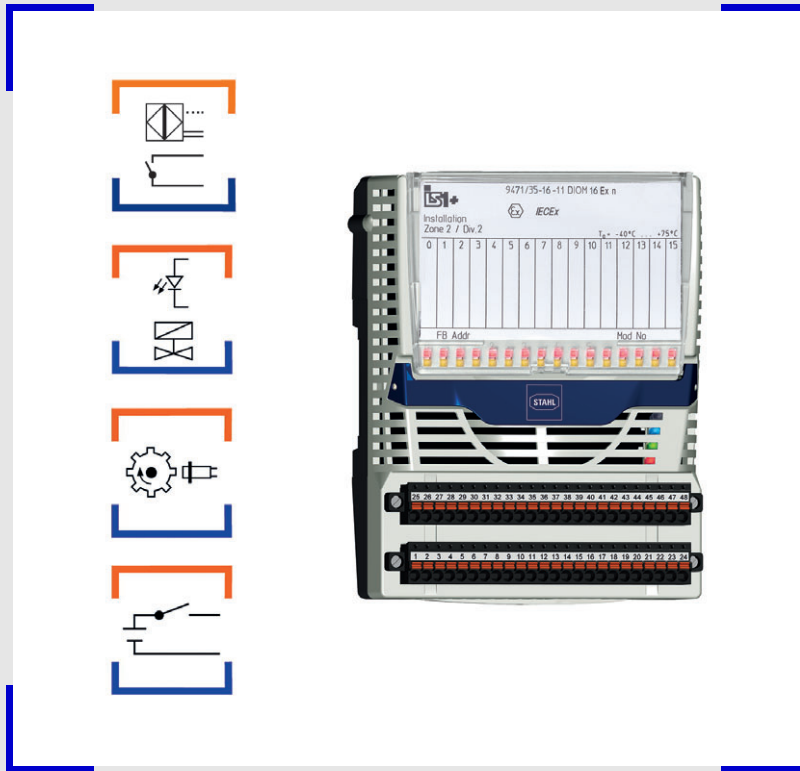


# Digital Input Output Module NAMUR for Ex n Zone 2

## Series 9471/35



www.stahl.de



17617E00

- > 16 channels can be adjusted in pairs as digital inputs or outputs
- > Suitable for NAMUR proximity switches, 3-conductor PNP proximity switches with external supply, contacts and low power solenoid valves
- > 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
- > Module can be replaced in the hazardous area when under voltage (hot swap)



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The digital input output module NAMUR series 9471/35 can connect up to 16 non-intrinsically safe digital signals to the IS1+ remote I/O system. All channels can be configured in pairs as input for NAMUR proximity switches (EN 60947-5-6), 3-conductor PNP proximity switches with external supply, for passive/active 24-V contacts and as output for connection of low power solenoid valves (with adjustable parameters). Up to 8 inputs can be used as frequency inputs or as counters up to 20 kHz. In the "Rotation direction recognition" and "forward/backward counter" operating modes, there are up to 4 inputs. All inputs and outputs are monitored for short circuiting and line breakage.

Function-compatible replacement for IS1 I/O modules:  
9470/25 and 9471/15 series

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

WebCode 9471B

# Digital Input Output Module NAMUR for Ex n Zone 2

## Series 9471/35



### Selection Table

Version	Description	Installation	Order number	Weight kg
Digital input output module NAMUR, Series 9471/35	16 channels with adjustable parameters for NAMUR proximity switches / contacts, supply of 3 conductor PNP proximity switches via external supply voltage, low-power solenoid valves, with channel status LEDs	Zone 2, 22 and safe area	<b>9471/35-16-11</b>	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
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#### 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
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#### 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 and active 24 V signals with and without 47 kΩ resistance connected in parallel
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	> 13 V
Voltage for OFF	< 5 V
Max. external supply voltage	24 V
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 NAMUR for Ex n Zone 2

## Series 9471/35



### Technical Data

#### Frequency input

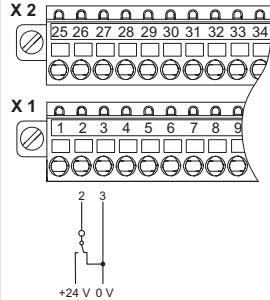
Max. number of channels  
Max. switching frequency

8 (channel 8 to 15)

NAMUR input: 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

Input: 25 μs

20460E00

Measuring range	0.1 to 600 Hz	1 Hz to 3 kHz <sup>*)</sup>	1 Hz to 20 kHz
Resolution	0.01 Hz	0.05 Hz	0.5 Hz
Accuracy	0.1 %	0.1 %	0.1 %

<sup>\*)</sup> 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  
Resolution

Forward/backward counter; frequency with direction  
16 bit / 32 bit

#### Outputs

Max. number of channels

16 (channel 0 to 15)

Output voltage

8.2 V

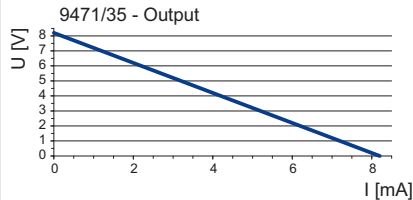
Max. output current

8.2 mA per channel

Rated operation

6 V / 2 mA

Output characteristic



18430E00

# Digital Input Output Module NAMUR for Ex n Zone 2

## Series 9471/35



### Technical Data

Signal transmission	< 1 ms				
Max. delay from signal / internal bus					
Max. delay from frequency input / internal bus	Filter	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
Galvanic separation					
Test voltages					
acc. to standard	EN 60079-11				
Between auxiliary power / system components	≥ 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-pin, push-in version with lock (must be ordered separately)				
	Single-wire connection				
	- rigid	0.08 to 1.5 mm <sup>2</sup> (AWG 28 to 16)			
	- flexible with core end sleeves (without plastic sleeve)	0.25 to 1.5 mm <sup>2</sup>			
	- flexible with core end sleeves (with plastic sleeve)	0.25 to 0.5 mm <sup>2</sup>			
	- stripping length	min. 9 mm			
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	< 0.7 W				
<b>Device-specific data</b>					
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 *)				

# Digital Input Output Module NAMUR for Ex n Zone 2

## Series 9471/35



### Technical Data

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 (observe operating instructions)
Storage temperature range	-40 to +80 °C
Maximum relative humidity	95 % (without condensation)
Maximum operating height	< 2000 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

### Mechanical data

Degree of protection (IEC 60529)	IP30
Module enclosure	Polyamide 6GF
Fire resistance (UL 94)	V2
Dimensions	L = 128 mm, W = 96.5 mm, H = 64 mm

### Indication

LED indication							
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"> <li>• Primary / redundant internal bus error</li> <li>• No response from IOM</li> <li>• Configuration does not correspond to the module</li> <li>• Hardware error</li> <li>• Excess temperature</li> <li>• Slot error</li> <li>• Module requires maintenance</li> </ul>						
Signal errors for each channel							
Signal status bit	"1" = signal interfered; "0" = signal valid						
Open circuit	<table border="1"> <tr> <td>NAMUR input:</td> <td><math>I &lt; 100 \mu\text{A}</math></td> </tr> <tr> <td>3-conductor PNP proximity switch:</td> <td><math>U_{IN} &lt; 1.6 \text{ V}</math></td> </tr> <tr> <td>Output:</td> <td><math>I &lt; 30 \mu\text{A}</math> in ON state <math>R &gt; 800 \text{ k}\Omega</math> in OFF state</td> </tr> </table>	NAMUR input:	$I < 100 \mu\text{A}$	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 input:	$I < 100 \mu\text{A}$						
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"> <tr> <td>NAMUR input:</td> <td><math>R &lt; 100 \Omega</math></td> </tr> <tr> <td>3-conductor PNP proximity switch:</td> <td><math>U_{IN} &lt; 1.6 \text{ V}</math></td> </tr> <tr> <td>Output:</td> <td><math>I &gt; 500 \text{ mA}</math> in ON state <math>R &lt; 25 \Omega</math> in OFF state</td> </tr> </table>	NAMUR input:	$R < 100 \Omega$	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 input:	$R < 100 \Omega$						
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 NS 35/15 (DIN EN 60715)




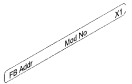
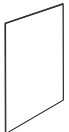


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# Digital Input Output Module NAMUR for Ex n Zone 2

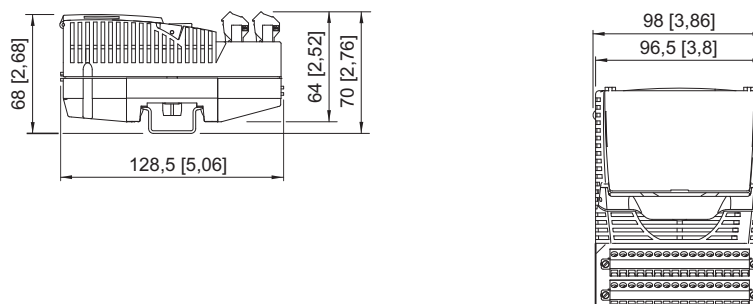
## Series 9471/35



### Accessories and Spare Parts

Designation	Figure	Description	Art. no.
Plug-in terminal	 17744E00	1.5 mm <sup>2</sup> 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
	 17743E00	1.5 mm <sup>2</sup> 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	 17310E00	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	 05869E00	"FB Addr ... Mod No ..." for pluggable terminal, sheet with 26 strips	162788
DIN A4 sheet	 09900E00	For label plate on I/O modules; 6 labels on each sheet; print-out using IS Wizard; packaging unit = 20 sheets	162832
Partition	 15196E00	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	 05872E00	"Clean modules only with a damp cloth."	162796

### Dimensional drawings (all dimensions in mm [inches]) – Subject to modification



15254E00

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.