

# Isolators

## Switching repeater

Ex i field circuit

9170/21-14-12s Art. No. 203153



- 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

Application range (zones)	2
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 ec nC [ia Ga] IIC T4 Gc
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	⊕ II 3 (1) G Ex ec nC [ia Ga] IIC T4 Gc
ATEX dust certificate	DMT 02 ATEX E 195 X
ATEX dust explosion protection	⊕ II (1) D [Ex ia Da] IIIC
ATEX firedamp certificate	DMT 02 ATEX E 195 X
ATEX firedamp protection	⊕ I (M1) [Ex ia Ma] I
FMus certificate	FM16US0122X
cFM certificate	FM16CA0067X
Marking cFMus	Class I, Div. 2, Groups A,B,C,D; Class I, Zone 2, Group IIC 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), Korea (KGS), SIL (exida), USA (FM)
Ship approval	CCS, EU RO MR (DNV)

#### Explosion Protection

Declaration of conformity	ATEX (EUK), China (CCC)
Installation	In Zone 2, Division 2 and safe areas
Further information	See relevant 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 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	84%
Lambda SD	7 FIT
Lambda SU	106 FIT
Lambda DD	1 FIT
Lambda DU	21 FIT
$PFD_{avg}$ at $T_{proof}$ 1 year	1,00E-04
$PFD_{avg}$ at $T_{proof}$ 2 years	1,91E-04
$PFD_{avg}$ at $T_{proof}$ 5 years	4,65E-04
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	40 mA

#### Auxiliary Power

Power consumption	0.96 W
Max. power dissipation	0.96 W
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
Min. pulse duration (ON/OFF)	50 $\mu$ s

#### Output

Output per channel	1 LFT electronic output
Output	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 switching frequency	10 kHz
Switching delay ON/OFF	60 $\mu$ s
Switching delay OFF/ON	50 $\mu$ s
INV switch user adjustment	Activated/deactivated
Output electrical service life	$> 10^9$ at 35 V/50 mA
Electrical service life note	Resistive load All specifications given for switching times and frequencies apply to a load of 24 V, 1 mA to 50 mA 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

<b>Output</b>	
Behaviour of the output at line fault	OFF
Behaviour of the output at line fault note	Due to the special output circuit, line faults are transmitted directly via the signal channel to the downstream control level. Electronic output closed: $R = 2.4 \text{ k}\Omega$ Electronic output open: $R > 13 \text{ k}\Omega$ Error case (fault message contact open): $R > 100 \text{ k}\Omega$
Line fault indication	LED
Fault message contact switching capacity	30 V / 100 mA
Line fault and loss of power signalisation	- Contact in the output circuit (35 V / 50 mA) opens in case of fault - 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	108 mm
Length in inches	4.25 in
Weight	180 g
Weight	0.4 lb

<b>Mounting / Installation</b>	
Mounting type	DIN rail NS35/15, NS35/7.5
Mounting orientation	Vertical 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>

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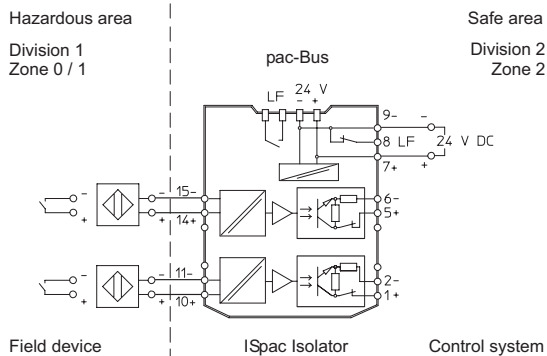


## Mounting / Installation

Connection cross-section AWG

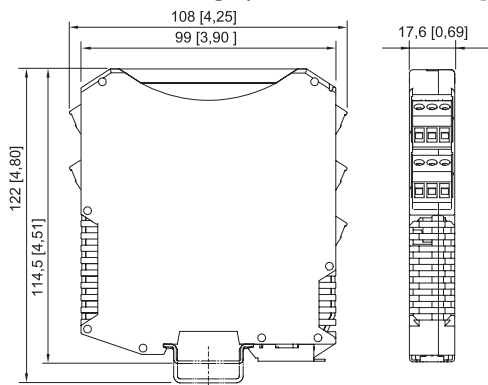
24 ... 14

## Technical Drawings – Subject to Alterations



Connection diagram 9170/21-14-12

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



ISpac Series 9143, 9146, 9147, 9160, 9162, 9163, 9165, 9167, 9170, 9172, 9175, 9176, 9180, 9182, 9193, ISbus Series 9412 with screw terminal

## Accessories

### Screw terminal with test tap

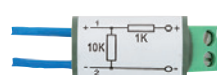


Additional connection of contacts also in hazardous areas to enable short-circuit and wire breakage detection. Mounting on DIN rail.

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.