

# Isolators

Binary output

Ex i field circuit

9175/20-16-11s Art. No. 160419



- Extensive portfolio – the ideal solution for solenoid valves and signalling devices
- Two-channel variants reduce the amount of space required
- Wire breakage and short-circuit monitoring, can be fully disconnected

MY R. STAHL 9175A



The Series 9175 binary outputs transmit binary signals via one or two channels for the intrinsically safe operation of Ex i solenoid valves, indicator lamps and horns. The devices feature three-way galvanic separation. A wire-breakage and short-circuit monitoring system, which can be disconnected, directly monitors the status of the field circuit.

## Technical Data

### Explosion Protection

|                                 |                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Application range (zones)       | 2                                                                                                                                                                                                                                              |
| Ex interface zone               | 0, 1, 2, 20, 21, 22                                                                                                                                                                                                                            |
| IECEx gas certificate           | IECEx BVS 10.0050 X                                                                                                                                                                                                                            |
| IECEx gas explosion protection  | Ex ec nC [ia Ga] IIC T4 Gc                                                                                                                                                                                                                     |
| IECEx dust certificate          | IECEx BVS 10.0050 X                                                                                                                                                                                                                            |
| IECEx dust explosion protection | [Ex ia Da] IIIC                                                                                                                                                                                                                                |
| ATEX gas certificate            | DMT 03 ATEX E 043 X                                                                                                                                                                                                                            |
| ATEX gas explosion protection   | II 3 (1) G Ex ec nC [ia Ga] IIC T4 Gc                                                                                                                                                                                                          |
| ATEX dust certificate           | DMT 03 ATEX E 043 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 Mounting vert. at Ta = 70°C , or horizontal Ta = 60°C<br>See Doc. 91 756 01 31 1 |
| cULus certificate               | E81680V1S7                                                                                                                                                                                                                                     |
| Marking cULus                   | prov. intr. safe circ. f.u.in Class I,II,III, Groups A,B,C,D,E,F,G;<br>See Doc. 91 756 01 31 3                                                                                                                                                 |
| Certificates                    | ATEX (BVS), Brazil (ULB), Canada (FM), China (NEPSI), IECEx (BVS), Korea (KTL), SIL (exida), USA (FM), USA (UL)                                                                                                                                |
| Ship approval                   | CCS, EU RO MR (DNV)                                                                                                                                                                                                                            |
| Declaration of conformity       | ATEX (EUK)                                                                                                                                                                                                                                     |

### Safety Data

|                            |        |
|----------------------------|--------|
| Max. voltage $U_o$         | 27.6 V |
| Max. current $I_o$ (Ex ia) | 110 mA |

### Safety Data

|                                                                        |                                                                             |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Max. current $I_o$ (Ex ib)                                             | 50 mA                                                                       |
| Max. power $P_o$                                                       | 760 mW                                                                      |
| Max. permissible external capacity $C_o$ for IIC                       | 0.085 $\mu$ F                                                               |
| Max. permissible external inductance $L_o$ for IIC                     | 1.2 mH                                                                      |
| Max. permissible external capacity $C_o$ for IIB                       | 0.667 $\mu$ F                                                               |
| Max. permissible external inductance $L_o$ for IIB                     | 9 mH                                                                        |
| Internal capacitance                                                   | 1.1 nF                                                                      |
| Internal capacitance                                                   | 1.1 nF                                                                      |
| Internal inductance                                                    | Negligible                                                                  |
| Max. voltage $U_o$ parallel                                            | 27.6 V                                                                      |
| Max. power $P_o$ parallel                                              | 1520 mW                                                                     |
| Max. current $I_o$ (Ex ia) paral.                                      | 220 mA                                                                      |
| Max. current $I_o$ (Ex ib) paral.                                      | 100 mA                                                                      |
| Internal capacitance parallel                                          | 2.2 nF                                                                      |
| Internal inductance parallel                                           | negligible                                                                  |
| Safety-related max. voltage                                            | 253 V                                                                       |
| Intrinsically safe limiting values inductance $L_o$ /capacitance $C_o$ | Max. connectable inductance $L_o$ /capacitance $C_o$<br>2 parallel channels |
| IIC $L_o$ [mH]<br>$C_o$ [ $\mu$ F]                                     |                                                                             |
| IIB $L_o$ [mH]<br>$C_o$ [ $\mu$ F]                                     | 1,8 mH<br>0.665 $\mu$ F                                                     |
| IIIC $L_o$ [mH]<br>$C_o$ [ $\mu$ F]                                    | 1.800 mH<br>0.665 $\mu$ F                                                   |

### Functional Safety

|                                    |          |
|------------------------------------|----------|
| SIL                                | 3        |
| HFT                                | 0        |
| SFF                                | 94%      |
| Lambda SU                          | 166 FIT  |
| Lambda DD                          | 0 FIT    |
| Lambda DU                          | 9 FIT    |
| $PFD_{avg}$ at $T_{proof}$ 1 year  | 4,25E-05 |
| $PFD_{avg}$ at $T_{proof}$ 2 years | 8,12E-05 |
| $PFD_{avg}$ at $T_{proof}$ 5 years | 1,97E-04 |

### Electrical Data

|                           |              |
|---------------------------|--------------|
| Number of channels        | 2            |
| LFD relay                 | Yes          |
| Internal resistance $R_i$ | 250 $\Omega$ |

### Auxiliary Power

|                               |                   |
|-------------------------------|-------------------|
| Auxiliary power               | 24 V DC           |
| Auxiliary power voltage range | 18 ... 31.2 V     |
| Voltage range residual ripple | $\leq 3,6 V_{ss}$ |

### Auxiliary Power

|                              |                 |
|------------------------------|-----------------|
| Nominal current              | 140 mA          |
| Power consumption            | 3.4 W           |
| Max. power dissipation       | 2.4 W           |
| Polarity reversal protection | Yes             |
| Undervoltage monitoring      | Yes             |
| Operation indication         | Green "PWR" LED |

### Galvanic Isolation

|                                          |                 |
|------------------------------------------|-----------------|
| Test voltage as per standard             | EN IEC 60079-11 |
| Galvanic separation Ex i output to FMC   | 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        |
| Input to input                           | 350 V AC        |
| Fault message contact to input           | 350 V AC        |

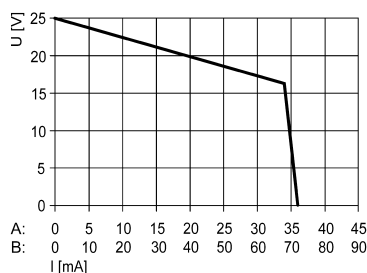
### Input

|                       |                               |
|-----------------------|-------------------------------|
| Input                 | In accordance with EN 61131-2 |
| Input voltage for ON  | 15 – 31.2 V                   |
| Input voltage for OFF | 0 – 5 V                       |
| Control current       | < 5 mA                        |

### Output

|                                            |                                                                                                                                                 |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Output open-circuit voltage $U_a$          | 25 V                                                                                                                                            |
| Max. output current $I_{a \max}$           | 35 mA                                                                                                                                           |
| $I_{off \max}$                             | 0 mA                                                                                                                                            |
| Max. output current $I_a$ note             | Parallel channels: 70 mA                                                                                                                        |
| Internal resistance $R_i$ note             | 250 $\Omega$ /parallel: 125 $\Omega$                                                                                                            |
| Output residual ripple                     | < 50 mV                                                                                                                                         |
| Output switching frequency                 | $\leq$ 200 Hz                                                                                                                                   |
| Switching delay ON/OFF                     | $\leq$ 1 ms                                                                                                                                     |
| Switching delay OFF/ON                     | $\leq$ 1 ms                                                                                                                                     |
| Switching state indication                 | Yellow "OUT" LED                                                                                                                                |
| LF switch user adjustment                  | Activated/deactivated                                                                                                                           |
| Wire break. err detection OFF              | > 30 k $\Omega$ / > 15 k $\Omega$                                                                                                               |
| Short circuit error detection output       | 50 ... 90 ohm $\pm$ 8 ohm/10 K                                                                                                                  |
| S-C para. error detection OFF              | 25 ... 45 ohm $\pm$ 8 ohm/10 K                                                                                                                  |
| Note on shrt-crct error det.               | relative to 23 °C                                                                                                                               |
| Test current                               | 0.23 mA (at 10-K $\Omega$ load)<br>1.5 mA (at 100- $\Omega$ load)                                                                               |
| Parallel channels test current             | 3 mA (at 100- $\Omega$ load)<br>0.46 mA (at 10-K $\Omega$ load)                                                                                 |
| Line fault indication                      | Red "LF" LED                                                                                                                                    |
| Fault message contact switching capacity   | 30 V / 100 mA                                                                                                                                   |
| Line fault and loss of power signalisation | - Contact (30 V/100 mA), closed against earth in case of error<br>- pac-Bus, potential-free contact (30 V/100 mA)                               |
| Note                                       | You can find a list of connectible Ex i solenoid valves on our homepage at <a href="http://www.r-stahl.com">www.r-stahl.com</a> (WebCode 9175A) |

9175/0-16-11; 9176/0-16-00 output characteristic



At  $U_N$ : -20 to +60 °C

X axis (I [mA])

A: Characteristic curve for each channel

B: Characteristic curve for channel 1, parallel channel 2 (only types 9175/20-...-...)

### Ambient Conditions

|                               |                                                                                                                |
|-------------------------------|----------------------------------------------------------------------------------------------------------------|
| Ambient temperature           | -20 °C ... +70 °C (Single device)<br>-20 °C ... 60 °C (Group assembly)                                         |
| Ambient temperature           | -4 °F ... +140 °F (Single device)<br>-4 °F ... +131 °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      |

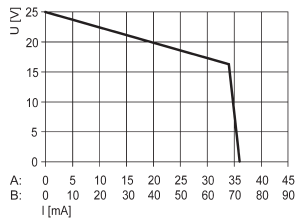
### Mechanical Data

|                                       |                     |
|---------------------------------------|---------------------|
| 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                                 | 17.6 mm             |
| Width, inches                         | 0.69 in             |
| Height                                | 114.5 mm            |
| Height                                | 114.5 mm            |
| Height in inches                      | 4.51 in             |
| Length                                | 108 mm              |
| Length in inches                      | 4.25 in             |
| Weight                                | 190 g               |
| Weight                                | 0.42 lb             |

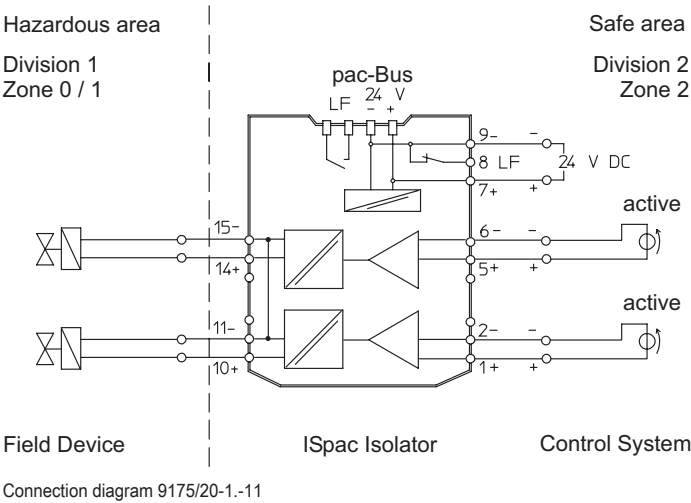
### Mounting / Installation

|                              |                            |
|------------------------------|----------------------------|
| Mounting type                | DIN rail NS35/15, NS35/7.5 |
| Grid dimension               | 17.6 mm                    |
| Mounting orientation         | Vertical<br>Horizontal     |
| Connection type              | Screw terminal             |
| Connection cross-section AWG | 24 ... 14                  |

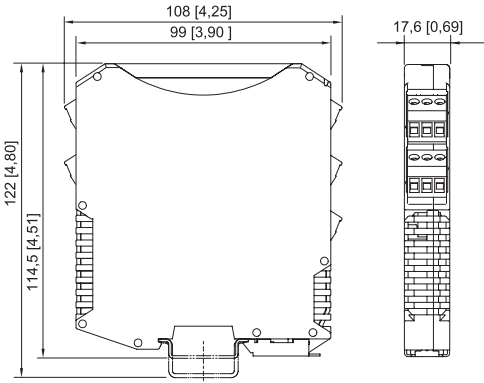
Technical Drawings – Subject to Alterations



9175/0-16-11; 9176/0-16-00 output characteristic

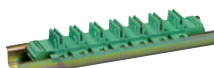


Dimensional Drawings (All Dimensions in mm [inches]) – Subject to Alterations



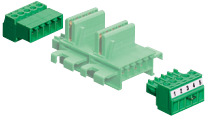
ISpac Series 9143, 9146, 9147, 9160, 9162, 9163, 9165, 9167, 9170, 9172, 9175, 9176, 9180, 9182, 9193, ISbus Series 9412 with screw terminal

Accessories

| Ex i/Ex e relay module for Zone 1                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Art. No. |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|  | <p>The Ex i/Ex e relay module is used for the galvanically isolated switching of intrinsically safe (Ex i) and non-Ex i (Ex e) electrical circuits.</p> <p>Coil circuit: Ex i or non-Ex i (Ex e)</p> <p>Contact circuit: Ex i or non-Ex i (Ex e)</p> <p>Thanks to the integrated safeguarding for the contact and coil circuit, additional safeguarding is not necessary.</p> <p>Usable with the following ISpac isolators: 9175/10-16-11, 9175/20-16-11, 9176/20-15-00, 9176/10-16-00, 9176/20-16-00, 9275/10-24-48-11, 9276/10-21-60-00, 9276/10-24-48-00</p> <p>Usable with the following IS1+ modules: 9475/32-04-22, 9475/32-08-62, 9475/33-08-60</p> | 273000   |
| pac-Bus                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Art. No. |
|  | Wiring auxiliary power and collective error message                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 160731   |

### Terminal set for pac-Bus

### Art. No.

|                                                                                  |                                                                                                                                                                                  |               |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
|  | <p>For the supply of 24 V DC auxiliary power via terminals (alternative to using the supply module 9193/21-11-11), with jumper for error message chain for ISpac module 91xx</p> | <p>160730</p> |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|

### Spare Parts

#### Screw terminal

#### Art. No.

|                                                                                   |                                                                                                 |               |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------|
|   | <p>3-pole plug, screw connector<br/>thread: M3<br/>stripping length: 7 mm<br/>colour: green</p> | <p>112817</p> |
|   | <p>3-pole plug, screw connector<br/>thread: M3<br/>stripping length: 7 mm<br/>colour: black</p> | <p>112816</p> |
|  | <p>3-pole plug, screw connector<br/>thread: M3<br/>stripping length: 7 mm<br/>colour: blue</p>  | <p>112818</p> |

#### Spring clamp terminal

#### Art. No.

|                                                                                    |                                                                                                         |               |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------|
|  | <p>3-pole plug with test tap, spring clamp connection<br/>stripping length: 10 mm<br/>colour: green</p> | <p>112825</p> |
|  | <p>3-pole plug with test tap, spring clamp connection<br/>stripping length: 10 mm<br/>colour: black</p> | <p>112824</p> |
|  | <p>3-pole plug with test tap, spring clamp connection<br/>stripping length: 10 mm<br/>colour: blue</p>  | <p>112826</p> |

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.