Remote I/O

IS1+ Remote I/O HART analog universal module
For Zone 2 Ex i
9468/33-08-10 Art. No. 210660

- Eight channels can be used individually as inputs or outputs
- Intrinsically safe Ex ia IIC inputs/outputs with line fault monitoring
- Module in Zone 2, Cl. I, II, Div. 2 can be hot swapped

MY R. STAHL **9468B**

The 9468/33 series HART Analog Universal Module for Zone 2, Cl. I, II, Div. 2 has eight channels that can be used individually for Ex i operating two-/three-conductor HART transmitters, four-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	A suitable enclosure in accordance with the area of application must be used. Refer to the operating instructions.
Ex interface zone	0, 1, 2, 20, 21, 22
IECEx gas certificate	IECEx DEK 12.0054X
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 certificate	DEKRA 12 ATEX0173 X
ATEX gas explosion protection	Ⓔx II 3 (1) G Ex ec ia [ia Ga] IIC T4 Gc
ATEX dust certificate	DEKRA 12 ATEX0173 X
ATEX dust explosion protection	Ⓔx 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), 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)
Installation	Zone 2, Cl. I, Div. 2 and in the safe area
Further information	see operating instructions and certificate

Safety Data

Max. voltage U_o/V_{oc}		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 with adjustable parameters as input or output (3-wire, 4-wire 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
Communication signal	HART protocol
Connection Ex i field signals	Pluggable, blue terminals, 16-pole, 2.5 mm², screw- or spring-type versions with lock

Electrical Data

Notes	In order to operate an active 4-wire HART transmitter, a 9164 must be connected between each channel. 9164 is not required when operating 4-wire 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
Signal filter module	50 Hz large 60 Hz large medium small

Device Specific Data

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	Internal bus error primer / redundant No response from IOM Configuration does not correspond to the module Hardware error Excess temperature 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 ... 16.5 V) or output current can not longer be set
Short circuit output	Output load < 60 Ω (response range 40 ... 60 Ω)
Influence of ambient temperature	< 0,03 % / 10 K

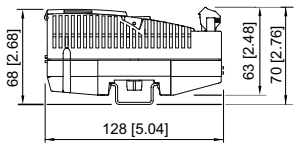
Accuracy of measurement			
Error of measurement with filter time constant	Small	Medium	50 Hz, 60 Hz

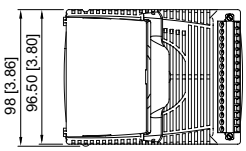
Maximum error of measurement	0.075% (12 µA at 4 to 20 mA)	0.05% (8 µA at 4 to 20 mA)	0.05% (8 µA at 4 to 20 mA)

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

Diagnostics	
LED group error	"ERR" LED, red
Ambient Conditions	
Ambient temperature °C	-40 °C ... +75 °C Observe operating instructions
Ambient temperature °F	-40°F ... +167°F Observe operating instructions
Storage temperature °C	-40 °C ... +80 °C
Storage temperature °F	-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 … 13.2 Hz Amplitude 1 mm (peak value) Frequency range 13.2 … 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

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





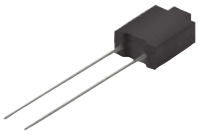
Accessories

Pluggable terminal		Art. No.
	2.5 mm² 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 mm² 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

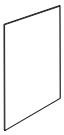
Ex i/Ex e relay module for Zone 1		Art. No.
	The Ex i/Ex e relay module is used for the galvanically isolated switching of intrinsically safe (Ex i) and non-Ex i (Ex e) electrical circuits. Coil circuit: Ex i or non-Ex i (Ex e) Contact circuit: Ex i or non-Ex i (Ex e) Thanks to the integrated safeguarding 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

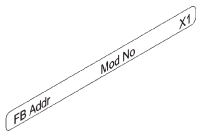
mA isolating repeater		Art. No.
	The mA isolating repeaters are used to connect 4-wire transmitters to active 2-wire inputs and for galvanic separation. Input: Sink, Ex e Output: Sink, Ex i	224365
	The mA isolating repeaters are used to connect 4-wire transmitters to active 2-wire inputs and for galvanic 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

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