mounting

- Power supply LED
- plug-in barriers
- cage clamp wiring
- replaceable fuses
- large tagging area
- dual ground
- Backplane mounting by 35 mm top hat rail

Terminology

Operating data

V_N	Rated maximum voltage < 2 μ A for $V < V_N$
R_{max}	End to end resistance
S_i	Internal fuse

Safety parameters

(in intrinsically safe circuits)

V_{oc}	Maximum open circuit voltage
I_{sc}	Maximum short circuit current
C_a	Maximum permissible external capacitance
L_a	Maximum permissible external inductance

Technical data:

Leakage current at V_N	< 2 μ A
Temperature drift	$\leq -250 \times 10^{-6} / K$
Operating temperature	-40°C ... +60 °C
Storage temperature range	-40°C ... +80 °C
Relative humidity	< 75 % (annual average) < 95 % (30 d/a), no condensation
Width	see dimensions page 87
Weight	approx. 70 g

Explosion protection:

Approval	TÜV 99 ATEX 1449 X
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Ordering details

Description	Type	Order No.
Standard socket (backplane) for 1 barrier	SB- 9101	GHG 110 0000 W9101
Standard socket (backplane) for 10 barriers	SB- 9100	GHG 110 0000 W9100
replaceable fuse 63 mA	SB- 9201	GHG 110 0000 W9201
replaceable fuse 100 mA	SB- 9202	GHG 110 0000 W9202
replaceable fuse 125 mA	SB- 9203	GHG 110 0000 W9203
replaceable fuse 160 mA	SB- 9204	GHG 110 0000 W9204
replaceable fuse 250 mA	SB- 9205	GHG 110 0000 W9205

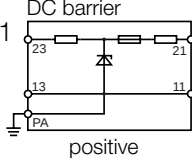
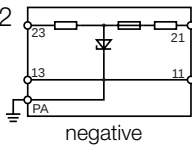
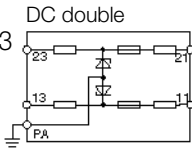
Note

Barriers will be supplied without sockets.
Please order socket separately.
All barriers can be ordered using the type number or the full order no. GHG....

Safety Barriers



Safety barriers

	Type	V_N (V)	R_{max} (Ω)	Fuse (mA)	V_{oc} (V)	I_{sc} (mA)	Drawing No.	LED	Order No.
 	SB-0710	6	78	50	10	200	1		GHG 111 0000 W0710
	SB-1710	- 6	78	50	10	200	2		GHG 111 0000 W1710
	SB-3710	8	44	160	10	300	1		GHG 111 0000 W3710
	SB-4710	- 8	44	160	10	300	2		GHG 111 0000 W4710
	SB-3715	12	65	100	15	291	1	X	GHG 111 0000 W3715
	SB-4715	- 12	65	100	15	291	2	X	GHG 111 0000 W4715
	SB-0715	12	153	100	15	150	1	X	GHG 111 0000 W0715
	SB-1715	- 12	153	100	15	150	2	X	GHG 111 0000 W1715
	SB-3722	18	124	63	22	213	1		GHG 111 0000 W3722
	SB-4722	- 18	124	63	22	213	2		GHG 111 0000 W4722
	SB-0722	18	198	50	22	150	1		GHG 111 0000 W0722
	SB-1722	- 18	198	50	22	150	2		GHG 111 0000 W1722
	SB-3729	24	198	50	28	171	1	X	GHG 111 0000 W3729
	SB-4729	- 24	198	50	28	171	2	X	GHG 111 0000 W4729
	SB-3728	24	264	50	28	120	1	X	GHG 111 0000 W3728
	SB-4728	- 24	264	50	28	120	2	X	GHG 111 0000 W4728
	SB-1350	10/10	84/487	100	11,7/11,7	174/25	3		GHG 111 0000 W1350
	SB-2350	10/10	84/487	100	11,7/11,7	174/25	3		GHG 111 0000 W2350
	SB-1351	10/10	487/487	100	11,7/11,7	25/25	3		GHG 111 0000 W1351
	SB-2351	10/10	487/487	100	11,7/11,7	25/25	3		GHG 111 0000 W2351
	SB-0764	10/10	1029/1029	50	12/12	12/12	3		GHG 111 0000 W0764
	SB-1764	10/10	1029/1029	50	12/12	12/12	3		GHG 111 0000 W1764
	SB-0767	12/12	159/159	100	15/15	150/150	3	X	GHG 111 0000 W0767
	SB-1767	12/12	159/159	100	15/15	150/150	3	X	GHG 111 0000 W1767
	SB-0768	19/19	198/198	50	22/22	147/147	3		GHG 111 0000 W0768
	SB-1768	19/19	198/198	50	22/22	147/147	3		GHG 111 0000 W1768
	SB-0796	23/17	349/444	50	26/20	87/51	3		GHG 111 0000 W0796
	SB-1796	23/17	349/444	50	26/20	87/51	3		GHG 111 0000 W1796
	SB-0788	24/6	97/337	50	28/10	200/93	3	X	GHG 111 0000 W0788
	SB-1788	24/6	97/337	50	28/10	200/93	3	X	GHG 111 0000 W1788
	SB-0779	24/24	337/337	50	28/28	93/93	3	X	GHG 111 0000 W0779
	SB-1779	24/24	337/337	50	28/28	93/93	3	X	GHG 111 0000 W1779



Note

Barriers will be supplied without sockets.
Please order socket separately.
All barriers can be ordered using the type
number or the full order no. GHG....

Safety Barriers

Safety barriers

	Type	V _N (V)	R _{max} (Ω)	Fuse (mA)	V _{OC} (V)	I _{sc} (mA)	Drawing No.	LED	Order No.
4 	SB-1301	+6/-6	71	100	17,2	414	4		GHG 111 0000 W1301
	SB-1302	+9/-9	1182	50	25,2	25	4		GHG 111 0000 W1302
	SB-1303	+12/-12	185	50	29,4	248	4		GHG 111 0000 W1303
5 	SB-2427	24/24	1,2 V+34/289 Ω	50	26,3/26,3	0/102	5	X	GHG 111 0000 W2427
	SB-2787	24/24	1,2 V+44/265 Ω	50	28/28	0/120	5	X	GHG 111 0000 W2787
	SB-1787	24/24	1,2 V+44/337 Ω	50	28/28	0/93	5	X	GHG 111 0000 W1787
6 	SB-0786	24/24	1,2 V + 44 Ω/ 1,2 V + 44 Ω	50	28/28	0/0	6		GHG 111 0000 W0786
7 	SB-1502	12	1,2 V + 34 Ω	50	16,8	294	7		GHG 111 0000 W1502
8 	SB-2710	6	97	50	10	200	8		GHG 111 0000 W2710
	SB-1602	12	58	100	16,8	390	8		GHG 111 0000 W1602
9 	SB-0201	2/2	38/38	160	5/5	178/178	9		GHG 111 0000 W0201
	SB-0761	6/6	145/145	100	9/9	100/100	9		GHG 111 0000 W0761
	SB-1761	7/7	394/394	50	9/9	25/25	9		GHG 111 0000 W1761
	SB-1766	9,8/9,8	103/103	50	12/12	160/160	9		GHG 111 0000 W1766
	SB-0766	10/10	194/194	50	12/12	80/80	9		GHG 111 0000 W0766
	SB-2764	10/10	1079/1079	50	12/12	12/12	9		GHG 111 0000 W2764
10 	SB-0760	6/6	97/97	50	10/10	200/200	10		GHG 111 0000 W0760
	SB-0765	12/12	147/147	50	15/15	150/150	10		GHG 111 0000 W0765
	SB-0772	18/18	353/353	50	22/22	73/73	10		GHG 111 0000 W0772
	SB-0778	24/24	663/663	50	28/28	47/47	10		GHG 111 0000 W0778

Note

Barriers will be supplied without sockets.
Please order socket separately.
All barriers can be ordered using the type
number or the full order no. GHG....

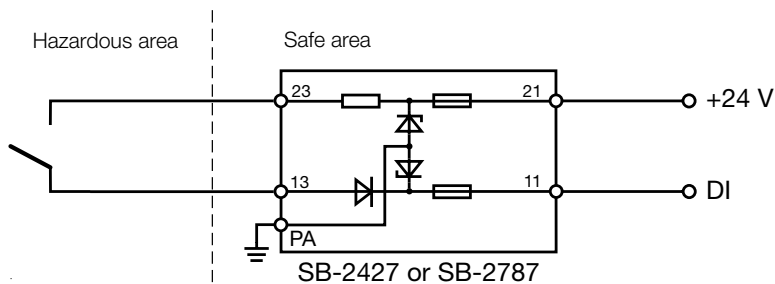
Safety Barrier Applications



Digital input

Floating circuit

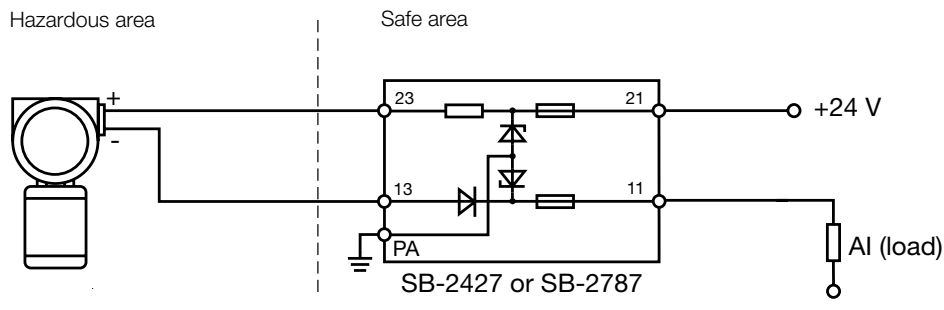
- Power supply voltage: 24 V DC
- End-to-end resistance $309\ \Omega$ +1,2 V (SB2787)
- Short circuit proof
- IS connections for: Zone 1, group IIC
class I, II, III, div. 1, gr. A-G



Analog input (4 - 20 mA transmitters)

Floating circuit - safety barrier circuit

- Lowest possible barrier voltage drop:
7,66 V maximum at 20 mA
- Power supply voltage: 24 V DC
- No restrictions for programming SMART transmitters
- Smallest IS barrier available
- IS connections for: Zone 1, group IIC
class I, II, III, div. 1, gr. A-G



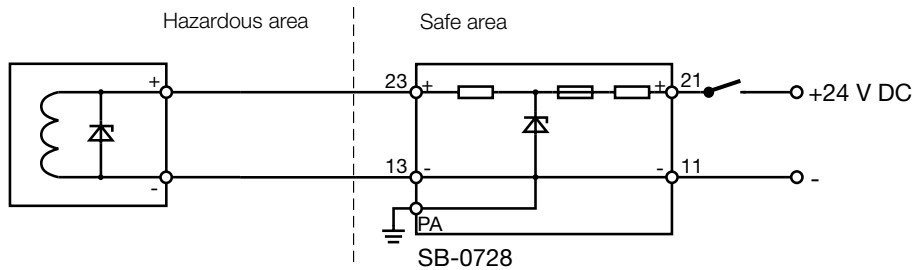
Safety Barrier Applications



Digital output (solenoid valves, LEDs or audible alarms)

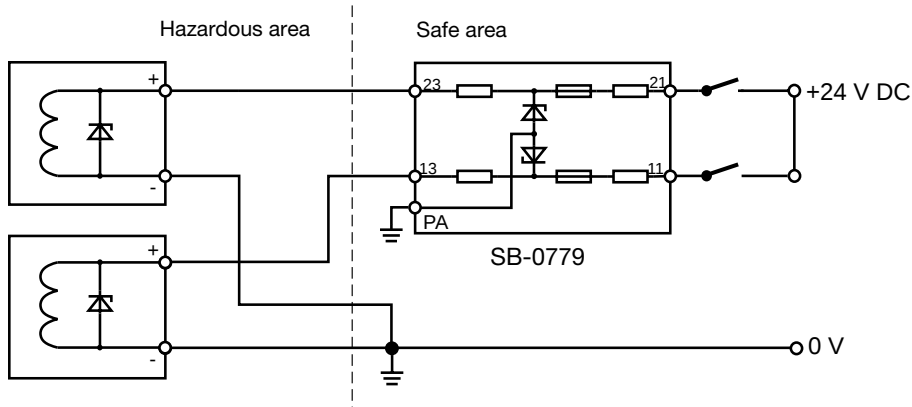
Grounded circuit - 1 channel, group IIC (SB-0728)

- Power supply voltage: to 24 V DC
- End-to-end resistance: 340 Ω
- Short circuit
- Smallest IS barrier available
- IS connections for: Zone 1, group IIC
class I, II, III, div. 1, gr. A-G



Grounded - 2 channel, group IIC

- Power supply voltage: to 24 V DC
- End-to-end resistance 340 Ω /channel
- Short circuit proof
- Smallest IS barrier available
- IS connections for: Zone 1, group IIC
class I, II, III, div. 1, gr. A-G
- Lowest cost solution



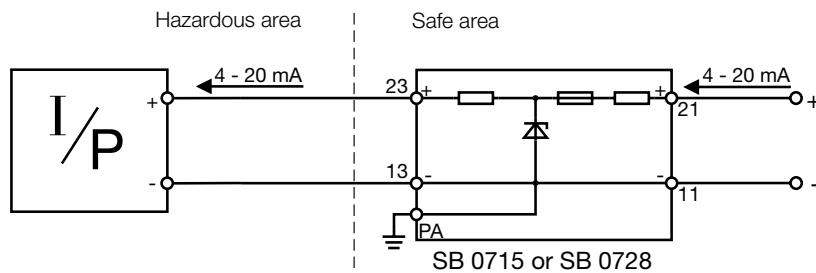
Safety Barrier Applications



Analog output (4 - 20 mA I/P transducers)

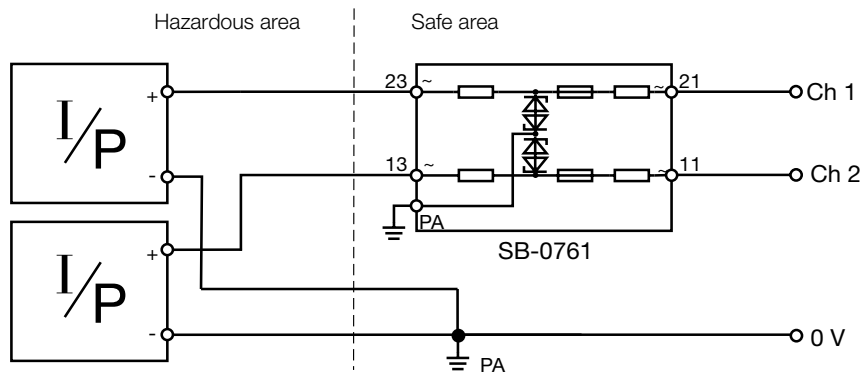
Grounded circuit - 1 channel, group IIC

- Barrier end-to-end resistance: 155 Ω (SB0715)
- Allows the connections of transducers with maximum 445 Ω input impedance
- Short circuit proof
- Smallest IS barrier available
- IS connections for: Zone 1, group IIC
class I, II, III, div. 1, gr. A-G



Grounded circuit - 2 channels, group IIC

- Barrier end-to-end resistance 145 Ω /channel
- Allows the connections of transducers with maximum 445 Ω input impedance
- Short circuit proof
- Smallest IS barrier available
- IS connections for: Zone 1, group IIC
class I, II, III, div. 1, gr. A-G



Safety Barrier Applications

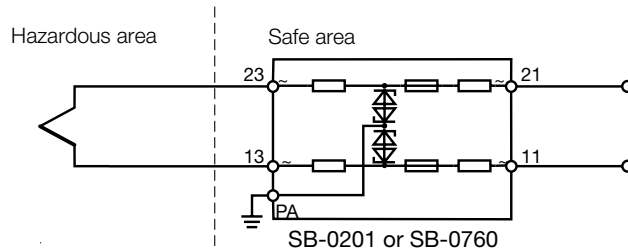


Temperature sensors (thermocouples, Pt100)

One safety barrier for all applications

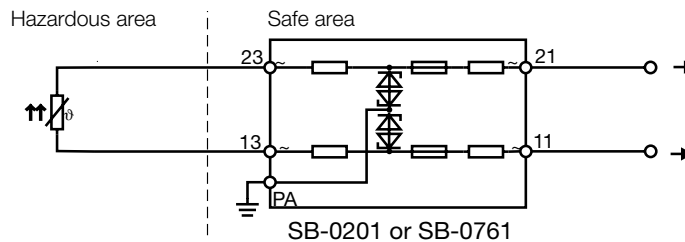
Thermocouple

- Low resistance solution (97 Ω maximum)
- Short circuit proof
- Lowest cost solution for thermocouple available
- Smallest thermocouple IS barrier available
- Suited for all thermocouples
- IS connections for: Zone 1, group IIC class I, II, III, div. 1, gr. A-G



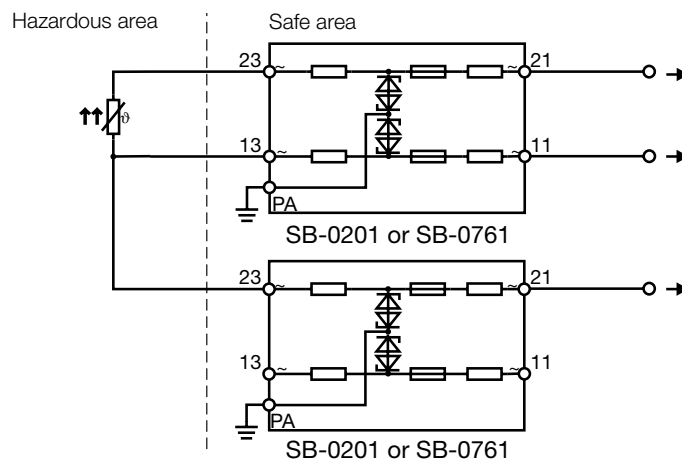
2-wire RTD

- Lowest resistance solution (40 Ω maximum)
- Short circuit proof
- Lowest cost solution for RTD available
- Smallest RTD IS barrier available
- Suitable for all type of RTD
- IS connections for: Zone 1, group IIC class I, II, III, div. 1, gr. A-G



3-wire RTD

- Lowest resistance solution (40 Ω maximum)
- Short circuit proof
- Lowest temperature coefficient
- Lowest cost solution for RTD available
- Smallest RTD IS barrier available
- Suitable for all type of RTD
- IS connections for: Zone 1, group IIC class I, II, III, div. 1, gr. A-G



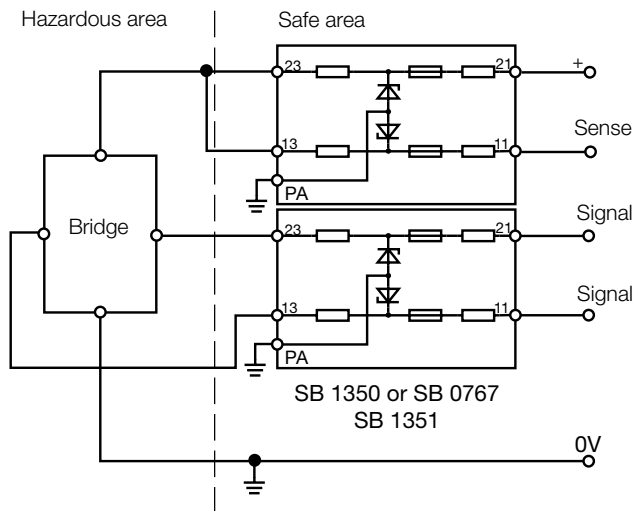
Safety Barrier Applications



Load cells

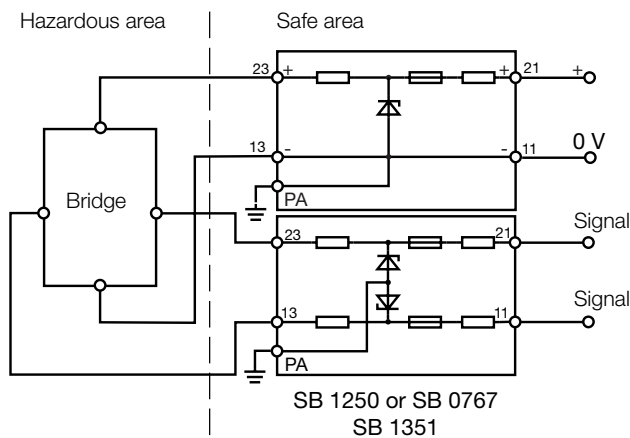
10 V DC supply - sense

- Lowest resistance solution (155 ... 487Ω)
- Lowest temperature coefficient
- Lowest cost solution for load cells
- Only two barriers required for complete system
- IS connections for: Zone 1, group IIC
class I, II, III, div. 1, gr. A-G



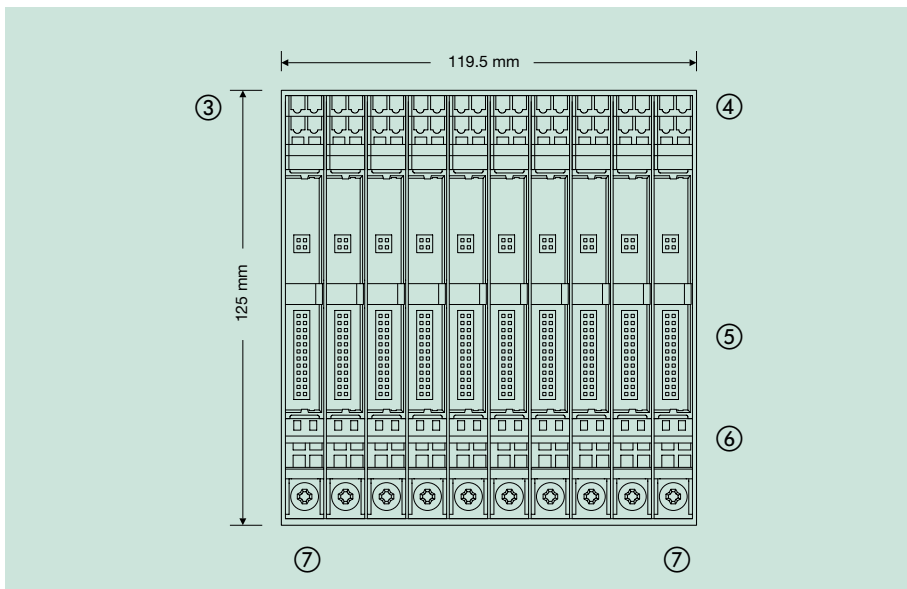
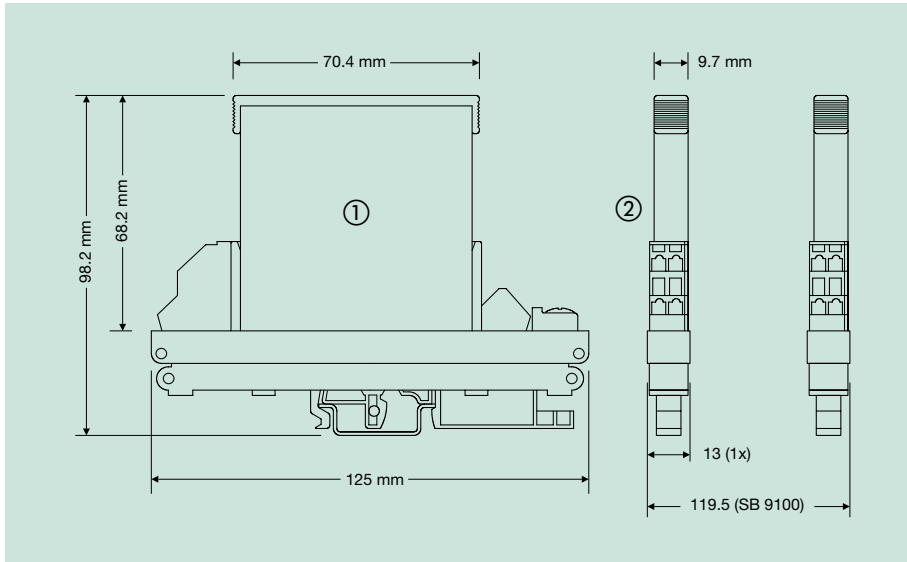
12 V DC supply - without sense

- Lowest resistance solution (maximal 65 Ω)
- Lowest temperature coefficient
- Lowest cost solution for load cells without sense wire
- Only two barriers required for complete system
- IS connections for: Zone 1, group IIC
class I, II, III, div. 1, gr. A-G



Dimensions

Safety barriers



Glossary

- ① Barrier
- ② Socket for 1 barrier
- ③ Socket for 10 barriers
- ④ Fast-on terminals
- ⑤ Backplane sockets
- ⑥ Fast-on IS terminals
- ⑦ Equipotential earth

Terminal connetions
See operating instruction

Field Mounted Units



Description

Field mounted devices can be installed in the hazardous area. They are connected to PLC or DCS systems via intrinsically safe transmitter power supplies. Field mounted devices offer the advantage of amplifying the signal very early in the loop converting it to a standard 4 - 20 mA signal.

From the safety point of view you simply match the maximum values for current, voltage and power as well as the cable parameters with those of the transmitter power supply.

- Configurable ranges
- Operation by HART protocol
- Mounted in zone 1 areas
- Fits thermowell heads Size B
- IP 66 field enclosures optional

Type MT102

2-Wire-Head-Mounted

RTD Converter



Product features

- Off line programmable (powered by PC)
- Fits thermowell heads size B
- Customized linearisation
- EMV to IEC 1000 and EN 50081-50082
- Calibration signal for commissioning
- EEx ia/ib approved
- Safe galvanic isolation between input, output and power supply

Technical data:

-Input RTD	- 200 °C + 850 °C
-Input Ni 100	- 60 °C + 250 °C
-Input slide wire	0 ... 2000 Ω
-Input thermocouples	E, B, J, K, L, N, R, S, T, U
-mV	- 30 ... + 500 mV, smallest span >2 mV
Cold junction compensation	internal
Output	4 - 20 mA, 20 - 4 mA selectable
LFD	programmable <3.6 mA or <21.5 mA
Load	$R_B = (U_H - 8 V) / 20 mA$
Linearity	0.05 % refer to Input range
Accuracy:	
RTD, Ni100	0.1 %
Thermocouples	0.1 % or 0.2 °C
slide wire	0.1 % or 0.02 mV
cold junction compensation	< 0.5° K
Temperature drift	<0.1 %/10° K, mode dependant
Response time	approx. 0.5 s
Power supply	8 - 30 V DC
Weight	approx. 50 g
Ambient temperature protection	-40 °C ... +85 °C

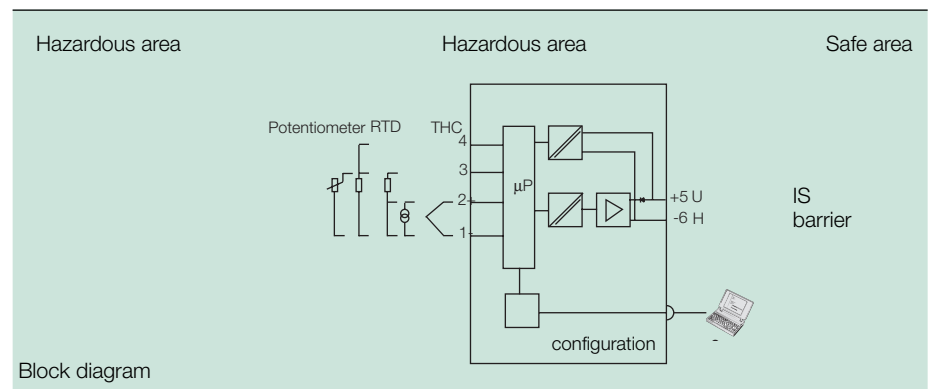
Explosion:

Category	EEx ia IIC T4, T5, T6
Approval	Ex-93.C.4056 X
Safety values	(Output) $U_i = 30 V, I_i = 100 mA, P_i < 900 mW$
	(Input) $U_o = 30 V, I_o = 25 mA, P_o = 188 mW$

Ordering details

Type	Housing	Parameters	Protection	Order No.
MT102	Head mounted	customized	-	MT102-E01AEA000P
MT102	Field enclosure	customized	-	MT102-P01AEA000P
MT102	Head mounted	standard *	ia/ib	MT102-E01AEB000X
MT102	Head mounted	customized	ia/ib	MT102-E01AEB000P
MT102	Field enclosure	standard *	ia/ib	MT102-P01AEB000X
MT102	Field enclosure	customized	ia/ib	MT102-P01AEB000P

* RTD 4-wire, selcted range 0 ... 100 °C, Linear, LFD



Type MT115

HART-Head-Mounted

RTD Converter



Product features

- Remote setting via HART
- Fits thermowell heads size B
- Customized linearization
- EMV to IEC 1000 and EN 50081-50082
- Calibration signal for commissioning
- EEx ia/ib approved
- Safe galvanic isolation between input, output and power supply



Technical data:

-Input RTD	- 200 °C ... + 850 °C
-Input Ni 100	- 60 °C ... + 250 °C
-Input slide wire	0 ... 2000 Ω
-Input thermocouples	E, B, J, K, L, N, R, S, T, U
-mV	- 10 ... + 500 mV, smallest span >2 mV
Cold junction	internal (car bi disabled) compensation to 0 °C
Output	4 - 20 mA, 20 - 4 mA selectable
LFD	programmable <3.6 mA or <21.5 mA
Load	$R_B = (U_H - 12 \text{ V}) / 20 \text{ mA}$
Linearity	0.05 % refer to Input range
Accuracy: RTD	0.1 K or 0.05 Ω
Thermocouples	0.15 K - 0.4° K range dependant
Slide wire	0.1 % or 0.1 Ω
Temperature drift	< 0.1 %/10 K
Response time	approx. 360 ms
Power supply	12 - 30 V DC
Weight	approx. 50 g
Ambient temperature	-25 °C ... +85 °C
Field enclosure IP 65	75 x 110 x 56 mm

Explosion protection

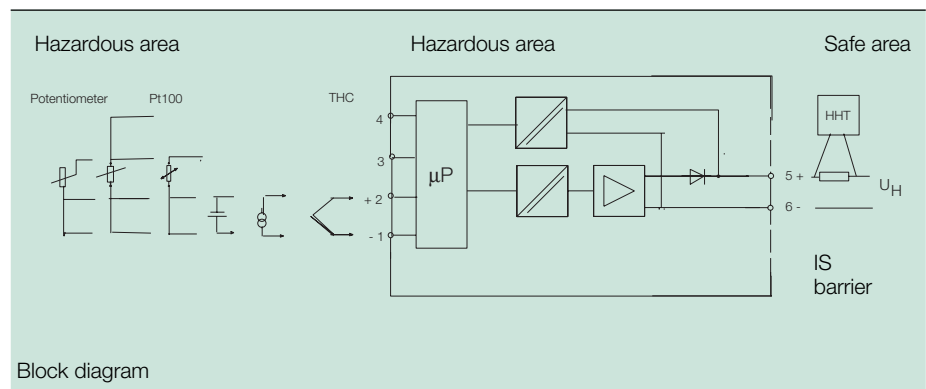
Category	EEx ia IIC T4, T5, T6
Approvals	TÜV 99 ATEX 1466
Safety values	(Output) $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i < 800 \text{ mW}$
	(Input) $U_o = 8,6 \text{ V}$, $I_o = 175 \text{ mA}$, $P_o = 36 \text{ mW}$



Ordering input

Type	Housing	Parameters	Ex-Protection	Order No.
MT115	Head mounted	customized	-	MT115AP-E01AEA000
MT115	Field enclosure	customized	-	MT115AP-P01AEA000
MT115	Head mounted	standard *	ia/ib	MT115AX-E01AEB200
MT115	Head mounted	customized	ia/ib	MT115AP-E01AEB000
MT115	Field enclosure	standard *	ia/ib	MT115AX-P01AEB200
MT115	Field enclosure	customized	ia/ib	MT115AX-P01AEB000

* Factory setting: Pt100, 4 wire, 0 ... 100 °C, linear, upscale drive, no filter, no trip, no cjc



Block diagram