

Isolators

Switching repeater

Ex i field circuit

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



- 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

Ex interface zone	0 1 2 20 21 22
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
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
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
EAC certificate	EAEU RU S-DE.HA91.B.00100/20
EAC gas explosion protection	Ex 2 Ex nA nC [ja Ga] IIC T4 Gc X
EAC dust explosion protection	Ex [Ex ia Da] IIIC X
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

Explosion Protection

Installation	in 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 μ F
Max. permissible external capacity C_o for IIB	26 μ 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
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Electrical Data

Number of channels	2
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	55 mA
Power consumption	1.3 W
Max. power dissipation	1.3 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
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
Galv. separation FMC to output	1,1 kV AC

Input

Input signal	As per EN 60947-5-6 (NAMUR)
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Input

Input current for ON	$\geq 2.1 \text{ mA}$
Input current for OFF	$\leq 1.2 \text{ mA}$
Hysteresis	Approx. 0.2 mA
Input internal resistance R_i	1000Ω
Input for open-circuit voltage U_a	$8,2 \text{ V}$
Short-circuit current	$\leq 8.2 \text{ mA}$

Output

Output per channel	1 change-over contact – power relay
Output	1 change-over contact – power relay
Min. output load condition	$12 \text{ V} / 0.1 \text{ mA}$
Max. output DC load condition	$250 \text{ V} / 2 \text{ A}$
Max. output AC load condition	$250 \text{ V} / 4 \text{ A}$
Output switching capacity	$50 \text{ W} / 1000 \text{ VA}$
Output electrical service life	1×10^5 operating cycles at $250 \text{ V} / 4 \text{ A}$
Output mechanical service life	15×10^6 operating cycles
Recommended back-up fuse	$\leq F 4 \text{ A AC} / 2 \text{ A DC}$
Output switching frequency	6 Hz
Switching delay ON/OFF	10 ms
Switching delay OFF/ON	10 ms
INV switch user adjustment	Activated/deactivated
Switching state indication	Yellow "OUT" LED per channel
Fault message contact switching capacity	$30 \text{ V} / 100 \text{ mA}$
LF switch user adjustment	Activated/deactivated
Indication of line fault	Red "LF" LED for each channel
Wire breakage error detection	$I_E < 0.05 \text{ to } 0.35 \text{ mA}$
Short circuit error detection	$R_E < 100 \text{ to } 360 \text{ ohm}$
Line fault and loss of power signalisation	- Contact ($30 \text{ V} / 100 \text{ mA}$) closed to ground in case of fault - pac-Bus, floating contact ($30 \text{ V} / 100 \text{ mA}$)

Ambient Conditions

Ambient temperature	$-20 \text{ }^\circ\text{C} \dots +70 \text{ }^\circ\text{C}$ (Single device) $-20 \text{ }^\circ\text{C} \dots +60 \text{ }^\circ\text{C}$ (Group assembly)
Ambient temperature	$-4 \text{ }^\circ\text{F} \dots +158 \text{ }^\circ\text{F}$ (Single device) $-4 \text{ }^\circ\text{F} \dots +140 \text{ }^\circ\text{F}$ (Group assembly)
Storage temperature	$-40 \text{ }^\circ\text{C} \dots +80 \text{ }^\circ\text{C}$
Storage temperature	$-40 \text{ }^\circ\text{F} \dots +176 \text{ }^\circ\text{F}$
Maximum relative humidity	95%
Use at the height of	$< 2000 \text{ m}$
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
Grid dimension	17.6 mm

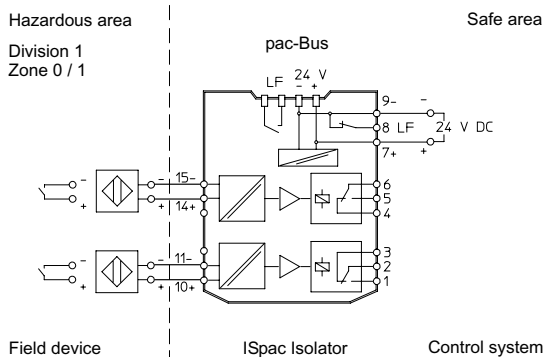
Mechanical Data

Width	17.6 mm
Width, inches	0.69 in
Height	114.5 mm
Height, inches	4.51 in
Length	128 mm
Length, inches	5.04 in
Weight	0.225 kg
Weight	0.5 lb

Mounting / Installation

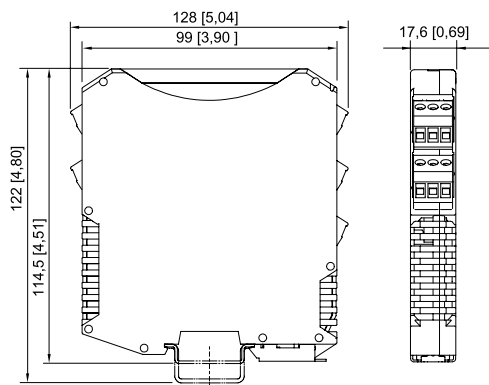
Mounting type	DIN rail NS35/15, NS35/7.5
Mounting orientation	Vertical Horizontal
Connection type	Spring clamp terminal
Min. rigid conductor cross section	0.2 mm ²
Max. rigid conductor cross section	2.5 mm ²
Min. flex conductor cross section	0.2 mm ²
Max. flex conductor cross section	2.5 mm ²
Connection cross-section AWG	24 – 13

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

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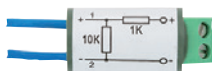
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Accessories

Resistance coupling element

Art. No.



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

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