

Digital Input Module 24 V Ex n / NI Inputs, 16 Channels Series 9471



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04652E00

- > 16 channels for active 0 / 24 V signals
- > Zone 2 / Division 2 version for connection of circuits acc. to Ex nL, Ex nA, Nonincendive and Non-Ex
- > Galvanic separation between inputs and system
- > Two channels can be used as frequency inputs or counters up to 20 kHz
- > Module can be replaced in operation (hot swap)

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The Digital Input Module 24 V is used for the connection of up to 16 contacts with active 24 V signals. The inputs are passive voltage inputs for 0 / 24 V signals. All 16 channels have a common earth (0 V). Channels 14 and 15 are equipped with a fast comparator and can also be used for frequency measurement or as pulse counters up to 20 kHz. Intrinsically safe power supply of the module via BusRail. The interface of the Digital Input Module with the internal data bus of the BusRail is designed with redundancy.

	ATEX						NEC 505						NEC 506						NEC 500					
	Zone		Class I		Class II		Class I		Class II		Class III		Division		Class I		Class II		Class III					
Ex interface	0	1	2	20	21	22	0	1	2	20	21	22	1	2	1	2	1	2	1	2	1	2		
Installation in			x			x ^{*)}			x			x ^{*)}			x			x ^{*)}			x ^{*)}		x ^{*)}	

^{*)} Restrictions see table explosion protection

WebCode 9471A

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Selection Table

Version	Description	Order number	Weight kg / lbs
Digital Input Module 24 V	16 channels for active 0 / 24 V signals	9471/15-16-12	0.263 / 0.580
Note	Please order terminal separately - see Accessories		

Explosion Protection

Europe (ATEX)

Gas and dust	KEMA 06 ATEX 0291 X ⊕ II 3 (2) GD Ex nA [nL] [ib] IIC T4
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USA (NEC)

Gas	3007532 (FM) NI/I/2/ABCD/T4 Ta = 65 °C, I/2/IIC/T4 Ta = 65 °C
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Certificates and approvals

Certificates	ATEX, Serbia (IZP), USA (FM)
Other approvals	ship approval (BV, DNV, LR)

Safety data

Maximum values	max. voltage U_o / V_{oc}	12.6 V
	max. current I_o / I_{sc}	2.6 mA
	max. power P_o or for connection to energy-limited Ex nL circuits with max. $U_i / V_{max} = 32$ V	8 mW
Cable parameters (ATEX) (for inductive or capacitive circuits)	max. capacitance C_o / C_a (IIC/IIB)	0.72 μ F / 3.2 μ F
	max. inductance L_o / L_a (IIC/IIB)	20 mH / 50 mH
	or for connection to energy-limited Ex nL circuits with max. $C_i = 2.6$ nF und $L_i = 0$ mH	
Further information	see respective certificate	

Technical Data

Electrical data

Digital inputs		
Number of channels	16	
Voltage for ON / OFF	> 13 V / < 5 V	
Max. voltage	32V	
Switching threshold	approx. 8 ... 10 V	
Hysteresis	approx. 2 V	
Internal resistance	approx. 6 k Ω	
Minimum pulse width of the input signal	Channels 0-15 as digital inputs	approx. 1 ms
	If channels 14 or 15 are used as frequency input or counter	approx. 2 ms
Galvanic separation		
between power supply and system components	1500 V AC	
between two input / output modules	1500 V AC	
between inputs and system components	1500 V AC	
The inputs of an I/O module have a common negative conductor.		

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Technical Data

Electrical data

Frequency and counter inputs	2 (channels 14 and 15) 20 kHz, only with push-pull sensor *) (the line length must be reduced for frequencies > 1 kHz, e.g. at 5 kHz to approx. 75 m / 246 ft) *) The inputs must be switched to + 24 V and 0 V. Schematic representation:																													
Minimum pulse width	25 µs																													
Frequency input	<table border="1"> <thead> <tr> <th></th> <th colspan="2">Measuring range</th> </tr> <tr> <th></th> <th>1 Hz ... 1 kHz</th> <th>1 Hz ... 20 kHz</th> </tr> </thead> <tbody> <tr> <td>Resolution</td> <td>0.05 Hz</td> <td>1 Hz</td> </tr> <tr> <td>Accuracy</td> <td>0.02 %</td> <td>0.02 %</td> </tr> </tbody> </table> adjustable parameters for each channel				Measuring range			1 Hz ... 1 kHz	1 Hz ... 20 kHz	Resolution	0.05 Hz	1 Hz	Accuracy	0.02 %	0.02 %															
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	1 Hz ... 1 kHz	1 Hz ... 20 kHz																												
Resolution	0.05 Hz	1 Hz																												
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Counter input	Start, Stop, Reset																													
Control signal for counter	0 ... 65535																													
Counter range	0 ... 65535																													
Characteristic values	<table border="1"> <thead> <tr> <th>from digital inputs to internal bus</th> <th>channels 0-15 as digital inputs</th> <th>approx. 1 ms</th> </tr> </thead> <tbody> <tr> <td></td> <td>channels 14 or 15 as frequency input or counter</td> <td>approx. 2 ms</td> </tr> <tr> <td>from frequency inputs to internal bus</td> <td>measuring range 1 Hz ... 1 kHz for measurement frequency f = 1 ... 35 Hz</td> <td>2 ms + 1/f</td> </tr> <tr> <td></td> <td>measuring range 1 Hz ... 1 kHz for measurement frequency f = 35 Hz ... 1 kHz</td> <td>34 ms + 1/f</td> </tr> <tr> <td></td> <td>measuring range 1 Hz ... 20 kHz gate time</td> <td></td> </tr> <tr> <td></td> <td>50 ms</td> <td>approx. 50 ms</td> </tr> <tr> <td></td> <td>200 ms</td> <td>approx. 200 ms</td> </tr> <tr> <td></td> <td>1 s</td> <td>approx. 1 s</td> </tr> <tr> <td>from counter inputs to internal bus</td> <td></td> <td>approx. 2 ms</td> </tr> </tbody> </table>			from digital inputs to internal bus	channels 0-15 as digital inputs	approx. 1 ms		channels 14 or 15 as frequency input or counter	approx. 2 ms	from frequency inputs to internal bus	measuring range 1 Hz ... 1 kHz for measurement frequency f = 1 ... 35 Hz	2 ms + 1/f		measuring range 1 Hz ... 1 kHz for measurement frequency f = 35 Hz ... 1 kHz	34 ms + 1/f		measuring range 1 Hz ... 20 kHz gate time			50 ms	approx. 50 ms		200 ms	approx. 200 ms		1 s	approx. 1 s	from counter inputs to internal bus		approx. 2 ms
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Settings	Input from nonhazardous location Invert input value Adjustable pulse width Gate time for frequency measuring range 1 Hz ... 20 kHz Active edge for counter (channels 14 and 15)																													
	Digital input (0 ... 15), frequency input (14 + 15), counter input (14 + 15) ON, OFF (all channels) 0 s, 0.6 s, 1.2 s, 2.4 s (for channel groups) 50 ms, 200 ms, 1 s (channels 14 and 15) positive (voltage ↑) negative (voltage ↓)																													
Diagnostics	Retrievable parameters Module faults																													
	Manufacturer, type, version, serial number <ul style="list-style-type: none"> Internal primary bus faults Internal redundant bus faults No response Module does not correspond to configuration Hardware fault 																													
Signal fault	None																													
Operator interface	Operation Fault																													
	LED green "RUN" LED red "ERR"																													

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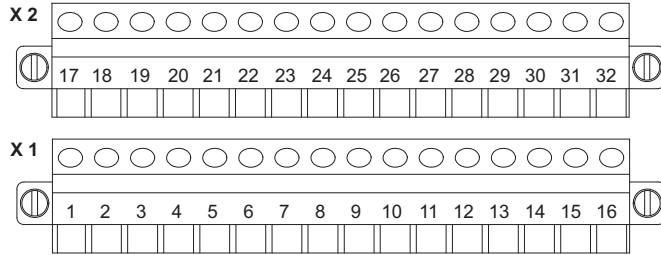
Technical Data

Electrical data

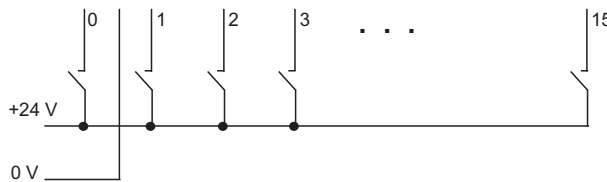
Auxiliary power
 Maximum power consumption
 Maximum power dissipation
 Electrical connection
 Ex n / NI field signals
 Connection diagram

1.4 W
 1.4 W

Plug-in terminals 16-pole with catch, 2.5 mm² / up to 14 AWG, screw or spring type



Voltage signal 0 / 24 V



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Ambient conditions

Ambient temperature
 Storage temperature
 Maximum relative humidity
 Sinusoidal vibration (IEC EN 60068-2-6)
 Semi-sinusoidal shock (IEC EN 60068-2-27)
 Electromagnetic compatibility

-20 ... +65 °C / -4 ... +149 °F
 -40 ... +70 °C / -40 ... +158 °F
 95 % (no condensation)
 1 g in frequency range between 10 ... 500 Hz
 2 g in frequency range 45 ... 100 Hz
 15 g (3 shocks per axis and direction)
 Tested according to the following standards and regulations:
 EN 61326-1 (1998) IEC 1000-4-1...6, NAMUR NE 21

Mechanical data

Module enclosure
 Fire resistance (UL 94)
 Degree of protection (IEC 60529)
 Modules
 Connections

Polyamide 6GF
 V2
 IP30
 IP20

Mounting / installation

Installation conditions
 Mounting type
 Mounting orientation
 Engineering notes

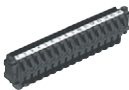



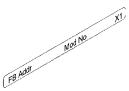


on 35 mm DIN rail NS 35/15
 horizontal and vertical
 • Combination of Zone 1 / Division 1 and Zone 2 / Division 2 modules on same BusRail is allowed.
 • A partition (162740) is required to separate intrinsically safe and non-intrinsically safe circuits (≥ 50 mm / 2 in).

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Accessories and Spare Parts

Designation	Figure	Description	Art. no.
Plug-in terminal		2.5 mm ² with catch, 16-pole, screw connection, black, for connecting the field signals to I/O modules, for non-intrinsically safe field circuits Labelling: 1 ... 16 Attention: An additional terminal is necessary for I/O module Series 9470, 9471 and 9480. Labelling: 17 ... 32	162688
		2.5 mm ² with catch, 16-pole, screw connection, black, for connecting the field signals to I/O modules, for non-intrinsically safe field circuits Labelling: 17 ... 32	162714
		2.5 mm ² with catch, 16-pole, spring connection, black, for connecting the field signals to I/O modules, for non-intrinsically safe field circuits including test jacks Labelling: 1 ... 16 Attention: An additional terminal is necessary for I/O module Series 9470, 9471 and 9480. Labelling: 17 ... 32	162700
		2.5 mm ² with catch, 16-pole, spring connection, black, for connecting the field signals to I/O modules, for non-intrinsically safe field circuits including test jacks Labelling: 17 ... 32	162717
Labelling strips		"FB Addr ... Mod No ..." for pluggable terminal, sheet with 26 strips	162788
DIN A4 sheet		For label plate on I/O modules; 6 labels on each sheet; print-out using IS Wizard; 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

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



We reserve the right to make alterations to the technical data, dimensions, weights, designs and products available without notice. The illustrations cannot be considered binding.