# Non - Ex i Isolators




06295E00

**Temperature Transmitter with Output 0/4 ... 20 mA and Limit Value Contact, SIL 2 (Field Circuit Non-Ex i) Type 9182/10-51-64**

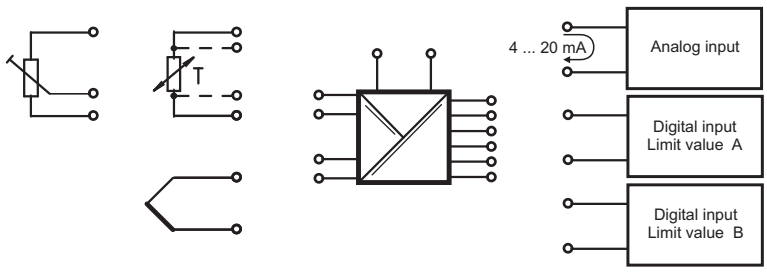
- One unit for nearly all temperature sensors indivdually configurable
- 1 channel
- Galvanic isolation between input, output, power supply and configuration interface
- Open-circuit and short-circuit monitoring and messaging (can be switched off)
- Simple configuration with PC
- Installation possible in Zone 2
- Can be used up to SIL 2 (IEC 61508)

| Zones | 0 | 1 | 2 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|
| Ex i interfaces | | | | | | |
| Installation in | | | X | | | X |

SIL Safety Integrity Level
IEC 61508 IEC 61511

10648E00

Basic function: temperature input, Ω, and 1 channel.
The temperature transmitter is used for operation of temperature sensors. Most currently available sensors can be connected, such as Pt 100, Pt 500, Pt 1000, Ni 100, thermocouples and resistance transmitters. The parameters can be set using parameterising software ISpac Wizard.




07366E02

## Selection Table

| Version | Channels | Output, analog | Limit value contact | Connection type | Order number |
|---|---|---|---|---|---|
| Temperature transmitter Type 9182, field circuit Non-Ex i | 1 | 0/4 ... 20 mA active | 2 NO | Screw terminals | **9182/10-51-64s** |
| | | | | Spring clamp terminals | **9182/10-51-64k** |

Configuration is only possible with parameterising software ISpac Wizard, not with DIP-switches

## Technical Data

| | | | |
|---|---|---|---|
| Certificates | BVS 08 ATEX E 016 X | | |
| Explosion protection | Ⓔx II 3G En Ac nCc II T4 | | |
| Installation | in Zone 2 and in the safe area | | |
| Power supply | Nominal voltage $U_N$ | | 24 V DC |
| | Voltage range | | 18 ... 31.2 V |
| | Residual ripple within voltage range | ≤ | 3.6 $V_{SS}$ |
| | Nominal current (at $U_N$) | | 70 mA |
| | Power consumption (at $U_N$) | ≤ | 1.9 W |
| | Power losses (at $U_N$) | ≤ | 1.9 W |
| | Indication | | LED green „PWR“ |
| | Polarity reversal protection | | yes |
| | Undervoltage monitoring | | yes (no faulty module / output states) |
| Galvanic isolation | Test voltage | | |
| | input to output | | 1.5 kV AC |
| | input to power supply | | 1.5 kV AC |
| | input to configuration interface | | 1.5 kV AC |
| | input to error-contact | | 1.5 kV AC |
| | Test voltage under regulations EN 50178 | | |
| | Output to power supply | | 350 V AC |
| | Output to configuration interface | | 350 V AC |
| | Outputs to each other | | 350 V AC |
| | Error-contact to power supply and outputs | | 350 V AC |
| | Galvanic isolaton of Ex i inputs | | |
| | at thermocouples | | 20 V |
| | at resistance sensors | | - - |

| | | | | |
|---|---|---|---|---|
| Functional safety (IEC 61508) | | | | |
| Test report | Exida STAHL 07/07-23 R016 and STAHL 07/07-23 R017 | | | |
| Max. SIL | 2 | | | |
| Safe Failure Fraction SFF | | 4 ... 20 mA | Limit value contact | Limit value contact parallel |
| | | 78 % | 78.4 % | 81.1 % |
| MTBF | | 4 ... 20 mA | Limit value contact | Limit value contact parallel |
| | | 120 years | 114 years | 114 years |
| $PFD_{AVG}$ at $T_{[Proof]}$ | | 4 ... 20 mA | Limit value contact | Limit value contact parallel |
| | 1 year | $7.59 \times 10^{-4}$ | $7.03 \times 10^{-4}$ | $6.17 \times 10^{-4}$ |
| | 2 years | $1.44 \times 10^{-3}$ | $1.34 \times 10^{-3}$ | $1.17 \times 10^{-3}$ |
| | 5 years | $3.48 \times 10^{-3}$ | $3.23 \times 10^{-3}$ | $2.84 \times 10^{-3}$ |
| Further information | see safety manual and test report | | | |

| | | | |
|---|---|---|---|
| Configuration | Interface: | Version | RS 232 C |
| | | Software | IS pac Wizard 9199 |
| | | Connection | 4-pole plug on front |
| | | Settings | all module functions and diagnostics |
| Input | The input parameters can be set via parameterising software ISpac Wizard. | | |

# Temperature Transmitter with Output 0/4 ... 20 mA and Limit Value Contact, SIL 2 (Field Circuit Non-Ex i) Type 9182/10-51-64

## Technical Data

### Input: resistance thermometer

| Types | Standard | Basic measuring range [°C] | Min. measuring span | Average Resolution | Average Measurement error |
|---|---|---|---|---|---|
| Pt 100<br>Pt 500<br>Pt 1000 | IEC 60751 | - 200 ...+ 850 | 50 K | 0.1 K | 0.35 K |
| Ni 100<br>Ni 500<br>Ni 1000 | DIN 43760 | - 60 ...+ 180 | 31 K | 0.1 K | 0.25 K |

| | | |
|---|---|---|
| Connection type | | in 2-, 3- or 4-wires connection |
| Linearisation | | Temperature / resistance |
| Measuring current | ≤ | 0.25 mA |
| Max. wire resistance per conductor | < | 50 Ω (2-wires connection) |
| | < | 100 Ω (3-, 4-wires connection) |

### Input: Thermocouple

| Types | Standard | Basic measuring range [°C] | Min. measuring span | Average Resolution | Average Measurement error |
|---|---|---|---|---|---|
| B | IEC 60584 | 250 ...1800 | 314 K | 0.1 K | 1.2 K |
| E | | - 200 ...1000 | 36 K | 0.1 K | 0.2 K |
| J | | - 200 ...1200 | 42 K | 0.1 K | 0.2 K |
| K | | - 200 ...1370 | 63 K | 0.1 K | 0.3 K |
| N | | - 200 ...1300 | 75 K | 0.1 K | 0.3 K |
| R | | - 50 ...1767 | 171 K | 0.1 K | 0.7 K |
| S | | - 50 ...1767 | 185 K | 0.1 K | 0.8 K |
| T | | - 200 ...400 | 60 K | 0.1 K | 0.3 K |
| L | DIN 43710 | - 200 ...900 | 55 K | 0.1 K | 0.3 K |
| U | | - 200 ...600 | 48 K | 0.1 K | 0.3 K |
| XK | GOST | - 200 ...800 | 50 K | 0.1 K | 0.2 K |

| | |
|---|---|
| Linearisation | Temperature / Voltage |
| Max. wire resistance (sum) | ≤ 1000 Ω |
| External references | |
| both channels together | Pt 100 2-wires connection (- 40 ... + 85 °C) |
| per channel | constant temperature (- 40 ... + 85 °C) |

### Input: Resistance temperature detector (RTD)

| Basic measuring range | Average Resolution |
|---|---|
| 50 ... 500 Ω | 10 mΩ |
| 500 ... 10 kΩ | 10 mΩ |
| 10 ... 100 kΩ *) | 10 mΩ |

*) with parallel 10 kΩ Shunt; no open-circuit detection

| | | |
|---|---|---|
| Connection type | | 3-wires connection |
| Measuring current | ≤ | 0.25 mA |

### Output

| | | |
|---|---|---|
| Output signal (configurable) | | 0/4 ... 20 mA |
| Function range | | 0 ... 21 mA |
| Connectable load resistance $R_L$ 1 / 2 channels | | 0 ... 750 Ω / 0 Ω ... 600 Ω |
| Resolution | ≤ | 1 µA |
| Response time (10 % ... 90 %) | ≤ | 35 ms |
| Delay input - output | ≤ | 500 ms |

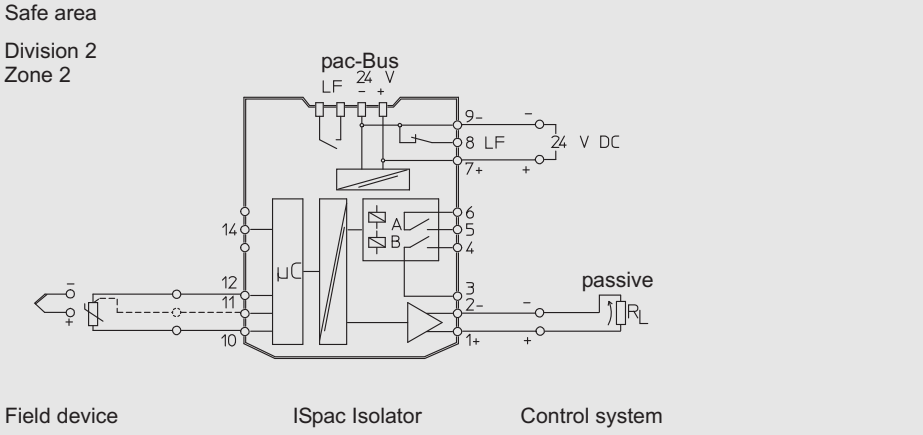
### Limit values

| | | |
|---|---|---|
| Messaging | | 2 NO |
| Switching voltage | ≤ | ± 30 V |
| Switching current (resistive load) | ≤ | 100 mA |
| On-resistance | ≤ | 2.5 Ω (typical < 1 Ω) |
| Reclosing lockout | | Reset through DIP-switch or „Power-Off“ (configurable) |

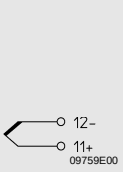
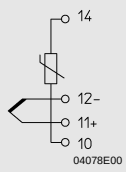
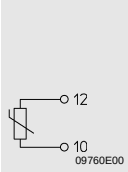
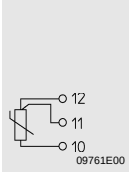
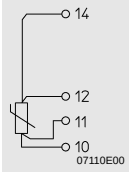
## Technical Data

| | | | |
|---|---|---|---|
| Error detection input | Open-circuit | | for resistance thermometers, thermocouples and RTD > 1 kΩ |
| | Short-circuit | | for resistance thermometers with temperature linearisation and RTD |
| | Behaviour of output | | 2,4 mA (configurable 0 ... 23 mA or „hold last value“) |
| | Settings (switch LF) | | activated / deactivated |
| | Error detection | | LED red „LF“ I |
| | Error messaging and power supply failure | | - Contact (30 V / 100 mA), closed to ground in case of error<br>- pac-Bus, floating contact (30 V / 100 mA) |
| Fault limits | Accuracy, typical data expressed as % of basic range at $U_N$, 23 °C | | |
| | Average measurement error | ≤ | 0.1 % |
| | Temperature influence | ≤ | 0.1 % / 10 K |
| Electromagnetic compatibility | Tested under the following standards and regulations:<br>EN 61326-1 Use in industrial environment;<br>NAMUR NE 21 | | |
| Ambient conditions | Ambient temperature | | - 20 ... + 60 / + 70 °C (see instructions) |
| | Storage temperature | | - 40 ... + 80 °C |
| | Relative humidity (no condensation) | ≤ | 95 % |

Connection diagram




Configuration input

| Thermocouple | | Resistance thermometer / RTD | | |
|---|---|---|---|---|
| Cold junction compensation | | 2-wire | 3-wire | 4-wire |
| const. temp. | ext. Pt. 100 | | | |
|  |  |  |  |  |

# Temperature Transmitter with Output 0/4 ... 20 mA and Limit Value Contact, SIL 2 (Field Circuit Non-Ex i) Type 9182/10-51-64

## Technical Data

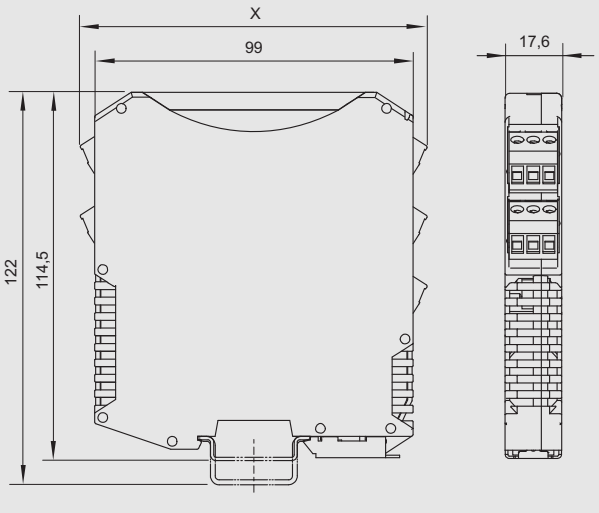
| Mechanical data | | Screw terminals | Spring clamp terminals |
|---|---|---|---|
| | Connection one wire | | |
| | - rigid | 0.2 ... 2.5 mm² | 0.2 ... 2.5 mm² |
| | - flexible | 0.2 ... 2.5 mm² | 0.2 ... 2.5 mm² |
| | - flexible, end covering sleeves (without / with plastic sleeving) | 0.25 ... 2.5 mm² | 0.25 ... 2.5 mm² |
| | Connection two wires | | |
| | - rigid | 0.2 ... 1 mm² | - - |
| | - flexible | 0.2 ... 1.5 mm² | - - |
| | - flexible, end covering sleeves | 0.25 ... 1 mm² | 0.5 ... 1 mm² |

| | |
|---|---|
| Weight | approx. 160 g |
| Mounting type | on DIN rail (NS35/15; NS35/7.5) |
| Mounting position | horizontal or vertical |
| Casing protection class | IP30 |
| Terminal protection class | IP20 |
| Casing material | PA 6.6 |
| Fire protecting class (UL-94) | V0 |

## Accessories and Spare Parts

| Designation | Description | Order number |
|---|---|---|
| Front cover | yellow, transparent<br>Explicit marking of devices used for SIL applications.<br>(Packing unit: 10 pieces) | **200914** |
| Reference | Serves for measurement of the junction temperature with a Pt 100 in 2-wires circuit | |
| | Compact screw terminal<br>(applicable for single- or dual-channel terminal) | **9191/VS-05** |
| | Terminal (DIN-rail assembly) for the single-channel version 9182 | **9191/VS-03** |
| Parameterising set - ISpac - Wizard | The software is used to commission, configurate and diagnose on the ISpac Isolators Series 9146, 9162 and 9182.<br>For further information see operating instructions.<br>Supplied: as CD-ROM; Parameterising software incl. Parameterising cable / adapter.<br><br>System requirements:<br>• IBM compatible PC with MS Windows 98, NT, 2000, XP, Vista, Windows 7<br>• CD-ROM drive<br>• RS 232 C interface<br>• RS 232 / USB adapter | **9199/20-02** |

## Dimensional Drawing (All Dimensions in mm / inches) - Subject to Alterations




| | Dimension X |
|---|---|
| Screw terminals | 108 mm / 4.25 in |
| Spring cage terminals | 128 mm / 5.04 in |

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.

## Customer Specific Set-up Sheet

R. STAHL offers the service to configure ISpac isolators according to your requirements. There are two options:

1. The form can be downloaded on the product page ISpac, section "Data sheet". Please edit the form directly on your PC.
2. Download the software at ISpac Wizard free: "http://www.r-stahl.com/downloads/software/ex-i-isolators.html".
   Create them using the software configuration. Forward the .prj file to your R. STAHL sales office.

**Order-No.:** **- Pos.:** **Pieces:**

| | Type | Channels | Output | Limit value |
|---|---|---|---|---|
| ☐ | 9182 / 10 - 51 - 61. | 1 | 0/4...20 mA | none |
| ☐ | 9182 / 10 - 51 - 63. | 1 | 0/4...20 mA | none |
| ☐ | 9182 / 20 - 51 - 61. | 2 | 0/4...20 mA | none |
| ☐ | 9182 / 10 - 51 - 62. | 1 | 0/4...20 mA | 2 NO |
| ☐ | 9182 / 10 - 51 - 64. | 1 | 0/4...20 mA | 2 NO |

**with:** ☐ Screw terminal s (standard) ☐ Spring clamp terminal k

Please read the operating instructions before you fill in the following form.
Please select only one item parameter and channel.

| | Default | Channel 1 | Channel 2 |
|---|---|---|---|
| **Signal-Tag** | ID-Nr. | | |
| **Input** | | | |
| Resistance Thermometer | ☒ | ☐ | |
| Sensor type | PT 100 | ☐ PT 100 ☐ PT 500 ☐ PT 1000<br>☐ NI 100 ☐ NI 500 ☐ NI 1000 | ☐ PT 100 ☐ PT 500 ☐ PT 1000<br>☐ NI 100 ☐ NI 500 ☐ NI 1000 |
| Circuit type | 3-Wires | ☐ 2-Wires ☐ 3-Wires ☐ 4-Wires | ☐ 2-Wires ☐ 3-Wires ☐ 4-Wires |
| Measurement range | 0 °C ... 400 °C | from to<br>☐ °C ☐ °F ☐ K ☐ Ω | from to<br>☐ °C ☐ °F ☐ K ☐ Ω |
| Thermocouple | | ☐ | |
| Type | | ☐ Type B ☐ Type E ☐ Type L<br>☐ Type K ☐ Type N ☐ Type R<br>☐ Type S ☐ Type T ☐ Type J<br>☐ Type U ☐ Type XK | ☐ Type B ☐ Type E ☐ Type J<br>☐ Type K ☐ Type N ☐ Type R<br>☐ Type S ☐ Type T ☐ Type L<br>☐ Type U ☐ Type XK |
| CJC type | | ☐ external PT 100 ☐ fixed Temp.<br>☐ internal | ☐ external PT 100 ☐ fixed Temp.<br>☐ internal |
| Measurement range | | from to<br>☐ °C ☐ °F ☐ K ☐ mV | from to<br>☐ °C ☐ °F ☐ K ☐ mV |
| Resistance Transmitter | | ☐ | |
| Range | | ☐ up to 500 Ω ☐ up to 2.5 kΩ<br>☐ up to 10 kΩ ☐ up to 100 kΩ (+ Shunt) | ☐ up to 500 Ω ☐ up to 2.5 kΩ<br>☐ up to 10 kΩ ☐ up to 100 kΩ (+ Shunt) |
| Measurement range | | from % to % | from % to % |
| **Output (only 9182/*0-51-6*)** | | | |
| Signal | 4 mA ... 20 mA | ☐ 0 mA ... 20 mA ☐ 4 mA ... 20 mA | ☐ 0 mA ... 20 mA ☐ 4 mA ... 20 mA |
| Fault behavior | Output Fault value | ☐ Hold last value ☐ Fault control off<br>☐ Output Fault value:<br>(standard 2.4 mA) | ☐ Hold last value ☐ Fault control off<br>☐ Output Fault value:<br>(standard 2.4 mA) |
| **Limit value for Relay A (9182/10-51-62 and 9182/10-51-64.)** | | | |
| Signaling | deactivated | ☐ activated ☐ deactivated | ☐ activated ☐ deactivated |
| Value | 25 % | % or absolute: | % or absolute: |
| Behavior contact | inactive | ☐ inactive<br>☐ closes, if value > limit value<br>☐ closes, if value < limit value<br>☐ opens, if value > limit value<br>☐ opens, if value < limit value | ☐ inactive<br>☐ closes, if value > limit value<br>☐ closes, if value < limit value<br>☐ opens, if value > limit value<br>☐ opens, if value < limit value |
| Hysteresis | 1 % | % (0.1 % ... 10 %) | % (0.1 % ... 10 %) |
| Lockout function | inactive | ☐ active ☐ inactive ☐ active-pwrrst | ☐ active ☐ inactive ☐ active-pwrrst |
| **Limit value for Relay B (9182/10-51-62 and 9182/10-51-64.)** | | | |
| Signaling | deactivated | ☐ activated ☐ deactivated | ☐ activated ☐ deactivated |
| Value | 75 % | % or absolute: | % or absolute: |
| Behavior contact | inactive | ☐ inactive<br>☐ closes, if value > limit value<br>☐ closes, if value < limit value<br>☐ opens, if value > limit value<br>☐ opens, if value < limit value | ☐ inactive<br>☐ closes, if value > limit value<br>☐ closes, if value < limit value<br>☐ opens, if value > limit value<br>☐ opens, if value < limit value |
| Hysteresis | 1 % | % (0.1 % ... 10 %) | % (0.1 % ... 10 %) |
| Lockout Function | inactive | ☐ active ☐ inactive ☐ active-pwrrst | ☐ active ☐ inactive ☐ active-pwrrst |

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# Temperature Transmitter with Output 0/4 ... 20 mA and Limit Value Contact, SIL 2 (Field Circuit Non-Ex i) Type 9182/10-51-64