

Analog Input Module HART Ex i / I.S. Inputs, 4 + 4 Channels Type 9461/12-08-21

- 4 channels for 2-wire HART transmitters and 4 channels for 4-wire HART transmitters
- Intrinsically safe inputs Ex ia IIC
- Galvanic isolation between inputs and system
- Open-circuit and short-circuit monitoring for each field circuit
- Module can be replaced in operation (hot swap)

Zone	0	1	2	20	21	22
Class	I			II / III		
Zone	0	1	2	20	21	22
Ex interface	X	X	X	X	X	X
Installation in		X	X		X ^{*)}	X ^{*)}

Class	I		II / III	
Division	1	2	1	2
Ex interface	X	X	X	X
Installation in	X	X	X ^{*)}	X ^{*)}

^{*)} suitable enclosure necessary



The Analog Input Module HART is used for the connection and supply of up to 4 x 2-wire and 4 x 4-wire HART transmitters with 0 ... 20 mA or 4 ... 20 mA signals. Each input is individually monitored for open and short circuits.

2-wire transmitters are supplied with power from the module. Signals and power supplies are short-circuit proof and intrinsically safe.

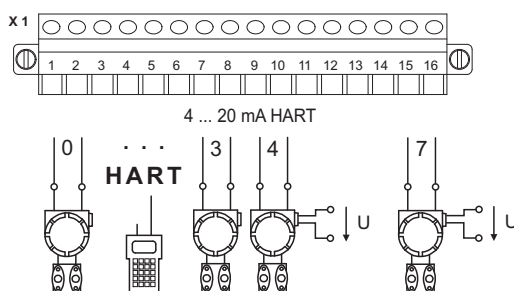
4-wire transmitters are powered from an external supply.

The signals are connected intrinsically safe.

The interface of the Analog Input Module with the internal data bus of the BusRail is designed with redundancy.

The integrated HART multiplexer permits bidirectional HART communication between HART field devices and the automation and engineering system.

Analog transmitters (non-HART) can also be operated.



06304E00

Selection Table

Version	Description	Order number	Weight kg / lbs
Analog Input Module HART	4 channels for 2-wire HART transmitters and 4 channels for 4-wire HART transmitters	9461 / 12-08-21	0.321 / 0.708

Explosion Protection

Certificates			
IECEX	PTB 06.0001X		
Europe (ATEX)	PTB 99 ATEX 2175		
USA (NEC)	3007532 (FM)		
Russia (GOST-R)	04.B00806 (CTB)		
Other countries	Canada (CSA), Brazil (INMETRO), Belarus (Promatomnadzor)		
Marking			
IECEX	Ex ib [ia] IIC/IIB T4		
Europe (ATEX)	Ⓢ II 2 (1) G EEx ib [ia] IIC / IIB T4 Ⓢ II (1) D [Ex iaD]		
USA (NEC)	IS/II/1/ABCD/T4 Ta = 65 °C, IS/II/1/IIC/T4 Ta = 65 °C, AIS/I,II,III/1/ABCDEFG, [AEx ia] IIC, NI/II/2/ABCD/T4 Ta = 65 °C, NI/II/2/IIC/T4 Ta = 65 °C, AIS/I,II,III/1/ABCDEFG, [AEx ia] IIC		
Russia (GOST-R)	1Exib[ia]IIC/IIBT4		
Other certificates	Marine (DNV, ABS, GL)		
Safety data			
Maximum values		2-wire transmitter	4-wire transmitter
	max. voltage U_o / V_{oc}	26.2 V	28 V
	max. voltage U_i / V_{max}	--	28 V
	max. current I_o / I_{sc}	91 mA	6 mA
	max. current I_i / I_{max}	--	144 mA
	max. power P_o	591 mW	42 mW
Cable parameters (ATEX)		2-wire transmitter	4-wire transmitter
	max. capacitance C_o / C_a for IIC	97 nF	83 nF
	max. capacitance C_o / C_a for IIB	0.75 μ F	0.65 μ F
	max. inductance L_o / L_a for IIC	2.38 mH	50 mH
	max. inductance L_o / L_a for IIB	14 mH	50 mH
	effective internal capacitance C_i	0	11 nF
	effective internal inductance L_i	37 μ H	37 μ H
Further information	see respective certificate		

Technical Data

Ex i / I.S. inputs for 2-wire transmitters

Number of channels	4		
Signal			
Signal range	0 ... 20 mA, 4 ... 20 mA (adjustable parameters for each channel)		
Minimum signal	0 mA		
Maximum signal	23.5 mA		
Supply voltage	16.0 V at 20 mA		
Signal transmission	Filter time constant (adjustable parameters)		
	small	medium	50 Hz, 60 Hz
Resolution in the range 4 ... 20 mA	12.75 bit	12.75 bit	12.75 bit
Maximum delay from the input to the internal bus, 0 ... 90 % of the signal span	32 ms	120 ms	840 ms

Note: For HART operation the time setting medium or 50 Hz, 60 Hz is recommended

Maximum short-circuit current 35 mA

Ex i / I.S. inputs for 4-wire transmitters

Number of channels	4		
Grounding	The field circuits must not be grounded		
Signal			
Signal range	0 .. 20 mA, 4 .. 20 mA (adjustable parameters for each channel)		
Minimum signal	0 mA		
Maximum signal	23.5 mA		
Maximum input resistance	450 Ω		
Signal transmission	Filter time constant (adjustable parameters)		
	small	medium	50 Hz, 60 Hz
Resolution in the range 4 ... 20 mA	12.75 bit	12.75 bit	12.75 bit
Maximum delay from the input to the internal bus, 0 ... 90 % of the signal span	32 ms	120 ms	840 ms

Note: For HART operation the time setting medium or 50 Hz, 60 Hz is recommended

Galvanic isolation

between power supply and system components	1500 V AC
between two input / output modules	500 V AC
between inputs and system components	500 V AC
The inputs and outputs of an I/O module have a common negative conductor	



Technical Data												
Measuring accuracy												
Note	All values in % of the signal span, at 23 °C / 73.4 °F											
Measurement deviation	<table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="3">Filter time constant (adjustable parameters)</th> </tr> <tr> <th>small</th> <th>medium</th> <th>50 Hz, 60 Hz</th> </tr> </thead> <tbody> <tr> <td>Maximum measurement deviation</td> <td>0.075 %</td> <td>0.05 %</td> <td>0.05 %</td> </tr> </tbody> </table>		Filter time constant (adjustable parameters)			small	medium	50 Hz, 60 Hz	Maximum measurement deviation	0.075 %	0.05 %	0.05 %
	Filter time constant (adjustable parameters)											
	small	medium	50 Hz, 60 Hz									
Maximum measurement deviation	0.075 %	0.05 %	0.05 %									
Ambient temperature effect	0.1 % / 10 K											
MTBF acc. to MIL	36.2 years (at 40 °C / 104 °F)											
Settings												
Open-circuit and short-circuit monitoring	ON, OFF (for each channel)											
Value to fieldbus during open circuit, short circuit	-10 %, 0 %, 100 % of the signal, alarm code, hold last value											
Diagnostics												
Retrievable parameters	Manufacturer, type, version, serial number											
Module faults	<ul style="list-style-type: none"> • Internal primary bus faults • Internal redundant bus faults • No response • Module does not correspond to configuration • Hardware fault 											
Signal faults per channel												
Open circuit	< 2.4 / < 3.6 mA (adjustable parameters, 4 ... 20 mA)											
Short circuit	> 23.5 / > 22.8 / > 21 mA (adjustable parameters, 0/4 ... 20 mA)											
Measuring range	Over range / under range											
Operator interface												
Operation	LED green "RUN"											
Fault	LED red "ERR"											
Power supply												
Maximum power consumption	4.1 W											
Maximum power dissipation	2.7 W											
Mechanical data												
Module enclosure	Polyamide 6GF											
Fire protection class (UL 94)	V2											
Degree of protection (IEC 60529)												
Modules	IP30											
Connections	IP20											
Electrical connection												
Ex i / I.S. field signals	Plug-in terminals 16-pole with catch, 2.5 mm ² / up to 14 AWG, screw or spring type											
Installation conditions												
Mounting type	on 35 mm DIN rail NS 35/15											
Installation position	horizontal and vertical											

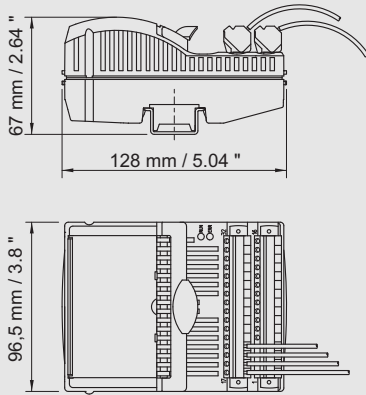
Technical Data

Ambient conditions	
Ambient temperature	- 20 ... + 65 °C / - 4 ... + 149 °F
Storage temperature	- 40 ... + 70 °C / - 40 ... + 158 °F
Maximum relative humidity	95 % (no condensation)
Vibration, sinusoidal (IEC EN 60068-2-6)	1 g in frequency range between 10 ... 500 Hz 2 g in frequency range 45 ... 100 Hz
Shock, semi-sinusoidal (IEC EN 60068-2-27)	15 g (3 shocks per axis and direction)
Electromagnetic compatibility	Tested according to the following standards and regulations: EN 61 326-1 (1998) IEC 1000-4-1...6, NAMUR NE 21

Accessories and Spare Parts

Designation	Illustration	Description	Order number
Plug-in terminal		2.5 mm ² / 14 AWG with catch, 16-pole, screw connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Designation: 1 ... 16 Attention: An additional terminal is necessary for I/O module Series 9470 and 9480. Designation: 17 ... 32	162702
		2.5 mm ² / 14 AWG with catch, 16-pole, spring connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits including test jacks Designation: 1 ... 16 Attention: An additional terminal is necessary for I/O module Series 9470 and 9480. Designation: 17 ... 32	162695
Labelling strips		„FB No ... Mod No ...“ for plug-in terminals, sheet with 26 labels	162788
Designation strips		For BusRail, for 1 BusRail with 16 I/O modules	162793
Warning sign		„Only clean modules with damp cloths“	162796
Partition		For assembly between intrinsically safe and non-intrinsically safe connectors of the I/O modules, in order to adhere to the required 50 mm / 2 in distance	162740

Dimensional Drawings (All Dimensions in mm / inches) - 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.