Remote I/O

Remote I/O IS1+ Digital input/output module for Zone 1 Ex i

9470/32-16-11 Art. No. 210447



- 16 channels can be used in pairs as inputs or outputs
- Intrinsically safe Ex ia IIC inputs/outputs with line fault monitoring and an LED fault and status display for each channel
- Module in Zone 1 can be replaced without having to disconnect the power supply (i.e. hot-swapped)

MY R. STAHL **9470C**

The 9470/32 digital input/output module for Zone 1 has 16 channels which can be used in pairs for Ex i operation as inputs for contacts and NAMUR proximity switches (EN 60947-5-6) or as outputs for indicator lamps and low-power solenoid valves. Eight inputs can be used for frequencies of up to 20 kHz, and four can be used for detecting the direction of rotation.
All inputs/outputs are short-circuit proof and galvanically separated from the system.

Technical Data

Explosion Protection	
Application range (zones)	1, 2
Ex interface zone	0, 1, 2, 20, 21, 22
IECEx gas certificate	IECEx DEK 12.0044X
IECEx gas explosion protection	Ex ia [ia Ga] IIC T4 Gb
IECEx dust certificate	IECEx DEK 12.0044X
IECEx dust explosion protection	[Ex ia Da] IIIC
ATEX gas certificate	DEKRA 12 ATEX0099 X
ATEX gas explosion protection	Ⓔx II 2 (1) G Ex ia [ia Ga] IIC T4 Gb
ATEX dust certificate	DEKRA 12 ATEX0099 X
ATEX dust explosion protection	Ⓔx II (1) D [Ex ia Da] IIIC
FMus certificate	FM17US0332X
cFM certificate	FM16CA0134X
Marking cFMus	IS, Class I, Div. 1, Groups A,B,C,D; Class I, Zone 1, AEx/Ex 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. 9470 6 031 001 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	In Zone 1, Zone 2 and safe areas
Further information	For additional combinations (4, 8 and 16 channels), see the operating instructions and certificate.
Safety Data	
Max. voltage U_o	9.8 V
Max. current I_o (Ex ia)	10.4 mA

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Safety Data

Max. power P_o (Ex ia)		25.5 mW											
Internal capacitance (1 channel)		2.5 nF											
Internal inductance		Negligible											
Max. connectable inductance L_o/capacitance C_o													
1 channel													
IIC	L_o [mH]	280	100	50	20	10	5	2	1	0.5	0.2	0.1	0.02
	C_o [µF]	-	0.49	0.56	0.64	0.72	0.81	0.96	1.1	1.3	1.6	2	3.3
IIB/IIIC	L_o [mH]	1000	100	50	20	10	5	2	1	0.5	0.2	0.1	0.01
	C_o [µF]	-	2.6	2.8	3.3	3.7	4.2	5.1	6	7.2	9.3	12	23
2 parallel channels													
Max. current I_o (Ex ia)		20.8 mA											
Max. power P_o (Ex ia)		51 mW											
Internal capacitance (2 channels)		5 nF											
IIC	L_o [mH]	100	50	20	10	5	2	1	0.5	0.2	0.1	0.02	
	C_o [µF]	0.3	0.44	0.57	0.67	0.77	0.93	1.1	1.3	1.6	2	3.3	
IIB/IIIC	L_o [mH]	270	100	50	20	10	5	2	1	0.5	0.2	0.1	0.01
	C_o [µF]	-	2.3	2.6	3.1	3.6	4.1	5.1	6	7.2	9.3	12	23

Electrical Data

Number of channels	(adjustable parameters in pairs) 16 Ex i inputs/outputs
Current consumption	120 mA
Connection Ex i field signals	Pluggable, blue terminals, 16-pin, 2.5 mm², screw type or cage clamp version with lock

Auxiliary Power

Power supply connection	BusRail types 9494
Auxiliary power version	Intrinsically safe Ex ia via BusRail
Current consumption	120 mA
Max. power consumption	2.5 W
Max. power dissipation outputs	2.5 W

Galvanic Isolation

Test voltage for galvanic separation	Acc. to standard EN 60079-11
Auxiliary power/system components	≥ 1500 V AC
Aux. pwr/system comp. AC min.	1500 V
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
	The inputs of an I/O module have a shared minus conductor.

Input

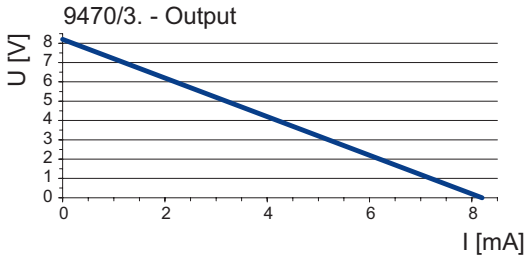
Number of inputs	16
Min. ON input signal	2.1 mA
Max. OFF input signal	1.2 mA

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Input				
Operating point	1.65 mA			
Supply voltage	8.2 V			
Internal resistance	1 kΩ			
Signal input	EN 60947 input (NAMUR)			
Function	Up/down counter Frequency with direction			
Max. number of counter inputs	8			
Counting range	0 ... 65535 as UINT16			
Max. number of frequency inputs	8			
Min. pulse width	25 µs			
Resolution	16 bit/32 bit			
Max. switching frequency	20 kHz (at frequencies > 1 kHz, the maximum conductor length is reduced, e.g. at 5 kHz to approx. 75 m)			
Frequency band	Measuring range	0.1 to 600 Hz	1 Hz to 3 kHz*	1 Hz to 20 kHz
	Measurement discrimination	0.01 Hz	0.05 Hz	0.5 Hz
	Accuracy	0.1%	0.1%	0.1%
			* Default	
Rotation direction recognition, forward/backward counter	Max. number of channels	4 (each with two inputs switched in parallel)		
Output				
Max. number of outputs	16			
Max. output current	8.2 mA			
Internal resistance of outputs	1 kΩ			
Output rated operation	6 V/2 mA			
Open-circuit voltage U_a	8.2 V			
Output characteristic				

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Signal transmission	Max. delay from signal/internal bus > 1 ms				
	Max. delay from frequency input/internal bus				
	Filter	None	Small	Medium	Large
	Frequency				
	0.1 Hz ≤ f < 1 Hz	1/f + 1 ms	2/f	3/f	6/f
	1 Hz ≤ f < 10 Hz	1/f + 1 ms	4/f	9/f	18/f
	10 Hz ≤ f < 100 Hz	1/f + 1 ms	8/f	27/f	54/f
	100 Hz ≤ f < 1 kHz	1/f + 1 ms	16/f	81/f	162/f
	1 kHz ≤ f < 1960 Hz	1.5 ms	32/f	243/f	486/f
	1960 Hz ≤ f < 10 kHz	1.5 ms	16.5 ms	124 ms	248 ms
	10 kHz ≤ f < 20 kHz	1.5 ms	33 ms	372 ms	744 ms
	f ≥ 20 kHz	1.5 ms	66 ms	372 ms	744 ms

Device Specific Data

Signal type	Output Input
Diagnostics message module	ON OFF
Pulse extension/frequency filter	2.4 s / large 0.6 s / small 1.2 s / medium 0 s/off
Inverting input/output	Normal inverted
Line fault monitoring	OFF ON
Input behaviour in case of error	Replacement value "0" Replacement value "1" Hold (initial value 0) Hold (initial value 1)
Counter/frequency operating mode	0.1 to 600 Hz 1 Hz to 20 kHz 1 Hz to 20 kHz with direction 1 Hz to 3 kHz 16-bit counter 16-bit up/down counter 32-bit up/down counter
Counter control	Stop Run Reset
Count	Negative slope Positive slope
Retrievable parameters	Type Software revision Serial number Hardware revision Manufacturer
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

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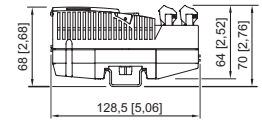
Device Specific Data	
Channel status LEDs	Yes
Signal status bit	"0" = High-impedance output "1" = Output supplied with power
Wire breakage input	< 50 µA
Short circuit input	< 100 ohm
Wire breakage output	< 50 µA
Output short circuit	< 100 Ω
Short-circuit detection	Only possible when ON
Note on wire breakage/short-circuit detection	For contacts, a connection with 1 kΩ in series and 10 kΩ in parallel is required for wire breakage/short-circuit detection. For outputs, wire breakage/short-circuit detection is only possible when ON.
Diagnostics	
LED group error	"ERR" LED, red
Ambient Conditions	
Ambient temperature	-40 °C ... 75 °C
Ambient temperature	-40°F ... +167°F
Storage temperature	-40 °C ... 80 °C
Storage temperature	-40°F ... +176°F
Max. operating altitude	< 2000 m
Max. operating altitude	2000 m
Max. relative humidity	95% (without condensation)
Max. relative humidity	95 %
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 HzAcceleration amplitude 0.7 g
Electromagnetic compatibility	Tested to the following standards and regulations: EN 61326-1, IEC 61000-4-1 to 61000-4-6 and 61000-4-11, NAMUR NE 21
Note	(observe operating instructions)
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	67 mm
Length	128 mm
Length in inches	5.04 in
Mounting depth in inches	2.64 in
Weight	275 g
Mounting / Installation	
Mounting type	on NS 35/15 DIN rail (DIN EN 60715)
Mounting orientation	Horizontal Vertical

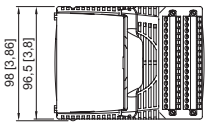
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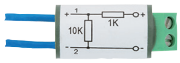
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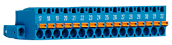
Dimensional Drawings (All Dimensions in mm [inches]) – Subject to Alterations





Accessories

Resistive coupling element		Art. No.
	Additional connection of contacts also in hazardous areas to enable short-circuit and wire breakage detection. Mounting on DIN rail.	247644
	Additional connection of contacts also in hazardous areas to enable short-circuit and wire breakage detection	105944

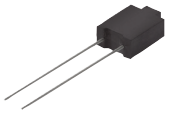
Pluggable terminal		Art. No.
	2.5 mm² with lock, 16-pin, screw connector, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Labelling: 1 to 16 Note: A second terminal is additionally required for I/O module Series 9470 and 9482 Labelling: 17 to 32	162702
	2.5 mm² with lock, 16-pin, screw connector, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Labelling: 17 to 32	162718
	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
	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: 17 to 32	162716

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

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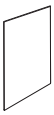
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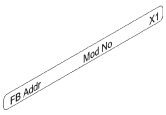
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Resistor error message suppression		Art. No.
	The resistors are used to suppress error messages for unused I/O channels Resistance value: 5K6/0.5 W Suitable for: AIM 9468; UMH 9469; DIOM 9470; DIOM 9471; DIOM 9472; DOM 9475 For intrinsically safe circuits (simple apparatus according to EN 60079-11)	244911

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

Indicator lamp		Art. No.
	Simple apparatus for intrinsically safe circuits according to EN 60079-11	228026

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

Spare Parts

LED indicator lamp for front installation		Art. No.
	for SA front installation	274899

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