

Remote I/O

Remote I/O IS1+ HART universal module

for Zone 2 Ex n

9469/35-08-12 Art. No. 230184



- Eight channels can be used as analogue inputs or outputs, and four of these channels can be used as binary inputs or outputs
- Ex ec inputs/outputs with line fault monitoring, an LED fault and status display for each channel and SIL2 shutdown input
- Module in Zone 2 can be replaced without having to disconnect the power supply (i.e. hot-swapped)

MY R. STAHL 9469A



The 9469/35 HART analogue universal module for Zone 2 has eight channels which can be used separately for operation of 2-/3-/4-conductor HART transmitters, or control valves/positioners, as well as for operation of 3-conductor proximity switches and 24 V/0.5 A binary outputs. 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
Ex interface zone	2
IECEX gas certificate	IECEX DEK 17.0044X
IECEX gas explosion protection	Ex ec ic [ia Ga] IIC T4 Gc
ATEX gas certificate	DEKRA 17 ATEX 0099 X
ATEX gas explosion protection	Ⓔ II 3 (1) G Ex ec ic [ia Ga] IIC T4 Gc
FMus certificate	FM17US0332X
cFM certificate	FM16CA0134X
Marking cFMus	NI, Class I, Div. 2, Groups A,B,C,D; Class I, Zone 2, AEx/Ex ec ic IIC T4 Gc Class I, Div. 2, Groups A,B,C,D; Ta = -40°C ... +75°C See Doc. 9496 6 031 001 1
Certificates	ATEX (DEK), Brazil (ULB), Canada (FM), China (NEPSI), IECEX (DEK), India (PESO), Korea (KTL), SIL (exida), USA (FM)
Ship approval	ABS, BVIS, EU RO MR (DNV), KR, LR
Declaration of conformity	ATEX (EUK), China (CCC)
Installation	Zone 2 and safe areas (non-intrinsically safe field circuits)
Further information	See operating instructions and certificate
Electrical Data	
Number of channels	(adjustable parameters in pairs) 8 Ex ec/nA universal input/output
Max. number of 2-conductor analogue input/outputs	8 (channels 0 to 7)
Max. number of 3/4-conductor analogue inputs	4 (channels 4 to 7)
Max. number of 3-conductor PNP inputs	4 (channels 4 to 7)

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9469/35-08-12 Art. No. 230184



Electrical Data

Max. number of binary outputs	4 (channels 4 to 7)
Analogue digital communication	HART protocol
Digital communication note	Up to version 7.x, only for 4 to 20 mA
External supply voltage U_H (X0)	18 to 32 V DC (nominal voltage 24 V)
Max. current consumption (X0)	4 x 0.5 A (depends on the total current of the binary outputs)
Control input suitability (X0)	Shutdown up to SIL 2, low demand (IEC 61508)
Control input function (X0)	"Plant STOP" for switching off all channels
Control input	X0 pins 3, 4 "Normal operation" ("Plant STOP" deactivated) Terminals bridged "OFF" ("Plant STOP" activated) interrupted
Connection Ex nA field signals	1 pluggable, black terminal, 24-pin, 1.5 mm ² , push-in design with lock (must be ordered separately) Single-wire connection - rigid 0.08 to 1.5 mm ² (AWG 28 to 16) - flexible with core end sleeves (without plastic sleeve) 0.25 to 1.5 mm ² - flexible with core end sleeves (with plastic sleeve) 0.25 to 0.5 mm ² - Stripping length min. 10 mm
Connection external supply and "System OFF"	Plug-in, black terminals, 4-pin, 1.5 mm ² , screw terminal design with lock (included) Single-wire connection - rigid 0.08 to 1.5 mm ² (AWG 28 to 16) - flexible with core end sleeves (without plastic sleeve) 0.25 to 1.5 mm ² - flexible with core end sleeves (with plastic sleeve) 0.25 to 0.5 mm ² - Tightening torque 0.5 to 0.6 Nm - Stripping length min. 7 mm
Engineering note	Versions 94xx/x5 may only be installed in Zone 2 or in safe areas. Combined operation with Ex i modules (94xx/x2 and /x3) on a BusRail is permissible. In this case, maintain a distance of 50 mm between the terminals with intrinsically safe and those with non-intrinsically safe field circuits. Alternatively, install a partition.

Auxiliary Power

Power supply connection	BusRail types 9494
Auxiliary power version	Intrinsically safe Ex ia via BusRail
Behaviour during undervoltage	All inputs/outputs "OFF"
Current consumption	250 mA
Max. power consumption	6 W
Max. power dissipation outputs	5.9 W

Galvanic Isolation

Test voltage for galvanic separation	Acc. to standard EN 60079-11
Auxiliary power/system components	≥ 1500 V AC
I/O channels/system components	≥ 1500 V AC
I/O channels / ground (PA)	≥ 1500 V AC
	The inputs and outputs of a module have a shared minus conductor

Input

Analogue input signal type	2/3/4-conductor transmitter
Analogue input supply voltage	15.5 V for 20 mA (for 2-conductor); corresponds to the ext. supply voltage $U_H - 0.7$ (X0) (for 4-conductor)
Analogue input nominal signal	0 to 20 mA 4 to 20 mA
Min. signal analogue input	0 mA

Remote I/O

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9469/35-08-12 Art. No. 230184



Input

Max. signal for analogue input	23.5 mA
Max. analogue input short-circuit current	< 30 mA
Max. input resistance analogue input	200 Ω per channel
Analogue input wire breakage detection	2.4 mA/3.6 mA (4 to 20 mA)
Analogue input short-circuit detection	22.8 mA (4 to 20 mA) 23.5 mA (0 to 20 mA)
Signal error measuring range analogue input	Overshoot Shortfall
Signal type binary input	3-conductor PNP initiators 2-conductor 24 V contacts
Binary input signal type note	3-conductor PNP proximity switches with and without 47 k Ω resistors connected in parallel for line fault detection
Min. binary ON input signal	> 60% U_H supply voltage
Max. binary OFF input signal	< 55% U_H supply voltage
Binary input switching hysteresis	5% U_H supply voltage
Binary input signal type	Corresponds to the ext. supply voltage U_H (X0)
Binary input internal resistance	11 k Ω
Pulse extension binary input	1.2 s (adjustable parameters, applies to all digital inputs)
Binary input wire breakage detection	Input signal < 2 V
Binary input short-circuit detection	To the earth

Signal transmission Analogue inputs/outputs for 2-conductor transmitters and analogue inputs for 3-/4-conductor	Filter time constant (adjustable parameters)			
	Small	Medium	Large 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	180 ms	255 ms	630 ms
Signal transmission Binary inputs for 3-conductor PNP proximity switches and 24 V contacts	Filter time constant (adjustable parameters)			
	Small	Medium	Large 50 Hz, 60 Hz	
	Max. switching frequency	f < 2.7 Hz	f < 1.9 Hz	f < 0.7 Hz
	Min. pulse duration	180 ms	255 ms	630 ms

Output

Analogue output signal type	2-conductor transmitter
Supply voltage analogue output	15.5 V at 20 mA
Analogue output nominal signal	0 to 20 mA 4 to 20 mA
Min. signal analogue output	0 mA
Max. signal analogue output	22.8 mA (4 to 20 mA) 23.5 mA (0 to 20 mA)
Max. analogue output short-circuit current	22.8 mA (4 to 20 mA) 23.5 mA (0 to 20 mA)
Max. input resistance analogue output	200 Ω per channel

Remote I/O

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9469/35-08-12 Art. No. 230184



Output

Max. load resistance analogue output	750 Ω at 20 mA 700 Ω at 21.8 mA
Signal error measuring range analogue output	Overshoot Shortfall
Output step response (10 to 90%)	80 ms
Signal type binary output	2-conductor (24 V/0.5 A)
Binary output supply voltage	Corresponds to the ext. supply voltage $U_H - 0.7$ V (X0)
Binary output output current	30 mA to 0.5 A per channel (electronically limited)
Binary output connectable loads	Resistive Inductive Capacitive
Max. switchable inductance binary output	< 0.5 H per channel (ext. freewheeling diode parallel to the load recommended)
Binary output wire breakage detection	< 30 mA
Binary output short-circuit detection	< 20 ohm

Signal transmission Analogue inputs/outputs for 2-conductor transmitters	Filter time constant (adjustable parameters)		
	Small	Medium	Large 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	180 ms	255 ms	630 ms

Device Specific Data

Signal type	Input Output
Diagnostics message module	ON OFF
Signal filter module	small medium 60 Hz large 50 Hz large
Scan HART live list module	ON OFF
Signal type	2-conductor analogue 2-/4-conductor, analogue (input only) 2-/3-conductor, digital
Line fault monitoring	ON OFF
Behaviour in case of an analogue signal error	-10% 0% 100% AI: Status code/AO: 110% AI: Status code/AO: 0% Hold 0% Hold 100%
Behaviour in case of binary signal error	-10% = 0 0% = 0 100% = 1 110% = 1

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9469/35-08-12 Art. No. 230184



Device Specific Data

Cyclical data transmission of HART variants	4HV 8HV No																			
LED module requires maintenance	"M/S" LED, blue																			
LED operating conditions	"RUN" LED, green																			
LED channel error	LED for each channel, red																			
LED channel status	LED per channel, yellow																			
24 V external power supply LED	"24 V" LED, green																			
"Plant STOP" LED	"24 V" LED, yellow																			
Retrievable parameters	Type Software revision Hardware revision Manufacturer Serial number																			
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	"0" = High-impedance output "1" = Output supplied with power																			
Influence of ambient temperature	0,07 % / 10 K																			
Note	All information in % of the signal span at 23 °C																			
Accuracy of measurement	<table border="1"><thead><tr><th rowspan="2">At 0/4 to 20 mA for inputs/outputs</th><th colspan="3">Filter time constant (adjustable parameters)</th></tr><tr><th>Small</th><th>Medium</th><th>Large</th></tr></thead><tbody><tr><td>Max. error of measurement</td><td>16 A</td><td></td><td></td></tr><tr><td></td><td>0.08% at 0 to 20 mA</td><td></td><td></td></tr><tr><td></td><td>0.1% at 4 to 20 mA</td><td></td><td></td></tr></tbody></table>	At 0/4 to 20 mA for inputs/outputs	Filter time constant (adjustable parameters)			Small	Medium	Large	Max. error of measurement	16 A				0.08% at 0 to 20 mA				0.1% at 4 to 20 mA		
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	Small	Medium	Large																	
Max. error of measurement	16 A																			
	0.08% at 0 to 20 mA																			
	0.1% at 4 to 20 mA																			

Diagnostics

LED group error	"ERR" LED, red
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Ambient Conditions

Ambient temperature	-40°C ... +75°C
Ambient temperature	-4°F ... +167°F
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
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9469/35-08-12 Art. No. 230184



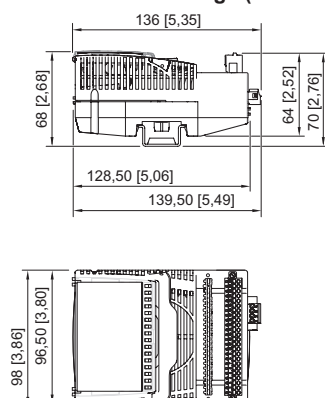
Mechanical Data

Module enclosure	Polyamide 6GF
Fire resistance (UL 94)	V2
Pollutant class	Corresponds to G3
Width	96.5 mm
Width, inches	3.8 in
Height	67 mm
Length	128 mm
Length in inches	5.04 in
Mounting depth in inches	2.64 in
Weight	250 g
Weight	0.55 lb

Mounting / Installation


Mounting type	on NS 35/15 DIN rail (DIN EN 60715)
Mounting orientation	Vertical Horizontal

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



Accessories

Ex i/Ex e relay module for Zone 1

	<p>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.</p> <p>Coil circuit: Ex i or non-Ex i (Ex e)</p> <p>Contact circuit: Ex i or non-Ex i (Ex e)</p> <p>Thanks to the integrated safeguarding for the contact and coil circuit, additional safeguarding is not necessary.</p> <p>Note: no usable with 9475/32-04-12, 9475/32-08-52, 9475/33-08-50</p>	Art. No. 273000
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9469/35-08-12 Art. No. 230184



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

Termination Board 9491

Art. No.



The termination boards are used for parallel switching of the inputs and outputs of two I/O modules for signal redundancy.

Signal redundancy for I/O modules 9469/35 from firmware 04-xx

273018

Pluggable terminal

Art. No.



1.5 mm² with lock, 24-pin, spring clamp connection, black, for connecting the field signals to I/O modules, for non-intrinsically safe field circuits

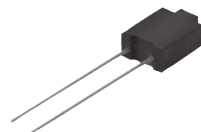
Version: Only for 9469, 9471 and 9472 I/O modules

Labelling: 1 to 24

245090

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

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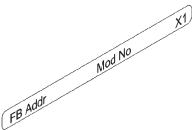
for Zone 2 Ex n

9469/35-08-12 Art. No. 230184




Labelling strips

Art. No.

	"FB Addr ... Mod No ..." for pluggable terminal, 26 pieces on the sheet	162788
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Vibration bracket set

Art. No.

	<p>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.</p> <p>For mounting: All I/O modules, except 9477/12 and 9478</p> <p>Number of brackets in a set: 8</p> <p>Screws (item no. 275516) must be ordered separately.</p>	271920
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Set of screws

Art. No.

	<p>Set of M5 x 14 screws (self-tapping) for 9490 vibration brackets</p> <p>Number of screws in a set: 25</p>	275516
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