

# Isolators

Isolating repeater Without auxiliary power

Ex i field circuit ISpac

9167/23-11-00s Art. No. 160247



- Loop-powered Ex i output isolating repeater
- Suitable for fire and gas detectors
- Suitable for loads of up to 800  $\Omega$

MY R. STAHL 9167A



The Series 9167 Ex i isolating repeaters for field circuits operate without auxiliary power and can be used for the intrinsically safe operation of control valves, I/P converters, analogue indicators and fire or gas detectors, for example. The devices have one or two channels and transmit HART signals (0/4 to 20 mA) via the analogue output. The devices transmit superimposed HART communication signals in both directions.

## Technical Data

### Explosion Protection

|                                 |                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Application range (zones)       | 2                                                                                                                                                                                                     |
| Ex interface zone               | 0, 1, 2, 20, 21, 22                                                                                                                                                                                   |
| IECEx gas certificate           | IECEx BVS 11.0089 X                                                                                                                                                                                   |
| IECEx gas explosion protection  | Ex nA [ia Ga] IIC T4 Gc                                                                                                                                                                               |
| IECEx dust certificate          | IECEx BVS 11.0089 X                                                                                                                                                                                   |
| IECEx dust explosion protection | [Ex ia Da] IIIC                                                                                                                                                                                       |
| ATEX gas certificate            | BVS 04 ATEX E 082 X                                                                                                                                                                                   |
| ATEX gas explosion protection   | II 3 (1) G Ex nA [ia Ga] IIC T4 Gc                                                                                                                                                                    |
| ATEX dust certificate           | BVS 04 ATEX E 082 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;<br>Class I, Zone 2, Group IIC<br>AIS Class I,II,III, Div. 1, Groups A,B,C,D,E,F,G;<br>Class I, Zone 0, [AEx/Ex ia] IIC<br>T4 at Ta = 70°C<br>See Doc. 91 676 01 31 1 |
| Certificate ULus                | E81680V1S7                                                                                                                                                                                            |
| Marking ULus                    | providing intrinsically safe circuits for use in<br>Class I,II,III, GROUPS A,B,C,D,E,F,G;<br>See Doc. 91 676 01 31 3                                                                                  |
| Certificates                    | ATEX (BVS), Canada (FM), IECEx (BVS), SIL (exida), USA (FM), USA (UL)                                                                                                                                 |
| Ship approval                   | CCS, EU RO MR (DNV)                                                                                                                                                                                   |
| Declaration of conformity       | ATEX (EUK)                                                                                                                                                                                            |
| Installation                    | In Zone 2, Division 2 and safe areas                                                                                                                                                                  |
| Further information             | See relevant certificate and operating instructions                                                                                                                                                   |

#### Safety Data

|                                                    |              |
|----------------------------------------------------|--------------|
| Max. voltage $U_o$                                 | 25 V         |
| Max. current $I_o$                                 | 99 mA        |
| Max. power $P_o$                                   | 613 mW       |
| Max. permissible external capacity $C_o$ for IIC   | 0.11 $\mu$ F |
| Max. permissible external inductance $L_o$ for IIC | 2.5 mH       |
| Max. permissible external capacity $C_o$ for IIB   | 0.84 $\mu$ F |
| Max. permissible external inductance $L_o$ for IIB | 11 mH        |
| Max. perm. ext. capacit. IIIC                      | 0.84 $\mu$ F |
| Max. permis. ext. induct. IIIC                     | 11 mH        |
| Internal capacitance                               | Negligible   |
| Internal inductance                                | Negligible   |
| Safety-related max. voltage                        | 253 V        |

#### Functional Safety

|                                                  |                 |
|--------------------------------------------------|-----------------|
| PFD <sub>avg</sub> at T <sub>proof</sub> 3 years | 4,34E-04        |
| Further information                              | See test report |

#### Electrical Data

|                      |      |
|----------------------|------|
| Number of channels   | 2    |
| LFD relay            | No   |
| Communication signal | HART |

#### Auxiliary Power

|                                 |              |
|---------------------------------|--------------|
| Auxiliary power                 | without      |
| Nominal voltage                 | Loop-powered |
| Auxiliary power voltage range   | Loop-powered |
| Max. power dissipation at 20 mA | 0.4 W        |
| Max. power dissipation at 40 mA | 1.2 W        |
| Polarity reversal protection    | Yes          |

#### Galvanic Isolation

|                              |                 |
|------------------------------|-----------------|
| Test voltage as per standard | EN IEC 60079-11 |
| Ex i output to input         | 1.5 kV AC       |
| Ex i output to Ex i output   | 350 V AC        |
| Test voltage as per standard | EN 50178        |
| Input to input               | 500 V AC        |

#### Input

|                                       |                         |
|---------------------------------------|-------------------------|
| Input                                 | 0/4 ... 20 mA with HART |
| Input signal                          | 0/4 to 20 mA with HART  |
| Function range input                  | 0 – 40 mA               |
| Input voltage $U_E$                   | $\leq 31.2$ V           |
| Max. effective voltage                | 23.6 V                  |
| Internal resistance $R_{i1}$ at 20 mA | 380 $\Omega$            |
| Internal resistance $R_{i1}$ at 40 mA | 330 $\Omega$            |
| Additional voltage drop               | 1 V                     |

#### Input

|                                |                       |
|--------------------------------|-----------------------|
| Internal consumption           | $\leq 10 \mu\text{A}$ |
| Behaviour of the input with DB | $\leq 1 \text{ mA}$   |

#### Output

|                                           |                                                                  |
|-------------------------------------------|------------------------------------------------------------------|
| Output                                    | 0/4 to 20 mA with HART                                           |
| Output signal                             | 0/4 to 20 mA with HART                                           |
| Function range output                     | 0 – 40 mA                                                        |
| Output short-circuit current              | $\leq 60 \text{ mA}$                                             |
| Open-circuit voltage $U_a$                | 25 V                                                             |
| Current residual ripple                   | $\leq 0.5\%$                                                     |
| Load resistance $R_L$                     | 0 ... 800 $\Omega$                                               |
| Load at 24 mA short circuit detection=OFF | Z1                                                               |
| Settling time 10-90%                      | $\leq 1 \text{ ms}$                                              |
| Cross-talk channel 1 / channel 2          | Not measurable                                                   |
| Wire break. err detection OFF             | $I_A = 0 \text{ mA}$                                             |
| Deviations / error note                   | Information in % of the measuring range (20 mA) at $U_N$ , 23 °C |
| Average measurement fault                 | 0,35%                                                            |
| Temperature influence error limits        | $\leq 0.1\%/10 \text{ K}$                                        |

#### Ambient Conditions

|                               |                                                                                                                |
|-------------------------------|----------------------------------------------------------------------------------------------------------------|
| Ambient temperature           | -20 °C ... +70 °C (Single device)<br>-20 °C ... +60 °C (Group assembly)                                        |
| Ambient temperature           | -4 °F ... +158 °F (Single device)<br>-4 °F ... +140 °F (Group assembly)                                        |
| Note                          | Installation conditions influence the ambient temperature.<br>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;<br>NAMUR NE 21      |

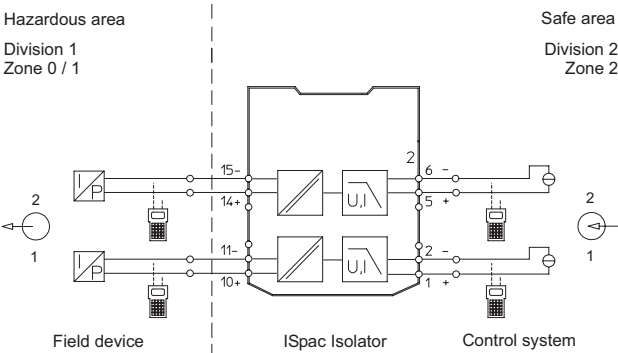
#### Mechanical Data

|                                       |                     |
|---------------------------------------|---------------------|
| Degree of protection (IP)             | IP30                |
| Degree of protection (IP) terminals   | IP20                |
| Fire resistance (UL 94)               | V0                  |
| Enclosure material                    | Polyamide           |
| Min. rigid conductor cross section    | 0.2 mm <sup>2</sup> |
| Max. rigid conductor cross section    | 2.5 mm <sup>2</sup> |
| Min. flexible conductor cross section | 0.2 mm <sup>2</sup> |
| Max. flexible conductor cross section | 2.5 mm <sup>2</sup> |
| 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             |

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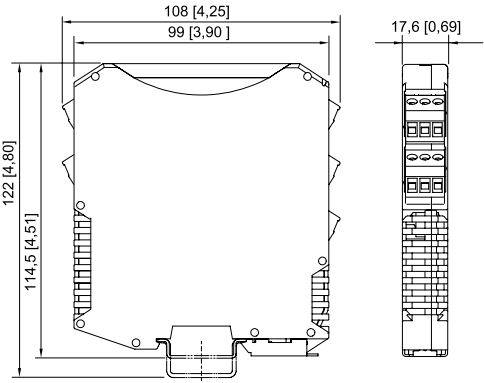
|                              |                            |
|------------------------------|----------------------------|
| Mechanical Data              |                            |
| Weight                       | 182 g                      |
| Weight                       | 0.4 lb                     |
| Mounting / Installation      |                            |
| Mounting type                | DIN rail NS35/15, NS35/7.5 |
| Grid dimension               | 17.6 mm                    |
| Mounting orientation         | Horizontal<br>Vertical     |
| Connection type              | Screw terminal             |
| Connection cross-section AWG | 24 ... 14                  |

Technical Drawings – Subject to Alterations



Connection diagram 9167/2

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

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.