Remote I/O

09271E00

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

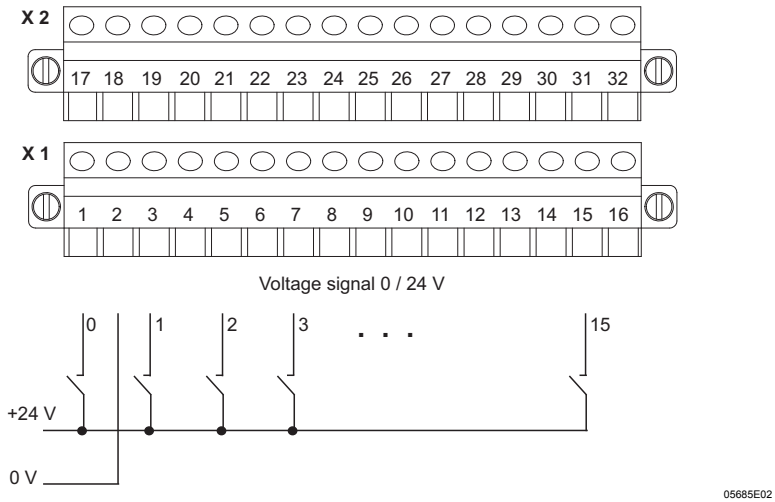
- 16 channels for active 0 / 24 V signals
- Zone 2 / Division 2 version for connection of circuits acc. to Ex nL, Ex nA, Nonincendive and Non-Ex
- Galvanic isolation between inputs and system
- Two channels can be used as frequency inputs or counters up to 20 kHz
- Module can be replaced in operation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

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

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

*) suitable enclosure necessary

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.



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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

Explosion Protection

Certificates		
Europe (ATEX)	KEMA 06 ATEX 0291 X	
USA (NEC)	3007532 (FM)	
Marking		
Europe (ATEX)	Ⓔx II 3 (2) GD Ex nA [nL] [ib] IIC T4	
USA (NEC)	NI/I/2/ABCD/T4 Ta = 65 °C, I/2/IIC/T4 Ta = 65 °C	
Other certificates	Marine (DNV)	
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	8 mW
	or for connection to energy-limited Ex nL circuits with max. U_i / V_{max} = 32 V	
Cable parameters (ATEX)	max. capacitance C_o / C_a (IIC/IIB)	0.72 µF / 3.2 µF
	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

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 kΩ	
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 isolation		
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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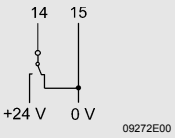
Technical Data

Frequency and counter inputs			
Number of channels	2 (channels 14 and 15)		
Maximum switching frequency	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		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		
Characteristic values			
Maximum signal delay	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
MTBF acc. to MIL	40.4 years (at 40 °C / 104 °F)		
Settings			
Input	Digital input (0 ... 15), frequency input (14 +15), counter input (14 + 15)		
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 (channels 14 and 15)		
Active edge for counter (channels 14 and 15)	positive (voltage ↑) negative (voltage ↓)		

Technical Data	
Diagnostics	
Retrievable parameters	Manufacturer, type, version, serial number
Module faults	• Internal primary bus faults • Internal redundant bus faults • No response • Module does not correspond to configuration • Hardware fault
Signal fault	None
Power supply	
Maximum power consumption	1.4 W
Maximum power dissipation	1.4 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 n / NI field signals	Plug-in terminals 16-pole with catch, 2.5 mm^2 / up to 14 AWG, screw or spring type
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
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	• 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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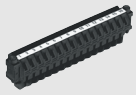
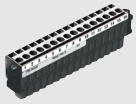
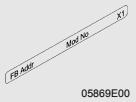
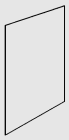
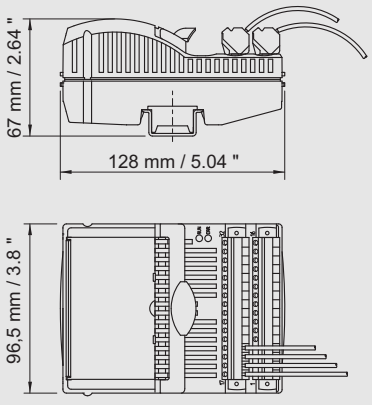
Accessories and Spare Parts

Designation	Illustration	Description	Order number
Plug-in terminal	 09898E00	2.5 mm² 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**
	 09898E00	2.5 mm² 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**
	 09899E00	2.5 mm² 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**
	 09899E00	2.5 mm² 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	 05869E00	„FB No ... Mod No ...“ for plug-in terminals, sheet with 26 labels	**162788**
DIN A4 sheet	 09900E00	For I/O module labels; 6 labels each sheet; print out with IS Wizard software; packaging unit = 20 sheets	**162832**
Partition	 02078E00	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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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.