

# Isolators

## Switching repeater

### Ex i field circuit

9170/21-12-11k Art. No. 203151



- For use up to SIL 2 (IEC/EN 61508)
- A wire breakage and short-circuit monitoring system, which can be disconnected and includes messages
- Variants with line fault transparency: The device notifies the control system directly of any field-side line faults via the signal output

MY R. STAHL 9170A



The Series 9170 Ex i switching repeaters are used to operate contacts, NAMUR proximity switches and 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

Ex interface zone	0, 1, 2, 20, 21, 22
IECEX gas certificate	IECEX BVS 09.0041 X
IECEX gas certificate	IECEX BVS 09.0041 X
IECEX gas explosion protection	Ex [Ex ia Ga] IIC
IECEX dust certificate	IECEX BVS 09.0041 X
IECEX dust explosion protection	[Ex ia Da] IIIC
IECEX firedamp certificate	IECEX BVS 09.0041X
IECEX firedamp protection	[Ex ia Ma] I
ATEX gas certificate	DMT 02 ATEX E 195 X
ATEX gas certificate	DMT 02 ATEX E 195 X
ATEX gas explosion protection	Ex II (1) G Ex [Ex ia Ga] IIC
ATEX dust certificate	DMT 02 ATEX E 195 X
ATEX dust explosion protection	Ex II (1) D [Ex ia Da] IIIC
ATEX firedamp certificate	DMT 02 ATEX E 195 X
ATEX firedamp protection	Ex I (M1) [Ex ia Ma] I
FMus certificate	FM16US0122X
cFM certificate	FM16CA0067X
Marking cFMus	AIS Class I,II,III, Div. 1, Groups A,B,C,D,E,F,G; Class I, Zone 0, [AEx ia]/[Ex ia] IIC T4 at Ta = 70°C See Doc. 91 706 02 31 1
Certificates	ATEX (BVS), Brazil (ULB), Canada (FM), China (NEPSI), IECEX (BVS), India (PESO), Korea (KGS), SIL (exida), USA (FM)
Ship approval	CCS, EU RO MR (DNV)
Declaration of conformity	ATEX (EUK), China (CCC)
Installation	In safe areas

#### Explosion Protection

Further information	See relevant certificate and operating instructions
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#### 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 inductance $L_o$ for IIC	350 mH
Max. permissible external capacity $C_o$ for IIB	26 $\mu$ F
Max. permissible external inductance $L_o$ for IIB	1000 mH
Max. permissible external capacity $C_o$ for IIIC	26 $\mu$ F
Max. permissible external inductance $L_o$ for IIIC	1000 mH
Max. permissible external inductance $L_o$ for I	1000 mH
Max. voltage $U_o$ parallel	9.6 V
Max. current $I_o$ parallel	20 mA
Max. power $P_o$ parallel	48 mW
Safety-related max. voltage	253 V

#### Functional Safety

SIL	2
HFT	0
SFF	64%
Lambda SD	8 FIT
Lambda SU	120 FIT
Lambda DD	1 FIT
Lambda DU	72 FIT
$PFD_{avg}$ at $T_{proof}$ 1 year	3,44E-04
$PFD_{avg}$ at $T_{proof}$ 2 years	6,56E-04
$PFD_{avg}$ at $T_{proof}$ 5 years	1,59E-03
Further information	See safety manual and test report

#### Electrical Data

Number of channels	2
LFD relay	Yes
Max. short-circuit current	8.2 mA

#### Auxiliary Power

Auxiliary power	24 V DC
Auxiliary power voltage range	18 ... 31.2 V
Voltage range residual ripple	$\leq 3,6 V_{SS}$
Nominal current	55 mA
Power consumption	1.3 W
Max. power dissipation	1.3 W

#### Auxiliary Power

Polarity reversal protection	Yes
Undervoltage monitoring	Yes
Operation indication	LED

#### Galvanic Isolation

Test voltage as per standard	EN IEC 60079-11
Ex i input to output	1.5 kV AC
Ex i input to auxiliary power	1.5 kV AC
Ex i input to fault message contact	1.5 kV AC
Ex i input to Ex i input	500 V AC
Test voltage as per standard	EN 50178
Output to auxiliary power	1,1 kV AC
Output to output	1,1 kV AC
Fault message contact to auxiliary power	350 V AC
Fault message contact to output	1,1 kV AC

#### Input

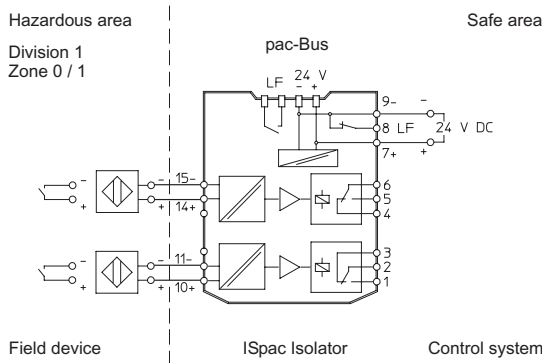
Input signal	As per EN 60947-5-6 (NAMUR)
Input current for ON	$\geq 2.1$ mA
Input current for OFF	$\leq 1.2$ mA
Hysteresis	Approx. 0.2 mA
Input internal resistance $R_i$	1000 $\Omega$
Input for open-circuit voltage $U_a$	8,2 V
Short-circuit current	$\leq 8.2$ mA

#### Output

Output per channel	1 change-over contact – power relay
Output	Change-over contact – power relay
Min. output load condition	12 V / 0.1 mA
Max. output DC load condition	250 V / 2 A
Max. output AC load condition	250 V / 4 A
Output switching capacity	50 W / 1000 VA
Output switching frequency	6 Hz
Switching delay ON/OFF	10 ms
Switching delay OFF/ON	10 ms
INV switch user adjustment	Activated/deactivated
Output electrical service life	$1 \times 10^5$ operating cycles at 250 V/4 A
Electrical service life note	Resistive load
Output mechanical service life	$15 \times 10^6$ operating cycles
Recommended back-up fuse	$\leq F 4$ A AC/2 A DC
Switching state indication	LED
LF switch user adjustment	Activated/deactivated
Wire breakage error detection input	$I_E < 0.05$ to 0.35 mA
Short circuit error detection input	$R_E < 100$ to 360 ohm
Behaviour of the output at line fault	OFF
Line fault indication	LED
Fault message contact switching capacity	30 V / 100 mA

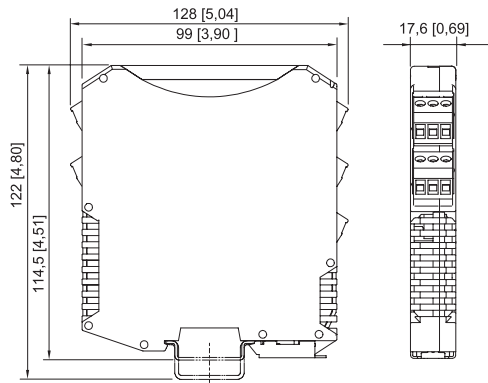
<b>Output</b>	
Line fault and loss of power signalisation	- Contact (30 V/100 mA), closed against earth in case of error - pac-Bus, potential-free contact (30 V/100 mA)
<b>Ambient Conditions</b>	
Ambient temperature	-20 °C ... +70 °C (Single device) -20 °C ... +60 °C (Group assembly)
Ambient temperature	-4 °F ... +158 °F (Single device) -4 °F ... +140 °F (Group assembly)
Note	Installation conditions influence the ambient temperature. Please observe the "Cabinet installation guide".
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 For use in industrial areas; NAMUR NE 21
<b>Mechanical Data</b>	
Degree of protection (IP)	IP30
Degree of protection (IP) terminals	IP20
Fire resistance (UL 94)	V0
Enclosure material	Polyamide
Grid dimension	17.6 mm
Width	17.6 mm
Width, inches	0.69 in
Height	114.5 mm
Height in inches	4.51 in
Length	128 mm
Length in inches	5.04 in
Weight	225 g
Weight	0.5 lb
<b>Mounting / Installation</b>	
Mounting type	DIN rail NS35/15, NS35/7.5
Mounting orientation	Vertical Horizontal
Connection type	Spring clamp 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 ... 14

#### Technical Drawings – Subject to Alterations



Connection diagram 9170/21-12-11

#### 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 spring clamp terminal

## Accessories

### Screw terminal with test tap

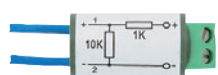


Additional connection of contacts also in hazardous areas to enable short-circuit and wire breakage detection.  
Mounting on DIN rail.

**Art. No.**

272381

### Resistive coupling element



Additional connection of contacts also in hazardous areas to enable short-circuit and wire breakage 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.