

**Transmitter Supply Unit
with Output 0/4 mA ... 20 mA
with HART
(Field Circuit Ex i)
Type 9160/..-11-11**

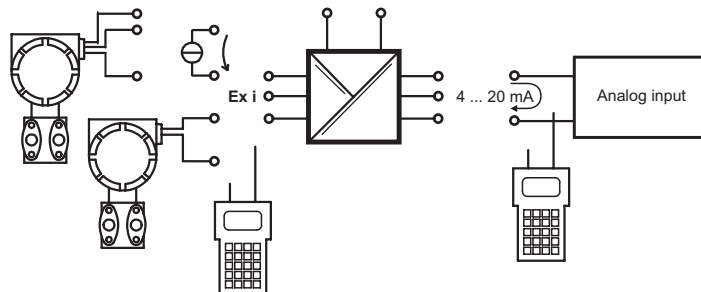
- Active output 0/4 mA ... 20 mA
- Suitable for 2-, 3-wire transmitter, 2-wire HART transmitter and mA-sources
- Intrinsically safe input [Ex ia] IIC
- 1 and 2 channels
- Galvanic isolation between input, output and power supply
- Open-circuit and short-circuit monitoring and messaging for input and output (can be switched off)
- Installation possible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC 61508)



09738E00

	Zones					
	0	1	2	20	21	22
Ex i interfaces	X	X	X	X	X	X
Installation in			X			X

Basic function: analog input 0/4 mA ... 20 mA, 1 and 2 channels. The transmitter supply units are used for intrinsically safe operation of 2- and 3- wire transmitters or for connection to intrinsically safe mA-sources. The 2- and 3-wire transmitters are supplied with power from the transmitter supply unit. For 2-wire transmitters the isolators transfer the HART communication signal bidirectionally.





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Transmitter Supply Unit with Output 0/4 mA ... 20 mA with HART (Field Circuit Ex i) Type 9160/..-11-11

Selection Table

Version	Channels	Input	Output A	Output B	Connection type	Order number	
Transmitter supply unit Type 9160, field circuit Ex i	1	0/4 mA ... 20 mA with HART	0/4 mA ... 20 mA with HART	--	Screw terminals	9160/13-11-11s	
					Spring cage terminals	9160/13-11-11k	
					0/4 mA ... 20 mA	Screw terminals	9160/19-11-11s
					Spring cage terminals	9160/19-11-11k	
	2	0/4 mA ... 20 mA with HART	0/4 mA ... 20 mA with HART	0/4 mA ... 20 mA with HART	Screw terminals	9160/23-11-11s	
					Spring cage terminals	9160/23-11-11k	

Technical Data

Certificates	DMT 03 ATEX E 010 X	
Other certificates	USA (FM, UL), Canada (CSA), Russia (CTB), Belarus (Promatomnadzor), Brazil (UL do Brasil), Ukraine (ISCVE), Shipping (DNV)	
Explosion protection	 II 3 (1) G Ex nA nC [ia] IIC T4  II (1) D [Ex iaD]	
Installation	In Zone 2, Div. 2 and in the safe area	
Safe maximum values (CENELEC)	Max. voltage U_o Max. current I_o Max. power P_o Max. connectable capacitance C_o for IIC / IIB Max. connectable inductance L_o for IIC / IIB Internal capacitance C_i and inductance L_i Insulation voltage U_m	27 V 88 mA 576 mW 90 nF / 705 nF 2.3 mH / 14 mH negligible 250 V
	When connecting mA sources: Max. output voltage U_o Max. connectable voltage U_i Max. connectable current I_i Internal capacitance C_i and inductance L_i	4.1 V 30 V 100 mA negligible
	Further information and combinations of values, see certification.	
Power supply	Nominal voltage U_N Voltage range Residual ripple within voltage range Nominal current (U_N , 20 mA) 1 / 2 channels Power consumption (U_N , 20 mA) 1 / 2 channels Power losses (at U_N , $R_L = 250 \Omega$) 1 / 2 channels Indication Polarity reversal protection Undervoltage monitoring	24 V DC 18 V ... 31.2 V $\leq 3.6 V_{pp}$ 70 mA / 125 mA 1.7 W / 3.0 W 1.3 W / 2.2 W LED green „PWR“ yes yes (no faulty module / output states)
Galvanic isolation	Test voltage under regulations EN 60079-11 Ex i input to output Ex i input to power supply Ex i input to Error-contact Ex i inputs to each other Test voltage under regulations EN 50178 Output to power supply Outputs to each other Error-contact to power supply and outputs	1.5 kV AC 1.5 kV AC 1.5 kV AC 500 V AC 350 V AC 350 V AC 350 V AC
Ex i Input	Input signal Function area Max. input current for mA sources Transmitter supply voltage Supply voltage residual ripple No-load voltage Short-circuit current Input resistance (AC-Impedance HART) Input resistance for mA sources Communication signal (at 2-wire transmitter)	0/4 mA .. 20 mA with HART 0 mA ... 24 mA 50 mA ≥ 16 V at 20 mA (for 2-, 3-wire) ≤ 25 mV _{eff} ≤ 26 V ≤ 35 mA $\approx 500 \Omega$ 30 Ω HART transmission bi-directional, 0.5 kHz ... 30 kHz

Technical Data				
Output	Output signal			
	- Type variant 9160/3-11-11.		0/4 mA ... 20 mA with HART	
	- Type variant 9160/19-11-11.	output A: output B:	0/4 mA ... 20 mA with HART 0/4 mA ... 20 mA without HART	
	Load resistance R_L at 9160/..-11-11.		0 Ω ... 600 Ω (terminal 1+/2- or 5+/6-) 0 Ω ... 379 Ω (terminal 3+/2- or 4+/6-) (with internal 221 Ω resistor for HART)	
	Residual ripple	\leq	40 μA_{eff}	
	No-load voltage	\leq	15.5 V	
	Communication signal (at 9160/19 only output A)		HART transmission bidirectionale	
Response time (10 % ... 90 %)	\leq	0.5 kHz ... 30 kHz 25 ms		
Error detection Ex i Input	Open-circuit	<	2 mA	
	Short-circuit	>	22 mA	
	Behaviour of output	=	Input signal	
	Output current at $I_E = 0$	$I_A =$	0 mA	
Error detection output	Open-circuit	<	2 mA	
Error messaging Ex i Input / Output	Settings (switch LF)		activated / deactivated	
	Error detection		LED red „LF“ each channel	
	Error messaging and power supply failure		- Contact (30 V, 100 mA), closed to ground in case of error - pac-Bus, floating contact (30 V, 100 mA)	
Error limits	Accuracy, typical data expressed as % of calibrated span at U_N , 23 °C			
	Linearity error	\leq	0.1 %	
	Offset error	\leq	0.1 %	
	Temperature influence	\leq	0.1 % / 10 K	
	Power supply effect within voltage range	\leq	0.01 %	
	Load resistance effect	\leq	0.02 %	
	Cross-talk channel 1 / channel 2	\leq	0.01 %	
Electromagnetic compatibility	Tested under the following standards and regulations: EN 61326-1 Use in industrial environment			
Ambient conditions	Ambient temperature		- 20 °C ... + 60 °C / + 70 °C (see instructions)	
	Storage temperature		- 40 °C ... + 80 °C	
	Relative humidity (no condensation)	\leq	95 %	
Mechanical data		Screw terminals	Spring cage terminals	Insulation displacement connectors
	Connection one wire			
	- rigid	0.2 ... 2.5 mm ²	0.2 ... 2.5 mm ²	--
	- flexible	0.2 ... 2.5 mm ²	0.2 ... 2.5 mm ²	0.5 ... 1 mm ²
	- flexible, end covering sleeves (without / with plastic sleeving)	0.25 ... 2.5 mm ²	0.25 ... 2.5 mm ²	--
	Connection two wires			
	- rigid	0.2 ... 1 mm ²	--	--
	- flexible	0.2 ... 1.5 mm ²	--	--
	- flexible, end covering sleeves	0.25 ... 1 mm ²	0.5 ... 1 mm ²	--
	Weight	approx. 160 g		
	Mounting type	on DIN rail acc. to EN 50022 (NS35/15; NS35/7.5) or in pac-Carrier		
	Mounting position	horizontal or vertical		
	Casing protection class	IP 30		
Terminal protection class	IP 20			
Casing material	PA 6.6			
Fire protecting class (UL-94)	V0			



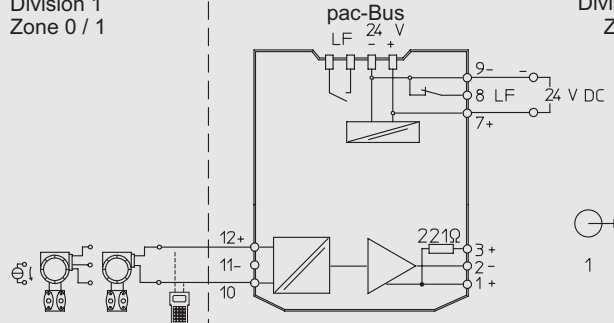
Technical Data

Connection diagram

1 channel
output: active with
HART
9160/13-11-11.

Hazardous area
Division 1
Zone 0 / 1

Safe area
Division 2
Zone 2



Field device

ISpac Isolator

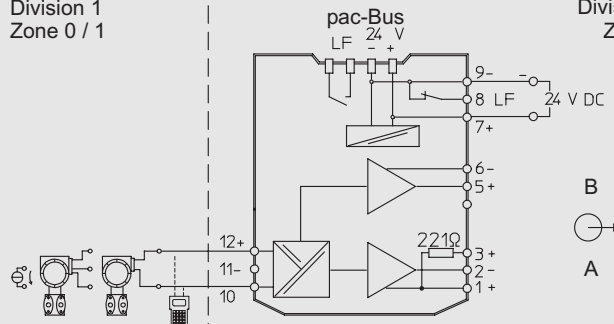
Control system

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1 channel
output A: active with
HART
output B: active
9160/19-11-11.

Hazardous area
Division 1
Zone 0 / 1

Safe area
Division 2
Zone 2



Field device

ISpac Isolator

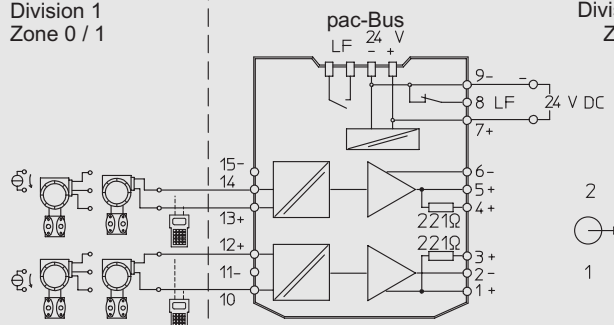
Control system

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2 channels
outputs: active with
HART
9160/23-11-11.

Hazardous area
Division 1
Zone 0 / 1

Safe area
Division 2
Zone 2



Field device

ISpac Isolator

Control system

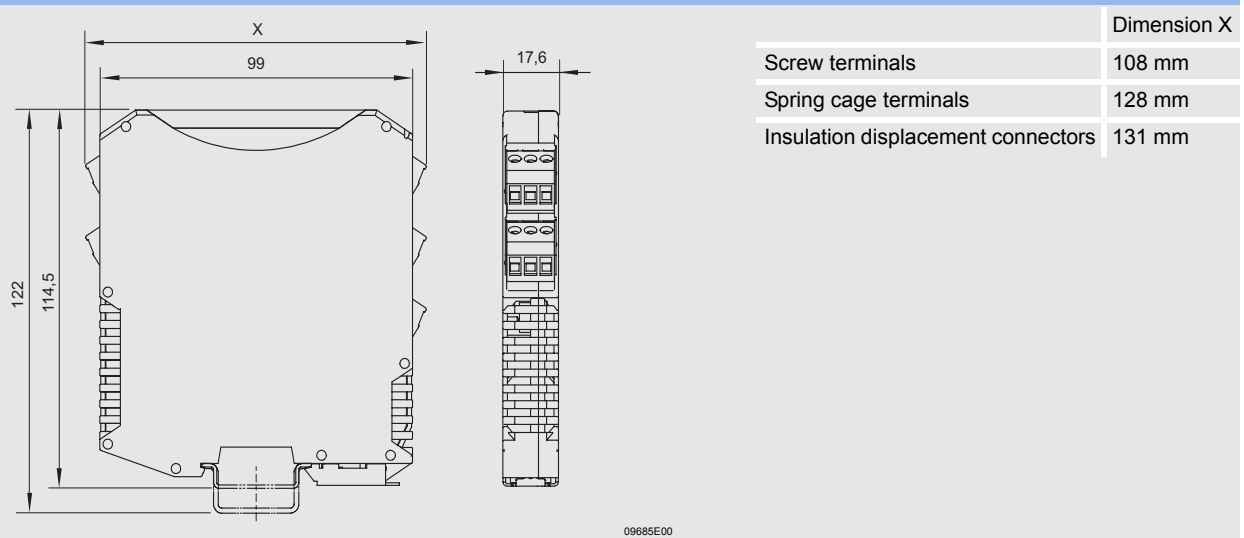
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Technical Data

Configuration output	9160/3-11-11.	9160/19-11-11.
Channel 2 / Output B	 09742E00	 09740E00
Channel 1 / Output A	 09744E00	 09744E00

Dimension drawings (all dimensions in mm) - subject to alterations



We reserve the right to make alterations to the technical data, weights, dimensions, designs and products available without notice. The illustrations cannot be considered binding.

