

Isolators

Isolating repeater

Ex i field circuit ISpac

9165/16-11-11k Art. No. 201271



- 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 [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 |
| EAC certificate | TS RU S-DE.GB04.B.00353 |
| EAC gas explosion protection | ⊕ 2 Ex nA nC [ja 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) |
| Notes | CCC, UKCA certificate available from 2022 onward |

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 μ F |
| Max. permissible external capacity C_o for IIB | 0.8 μ 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 |
|-----|---|

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 |
| 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 to 20 mA with HART |
| Input signal | 0/4 to 20 mA with HART |

Input

| | |
|--------------------------------|--------------------------------|
| Function range input | 0 – 24 mA |
| Maximum input current | 50 mA |
| Input resistance | 175/400 Ω |
| LF response threshold | $I_E > 3.6 \text{ mA}$ |
| Behaviour of the input with LF | $R_E \geq 100 \text{ k}\Omega$ |

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) (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 |
| 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, inches | 4.51 in |
| Length | 128 mm |
| Length, inches | 5.04 in |
| Weight | 0.18 kg |

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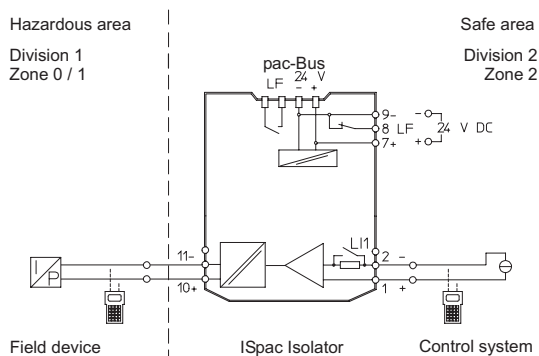
Mechanical Data

| | |
|--------|--------|
| Weight | 0.4 lb |
|--------|--------|

Mounting / Installation

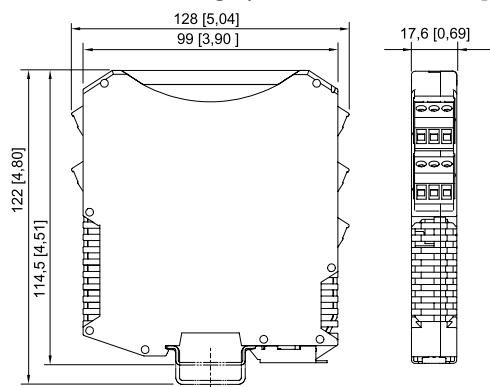
| | |
|------------------------------------|----------------------------|
| Mounting type | DIN rail NS35/15, NS35/7.5 |
| Mounting orientation | Horizontal Vertical |
| Connection type | Spring clamp terminal |
| Min. rigid conductor cross section | 0.2 mm ² |
| Max. rigid conductor cross section | 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 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 spring clamp terminal

Accessories

Front cover

| | Art. No. |
|---|----------|
| for ISpac modules 91xx yellow, transparent Clear marking of the device for SIL applications. (Packaging unit: 10 pieces) | 200914 |

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