

# Isolators

## Switching repeater

Ex i field circuit

9170/11-14-12s Art. No. 203288



- Can be used up to SIL 2 (IEC/EN 61508)
- Wire-breakage and short-circuit monitoring signalization, which can be disabled
- Optional line fault transparency version available: The device notifies the control system directly of any field-side line faults via the signal output.

WebCode 9170A



9170 series switching repeaters can be used for intrinsically safe operation of contacts, NAMUR proximity sensors or optocouplers. Models are available with one or two channels. The intrinsically safe digital input is always galvanically separated from the output and auxiliary power. The channels in the two-channel devices are galvanically separated. Certain variants transmit frequencies of up to 10 kHz and the output signal can be inverted.

## Technical Data

### Explosion Protection

|                                 |  |
|---------------------------------|--|
| Application range (zones)       | 2  |
| Ex interface zone               | 0<br>1<br>2<br>20<br>21<br>22  |
| IECEX gas certificate           | IECEX BVS 09.0041 X  |
| IECEX gas explosion protection  | Ex nA nC [ja Ga] IIC T4 Gc   |
| IECEX dust certificate          | IECEX BVS 09.0041 X  |
| IECEX dust explosion protection | [Ex ia Da] IIIC  |
| ATEX gas certificate            | DMT 02 ATEX E 195 X  |
| ATEX gas explosion protection   | ⊕ II 3 (1) G Ex nA nC [ja Ga] IIC T4 Gc  |
| ATEX dust certificate           | DMT 02 ATEX E 195 X  |
| ATEX dust explosion protection  | ⊕ II (1) D [Ex ia Da] IIIC   |
| FMus certificate                | FM16US0122X  |
| cFM certificate                 | FM16CA0067X  |
| Marking cFMus                   | Class I, Div. 2, Groups A,B,C,D;<br>Class I, Zone 2, Group IIC<br>AIS Class I,II,III, Div. 1, Groups A,B,C,D,E,F,G;<br>Class I, Zone 0, [AEx ia]/[Ex ia] IIC<br>T4 at Ta = 70°C<br>See Doc. 91 706 02 31 1 |
| EAC certificate                 | EAEU RU S-DE.HA91.B.00100/20   |
| EAC gas explosion protection    | ⊕ 2 Ex nA nC [ja Ga] IIC T4 Gc X   |
| EAC dust explosion protection   | ⊕ [Ex ia Da] IIIC X  |

#### Explosion Protection

|                     |   |
|---------------------|---|
| Certificates        | ATEX (BVS), Brazil (ULB), Canada (FM), EAC (ENDCE), IECEx (BVS), India (PESO), Korea (KGS), SIL (exida), USA (FM) |
| Ship approval       | CCS, EU RO MR (DNV GL)  |
| Notes               | CCC, UKCA certificate available from 2022 onward  |
| Installation        | in Zone 2, Division 2 and in the safe area  |
| Further information | see respective certificate and operating instructions   |

#### Safety Data

|  |             |
|--|-------------|
| Max. voltage $U_o$                                 | 9.6 V       |
| Max. current $I_o$                                 | 10 mA       |
| Max. power $P_o$                                   | 24 mW       |
| Max. permissible external capacity $C_o$ for IIC   | 3.6 $\mu$ F |
| Max. permissible external capacity $C_o$ for IIB   | 26 $\mu$ F  |
| Max. permissible external inductance $L_o$ for IIC | 350 mH      |
| Max. permissible external inductance $L_o$ for IIB | 1000 mH     |
| Internal capacitance                               | 2.42 nF     |
| Internal inductance                                | Negligible  |
| Safety-related max. voltage                        | 253 V       |

#### Functional Safety

|     |   |
|-----|---|
| SIL | 2 |
|-----|---|

#### Electrical Data

|                    |     |
|--------------------|-----|
| Number of channels | 1   |
| LFD relay          | Yes |

#### Auxiliary Power

|                               |                   |
|-------------------------------|-------------------|
| Auxiliary power               | 24 V DC           |
| Auxiliary power voltage range | 18 to 31.2 V      |
| Voltage range residual ripple | $\leq 3,6 V_{SS}$ |
| Nominal current               | 28 mA             |
| Power consumption             | 0.67 W            |
| Max. power dissipation        | 0.67 W            |
| Polarity reversal protection  | Yes               |
| Undervoltage monitoring       | Yes               |
| Operation indication          | Green "PWR" LED   |

#### Galvanic Isolation

|  |                 |
|--|-----------------|
| Test voltage as per standard             | IEC EN 60079-11 |
| Ex i input to output                     | 1.5 kV AC       |
| Ex i input to auxiliary power            | 1.5 kV AC       |
| Galv.sep. Ex i input to FMC              | 1.5 kV AC       |
| Test voltage as per standard             | EN 50178        |
| Output to auxiliary power                | 1,1 kV AC       |
| Fault message contact to auxiliary power | 350 V AC        |
| Galv. separation FMC to output           | 1,1 kV AC       |

#### Input

|                                      |                             |
|--------------------------------------|-----------------------------|
| Input signal                         | As per EN 60947-5-6 (NAMUR) |
| Input current for ON                 | $\geq 2.1$ mA               |
| Input current for OFF                | $\leq 1.2$ mA               |
| Hysteresis                           | Approx. 0.2 mA              |
| Input internal resistance $R_i$      | 1000 $\Omega$               |
| Input for open-circuit voltage $U_a$ | 8,2 V                       |
| Short-circuit current                | $\leq 8.2$ mA               |
| Min. pulse duration (ON/OFF)         | 50 $\mu$ s                  |

#### Output

|  |   |
|--|---|
| Output per channel                         | 1 LFT electronic output   |
| Output                                     | 1 LFT electronic output   |
| Line fault transparency                    | Yes   |
| Max. output DC load condition              | 35 V / 50 mA  |
| Output switching capacity                  | 1,75 W  |
| Overload-proof                             | Yes   |
| Max. voltage drop                          | 2 V   |
| Output electrical service life             | $> 10^9$ at 35 V/50 mA  |
| Output switching frequency                 | 10 kHz  |
| Switching delay ON/OFF                     | 60 $\mu$ s  |
| Switching delay OFF/ON                     | 50 $\mu$ s  |
| INV switch user adjustment                 | Activated/deactivated   |
| Switching state indication                 | Yellow "OUT" LED  |
| Fault message contact switching capacity   | 30 V / 100 mA   |
| LF switch user adjustment                  | Activated/deactivated   |
| Indication of line fault                   | Red "LF" LED  |
| Wire breakage error detection              | $I_E < 0.05$ to 0.35 mA   |
| Short circuit error detection              | $R_E < 100$ to 360 ohm  |
| Line fault and loss of power signalisation | - contact (30 V / 100 mA) closed to ground in case of fault<br>- contact in the output circuit (35 V / 50 mA) opens in case of fault<br>- pac-Bus, floating contact (30 V / 100 mA) |

#### Ambient Conditions

|                               |  |
|-------------------------------|--|
| Ambient temperature           | -20 °C ... +70 °C (Single device)<br>-20 °C ... +60 °C (Group assembly)                                  |
| Ambient temperature           | -4 °F ... +158 °F (Single device)<br>-4 °F ... +140 °F (Group assembly)                                  |
| Storage temperature           | -40 °C ... +80 °C  |
| Storage temperature           | -40 °F ... +176 °F   |
| Maximum relative humidity     | 95%  |
| Use at the height of          | < 2000 m   |
| Electromagnetic compatibility | Tested to the following standards and regulations: EN 61326-1 Use in industrial environment; NAMUR NE 21 |

#### Mechanical Data

|                                     |           |
|-------------------------------------|-----------|
| Degree of protection (IP)           | IP30      |
| Degree of protection (IP) terminals | IP20      |
| Fire resistance (UL 94)             | V0        |
| Enclosure material                  | Polyamide |

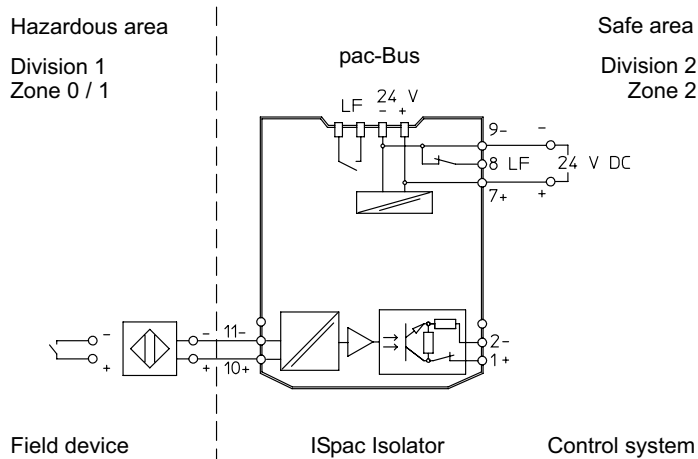
#### Mechanical Data

|                |          |
|----------------|----------|
| Grid dimension | 17.6 mm  |
| Width          | 17.6 mm  |
| Width, inches  | 0.69 in  |
| Height         | 114.5 mm |
| Height, inches | 4.51 in  |
| Length         | 108 mm   |
| Length, inches | 4.25 in  |
| Weight         | 0.18 kg  |
| Weight         | 0.4 lb   |

#### Mounting / Installation

|                                    |                            |
|------------------------------------|----------------------------|
| Mounting type                      | DIN rail NS35/15, NS35/7.5 |
| Mounting orientation               | Vertical<br>Horizontal     |
| Connection type                    | Screw terminal             |
| Min. rigid conductor cross section | 0.2 mm <sup>2</sup>        |
| Max. rigid conductor cross section | 2.5 mm <sup>2</sup>        |
| Min. flex conductor cross section  | 0.2 mm <sup>2</sup>        |
| Max. flex conductor cross section  | 2.5 mm <sup>2</sup>        |
| Connection cross-section AWG       | 24 – 13                    |

#### Technical Drawings – Subject to Alterations



Connection diagram 9170/11-14-12

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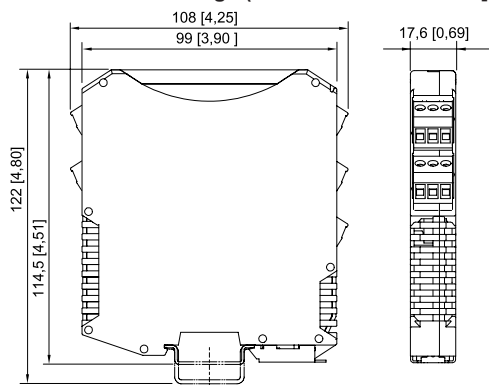
Switching repeater

Ex i field circuit

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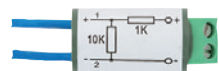
## Dimensional Drawings (All Dimensions in mm [inches]) – Subject to Alterations



ISpac Series 9146, 9147, 9160, 9162, 9163, 9165,  
9167, 9170, 9172, 9175, 9176, 9180, 9182, 9193,  
ISbus Series 9412 with screw terminal

## Accessories

### Resistance coupling element



Connection of additional contacts in the Ex area as well, in order to enable short circuit and open circuit detection.

### Art. No.

105944

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.