

# Isolators

## Isolating repeater

Ex i field circuit ISpac

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



- Compact one- two-channel Ex i output isolating repeater
- Variants with a wire breakage and short-circuit monitoring system, which can be disconnected and includes message contact
- For use up to SIL 2 (IEC/EN 61508)

MY R. STAHL 9165A



The Series 9165 Ex i isolating repeaters are used for the intrinsically safe operation of control valves, I/P converters and indicators. They transmit superimposed HART communication signals in both directions. The input, output and auxiliary power are galvanically separated from one another. The two 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 [ja 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	⊕ II 3 (1) G Ex nA nC [ja Ga] IIC T4 Gc
ATEX dust certificate	DMT 03 ATEX E 012 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; 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
Certificates	ATEX (BVS), Canada (FM), China (NEPSI), IECEX (BVS), Korea (KTL), SIL (exida), USA (FM)
Ship approval	CCS, EU RO MR (DNV)
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 <sub>o</sub>	25.6 V
Max. current I <sub>o</sub>	96 mA

#### Safety Data

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

#### Functional Safety

SIL	2
HFT	0
SFF	72%
Lambda SD	0 FIT
Lambda SU	0 FIT
Lambda DD	150 FIT
Lambda DU	58 FIT
$PFD_{avg}$ at $T_{proof}$ 1 year	3,63E-04
$PFD_{avg}$ at $T_{proof}$ 3 years	8,40E-04
$PFD_{avg}$ at $T_{proof}$ 5 years	1,32E-03
$PFD_{avg}$ at $T_{proof}$ 10 years	2,51E-03
Further information	See test report

#### 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
Undervoltage monitoring	Yes
Operation indication	Green "PWR" LED

#### Galvanic Isolation

Test voltage as per standard	EN IEC 60079-11
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#### Galvanic Isolation

Ex i output to fault message contact	1.5 kV AC
Ex i output to auxiliary power	1.5 kV AC
Ex i output to input	1.5 kV AC
Test voltage as per standard	EN 50178
Fault message contact to auxiliary power	350 V AC
Input to auxiliary power	350 V AC
Fault message contact to input	350 V AC

#### Input

Input	0/4 ... 20 mA with HART
Input signal	0/4 to 20 mA with HART
Function range input	0 – 24 mA
Maximum input current	50 mA
Input resistance	175/400 $\Omega$
Behaviour of the input with line fault	RE $\geq$ 100 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
Open-circuit voltage $U_a$	22,5 V
Output residual ripple	$\leq$ 50 mV
Load resistance $R_L$	0 ... 800 $\Omega$
Settling time 10-90%	$\leq$ 100 $\mu$ s
LF switch user adjustment	Activated/deactivated
Line fault response threshold	$I_E > 3.6$ mA
Min. RL for KS detection	150 $\Omega$
Wire break. err detection OFF	UA > 16 V
Short circuit error detection output	RL < 50 ohm
Line fault indication	Red "LF" LED
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)
Deviations / error note	Information in % of the measuring range (20 mA) at $U_N$ , 23 $^{\circ}$ C
Average measurement fault	0,10%
Temperature influence error limits	$\leq$ 0.05%/10 K

#### Ambient Conditions

Ambient temperature	-20 $^{\circ}$ C ... +70 $^{\circ}$ C (Single device) -20 $^{\circ}$ C ... +60 $^{\circ}$ C (Group assembly)
Ambient temperature	-4 $^{\circ}$ F ... +158 $^{\circ}$ F (Single device) -4 $^{\circ}$ F ... +140 $^{\circ}$ F (Group assembly)
Note	Installation conditions influence the ambient temperature. Please observe the "Cabinet installation guide".
Storage temperature	-40 $^{\circ}$ C ... +80 $^{\circ}$ C
Storage temperature	-40 $^{\circ}$ F ... +176 $^{\circ}$ 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

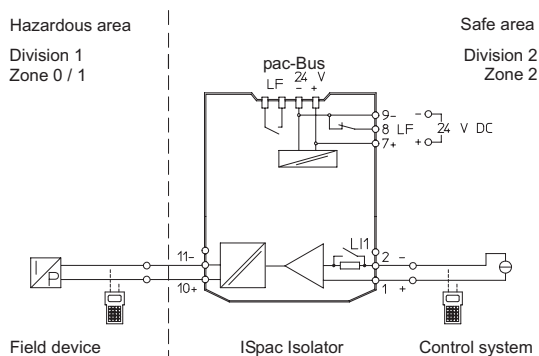
#### Mechanical Data

Degree of protection (IP)	IP30
Degree of protection (IP) terminals	IP20
Fire resistance (UL 94)	V0
Enclosure material	Polyamide
Grid dimension	17.6 mm
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

#### 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 ... 14

#### Technical Drawings – Subject to Alterations



Connection diagram 9165/16-11-11

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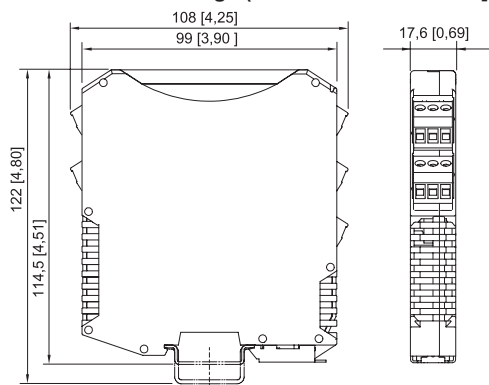
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#### Dimensional Drawings (All Dimensions in mm [inches]) – Subject to Alterations



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

## Accessories

### Transparent cover



For 91xx ISpac modules  
Yellow, transparent  
Clear identification of the device for SIL applications.  
(Packaging unit: 10 pieces)

### Art. No.

200914

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.