



Digital Input Module NAMUR Ex i / I.S. Inputs, 16 Channels Series 9470/22

- 16 channels for contacts and NAMUR proximity switches (EN 60947-5-6)
- Intrinsically safe inputs Ex ia IIC
- Galvanic isolation between inputs and system
- Open-circuit and short-circuit monitoring for each field circuit
- Two channels can be used as frequency inputs or counters up to 20 kHz
- Module can be replaced in operation (hot swap)

Zone	0	1	2	20	21	22
Class	I			II / III		
Zone	0	1	2	20	21	22
Ex interface	X	X	X	X	X	X
Installation in		X	X		X ^{*)}	X ^{*)}

Class	I		II / III	
Division	1	2	1	2
Ex interface	X	X	X	X
Installation in	X	X	X ^{*)}	X ^{*)}

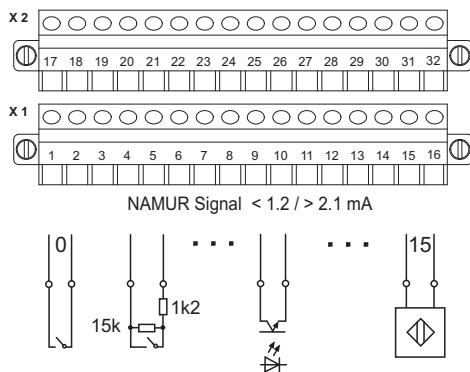
^{*)} suitable enclosure necessary



The Digital Input Module is used for the connection and supply of up to 16 volt-free contacts or proximity switches acc. to EN 60947-5-6 (NAMUR). All inputs are intrinsically safe, short-circuit proof and individually monitored for open-circuit and short-circuit.

Channels 14 and 15 can also be used for frequency measurement or as pulse counters up to 20 kHz.

The interface of the Digital Input Module with the internal data bus of the BusRail is designed with redundancy.



05687E00



Selection Table

Version	Description	Order number	Weight kg / lbs
Digital Input Module NAMUR	16 channels for contacts and NAMUR proximity switches (EN 60947-5-6)	9470/22-16-11	0.316 / 0.697

Explosion Protection

Certificates			
IECEX	PTB 06.0001X		
Europe (ATEX)	PTB 99 ATEX 2184		
USA (NEC)	3007532 (FM)		
Russia (GOST-R)	04.B00806 (CTB)		
Other countries	Canada (CSA), Brazil (INMETRO), Belarus (Promatomnadzor)		
Marking			
IECEX	Ex ib [ia] IIC/IIB T4		
Europe (ATEX)	Ⓢ II 2 (1) G EEx ib [ia] IIC / IIB T4 Ⓢ II (1) D [Ex iaD]		
USA (NEC)	IS/I/1/ABCD/T4 Ta = 65 °C, IS/I/1/IIC/T4 Ta = 65 °C, AIS/I,II,III/1/ABCDEFG, [AEx ia] IIC, NI/I/2/ABCD/T4 Ta = 65 °C, NI/I/2/IIC/T4 Ta = 65 °C, AIS/I,II,III/1/ABCDEFG, [AEx ia] IIC		
Russia (GOST-R)	1Exib[ia]IIC/IIBT4		
Other certificates	Marine (DNV, ABS, GL)		
Safety data			
Maximum values		per channel	4 channels connected in parallel
	max. voltage U_o / V_{oc}	11.6 V	11.6 V
	max. current I_o / I_{sc}	22 mA	55 mA
	max. power P_o	51 mW	127 mW
Cable parameters (ATEX)		per channel	4 channels connected in parallel
	max. capacitance C_o / C_a for IIC	600 nF	560 nF
	max. inductance L_o / L_a for IIC	1 mH	1 mH
Further information	see respective certificate		

Technical Data

Ex i / I.S. digital inputs			
Number of channels	16		
Signal	EN 60947-5-6 (NAMUR)		
Minimum current for ON	2.1 mA		
Maximum current for OFF	1.2 mA		
Switching threshold	1.65 mA		
Supply voltage	7.8 V		
Internal resistance	1 kΩ		
Minimum pulse width of the input signal		without OC/SC detection	with OC/SC detection
	Channels 0-15 as digital inputs	approx. 1 ms	approx. 2 ms
	Channels 14 or 15 as frequency input or counter	approx. 2 ms	approx. 4 ms

Technical Data

Ex i / I.S. digital inputs				
Maximum signal delay			without OC/SC detection	with OC/SC detection
	from digital inputs to internal bus	channels 0-15 as digital inputs	approx. 1 ms	approx. 2 ms
		channels 14 or 15 as frequency input or counter	approx. 2 ms	approx. 4 ms
	from frequency inputs to internal bus	measuring range 1 Hz ... 1 kHz (measurement frequency f = 1 ... 35 Hz)	2 ms + 1/f	4 ms + 1/f
		measuring range 1 Hz ... 1 kHz (measurement frequency f = 35 Hz ... 1 kHz)	34 ms + 1/f	36 ms + 1/f
measuring range 1 Hz ... 20 kHz gate time				
50 ms		approx. 50 ms	approx. 50 ms	
	200 ms	approx. 200 ms	approx. 200 ms	
	1 s	approx. 1 s	approx. 1 s	
	from counter inputs to internal bus		approx. 2 ms	approx. 4 ms
Galvanic isolation				
between power supply and system components	1500 V AC			
between two input / output modules	500 V AC			
between inputs and system components	500 V AC			
The inputs of an I/O module have a common negative conductor				
Channels 14 and 15 as frequency input or counter				
Maximum switching frequency	20 kHz (the line length must be reduced for frequencies > 1 kHz, e.g. at 5 kHz to approx. 75 m / 246 ft)			
Minimum pulse width	25 µs			
Frequency input	Measuring range			
		1 Hz ... 1 kHz	1 Hz ... 20 kHz	
	Resolution	0.05 Hz	1 Hz	
	Accuracy	0.02 %	0.02 %	
adjustable parameters for each channel				
Counter input				
Control signal for counter	Start, Stop, Reset			
Counter range	0 ...65535			
MTBF acc. to MIL	46.9 years (at 40 °C / 104 °F)			



Technical Data

Settings

Open-circuit and short-circuit monitoring	ON, OFF (for each channel)
Value to fieldbus during open circuit, short circuit	ON, OFF, hold last value (all channels)
Invert input value	ON, OFF (all channels)
Adjustable pulse width	0 s, 0.6 s, 1.2 s, 2.4 s (for channel groups)
Gate time for frequency measuring range 1 Hz ... 20 kHz	50 ms, 200 ms, 1 s
Active edge for counter (channels 14 and 15)	positive (voltage ↑) negative (voltage ↓)

Diagnostics

Retrievable parameters	Manufacturer, type, version, serial number
Characteristic values for open circuit and short-circuit detection	
Open-circuit detection	< 0.05 mA
Short-circuit detection	< 100 Ω

Note: If open-circuit / short-circuit detection is required, then contacts require resistors with 1.2 kΩ wiring in series and 15 kΩ in parallel.

Module faults	<ul style="list-style-type: none"> • Internal primary bus faults • Internal redundant bus faults • No response • Module does not correspond to configuration • Hardware fault
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Power supply

Maximum power consumption	5 W
Maximum power dissipation	5 W

Mechanical data

Module enclosure	Polyamide 6GF
Fire protection class (UL 94)	V2
Degree of protection (IEC 60529)	
Modules	IP30
Connections	IP20

Electrical connection

Ex i / I.S. field signals	Plug-in terminals 16-pole with catch, 2.5 mm ² / up to 14 AWG, screw or spring type
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Operator interface

Operation	LED green "RUN"
Fault	LED red "ERR"

Installation conditions



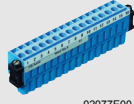
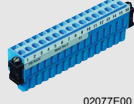
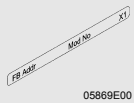

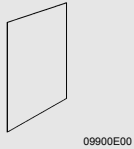

Mounting type	on 35 mm DIN rail NS 35/15
Installation position	horizontal and vertical



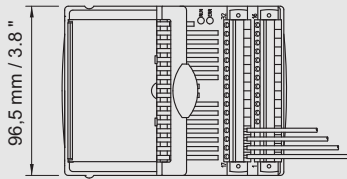
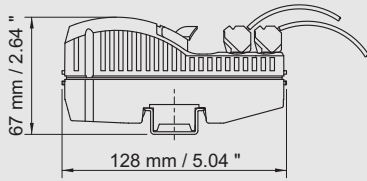
Technical Data

Ambient conditions	
Ambient temperature	- 20 ... + 65 °C / - 4 ... + 149 °F
Storage temperature	- 40 ... + 70 °C / - 40 ... + 158 °F
Maximum relative humidity	95 % (no condensation)
Vibration, sinusoidal (IEC EN 60068-2-6)	1 g in frequency range between 10 ... 500 Hz 2 g in frequency range 45 ... 100 Hz
Shock, semi-sinusoidal (IEC EN 60068-2-27)	15 g (3 shocks per axis and direction)
Electromagnetic compatibility	Tested according to the following standards and regulations: EN 61326-1 (1998) IEC 1000-4-1...6, NAMUR NE 21
Engineering notes	<ul style="list-style-type: none"> • Mixing of Zone 1 / Division 1 modules (9470/.2) and Zone 2 / Division 2 modules (9470/.5) on same BusRail is allowed. • For separation between intrinsically safe and non-intrinsically safe circuits (≥ 50 mm / 2 in), a partition (162740) is required.

Accessories and Spare Parts

Designation	Illustration	Description	Order number
Plug-in terminal		2.5 mm ² / 14 AWG with catch, 16-pole, screw connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Designation: 1 ... 16 Attention: An additional terminal is necessary for I/O module Series 9470 and 9480. Designation: 17 ... 32	162702
		2.5 mm ² with catch, 16-pole, screw connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Labelling: 17 ... 32	162718
		2.5 mm ² / 14 AWG with catch, 16-pole, spring connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits including test jacks Designation: 1 ... 16 Attention: An additional terminal is necessary for I/O module Series 9470 and 9480. Designation: 17 ... 32	162695
		2.5 mm ² with catch, 16-pole, spring connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits including test jacks Labelling: 17 ... 32	162716
Labelling strips		„FB No ... Mod No ...“ for plug-in terminals, sheet with 26 labels	162788
Warning sign		„Only clean modules with damp cloths“	162796
DIN A4 sheet		For I/O module labels; 6 labels each sheet; print out with IS Wizard software; packaging unit = 20 sheets	162832
Partition		For assembly between intrinsically safe and non-intrinsically safe connectors of the I/O modules, in order to adhere to the required 50 mm / 2 in distance	162740

Dimensional Drawings (All Dimensions in mm / inches) - Subject to Alterations



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