

# Isolators

## Resistance isolator

### Ex i field circuit ISpac

9180/11-77-11s Art. No. 160499



- 9180/.0 Ex i resistance isolator for Pt100 or 9180/.1 for Pt1000
- Only two-channel device in the world to require just 8.8 mm of space per channel
- For 2-, 3-, 4-wire connection

## MY R. STAHL 9180A



The Series 9180 Ex i resistance isolators are used for the intrinsically safe operation of Pt100 (9180/.0) or Pt1000 (9180/.1) resistance temperature detectors. The resistance measured at the input is transmitted to the output and can thereby be measured by an I/O card. The auxiliary power, output and intrinsically safe input are galvanically separated.

## Technical Data

| Explosion Protection                             |                                                                                                                                                                                                                           |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Application range (zones)                        | 2                                                                                                                                                                                                                         |
| Ex interface zone                                | 0, 1, 2, 20, 21, 22                                                                                                                                                                                                       |
| IECEX gas certificate                            | IECEX BVS 10.0055 X                                                                                                                                                                                                       |
| IECEX gas explosion protection                   | Ex ec nC [ia Ga] IIC T4 Gc                                                                                                                                                                                                |
| IECEX dust certificate                           | IECEX BVS 10.0055 X                                                                                                                                                                                                       |
| IECEX dust explosion protection                  | [Ex ia Da] IIIC                                                                                                                                                                                                           |
| ATEX gas certificate                             | BVS 05 ATEX E 176 X                                                                                                                                                                                                       |
| ATEX gas explosion protection                    | II 3 (1) G Ex ec nC [ia Ga] IIC T4 Gc                                                                                                                                                                                     |
| ATEX dust certificate                            | BVS 05 ATEX E 176 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, AEx/Ex nA nC Group IIC<br>AIS Class I,II,III, Div. 1, Groups A,B,C,D,E,F,G;<br>Class I, Zone 0, [AEx ia]/[Ex ia] IIC<br>T4 at Ta = 70°C<br>See Doc. 9180 6 031 001 1 |
| Certificates                                     | ATEX (BVS), Brazil (ULB), Canada (FM), China (NEPSI), IECEX (BVS), India (PESO), Korea (KTL), USA (FM)                                                                                                                    |
| Ship approval                                    | CCS, EU RO MR (DNV)                                                                                                                                                                                                       |
| Declaration of conformity                        | ATEX (EUK), China (CCC)                                                                                                                                                                                                   |
| Safety Data                                      |                                                                                                                                                                                                                           |
| Max. voltage $U_o$                               | 6.5 V                                                                                                                                                                                                                     |
| Max. current $I_o$                               | 16.5 mA                                                                                                                                                                                                                   |
| Max. power $P_o$                                 | 27 mW                                                                                                                                                                                                                     |
| Max. permissible external capacity $C_o$ for IIC | 25 $\mu$ F                                                                                                                                                                                                                |

#### Safety Data

|                                                                        |                                                         |               |               |               |               |
|------------------------------------------------------------------------|---------------------------------------------------------|---------------|---------------|---------------|---------------|
| Max. permissible external inductance $L_o$ for IIC                     | 120 mH                                                  |               |               |               |               |
| Max. permissible external capacity $C_o$ for IIB                       | 570 $\mu$ F                                             |               |               |               |               |
| Max. permissible external inductance $L_o$ for IIB                     | 450 mH                                                  |               |               |               |               |
| Max. perm. ext. capacit. IIIC                                          | 570 $\mu$ F                                             |               |               |               |               |
| Max. permis. ext. induct. IIIC                                         | 450 mH                                                  |               |               |               |               |
| Internal capacitance                                                   | Negligible                                              |               |               |               |               |
| Internal inductance                                                    | Negligible                                              |               |               |               |               |
| Safety-related max. voltage                                            | 253 V                                                   |               |               |               |               |
| Intrinsically safe limiting values inductance $L_o$ /capacitance $C_o$ | Jointly connectable inductance $L_o$ /capacitance $C_o$ |               |               |               |               |
| IIC                                                                    | $L_o$ [mH]                                              | 50 mH         | 5 mH          | 1 mH          | 0.200 mH      |
|                                                                        | $C_o$ [ $\mu$ F]                                        | 1.100 $\mu$ F | 1.700 $\mu$ F | 2.300 $\mu$ F | 3.400 $\mu$ F |
| IIB                                                                    | $L_o$ [mH]                                              | 100 mH        | 20 mH         | 2 mH          | 0.500 mH      |
|                                                                        | $C_o$ [ $\mu$ F]                                        | 5.300 $\mu$ F | 6.900 $\mu$ F | 11 $\mu$ F    | 1.500 $\mu$ F |
| IIIC                                                                   | $L_o$ [mH]                                              | 100 mH        | 20 mH         | 2 mH          | 0.500 mH      |
|                                                                        | $C_o$ [ $\mu$ F]                                        | 5.300 $\mu$ F | 6.900 $\mu$ F | 11 $\mu$ F    | 1.500 $\mu$ F |

#### Electrical Data

|                    |                      |
|--------------------|----------------------|
| Number of channels | 1                    |
| LFD relay          | Yes                  |
| Measuring range    | 180 to 3910 $\Omega$ |

#### Auxiliary Power

|                               |                   |
|-------------------------------|-------------------|
| Auxiliary power               | 24 V DC           |
| Nominal voltage               | 24 V DC           |
| Auxiliary power voltage range | 18 ... 31.2 V     |
| Voltage range residual ripple | $\leq 3,6 V_{ss}$ |
| Nominal current               | 27 mA             |
| Power consumption             | 0.65 W            |
| Max. power dissipation        | 0.6 W             |
| Polarity reversal protection  | Yes               |
| Undervoltage monitoring       | Yes               |
| Operation indication          | Green "PWR" LED   |

#### Galvanic Isolation

|                                          |                 |
|------------------------------------------|-----------------|
| Test voltage as per standard             | EN IEC 60079-11 |
| Ex i input to output                     | 1.5 kV AC       |
| Ex i input to auxiliary power            | 1.5 kV AC       |
| Ex i input to fault message contact      | 1.5 kV AC       |
| Test voltage as per standard             | EN 50178        |
| Output to auxiliary power                | 350 V AC        |
| Output to output                         | 350 V AC        |
| Fault message contact to auxiliary power | 350 V AC        |
| Fault message contact to output          | 350 V AC        |

#### Input

|                                           |                                                                         |
|-------------------------------------------|-------------------------------------------------------------------------|
| Sensor adjustment                         | DIP switch                                                              |
| Medium-resolution input                   | 0.2 $\Omega$                                                            |
| Input for resistance temperature detector | Pt 1000                                                                 |
| Connection type RTD input                 | 2-, 3- and 4-wire circuits                                              |
| 2-conductor adjustment                    | Via ADJ DIP switch                                                      |
| Sensor current RTD                        | 200 $\mu$ A ... 0.5 mA                                                  |
| Max. line resistance per wire RTD         | 50 $\Omega$ (2-wire connection)<br>100 $\Omega$ (3-, 4-wire connection) |

#### Output

|                                            |                                                                                                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Output signal                              | Equal to input signal (resistance value)                                                                          |
| Connection type RTD output                 | 2-, 3- and 4-wire circuits                                                                                        |
| Settling time output                       | < 10 ms                                                                                                           |
| Response time output                       | < 1 s                                                                                                             |
| Sensor current range                       | 200 $\mu$ A ... 0.5 mA                                                                                            |
| LF switch user adjustment                  | Activated/deactivated                                                                                             |
| Wire breakage error detection input        | > 3940 ohm                                                                                                        |
| Short circuit error detection input        | < 160 ohm                                                                                                         |
| Behaviour of output during LF              | > 10 k $\Omega$                                                                                                   |
| 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) |
| Deviations / error note                    | Information in % of the measuring range (20 mA) at U <sub>N</sub> , 23 °C                                         |
| Average measurement fault                  | < 0,1%                                                                                                            |
| Temperature influence                      | $\leq$ 0,1 %/10K                                                                                                  |

#### 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%                                                                                                            |
| Max. additional relative humidity | No condensation                                                                                                |
| Use at the height of              | < 2000 m                                                                                                       |
| Overvoltage category              | II                                                                                                             |
| Degree of pollution               | 2                                                                                                              |
| 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 |

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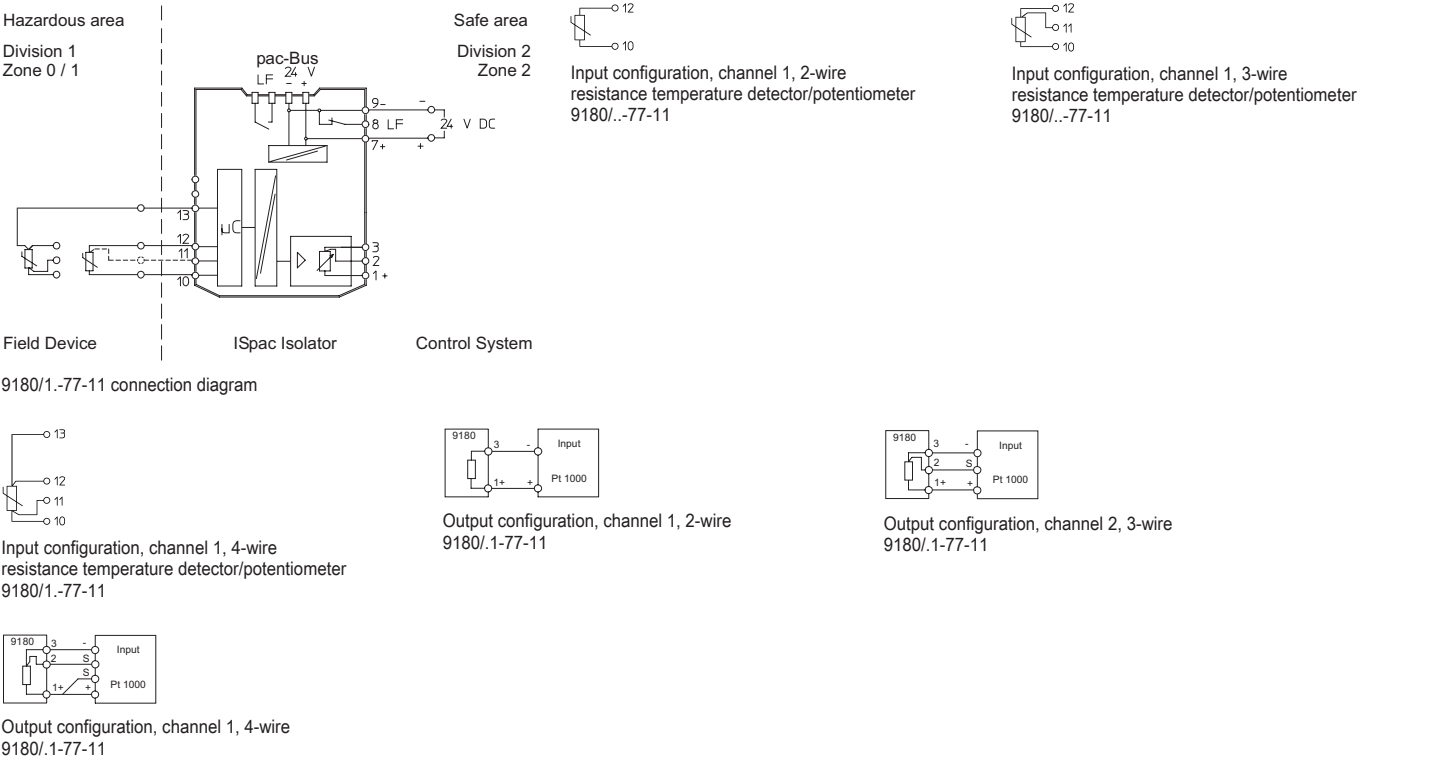
Mechanical Data

|                          |                                                                                                  |
|--------------------------|--------------------------------------------------------------------------------------------------|
| Connection cross-section | 0.2 to 2.5 mm² flexible<br>0.25 to 2.5 mm² flexible with core end sleeve<br>0.2 to 2.5 mm² rigid |
| Grid dimension           | 17.6 mm                                                                                          |
| Width                    | 17.6 mm                                                                                          |
| Width, inches            | 0.69 in                                                                                          |
| Height                   | 114.5 mm                                                                                         |
| Length                   | 108 mm                                                                                           |
| Length in inches         | 4.25 in                                                                                          |
| Mounting depth in inches | 4.51 in                                                                                          |
| Weight                   | 160 g                                                                                            |
| Weight                   | 0.35 lb                                                                                          |

Mounting / Installation

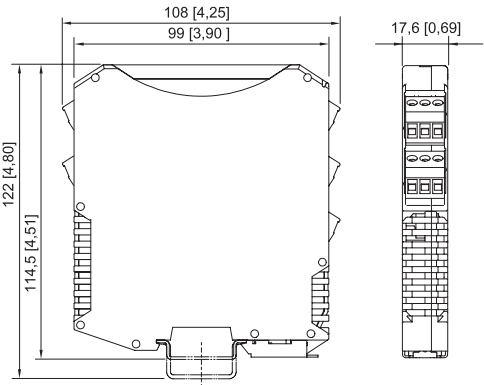
|                                    |                            |
|------------------------------------|----------------------------|
| Mounting type                      | DIN rail NS35/15, NS35/7.5 |
| Mounting orientation               | Vertical<br>Horizontal     |
| Connection type                    | Screw terminal             |
| Min. rigid conductor cross section | 0.2 mm²                    |
| Max. rigid conductor cross section | 2.5 mm²                    |
| Min. flex conductor cross section  | 0.2 mm²                    |
| Max. flex conductor cross section  | 2.5 mm²                    |
| Connection cross-section AWG       | 24 ... 14                  |

Technical Drawings – Subject to Alterations



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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                                                                 |                                                                                                                                          | Art. No. |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------|
|  | For 91xx ISpac modules<br>Yellow, transparent<br>Clear identification of the device for SIL applications.<br>(Packaging unit: 10 pieces) | 200914   |

Spare Parts

| Screw terminal                                                                     |                                                                                                           | Art. No. |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------|
|  | 3-pole plug, screw connector<br>thread:    M3<br>stripping length: 7 mm<br>colour:    black               | 112816   |
|  | 3-pole plug, screw connector<br>thread:    M3<br>stripping length: 7 mm<br>colour:    blue                | 112818   |
|  | 3-pole plug, screw connector<br>thread:    M3<br>stripping length: 7 mm<br>colour:    green               | 112817   |
| Screw terminal with test tap                                                       |                                                                                                           | Art. No. |
|  | 3-pole plug with test tap, screw connector<br>thread:    M3<br>stripping length: 7 mm<br>colour:    blue  | 113004   |
|  | 3-pole plug with test tap, screw connector<br>thread:    M3<br>stripping length: 7 mm<br>colour:    black | 113005   |

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