Type 3770 Ex d/Ex i Field Barrier

⟨Ex⟩ 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.

CE Ex certified

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	0/4 to 20 mA or U_N to 10 V DC
		or limit switches acc. to IEC 60947-5-6 not suitable for transmitter supply	
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	≤ 17.2 V	≤ 12.6 V
Max. output current	I_0	≤ 110 mA	≤ 49 mA
Max. power	P_0	≤ 473 mW	≤ 154 mW
Max. perm. capacitance	C_0	360 nF/IIC · 2.1 µF/IIB	1.15 µF/IIC · 7.4 µF/IIB
Max. perm. inductance i	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/20 mA	5.7 V/20 mA
Perm. ambient temperature		–45 °C ≤ t_a ≤ +60 °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.

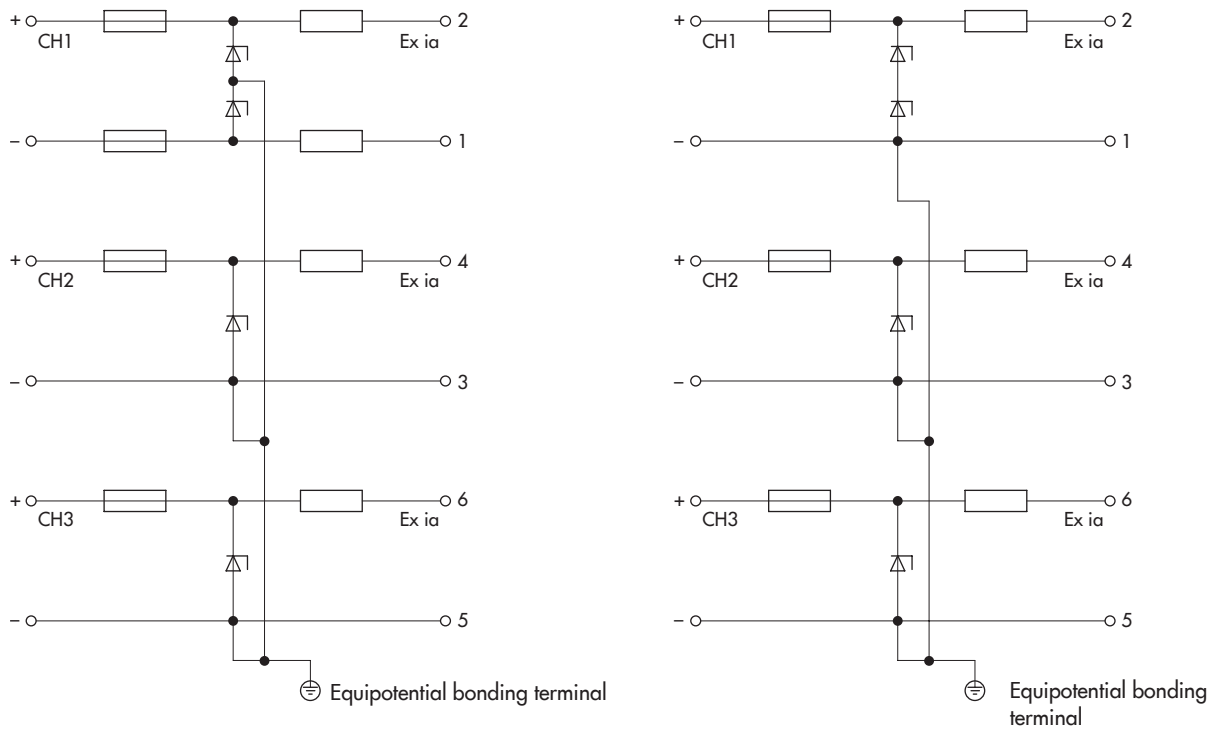


Fig. 2: *Type 3770-1310 (left), Channel 1 floating · Type 3770-1410 (right), Channel 1 grounding via the negative conductor*

Circuitry

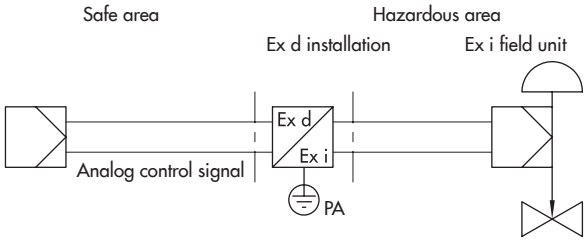


Fig. 3: *Field barrier (one channel interconnected) with positioner and pneumatic control valve*

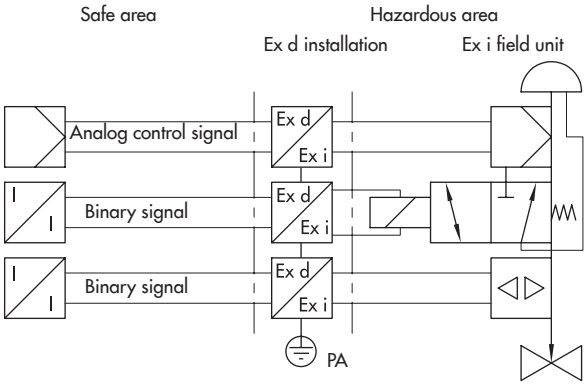
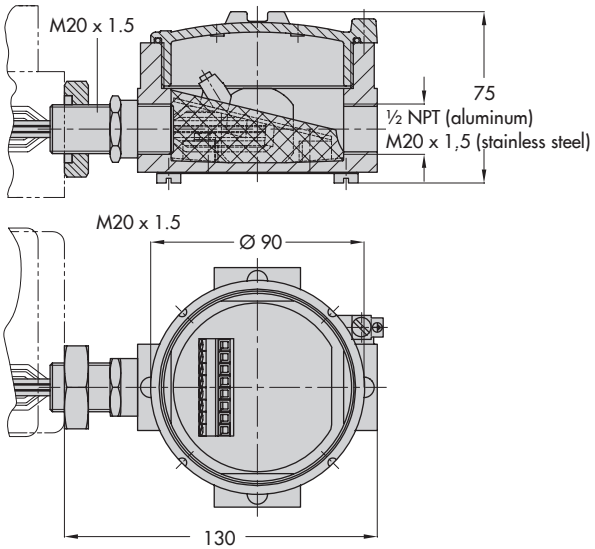


Fig. 4: *Field barrier (three channels interconnected) with positioner, solenoid valve and limit switch mounted on a pneumatic control valve*

Dimensions in mm



Electrical connections

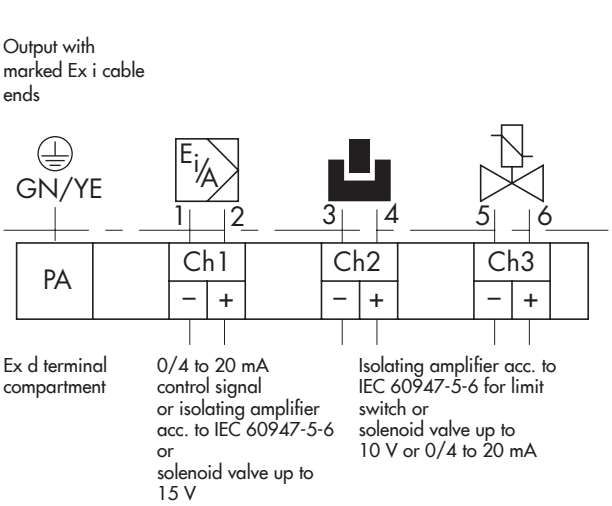


Table 2: *Summary of explosion protection approvals*

Type	Certification			Type of protection/comments
3770	EAC Ex	Number Date Valid until	POCC DE.08.B00045 2014-12-09 2019-12-08	1Ex d[ia] IIC T6 Gb X
3770-1	Ex EC type examination certificate	Number Date	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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