

# Isolators

## Isolating repeater

Ex i field circuit ISpac

9165/16-11-11s Art. No. 201270



- Compact single- and dual-channel Ex i output isolating repeater
- Variants with wire-breakage and short-circuit monitoring system, which can be disabled and features a signalling contact
- Can be used up to SIL 2 (IEC/EN 61508)

WebCode **9165A**



9165 series isolating repeaters can be used for the intrinsically safe operation of control valves, I/P transducers or indicators. They transmit superimposed HART communication signals in both directions. The input, output and auxiliary power are galvanically separated from one another. The channels in the two-channel variants are galvanically separated from one another.

### Technical Data

Explosion Protection	
Application range (zones)	2
Ex interface zone	0 1 2 20 21 22
IECEX gas certificate	IECEX BVS 10.0011 X
IECEX gas explosion protection	Ex nA nC [ia Ga] IIC T4 Gc
IECEX dust certificate	IECEX BVS 10.0011 X
IECEX dust explosion protection	[Ex ia Da] IIIC
ATEX gas certificate	DMT 03 ATEX E 012 X
ATEX gas explosion protection	Ex II 3 (1) G Ex nA nC [ia Ga] IIC T4 Gc
ATEX dust certificate	DMT 03 ATEX E 012 X
ATEX dust explosion protection	Ex II (1) D [Ex ia Da] IIIC
FMus certificate	FM16US0122X
cFM certificate	FM16CA0067X
Marking cFMus	Class I, Div. 2, Groups A,B,C,D; Class I, Zone 2, AEx/Ex nA nC 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. 91 656 01 31 1
EAC certificate	TS RU S-DE.GB04.B.00353
EAC gas explosion protection	Ex II 2 Ex nA nC [ia Ga] IIC T4 Gc X
EAC dust explosion protection	[Ex ia Da] IIIC
Certificates	ATEX (BVS), Canada (FM), EAC (ENDCE), IECEX (BVS), India (PESO), Korea (KTL), Russia (Meteorological certificate), SIL (exida), USA (FM)

#### Explosion Protection

Ship approval	CCS, EU RO MR (DNV GL)
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#### Safety Data

Max. voltage $U_o$	25.6 V
Max. current $I_o$	96 mA
Max. power $P_o$	605 mW
Max. permissible external capacity $C_o$ for IIC	0.103 $\mu$ F
Max. permissible external capacity $C_o$ for IIB	0.8 $\mu$ F
Max. permissible external inductance $L_o$ for IIC	1.9 mH
Max. permissible external inductance $L_o$ for IIB	11 mH
Internal capacitance	Negligible
Internal inductance	Negligible
Safety-related max. voltage	253 V

#### Functional Safety

SIL	2
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#### Electrical Data

Number of channels	1
LFD relay	Yes
Communication signal	HART

#### Auxiliary Power

Auxiliary power	24 V DC
Nominal voltage	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	1.1 W
Polarity reversal protection	Yes
Operation indication	Green "PWR" LED

#### Galvanic Isolation

Test voltage as per standard	IEC EN 60079-11
Galvanic separation Ex i OFF to FMC	1.5 kV AC
Galvanic separation Ex i OFF to HE	1.5 kV AC
Galvanic separation Ex i OFF to ON	1.5 kV AC
Test voltage as per standard 2	EN 50178
Fault message contact to auxiliary power	350 V AC
ON to HE galvanic separation	350 V AC
FMC to ON galvanic separation	350 V AC

#### Input

Input	0/4 to 20 mA with HART
Input signal	0/4 to 20 mA with HART
Function range input	0 – 24 mA

#### Input

Max. input current	50 mA
Input resistance	175/400 Ω
LF response threshold	$I_E > 3.6 \text{ mA}$
Behaviour of the input with LF	$RE \geq 100 \text{ k}\Omega$

#### Output

Output	0/4 to 20 mA with HART
Output signal	0/4 to 20 mA with HART
Function range output	0 – 24 mA
Max. load resistance $R_L$	800 Ω
Min. $R_L$ for KS detection	150 Ω
Output residual ripple	$\leq 50 \text{ mV}$
Open-circuit voltage $U_a$	22,5 V
Settling time 10-90%	$\leq 100 \mu\text{s}$
Average measurement fault	0,10%
Temperature influence error limits	$\leq 0.05\%/10 \text{ K}$
LF switch user adjustment	Activated/deactivated
Indication of line fault	Red "LF" LED
Wire breakage error detection	$U_A > 16 \text{ V}$
Short circuit error detection	$R_L < 50 \text{ ohm}$
Line fault and loss of power signalisation	- Contact (30 V / 100 mA) closed to ground in case of fault - pac-Bus, floating contact (30 V / 100 mA)

#### Ambient Conditions

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)
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

#### Mechanical Data

Degree of protection (IP)	IP30
Terminal degree of prot. (IP)	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, inches	4.51 in
Length	108 mm
Length, inches	4.25 in
Weight	0.18 kg

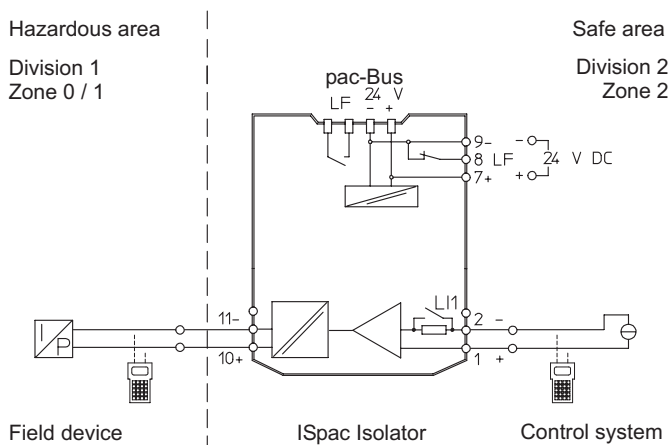
#### Mechanical Data

Weight	0.4 lb
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#### Mounting / Installation

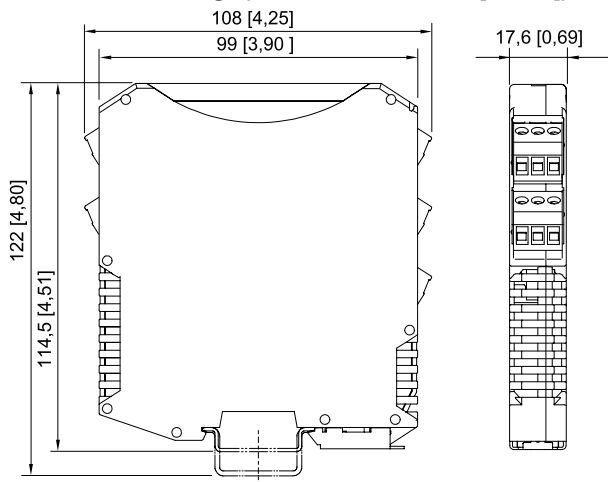
Mounting type	DIN rail NS35/15, NS35/7.5
Mounting orientation	Horizontal Vertical
Connection type	Screw terminal
Min. rigid conductor cross section	0.2 mm <sup>2</sup>
Max. rigid conductor cross section	2.5 mm <sup>2</sup>
Min. flex conductor cross section	0.2 mm <sup>2</sup>
Max. flex conductor cross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

#### Technical Drawings – Subject to Alterations



Connection diagram 9165/16-11-11

#### 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 screw terminal

#### Accessories

Front cover

Art. No.


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	for ISpac modules 91xx yellow, transparent Clear marking of the device for SIL applications. (Packaging unit: 10 pieces)	200914
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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.