Analog Universal Module HART for Zone 1

Series 9468/32

15230E00

- 8 channels can be adjusted individually as analog inputs or outputs
- Intrinsically safe inputs/outputs Ex ia
- For 0/4…20 mA + HART signals
- Line fault monitoring and LED display per channel
- Diagnostics based on NE107
- Module can be replaced in the hazardous area under power (hot swap)

The Analog Universal Module HART is used for connecting of up to 8 intrinsically safe analog standard signals 0/4 … 20 mA to the IS1 Remote I/O system. The digital communication with connected field devices can take place bidirectionally via the HART protocol. Each channel can be parameterised as input for connecting 2-wire transmitters including transmitter supply or as output for connecting positioners or indicators. The Ex i inputs or outputs are short-circuit proof and galvanically separated from the system.

Compatible spare for IS1 I/O modules:
Series 9460/12*), 9461/12 *), 9465/12 and 9466/12

*) for operation with active 4-wire HART transmitters, a 9164 is additionally required for each channel

	ATEX / IECEx					
Zone	0	1	2	20	21	22
Ex interface	x	x	x	x	x	x
Installation in		x	x		x	x

	NEC 505 Class I			NEC 506		
Zone	0	1	2	20	21	22
Ex interface	x	x	x	x	x	x
Installation in		x	x		x	x

	NEC 500					
	Class I		Class II		Class III	
Division	1	2	1	2	1	2
Ex interface	x	x	x	x	x	x
Installation in	x	x	x	x	x	x

WebCode 9468A

Explosion Protection

Global (IECEx)	
Gas and dust	IECEx DEK 12.0054X Ex ia [ia Ga] IIC T4 Gb [Ex ia Da] IIIC
Europe (ATEX)	
Gas and dust	DEKRA 12 ATEX0173 X Ⓔx II 2 (1) G Ex ia [ia Ga] IIC T4 Gb Ⓔx II (1) D [Ex ia Da] IIIC
Certifications and certificates	
Certificates	IECEx, ATEX, Brazil (INMETRO), Canada (cFM), Kazakhstan (TR), Russia (TR), USA (FM), Belarus (TR)
Ship approval	ABS, CCS, ClassNK, DNVGL, LR, RINA, RS
Further parameters	
Installation	in Zone 1, Zone 2, Zone 21, Zone 22 and in the safe area
Further information	see operating instructions and certificates
Safety data	
Max. voltage U_o	24.4 V
2-wire input/output	
Max. current I_o	80 mA
Max. power P_o	488 mW
Max. connectable inductance L_o/ capacity C_o	

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-wire input	
Max. current I_o	81.8 mA
Max. power P_o	499 mW
Max. connectable inductance L_o/ capacity C_o	

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

4-wire transmitter

Limit values

U_o, I_o, P_o, C_i and L_i are negligible.
Maximum connectable safety characteristic values during operation with active 4-wire 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

Max. internal capacity C_i	negligible
Max. internal inductance L_i	negligible

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Series 9468/32

Selection Table

Version	Description	Installation	Order number	Weight kg
Analog Universal Module HART	8 channels with adjustable parameters for 2-wire transmitters or positioners *); with channel status LEDs	Zone 1	**9468/32-08-11**	0.275
	*) to operate active 4-wire HART transmitters, a 9164 must be connected in between for each channel, 9164 is not required when operating 4-wire transmitter without HART communication			
Note	Please order terminal separately - see Accessories			

Technical Data

Electrical data

Ex i inputs/outputs				
Number of channels	8 (each with adjustable parameters as input or output) (3-wire, 4-wire transmitters, or active mA-sources occupy 2 channels)			
Supply voltage for 2-wire transmitter	16 V (at 20 mA)			
Nominal signal range	0 … 20 mA / 4 … 20 mA			
Digital communication	HART protocol			
Min. signal	0 mA			
Max. signal				
For inputs	23.5 mA			
For outputs	22.8 mA (4 ... 20 mA) / 23.5 mA (0 ... 20 mA)			
Signal transmission		Filter time constant (adjustable parameters)		
		small	medium	50 Hz, 60 Hz
	Resolution in the range 4 ... 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
Transient response output (10...90 %)	40 ms			
Max. short-circuit current				
For inputs	24 mA			
For outputs	22.8 mA (4 ... 20 mA) / 23.5 mA (0 ... 20 mA)			
Max. input resistance per channel	14.1 Ω			
Max. load resistance (output)	750 Ω at 20 mA 700 Ω at 21.8 mA			
Galvanic separation				
Test voltage				
acc. to standard	EN 60079-11			
Between auxiliary power / system components	≥ 1500 V AC			
Between two I/O modules	≥ 500 V AC			
Between I/O channels / system components	≥ 500 V AC			
Between I/O channels / ground (PA)	≥ 500 V AC			
Electromagnetic compatibility	Tested to the following standards and regulations: EN 61326-1 (2006) IEC 61000-4-1 … 6, NAMUR NE 21			
Electrical connection				
Power supply	BusRail Types 9494			
Ex i field signals	Pluggable, blue terminals, 16-pole, 2.5 mm^2, screw- or spring-type versions with lock			

Technical Data

Electrical data

Auxiliary power	
Version	Intrinsically safe Ex ia via BusRail
Max. current consumption	220 mA (at 20 mA per channel)
Max. power consumption	5.3 W (at 20 mA per channel)
Max. power dissipation	
Only outputs	3.7 W (at 20 mA, 500 Ω per channel)
Only inputs	2.7 W (at 20 mA per channel)

Device-specific data

Settings	
Module	
Diagnostics message	ON / OFF
Signal filter	small / medium / large 50 Hz / large 60 Hz
Scan HART live list	ON / OFF
Signal	
Signal type	Input / output
Signal range	0 … 20 mA / 4 … 20 mA
Measuring range input	2.4 … 22.8 or 23.5 mA / 3.6 … 21 mA (acc. to NAMUR)
Line fault monitoring	ON / OFF
Behaviour in case of error	Input: -10 %, 0 %, 100 %, 110 %, alarm code, hold last value Output: -10 %, 0 %, 100 %, 110 %, hold last value
Cyclic transmission of HART variables	no / 4 HV / 8 HV

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 … 20 mA)	0.05 % (8 µA at 4 … 20 mA)	0.05 % (8 µA at 4 … 20 mA)

Ambient temperature influence	< 0.03 % / 10 K
Note	All values in % of the signal span at 23 °C

Ambient conditions

Ambient temperature	-40 … +75 °C (observe operating instructions)
Storage temperature	-40 … +80 °C
Maximum relative humidity	95 % (without condensation)
Semi-sinusoidal shock (IEC EN 60068-2-27)	15 g (3 shocks per axis and direction)
Sinusoidal vibration (IEC EN 60068-2-6)	1 g in the frequency range 10 ... 500 Hz 2 g in the frequency range 45 ... 100 Hz

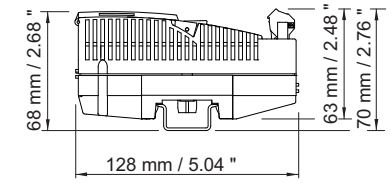
Mechanical data

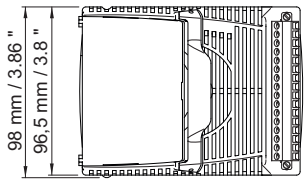
Degree of protection (IEC 60529)	IP20
Module enclosure	polyamide 6GF
Fire resistance (UL 94)	V2
Pollutant class	corresponds to G3
Dimensions	L = 128 mm, W = 96.5 mm, H = 67 mm

Technical Data

Indication	
LED indication	
Module requires maintenance	LED "M/S", blue
Operating state	LED "RUN", green
Group error	LED "ERR", red
Channel error	LED red for each channel
Function indication	
Retrievable parameters	Manufacturer, Type, hardware revision, software revision, serial number
Error indication	
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 errors for each channel	
Signal status bit	"0" = signal disturbed; "1" = signal valid
Wire breakage input	< 2.4 mA / < 3.6 mA (adjustable parameters, at 4 … 20 mA)
Short circuit input	> 23.5 mA or > 22.8 mA / > 21 mA (adjustable parameters)
Wire breakage output	Terminal voltage > 16 V (response range 16 ... 16.5 V) or output current can no longer be set
Short circuit output	Output load < 60 Ω (response range 40 ... 60 Ω)
Mounting / Installation	
Mounting orientation	horizontal or vertical (observe operating instructions)
Mounting type	on 35 mm DIN rail NS 35/15 (DIN EN 60715)

Dimensional drawings (all dimensions in mm / inches) - subject to modifications





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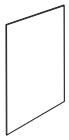
Accessories and Spare Parts

Designation	Figure	Description	Art. no.
Pluggable terminal	 02079E00	2.5 mm² with lock, 16-pole, screw connector, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Labelling: 1 ... 16 Attention: An additional terminal is necessary for I/O module Series 9470 and 9480. Designation: 17 ... 32	**162702**
	 02077E00	2.5 mm² with lock, 16-pole, spring clamp connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits, incl. test jacks Labelling: 1 ... 16 Attention: An additional terminal is necessary for I/O module Series 9470 and 9480. Designation: 17 ... 32	**162695**
mA - Isolating repeater	 10389E00	The mA isolating repeaters are used for the connection of 4-wire transmitters to active 2-wire inputs and for the galvanic separation. Input: sink, Ex e Output: sink, Ex i	**224365**
mA - Isolating repeater	 04653E00	The mA isolating repeaters are used for the connection of 4-wire transmitters to active 2-wire inputs and for the galvanic separation. Input: sink, Ex i Output: sink, Ex i	**224364**
Labelling strips	 05869E00	"FB Addr ... Mod No ..." for pluggable terminal, sheet with 26 strips	**162788**
DIN A4 sheet	 09900E00	For label plate on I/O modules; 6 labels on each sheet; print-out using IS Wizard; packaging unit = 20 sheets	**162832**
Partition	 15196E00	For mounting between intrinsically safe and non-intrinsically safe connections of the I/O modules, in order to adhere to the required 50 mm distance	**220101**
Warning sign	 05872E00	"Clean modules only with a damp cloth."	**162796**
Resistor error message suppression	 17310E00	The resistors are used to suppress error messages for unused I/O channels	
		Resistance value: 5K6 / 0.5 W Suitable for: AIM 9468; DIOM 9470; DIOM 9471; DIOM 9472; DOM 9475 For intrinsically safe circuits (simple apparatus according to EN 60079-11)	**244911**
		Resistance value: 62R / 0.5 W Suitable for: AOM 9468; TIM 9482	**244912**