

## II 2G Ex d [ia] IIC T6 GB

### 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 with HART® communication, i/p converters, solenoid valves or limit switches.

Devices with HART® communication need an adaptation, which is available e.g. with Type 3730-3 and Type 3730-6 Positioners.

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, remain in effect within the hazardous area.

The connecting cable of the non-intrinsically safe circuit is introduced in the enclosure of the field barrier either via pipeline systems or via design-certified 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 using a negative conductor (non-floating) or a line between the positive and the negative conductor (floating). The selection of the appropriate version (with grounding using a negative conductor or a connecting line) must correspond to the grounding method of the analog output of the controller or control system.

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 IEC 60947-5-6 or Ex i solenoid valves (e.g. Type 3767 Positioner with a solenoid valve coil for 6 V).



Fig. 1: Type 3770 Field Barrier, attached to positioner

### Attachment

The field barrier has a connecting adapter with an M20 x 1.5 male thread, allowing direct mounting on an intrinsically safe field device, such as a Type 3730-3 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 ½ NPS female thread or an M20 x 1.5 female thread connection.

**Table 1: Technical data**

Connection	Channel 1: Ch 1 +/-	Channel 2 and 3: Ch 2 +/- and Ch 3 +/-
Operating values	0/4 to 20 mA or $U_N$ to 15 V DC or limit switches acc. to IEC 60947-5-6 not suitable for transmitter supply	0/4 to 20 mA or $U_N$ to 10 V DC
Input	$U_m = 250$ V	
Fuse rating	$I_N = 80$ mA (slow-acting)	
Output circuit	Ex ia IIC	
Maximum values according to EC type examination certificate		
Max. output voltage	$U_0 \leq 17.2$ V	$\leq 12.6$ V
Max. output current	$I_0 \leq 110$ mA	$\leq 49$ mA
Max. power	$P_0 \leq 473$ mW	$\leq 154$ mW
Max. perm. capacitance	$C_0 = 360$ nF/IIC · $2.1$ $\mu$ F/IIB	$1.15$ $\mu$ F/IIC · $7.4$ $\mu$ F/IIB
Max. perm. inductance i	$L_0 = 3$ mH/IIC · $12$ mH/IIB	$15$ mH/IIC · $56$ mH/IIB
Series resistance	$R_{Lmax} = 190$ $\Omega$	$285$ $\Omega$
Load impedance	$3.8$ V/20 mA	$5.7$ V/20 mA
Perm. ambient temperature	$-45$ $^{\circ}$ C $\leq t_a \leq +60$ $^{\circ}$ C T6	
Degree of protection	IP 65 according to DIN EN 60529	
Enclosure material	Die-cast aluminum, painted or stainless steel (AISI 316)	

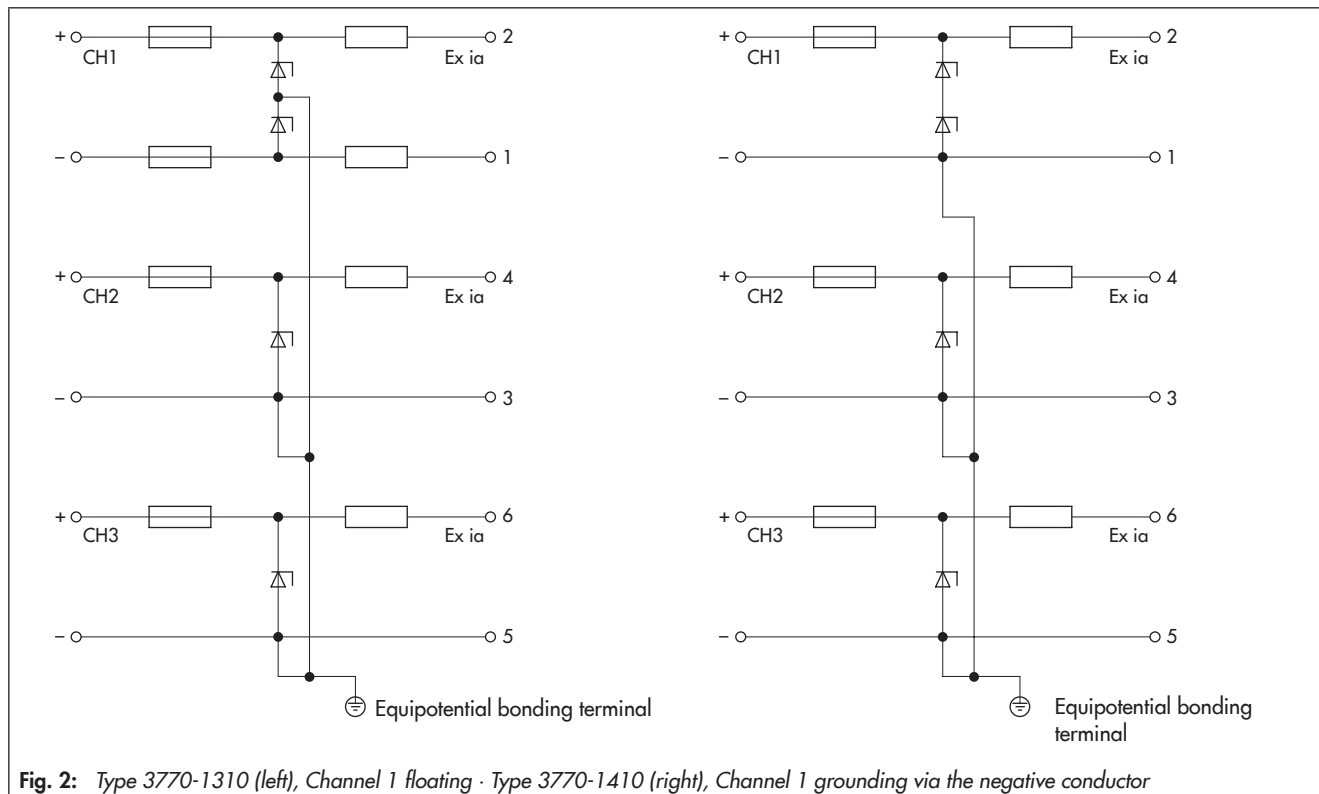
**Electrical connections**

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.

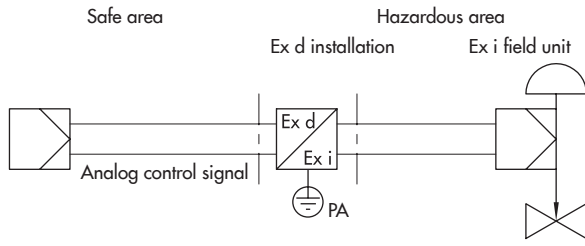
The connection between the equipotential bonding terminal and the equipotential bonding system must be as short as possible.

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, left) or the negative conductor of Channel 1 (Fig. 2, right) has to be connected to the equipotential bonding system.

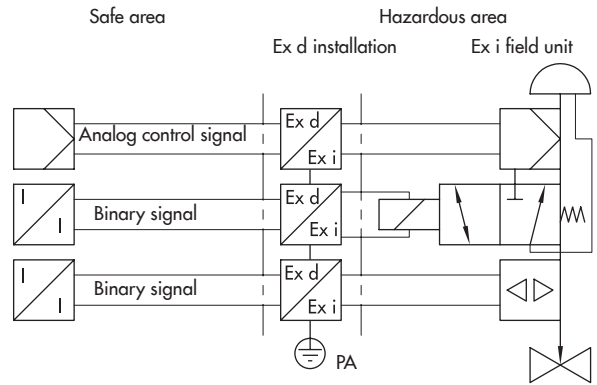


**Fig. 2:** Type 3770-1310 (left), Channel 1 floating · Type 3770-1410 (right), Channel 1 grounding via the negative conductor

### Circuitry

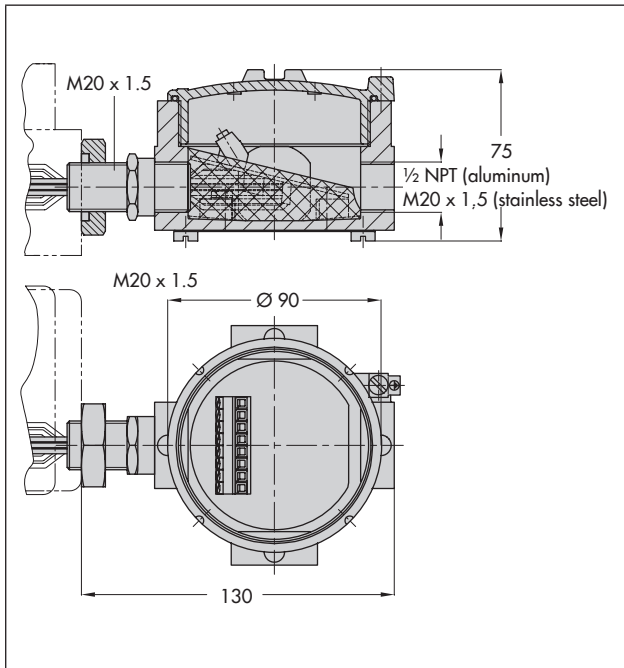


**Fig. 3:** Field barrier (one channel interconnected) with positioner and pneumatic control valve

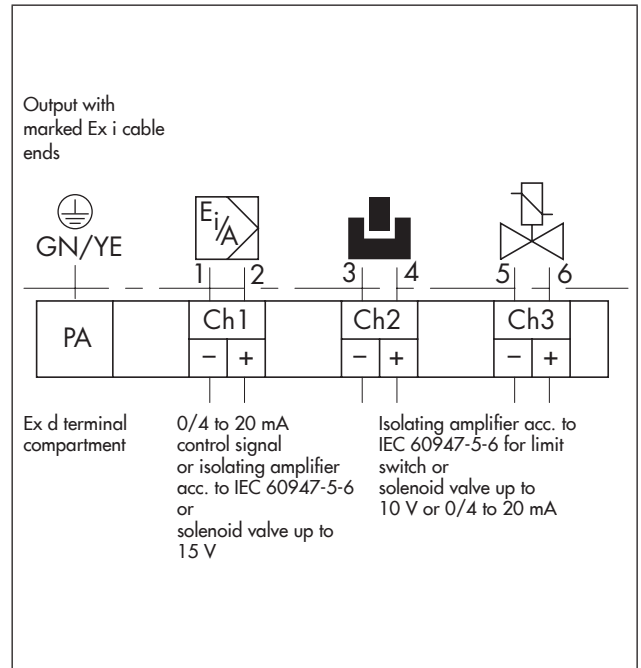


**Fig. 4:** Field barrier (three channels interconnected) with positioner, solenoid valve and limit switch mounted on a pneumatic control valve

### Dimensions in mm



### Electrical connections



**Table 2:** Summary of explosion protection approvals

Type	Certification	Number	Date	Type of protection/comments
3770		POCC DE.08.B00045	2014-12-09	I Ex d[ia] IIC T6 Gb X
			2019-12-08	
3770-1	EC type examination certificate	PTB 98 ATEX 1025 X	2004-01-14	II 2G Ex d[ia] IIC T6 GB

**Article code**

Field barrier acc. to ATEX	Type 3770-	1	x	x	x	0	x	x	x
Channels									
Three channels, 4 to 20 mA, floating and two circuits according to IEC 60947-5-6		3							
Three channels, 4 to 20 mA, non-floating and two circuits according to IEC 60947-5-6		4							
Electrical connections									
½ NPT female thread (aluminum)			1	0					
M20 x 1.5 female thread (stainless steel)			3	1					
Enclosure material									
Die-cast aluminum				0					
Stainless steel (AISI 316)				1					
Special version									
Without						0	0	0	
GOST certificate						0	0	1	

Specifications subject to change without notice



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