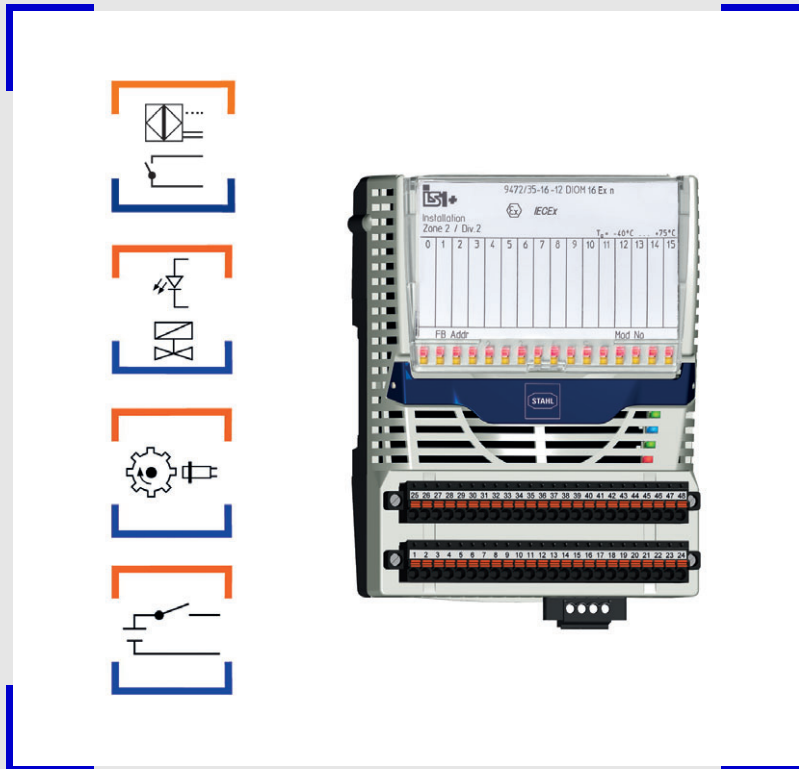


Digital Input Output Module 24 V for Ex n Zone 2 Series 9472/35



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17616E00

- > 16 channels can be adjusted in pairs as digital inputs or outputs
- > Suitable for NAMUR proximity switches, 3-conductor PNP proximity switches, active 24 V signals, passive contacts and solenoid valves (24 V / 0.5 A).
- > Up to 8 channels can be used as frequency/counter inputs; with rotation direction recognition
- > Line fault monitoring
- > LED display for signal and errors for each channel
- > Additional control input for "Plant STOP" (in accordance with IEC 61508 through SIL 2, low demand)
- > Module can be replaced in the hazardous area when under voltage (hot swap)



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The 24 V digital input output module series 9472/35 can connect up to 16 non-intrinsically safe digital signals to the IS1+ Remote I/O system. All channels can be configured as inputs for NAMUR proximity switches (EN 60947-5-6), 3-conductor PNP proximity switches (with a 24 V supply) as well as for passive contacts and for solenoid valves (24 V / 0.5 A) (in pairs with adjustable parameters). The external power supply for 3-conductor proximity switches, active 24 V signals and solenoid valves comes from a separate terminal X0 on the front side of the module. Up to 8 inputs can be used as frequency inputs or counters up to 20 kHz, in the "Rotation direction recognition" and "Forward/backward counter" operating mode up to 4 inputs. An additional "Plant STOP" control input on the front side of the module, terminal X0, is used to safely switch off all outputs. All inputs and outputs are monitored for short circuiting and line breakage.

Function-compatible replacement for IS1 I/O module:
Series 9470/25, 9471/15 and sometimes
9477/15 (if polarity and switching capacity match)

	ATEX / IECEx					
Zone	0	1	2	20	21	22
For use in			x			x

WebCode 9472A

Digital Input Output Module 24 V for Ex n Zone 2

Series 9472/35



Selection Table

Version	Description	Installation	Order number	Weight kg
Digital input output module 24 V, Series 9472/35	16 channels with adjustable parameters for NAMUR proximity switches, 3-conductor PNP proximity switches with 24 V power supply, active 24 V signals, passive contacts and solenoid valves (24 V / 0.5 A), with channel status LEDs and "System OFF"	Zone 2, 22 and safe area	9472/35-16-12	0.275
Note	Order 2 terminals separately - see Accessories This module is not supported by the Ethernet CPU 9441!			

Explosion Protection

Global (IECEX)	
Gas	IECEX DEK 16.0010X Ex ec ic [ia Ga] IIC T4 Gc or Ex nA ic [ia Ga] IIC T4 Gc
Europe (ATEX)	
Gas	DEKRA 16 ATEX 0016 X ⊕ II 3 (1) G Ex ec ic [ia Ga] IIC T4 Gc or ⊕ II 3 (1) G Ex nA ic [ia Ga] IIC T4 Gc
Certifications and certificates	
Certificates	IECEX, ATEX, EAC (TR), India (PESO), Canada (FM), Korea (KTL), USA (FM)
Ship approval	In progress

Technical Data

Electrical data

Ex ec/nA inputs/outputs	
Number of channels	16 (in pairs with adjustable parameters as input or output)
Inputs	
Max. number of channels	16 (channel 0 to 15)
Signal	IEC 60947-5-6-1999 (NAMUR), 3-conductor PNP proximity switches, active 24 V signals with and without 47 kΩ resistor connected in parallel and passive contacts
NAMUR proximity switch	
ON	> 2.1 mA
OFF	< 1.2 mA
Switching threshold	1.65 mA
Hysteresis	≥ 0.2 mA
Supply voltage	8.0 V ± 5%
Internal resistance	1 kΩ
3-conductor PNP proximity switch / active 24 V signals	
Voltage for ON	> 60 % * U _H (external supply voltage)
Voltage for OFF	< 55 % * U _H (external supply voltage)
Internal resistance	11 kΩ
Note	The "3-conductor PNP proximity switch" signal type must be selected for active 24 V signals!

Digital Input Output Module 24 V for Ex n Zone 2

Series 9472/35



Technical Data

Frequency and counter inputs

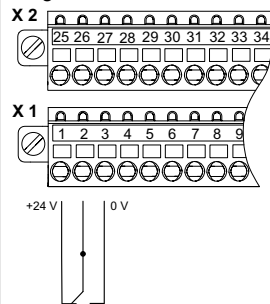
Max. number of channels
Max. switching frequency

8 (channel 8 to 15)

NAMUR signal: 20 kHz
(at frequencies > 1 kHz the maximum conductor length is reduced, e.g. at 5 kHz to approx. 75 m)

3-conductor PNP proximity switch / active 24 V signals

≤ 300 Hz (20 kHz only with push-pull transmitter)
The inputs must be switched to +24 V and 0 V.
Diagram:



Min. pulse width
Frequency input

Input: 25 μs

Measuring range	0.1 to 600 Hz	1 Hz to 3 kHz ^{*)}	1 Hz to 20 kHz
Resolution	0.01 Hz	0.05 Hz	0.5 Hz
Accuracy	0.1 %	0.1 %	0.1 %

^{*)} Default

Counter

Max. number of channels
Counter range

8 (channel 8 to 15)

0 to 65535

Rotation direction recognition, forward/backward counter

Max. number of channels

4 (each with two inputs switched in parallel)

Function

Forward/backward counter; frequency with direction

Resolution

16 bit / 32 bit

Outputs

Max. number of channels

16 (channel 0 to 15)

X0 external supply

For 3-conductor PNP proximity switches, active 24 V signals and digital outputs

External supply voltage U_H

18 to 32 V DC (max. permissible voltage $U_m = 32$ V DC)

Max. current consumption

8 A (depends on the total current of the outputs)

Connectable loads
Max. connectable inductance

Ohmic / inductive (for a freewheeling diode, see accessories) / capacitive
1 H per channel

Output voltage

U_H (external supply voltage) - 0.7 V

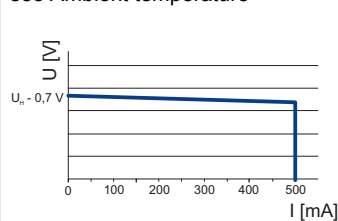
Output current

30 mA to 0.5 A per channel (electronically limited)

Total current of the outputs

see Ambient temperature

Output characteristic



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Digital Input Output Module 24 V for Ex n Zone 2

Series 9472/35



Technical Data

Signal transmission	< 1 ms				
Max. delay from signal / internal bus					
Max. delay from frequency input / internal bus	Filter (adjustable parameters)	without	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
X0 "Plant STOP" control input	"Plant STOP" to switch off all outputs				
Function	Disconnection up to SIL 2, low demand (IEC 61508)				
Suitability					
Control input	Terminals X0.3; X0.4				
	Output voltage without load	9.7 to 14.0 V (with external supply, 18 to 32 V)			
	Short-circuit current	0.36 to 0.65 mA			
	"Normal operation" ("Plant STOP" deactivated)	U > 6 V X0.3 and X0.4 terminal bridged			
	"Outputs OFF" ("Plant STOP" activated)	U < 2 V X0.3 and X0.4 terminal interrupted			
Galvanic separation					
Test voltages					
acc. to standard	EN 60079-11				
Between I/O channels/ auxiliary power	≥ 1800 V AC				
Between I/O channels / system components	≥ 1800 V AC				
Between I/O channels / ground (PA)	≥ 1800 V AC				
Electromagnetic compatibility	Tested to the following standards and regulations: EN 61326-1 (2006), IEC 61000-4-1 to 6, NAMUR NE 21				
Electrical connection					
Power supply	Power is supplied is via the BusRail				
Ex ec/nA field signals X1/X2	2 pluggable black terminals, 24-pole, push-in version with lock (must be ordered separately)				
	Single-wire connection				
	- rigid	0.08 to 1.5 mm ² (AWG 28 to 16)			
	- flexible with core end sleeves (without plastic sleeve)	0.25 to 1.5 mm ²			
	- flexible with core end sleeves (with plastic sleeve)	0.25 to 0.5 mm ²			
	- stripping length	min. 9 mm			

Digital Input Output Module 24 V for Ex n Zone 2

Series 9472/35



Technical Data

External supply and "Plant OFF" X0	Pluggable, black terminals, 4-pole, screw terminal version with lock (included)
	<p>Single-wire connection</p> <ul style="list-style-type: none"> - rigid 0.2 to 1.5 mm² (AWG 28 to 14) - flexible with core end sleeves (without plastic sleeve) 0.25 to 1.5 mm² - flexible with core end sleeves (with plastic sleeve) 0.25 to 1.5 mm² <p>Double-core connection</p> <ul style="list-style-type: none"> - rigid 0.75 mm² - flexible with core end sleeves (without plastic sleeve) 0.25 to 0.34 mm² - flexible with core end sleeves (with plastic sleeve) 0.5 mm² <p>Tightening torque 0.2 Nm</p> <p>Stripping length min. 7 mm</p>
Auxiliary power	
Version	Intrinsically safe Ex ia via BusRail
Behaviour during undervoltage	All outputs "Off"
Max. current consumption	90 mA
Max. power consumption	< 2.2 W
Max. power dissipation	Input: < 1.4 W Output: < 5.4 W

Device-specific data

Settings	
Module	
Diagnostics message	ON / OFF
Signal	
Signal type	NAMUR proximity switch / contact (default); 3-conductor PNP proximity switches with external supply; output
Pulse extension / frequency filter	0 s / off; 0.6 s / small; 1.2 s / medium; 2.4 s / large *)
Inverting input/output	normal / inverted*)
Line fault monitoring	ON / OFF
Behaviour in case of error	Replacement value '0'; replacement value '1'; hold (initial value 0); hold (initial value 1)
Operating mode counter/frequency	Counter 16 bit; 0.1 to 600 Hz; 1 Hz to 3 kHz; 1 Hz to 20 kHz; 1 Hz to 20 kHz with direction; up/down counter 16 bit; up/down counter 32 bit*)
Counter control	Run, Stop, Reset
Counting event	Positive slope; negative slope*)
	*) Setting is made for channel pairs

Ambient conditions

Ambient temperature	-40 to +75 °C for total current of the outputs ≤ 4 A -40 to +65 °C for total current of the outputs ≤ 8 A
Storage temperature range	-40 to +80 °C
Maximum relative humidity	95 % (without condensation)
Maximum operating height	< 2,000 m
Semi-sinusoidal shock (IEC/EN 60068-2-27)	15 g (3 shocks per axis and direction)
Sinusoidal vibration (IEC/EN 60068-2-6)	1 g in the frequency range 10 to 500 Hz 2 g in the frequency range 45 to 100 Hz
Pollutant class	corresponds to G3

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Digital Input Output Module 24 V for Ex n Zone 2

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Technical Data

Mechanical data

Degree of protection (IEC 60529)	IP30
Module enclosure	Polyamide 6GF
Fire resistance (UL 94)	V2
Dimensions	L = 139.5 mm, W = 96.5 mm, H = 64 mm

Indication

LED indication							
"Plant STOP"	"24 V" LED, yellow						
24 V external supply	"24 V" LED, green						
Module requires maintenance	"M/S" LED, blue						
Operating state	"RUN" LED, green						
Group error	"ERR" LED, red						
Channel error	LED, red for each channel						
Channel status	LED, yellow for each channel						
Function indication							
Retrievable parameters	Manufacturer, type, hardware revision, software revision, serial number						
Error indication							
Module status and alarms	<ul style="list-style-type: none"> • Primary / redundant internal bus error • No response from IOM • Configuration does not correspond to the module • Hardware error • Excess temperature • Slot error • Module requires maintenance 						
Signal errors for each channel							
Signal status bit	"1" = signal interfered; "0" = signal valid						
Open circuit	<table border="1" style="width: 100%;"> <tr> <td>NAMUR signal:</td> <td>$I < 100 \mu\text{A}$</td> </tr> <tr> <td>3-conductor PNP proximity switch:</td> <td>$U_{IN} < 1.6 \text{ V}$</td> </tr> <tr> <td>Output:</td> <td>$I < 30 \mu\text{A}$ in ON state $R > 800 \text{ k}\Omega$ in OFF state</td> </tr> </table>	NAMUR signal:	$I < 100 \mu\text{A}$	3-conductor PNP proximity switch:	$U_{IN} < 1.6 \text{ V}$	Output:	$I < 30 \mu\text{A}$ in ON state $R > 800 \text{ k}\Omega$ in OFF state
NAMUR signal:	$I < 100 \mu\text{A}$						
3-conductor PNP proximity switch:	$U_{IN} < 1.6 \text{ V}$						
Output:	$I < 30 \mu\text{A}$ in ON state $R > 800 \text{ k}\Omega$ in OFF state						
Short circuit	<table border="1" style="width: 100%;"> <tr> <td>NAMUR signal:</td> <td>$R < 100 \Omega$</td> </tr> <tr> <td>3-conductor PNP proximity switch:</td> <td>$U_{IN} < 1.6 \text{ V}$</td> </tr> <tr> <td>Output:</td> <td>$I > 500 \text{ mA}$ in ON state $R < 25 \Omega$ in OFF state</td> </tr> </table>	NAMUR signal:	$R < 100 \Omega$	3-conductor PNP proximity switch:	$U_{IN} < 1.6 \text{ V}$	Output:	$I > 500 \text{ mA}$ in ON state $R < 25 \Omega$ in OFF state
NAMUR signal:	$R < 100 \Omega$						
3-conductor PNP proximity switch:	$U_{IN} < 1.6 \text{ V}$						
Output:	$I > 500 \text{ mA}$ in ON state $R < 25 \Omega$ in OFF state						

Mounting / Installation

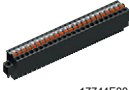


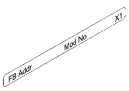




Installation position	Horizontal or vertical (observe operating instructions)
Mounting type	on 35 mm DIN rail LV 35/15 (DIN EN 60715)

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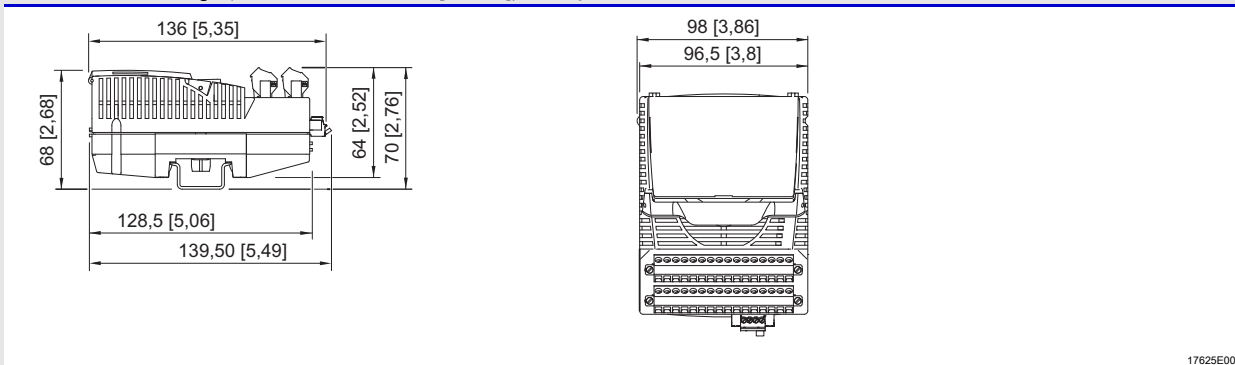


Accessories and Spare Parts

Designation	Figure	Description	Art. no.
Plug-in terminal		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 9471/35 and 9472/35 I/O modules Labelling: 25 to 48	245091
		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 9471/35 and 9472/35 I/O modules Labelling: 1 to 24	245090
Resistor error message suppression		The resistors are used to suppress error messages for unused I/O channels Resistance value: 5K6 / 0.5 W Suitable for: AIM 9468; DIOM 9470; DIOM 9471; DIOM 9472; DOM 9475 single electrical equipment for intrinsically safe circuits according to EN 60079-11	244911
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 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
Warning sign		"Clean modules only with a damp cloth."	162796
Freewheeling diode		The freewheeling diode is connected in parallel with the inductive load and protects the output while a solenoid is switched off	270212

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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.