

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.

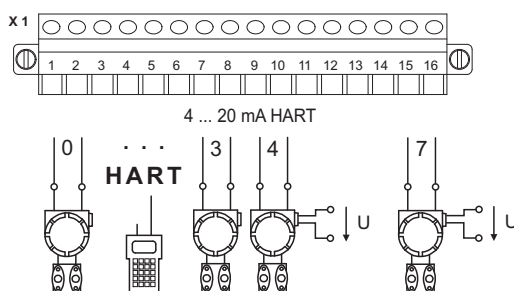
4-wire transmitters are powered from an external supply.

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/1/ABCD/T4 Ta = 65 °C, IS/1/1/IIC/T4 Ta = 65 °C, AIS/1,II,III/1/ABCDEFG, [AEx ia] IIC, NI/1/2/ABCD/T4 Ta = 65 °C, NI/1/2/IIC/T4 Ta = 65 °C, AIS/1,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 | | | | | | | | | | | |

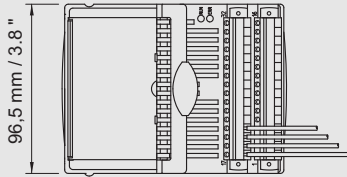
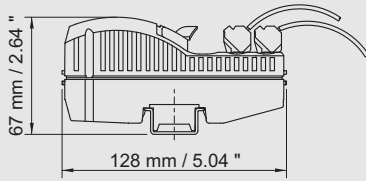
Technical Data

| | |
|---|--|
| 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



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