

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 4 of these channels can be used as binary inputs or outputs
- Inputs/outputs Ex Ec with line fault monitoring, an LED fault and status display for each channel and SIL2 shutdown input
- Module in Zone 2, Cl. I, Div. 2 can be replaced during operation (hot swap)

WebCode 9469A



HART
COMMUNICATION PROTOCOL

The HART 9469/35 universal module for Zone 2, Cl. I, Div. 2 has 8 channels that are suitable for separately operating 2-/3-/4-line HART transmitters, control valves/position regulators and operating 3-line proximity switches and 24 V / 0.5 A binary output signal can be used. 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
Certificate FMus	FM17US0332X
Certificate cFM	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
EAC certificate	TS RU S-DE.ME92.B.00915
EAC gas explosion protection	Ex 2 Ex e ic [ia Ga] IIC T4 Gc X Ex 2 Ex nA ic [ia Ga] IIC T4 Gc X
Certificates	ATEX (DEK), Canada (FM), EAC (ENDCE), EAC (Sertium), IECEX (DEK), Korea (KTL), SIL (exida), USA (FM)
Ship approval	EU RO MR
Notes	CCC certificate available from 2021 onward
Installation	Zone 2, Cl. I, Div. 2 and in the safe area (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 inputs/outputs	8 (channels 0 ... 7)

Electrical Data

Max. number of 3/4-conductor analogue inputs	4 (channels 4 ... 7)
Max. number of 3-conductor PNP inputs	4 (channels 4 ... 7)
Max. number of binary outputs	4 (channels 4 ... 7)
Analogue digital communication	HART protocol
Digital communication note	up to Version 7.x, only at 4 to 20 mA
External supply voltage U_H (X0)	18 ... 32 V DC (nominal voltage of 24 V)
Max. current consumption (X0)	4 x 0.5 A (depends on the total current of the binary outputs)
Control input suitability (X0)	Disconnection up to SIL 2. low demand (IEC 61508)
Control input function (X0)	"Plant STOP" to switch off all channels
Control input	X0 pin 3, 4 "Normal operation" ("Plant STOP" deactivated) Terminals bridged "OFF" ("Plant STOP" activated) Interrupted
Connection Ex nA field signals	1 pluggable, black terminal, 24-pole, 1.5 mm ² , push In version with lock (to be ordered separately) Single-wire connection - rigid 0.08 to 1.5 mm ² (AWG 28 to 16) - flexible with core end sleeve (without plastic sleeve) 0.25 to 1.5 mm ² - flexible with core end sleeve (with plastic sleeve) 0.25 to 0.5 mm ² - stripping length min. 10 mm
Connection external supply and "System OFF"	Pluggable, black terminals, 4-pole, 1.5 mm ² , screw terminals, version with lock (included) Single-wire connection - rigid 0.08 to 1.5 mm ² (AWG 28 to 16) - flexible with core end sleeve (without plastic sleeve) 0.25 to 1.5 mm ² - flexible with core end sleeve (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	The 94xx/x5 versions may only be installed in Zone 2 or in a safe area. Combined operation with Ex i modules (94xx/x2 and /x3) on a BusRail is permitted. 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 isolation	According 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); fulfils ext. supply voltage U_H - 0.7 (X0) (for 4-conductor)

Input

Analogue input nominal signal	0 ... 20 mA 4 ... 20 mA
Min. signal analogue input	0 mA
Max. signal analogue input	23.5 mA
Max. short-circuit current analogue input	< 30 mA
Analogue input max. input resistance	200 Ω per channel
Open-circuit detection analogue input	2.4 mA/3.6 mA (4 ... 20 mA)
Short-circuit detection analogue input	22.8 mA (4 ... 20 mA) 23.5 mA (0 ... 20 mA)
Signal error measuring range analogue input	exceeding shortfall
Binary input signal type	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% supply voltage U_H
Max. binary OFF input signal	< 55% supply voltage U_H
Switching hysteresis binary input	5% supply voltage U_H
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)
Open-circuit detection binary input	input signal ≤ 1.8 V
Short-circuit detection binary input	to the earth

Signal transmission Analogue inputs/outputs for 2-conductor transmitter and Analogue inputs for 3/4-conductor transmitters		Filter time constant (adjustable parameters)		
		small	medium	large 50 Hz, 60 Hz
	Resolution 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 ... 20 mA 4 ... 20 mA
Min. signal analogue output	0 mA
Max. signal analogue output	22.8 mA (4 ... 20 mA) 23.5 mA (0 ... 20 mA)

Remote I/O

Remote I/O IS1+ HART universal module

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

STAHL

Output

Max. short-circuit current analogue output	22.8 mA (4 ... 20 mA) 23.5 mA (0 ... 20 mA)
Analogue output max. input resistance	200 Ω per channel
Analogue output max. load resistance	750 Ω at 20 mA 700 Ω at 21.8 mA
Signal error measuring range analogue output	exceeding shortfall
Output step response (10 ... 90 %)	80 ms
Binary output signal type	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 current	30 mA ... 0.5 A per channel (electronically limited)
Binary output connectable loads	ohmic inductive capacitive
Max. switchable inductance binary output	< 0.5 H per channel (ext. freewheeling diode parallel to the load recommended)
Open-circuit detection binary output	< 30 mA
Short-circuit detection binary output	< 20 ohms

Signal transmission Analogue inputs/outputs for 2-conductor transmitter	Filter time constant (adjustable parameters)			
		small	medium	large 50 Hz, 60 Hz
	Resolution 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 (only input) 2/3-conductor, digital
Line fault monitoring	ON OFF
Behaviour in case of error analogue signals	-10% 0% 100% AI: Status Code / AO: 110% AI: Status Code / AO: 0% Hold 0% Hold 100%

Device Specific Data

Behaviour in case of error binary signals	-10% = 0 0% = 0 100% = 1 110% = 1			
Cyclic data transmission of HART variants	4HV 8HV No			
LED module requires maintenance	"M/S" LED, blue			
LED operating conditions	"RUN" LED, green			
LED group error	"ERR" LED, red			
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	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	"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			
Measurement accuracy	0/4 ... 20 mA for inputs / outputs	Filter time constant (adjustable parameters) smallmediumlarge 50 Hz, 60 Hz		
	Max. error of measurement	16 A 0.08 % at 0 ... 20 mA 0.1 % at 4 ... 20 mA		

Ambient Conditions

Ambient temperature °C	-40°C ... +75°C
Ambient temperature °F	-4°F ... +167°F
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

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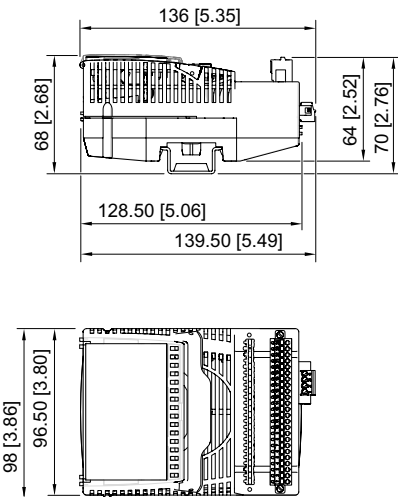
For Zone 2 Ex n

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



Ambient Conditions	
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
Height	67 mm
Length	128 mm
Length inches	5.04 in
Mounting depth inches	2.64 in
Weight	0.25 kg
Weight	0.55 lb
Mounting / Installation	
Mounting type	on DIN rail NS 35/15 (DIN EN 60715)
Mounting position	Vertical Horizontal

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



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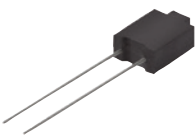
Remote I/O IS1+ HART universal module

For Zone 2 Ex n

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

STAHL

Accessories

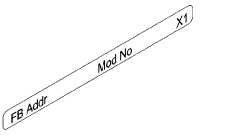
Electronic relay		Art. No.
	The electronic relay modules are used to switch from Ex e loads via intrinsically safe (Ex i) or non-intrinsically safe (Ex e) control. Coil circuit: Ex i or non-Ex i (Ex e)* Contact circuit: Non-Ex i (Ex e) *You can switch between Ex i and non-Ex i circuits, or vice-versa, at any time without restriction.	282457
Ex i/Ex e relay module for Zone 1		Art. No.
	The Ex i/Ex e relay modules are used for the galvanically isolated switching of intrinsically safe circuits (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)* *You can switch between Ex i and non-Ex i circuits, or vice-versa, at any time without restriction.	273000
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
Plug-in terminal		Art. No.
	1.5 mm ² with lock, 24-pole, spring clamp connection, black for connecting the field signals to I/O modules, for non-intrinsically safe field circuits Caution: only for 9469, 9471 and 9472 I/O modules Labelling: 1 ... 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 of the I/O modules, in order to adhere to the required 50 mm distance	220101

Spare Parts

Warning sign		Art. No.
	"Clean modules only with a damp cloth."	162796

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



Labelling strips		Art. No.
	"FB Addr ... Mod No ..." for pluggable terminal, 26 pieces on the sheet	162788
DIN A4 sheet		Art. No.
	For the label plate on I/O modules, 6 labels per sheet Print IS Wizard, packaging unit = 20 sheets	162832

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