

Remote I/O

IS1+ Remote I/O HART analog universal module

For Zone 2 Ex i

9468/33-08-10 Art. No. 210660



- 8 channels can be used individually as inputs or outputs
- Ex ia IIC intrinsically safe inputs/outputs with line fault monitoring
- Module in Zone 2 can be replaced without having to disconnect the power supply (i.e. hot-swapped)

MY R. STAHL 9468B



The 9468/33 HART analogue universal module for Zone 2 has eight channels which can be used separately for Ex i operation of 2-/3-conductor HART transmitters, 4-conductor transmitters or control valves/positioners with 0/4 to 20 mA signals. HART communication is bidirectional. All inputs/outputs are short-circuit proof, galvanically separated from the system and individually monitored to check for line faults.

Technical Data

Explosion Protection

| | |
|---------------------------------|---|
| Application range (zones) | 2 |
| Application range (Zone) note | An enclosure that is suitable for the application must be used. See operating instructions. |
| Ex interface zone | 0 1 2 20 21 22 |
| IECEX gas certificate | IECEX DEK 12.0054X |
| IECEX gas explosion protection | Ex ec ia [ia Ga] IIC T4 Gc |
| IECEX dust certificate | IECEX DEK 12.0054X |
| IECEX dust explosion protection | [Ex ia Da] IIIC |
| ATEX gas certificate | DEKRA 12 ATEX0173 X |
| ATEX gas explosion protection | Ex II 3 (1) G Ex ec ia [ia Ga] IIC T4 Gc |
| ATEX dust certificate | DEKRA 12 ATEX0173 X |
| ATEX dust explosion protection | Ex II (1) D [Ex ia Da] IIIC |
| FMus certificate | FM17US0332X |
| cFM certificate | FM16CA0134X |
| Marking cFMus | NI, Class I, Div. 2, Groups A,B,C,D; Class I, Zone 2, AEx/Ex nA ia [ia] IIC AIS Class I,II,III, Div. 1, Groups A,B,C,D,E,F,G; T4 at Ta = 75°C See Doc. 9468 6 031 002 1 |
| Certificates | ATEX (DEK), Brazil (ULB), Canada (FM), China (NEPSI), IECEX (DEK), India (PESO), Korea (KTL), USA (FM) |
| Ship approval | ABS, BVIS, EU RO MR (DNV), KR, LR |
| Declaration of Conformity | ATEX (EUK), China (CCC) |

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Explosion Protection

| | |
|---------------------|--|
| Installation | Zone 2 and safe areas |
| Further information | See operating instructions and certificate |

Safety Data

| | | | | | | | | | |
|--|------------|-----|-----|-----|-----|-----|-----|-----|------|
| Max. voltage U_o | 24.4 V | | | | | | | | |
| Max. current I_o (2-conductor) | 80 mA | | | | | | | | |
| Max. power P_o (2-conductor) | 488 mW | | | | | | | | |
| Max. current I_o (3-conductor) | 81.8 mA | | | | | | | | |
| Max. power P_o (3-conductor) | 499 mW | | | | | | | | |
| Internal capacitance | Negligible | | | | | | | | |
| Internal inductance | Negligible | | | | | | | | |
| Max. connectable inductance L_o /capacitance C_o | | | | | | | | | |
| 2-conductor input/output | | | | | | | | | |
| IIC | L_o [mH] | 3.8 | 2 | 1 | 0.5 | 0.2 | | | |
| | C_o [nF] | 53 | 59 | 71 | 88 | 119 | | | |
| IIB | L_o [mH] | 23 | 10 | 2 | 1 | 0.5 | 0.2 | 0.1 | 0.05 |
| | C_o [nF] | 370 | 430 | 430 | 470 | 550 | 700 | 860 | 890 |
| 3-conductor input | | | | | | | | | |
| IIC | L_o [mH] | 3.6 | 2 | 1 | 0.5 | 0.2 | | | |
| | C_o [nF] | 53 | 58 | 70 | 87 | 119 | | | |
| IIB | L_o [mH] | 21 | 10 | 2 | 1 | 0.5 | 0.2 | 0.1 | 0.05 |
| | C_o [nF] | 380 | 420 | 420 | 470 | 550 | 700 | 860 | 890 |

Limiting values

4-conductor transmitters

U_o , I_o , P_o , C_i und L_i are negligible.
Maximum connectable safety characteristic values during operation with active 4-conductor transmitters:

| Max. input voltage U_i [V] | Max. input current I_i [mA] | Max. ambient temperature T_{amb} [°C] |
|------------------------------|-------------------------------|---|
| 28 | 150 | 55 |
| 28 | 140 | 60 |
| 28 | 130 | 65 |
| 28 | 115 | 70 |
| 28 | 105 | 75 |

Electrical Data

| | |
|--------------------|--|
| Number of channels | 8 Ex i inputs/outputs |
| Channels | Each can be configured as input or output (3-conductor, 4-conductor transmitters or active mA sources occupy 2 channels) |
| Nominal signal | 4 to 20 mA 0 to 20 mA |
| Min. signal | 0 mA |
| Supply voltage | 16 V, at 20 mA for 2-conductor transmitters |

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Electrical Data

| | |
|-------------------------------|--|
| Communication signal | HART protocol |
| Connection Ex i field signals | Pluggable, blue terminals, 16-pin, 2.5 mm ² , screw type or cage clamp version with lock |
| Notes | In order to operate an active 4-conductor HART transmitter, a 9164 must be connected between each channel. A 9164 is not required when operating a 4-conductor transmitter without HART communication. |

| Signal transmission | | Filter time constant (adjustable parameters) | | |
|---------------------|--|--|-----------|--------------|
| | | Small | Medium | 50 Hz, 60 Hz |
| | Measurement discrimination in the range 4 to 20 mA | 14.75 bit (with HART: 12.75 bit) | 14.75 bit | 14.75 bit |
| | Maximum delay from signal/internal bus | 32 ms | 120 ms | 500 ms |

Auxiliary Power

| | |
|--------------------------------|--------------------------------------|
| Power supply connection | BusRail types 9494 |
| Auxiliary power version | Intrinsically safe Ex ia via BusRail |
| Current consumption | 220 mA (at 20 mA per channel) |
| Max. power consumption | 5.3 W (at 20 mA/channel) |
| Max. power dissipation outputs | 3.7 W (at 20 mA, 500 Ω/channel) |
| Max. power dissipation inputs | 2.7 W (at 20 mA/channel) |

Galvanic Isolation

| | |
|--------------------------------------|------------------------------|
| Test voltage for galvanic separation | Acc. to standard EN 60079-11 |
| Auxiliary power/system components | ≥ 1500 V AC |
| I/O module / I/O module | ≥ 500 V AC |
| I/O channels/system components | ≥ 500 V AC |
| I/O channels / ground (PA) | ≥ 500 V AC |

Input

| | |
|----------------------------------|--------------------|
| Max. signal for input | 23.5 mA |
| Max. input short-circuit current | 24 mA |
| Max. input resistance | 14.1 Ω per channel |

Output

| | |
|-------------------------------------|--|
| Output step response (10 to 90%) | 40 ms |
| Max. output short-circuit current | 22.8 mA (4 ... 20 mA) 23.5 mA (0 ... 20 mA) |
| Max. signal for output | 22.8 mA (4 to 20 mA) 23.5 mA (0 to 20 mA) |
| Output max. load resistance | 750 ohm at 20 mA 700 Ω at 21.8 mA |
| Open-circuit voltage U _a | 22.5 V |

Device Specific Data

| | |
|----------------------------|-----------------|
| Signal type | Output Input |
| Diagnostics message module | ON OFF |

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Device Specific Data

| | |
|---|---|
| Signal filter module | 50 Hz large 60 Hz large medium small |
| Scan HART live list module | ON OFF |
| Signal range | 0 ... 20 mA 4 ... 20 mA |
| Input measuring range | 3.6 to 21 mA (acc. to NAMUR) 2.4 to 22.8 or 23.5 mA |
| Line fault monitoring | OFF ON |
| Input behaviour in case of error | 110% 100% 0% -10% Alarm code, keep last value |
| Output behaviour in case of error | -10% 0% 100% 110% Keep last value |
| Cyclical data transmission of HART variants | No 8HV 4HV |
| LED module requires maintenance | "M/S" LED, blue |
| LED operating conditions | "RUN" LED, green |
| LED channel error | without |
| Retrievable parameters | Type Software revision Serial number Manufacturer Hardware revision |
| Module status and alarms | Primary/redundant internal bus error No response from IOM Configuration different from module Hardware error Overtemperature Slot error Module requires maintenance |
| Signal status bit | 1 = Signal valid 0 = Signal interrupted |
| Wire breakage input | < 2,4 mA / 3,6 mA (adjustable parameters, at 4 to 20 mA) |
| Short circuit input | > 23.5 mA > 22.8 mA / > 21 mA (adjustable parameters) |
| Wire breakage output | Terminal voltage > 16 V (response range 16 V to 16.5 V) or output current can no longer be adjusted |
| Short circuit output | Output load < 60 Ω (response range 40 to 60 Ω) |
| Influence of ambient temperature | < 0,03 % / 10 K |

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Accuracy of measurement

| Error of measurement with filter time constant | Small | Medium | 50 Hz, 60 Hz |
|--|---------------------------------|-------------------------------|-------------------------------|
| Maximum error of measurement | 0.075% (12 µA at 4 to 20 mA) | 0.05% (8 µA at 4 to 20 mA) | 0.05% (8 µA at 4 to 20 mA) |

Note: All information in % of the signal span at 23 °C

Diagnostics

| | |
|-----------------|----------------|
| LED group error | "ERR" LED, red |
|-----------------|----------------|

Ambient Conditions

| | |
|-------------------------------|---|
| Ambient temperature | -40 °C ... +75 °C Observe operating instructions |
| Ambient temperature | -40°F ... +167°F Observe operating instructions |
| Storage temperature | -40 °C ... +80 °C |
| Storage temperature | -40°F ... +176°F |
| Max. operating altitude | < 2000 m |
| Max. relative humidity | 95% (without condensation) |
| Shock (semi-sinusoidal) | (IEC EN 60068-2-27) 15 g (3 shocks per axis and direction) |
| Vibration (sinusoidal) | (IEC EN 60068-2-6) Frequency range 2 to 13.2 Hz Amplitude 1 mm (peak value) Frequency range 13.2 to 100 Hz Acceleration amplitude 0.7 g |
| Electromagnetic compatibility | Tested to the following standards and regulations: EN 61326-1 (2006) IEC 61000-4-1 to 61000-4-6, NAMUR NE 21 |

Mechanical Data

| | |
|---------------------------------------|-------------------|
| Degree of protection (IP) (IEC 60529) | IP20 |
| Module enclosure | Polyamide 6GF |
| Fire resistance (UL 94) | V2 |
| Pollutant class | Corresponds to G3 |
| Width | 96.5 mm |
| Width, inches | 3.8 in |
| Depth | 68 mm |
| Length | 128 mm |
| Length, inches | 5.04 in |
| Mounting depth, inches | 2.64 in |
| Weight | 275 g |
| Weight | 0.61 lb |

Mounting / Installation

| | |
|----------------------|------------------------|
| Mounting orientation | Horizontal Vertical |
|----------------------|------------------------|

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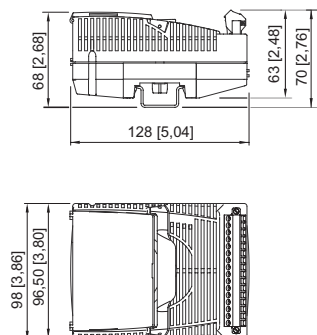
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Dimensional Drawings (All Dimensions in mm [inches]) – Subject to Alterations



Accessories

| Pluggable terminal | | Art. No. |
|--|--|----------|
|  | 2.5 mm ² with lock, 16-pin, screw connector, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Labelling: 1 to 16 Note: A second terminal is additionally required for I/O module Series 9470 and 9482 Labelling: 17 to 32 | 162702 |
|  | 2.5 mm ² with lock, 16-pin, spring clamp connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits, incl. test jacks Labelling: 1 to 16 Note: A second terminal is additionally required for I/O module Series 9470 and 9482 Labelling: 17 to 32 | 162695 |
| Electronic relay | | Art. No. |
|  | The electronic relay modules are used to switch Ex e loads using an intrinsically safe (Ex i) or non-intrinsically safe (Ex e) control system. Coil circuit: Ex i or non-Ex i (Ex e)* Contact circuit: Non-Ex i (Ex e) *It is possible to switch between Ex i and non-Ex i circuits, or vice versa, at any time without restriction. Note: Cannot be used with 9475/32-04-12, 9475/32-08-52, 9475/33-08-50 | 282457 |
|  | The 9174 electronic relay module makes it possible to switch Ex e loads using an intrinsically safe control system. Input: Ex i; output: 31.2 V/2 A DC, Ex e | 212340 |
| Ex i/Ex e relay module for Zone 1 | | Art. No. |
|  | The Ex i/Ex e relay module is used for the galvanically isolated switching of intrinsically safe (Ex i) and non-Ex i (Ex e) electrical circuits. Coil circuit: Ex i or non-Ex i (Ex e) Contact circuit: Ex i or non-Ex i (Ex e) Thanks to the integrated safeguarding for the contact and coil circuit, additional safeguarding is not necessary. Note: no usable with 9475/32-04-12, 9475/32-08-52, 9475/33-08-50 | 273000 |

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mA isolating repeater

Art. No.



The mA isolating repeaters are used to connect 4-wire transmitters to active 2-wire inputs and for galvanic separation.
Input: Sink, Ex e
Output: Sink, Ex i

224365

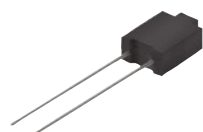


The mA isolating repeaters are used to connect 4-wire transmitters to active 2-wire inputs and for galvanic separation.
Input: Sink, Ex i
Output: Sink, Ex i

224364

Resistor error message suppression

Art. No.



The resistors are used to suppress error messages for unused I/O channels
Resistance value: 5K6/0.5 W
Suitable for: AIM 9468; UMH 9469; DIOM 9470; DIOM 9471; DIOM 9472; DOM 9475
For intrinsically safe circuits (simple apparatus according to EN 60079-11)

244911

The resistors are used to suppress error messages for unused I/O channels
Resistance value: 62R/0.5 W
Suitable for: AOM 9468; UMH 9469; DIOM 9472; TIM 9482

244912

Partition

Art. No.



For mounting between intrinsically safe and non-intrinsically safe connections between I/O modules to maintain a tight string length of 50 mm

220101

Warning label

Art. No.



"Clean modules only with a damp cloth."

162796

DIN A4 sheet

Art. No.

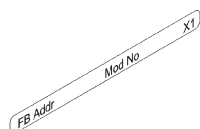


For label plate on I/O modules; 6 plates per sheet;
IS Wizard printout; packaging unit = 20 sheets

162832

Labelling strips

Art. No.



"FB Addr ... Mod No ..." for pluggable terminal, 26 pieces on the sheet

162788

Vibration bracket set

Art. No.



When installed in environments with extreme vibration (> 0.7 g and max. 4 g), the 9490 vibration brackets may be used as an additional measure and provide mechanical stability for the individual modules.

For mounting: All I/O modules, except 9477/12 and 9478

Number of brackets in a set: 8

Screws (item no. 275516) must be ordered separately.

271920

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| Set of screws | Art. No. |
|---|----------|
| Set of M5 x 14 screws (self-tapping) for 9490 vibration brackets Number of screws in a set: 25 | 275516 |

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