

Ex II 2 G EEx d [ia] IIC T6

Application

Field barrier with flameproof enclosure serving as an interface between intrinsically safe and non-intrinsically safe circuits in hazardous areas.



The field barrier is suitable for operating positioners, smart positioners using HART protocol, i/p converters, solenoid valves, or limit switches.

Upstream connection and direct attachment to intrinsically safe field devices enable the intrinsically safe circuits of these devices to be connected with the circuits of upstream input and output units that are not intrinsically safe. In this way, the advantages of intrinsic safety, such as commissioning and operation when connected to a voltage source, are still in effect within the hazardous area.

The connecting cable of the non-intrinsically safe circuit is introduced in the housing of the field barrier either via pipeline systems or via design-certified metal cable or conduit entries.

The field barrier transmits the analog reference variable to i/p converters and positioners. The use of HART protocol is also possible.

The field barriers must be connected to the equipotential bonding system either via the negative conductor (non-floating) or via the line between the positive and the negative conductor (floating). The selection of the appropriate version (with grounding via negative conductor or via connecting line) must correspond to the grounding method of the analog output of the controller or control system.

The version with three channels allows the connection of two limit switches according to EN 60 947-5-6 or one intrinsically safe solenoid valve and one limit switch.

An M20 x 1.5 adapter allows for a direct connection through the cable entry of the field devices.

Principle of operation

Channel 1 of the field barrier is especially designed for transmitting analog signals in the range of 4 to 20 mA, but it also transmits the HART protocol.

Channels 2 and 3 are intended for controlling limit switches according to EN 60 947-5-6 or Ex i solenoid valves. They may be used, for example, for the fail-safe venting function in the Type 3780 or Type 3767 Positioner with a solenoid valve coil using 6 V.

Attachment

The field barrier possesses a connecting adapter with male thread M 20 x 1.5, allowing direct mounting on an intrinsically safe field device, such as a Type 3780 Positioner.



Fig. 1 · Type 3770 Field Barrier, attached to Type 3780 HART Positioner

If the wiring method is used, the cable ends must be connected to an Ex i junction box.

The input is fitted with a 1/2" female thread connection.

Order code

Field Barrier Type	3770-	x	x	1	0
Explosion protection acc. to ATEX		1			
3 Channels					
4-20 mA, grounding via connecting line			3		
2 sw. circuits acc. to EN 60 947-5-6					
3 Channels					
4-20 mA, grounding via negative conductor				4	
2 sw. circuits acc. to EN 60 947-5-6					

Table 1 · Technical data

Type of protection		EEx d [ia] IIC T6	
Connection		Channel 1: Ch 1 +/-	Channels 2 and 3: Ch 2 +/- α. Ch 3 +/-
Operating values		(0)4 ... 20 mA or U_N ... 15 V or limit switches acc. to EN 60 947-5-6; not suitable for transmitter supply	(0)4 ... 20 mA or U_N ... 10 V or limit switches acc. to EN 60 947-5-6; not suitable for transmitter supply
Input		$U_m = 250$ V	
Fuse rating		$I_N = 80$ mA time-lag	
Output circuit		EEx ia IIC	
Max. values according to EC Type Examination Certificate	U_0	≤ 17.2 V	≤ 12.6 V
	I_0	≤ 110 mA	≤ 49 mA
	P_0	≤ 473 mW	≤ 154 mW
	C_0	360 nF/IIC · 2.1 μ F/IIB	1.15 μ F/IIC · 7.4 μ F/IIB
	L_0	3 mH/IIC · 12 mH/IIB	15 mH/IIC · 56 mH/IIB
Series resistance	R_{Lmax}	190 Ω	285 Ω
Load impedance		3.8 V at 20 mA	5.7 V at 20 mA
Permissible ambient temperature		-45 °C $\leq t_a \leq 60$ °C T6	
Housing material		Die-cast aluminum, varnished	
Degree of protection		IP 65 acc. to IEC 529	

Electrical connections

The individual current circuits of the Type 3770 Ex d/Ex i Field Barrier are electrically connected with internal and external equipotential bonding terminals.

For safety reasons, the intrinsically safe circuits must be connected to the equipotential bonding system. The connection between the equipotential bonding terminal and the equipotential bonding system must be as short as possible.

The selection of the grounding method of the barrier must correspond to the grounding method of the analog output of the controller or control system, i.e. either the connecting line between the negative and the positive conductor of Channel 1 (Fig. 2) or the negative conductor of Channel 1 (Fig. 3) has to be connected to the equipotential bonding system.

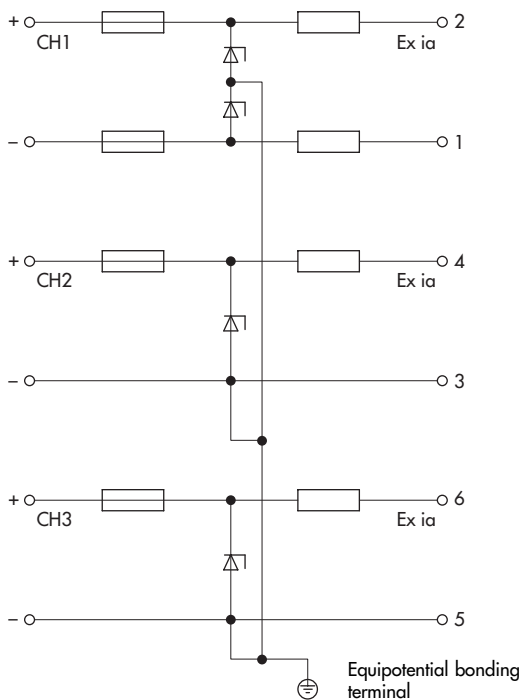


Fig. 2 · Circuit diagram for Type 3770-1310
Channel 1: grounding via connecting line

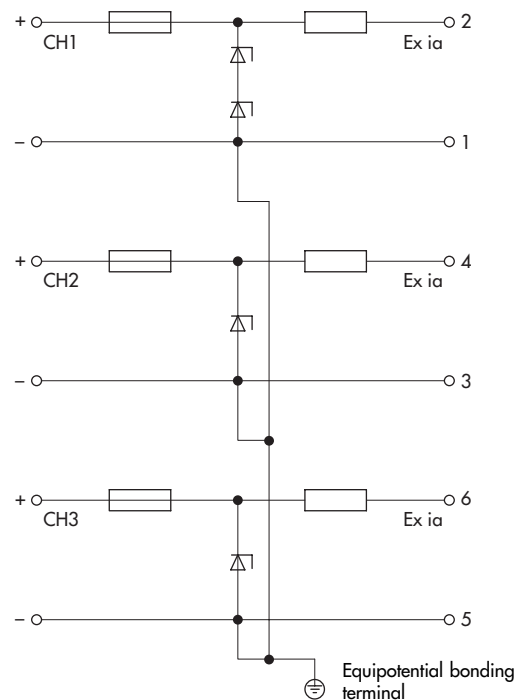


Fig. 3 · Circuit diagram for Type 3770-1410
Channel 1: grounding via negative conductor

Circuitry

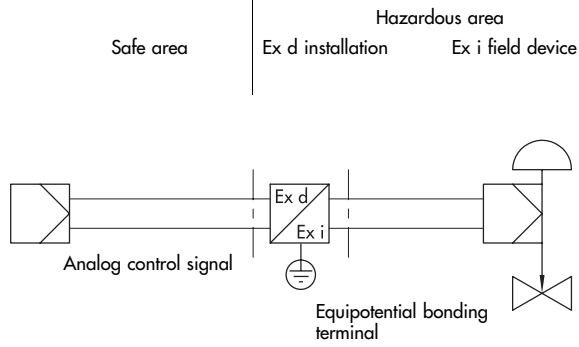


Fig. 4 · Field barrier (1 channel connected) with positioner and pneumatic control valve

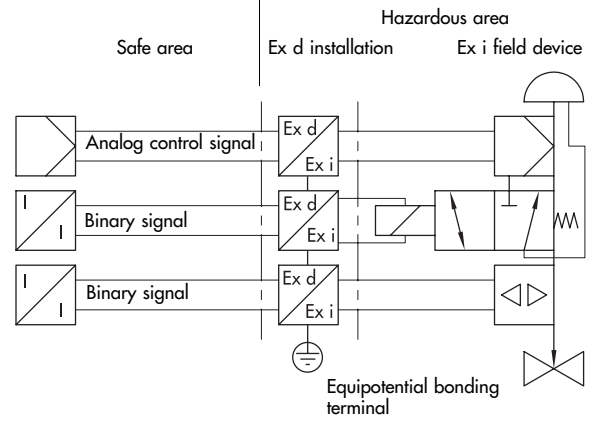
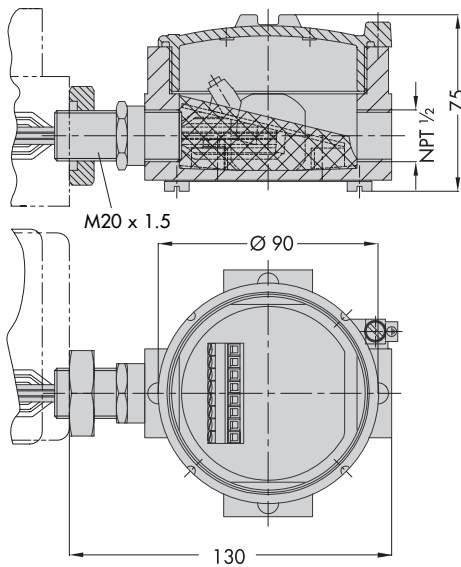


Fig. 5 · Field barrier (3 channels connected) with positioner, solenoid valve, and limit switch; attached to a pneumatic control valve

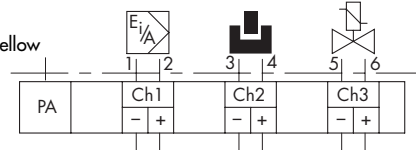
Dimensions in mm



Electrical connections

Output with marked cable ends Ex i

Green/yellow



Terminal compartment Ex d

Control signal (0)4 to 20 mA or isolating amplifier acc. to EN 60 947-5-6 or solenoid valve up to 15 V

Isolating amplifier acc. to EN 60 947-5-6 for limit switches or solenoid valve up to 10 V or (0)4 to 20 mA

Approved explosion protection certificate for Type 3770 Field Barrier

Certificate type	Certificate number	Date	Comments
EC Type Examination Certificate	PTB 98 ATEX 1025X	1998-06-08	EEx d [ia] IIC T6
First Addendum		2000-10-10	Ch 1: grounding via negative conductor



SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: <http://www.samson.de>

T 8379 EN