

PERFORMANCE
MADE
SMARTER

Product manual **9113-EMP**

Temperature / mA converter, EMPHASIS-assessed



TEMPERATURE | I.S. INTERFACES | COMMUNICATION INTERFACES | MULTIFUNCTIONAL | ISOLATION | DISPLAY

No. 9113-EMPV111-UK
Product version: 9113-004

PR
electronics

6 Product Pillars

to meet your every need

Individually outstanding, unrivalled in combination

With our innovative, patented technologies, we make signal conditioning smarter and simpler. Our portfolio is composed of six product areas, where we offer a wide range of analog and digital devices covering over a thousand applications in industrial and factory automation. All our products comply with or surpass the highest industry standards, ensuring reliability in even the harshest of environments and have a 5-year warranty for greater peace of mind.



Temperature

Our range of temperature transmitters and sensors provides the highest level of signal integrity from the measurement point to your control system. You can convert industrial process temperature signals to analog, bus or digital communications using a highly reliable point-to-point solution with a fast response time, automatic self-calibration, sensor error detection, low drift, and top EMC performance in any environment.



I.S. Interface

We deliver the safest signals by validating our products against the toughest safety standards. Through our commitment to innovation, we have made pioneering achievements in developing I.S. interfaces with SIL 2 Full Assessment that are both efficient and cost-effective. Our comprehensive range of analog and digital intrinsically safe isolation barriers offers multifunctional inputs and outputs, making PR an easy-to-implement site standard. Our backplanes further simplify large installations and provide seamless integration to standard DCS systems.



Communication

We provide inexpensive, easy-to-use, future-ready communication interfaces that can access your PR installed base of products. All the interfaces are detachable, have a built-in display for readout of process values and diagnostics, and can be configured via push-buttons. Product specific functionality includes communication via Modbus and Bluetooth and remote access using our PR Process Supervisor (PPS) application, available for iOS and Android.



Multifunction

Our unique range of single devices covering multiple applications is easily deployable as your site standard. Having one variant that applies to a broad range of applications can reduce your installation time and training, and greatly simplify spare parts management at your facilities. Our devices are designed for long-term signal accuracy, low power consumption, immunity to electrical noise and simple programming.



Isolation

Our compact, fast, high-quality 6 mm isolators are based on microprocessor technology to provide exceptional performance and EMC-immunity for dedicated applications at a very low total cost of ownership. They can be stacked both vertically and horizontally with no air gap separation between units required.



Display

Our display range is characterized by its flexibility and stability. The devices meet nearly every demand for display readout of process signals, and have universal input and power supply capabilities. They provide a real-time measurement of your process value no matter the industry, and are engineered to provide a user-friendly and reliable relay of information, even in demanding environments.

Temperature / mA converter, EMPHASIS-assessed 9113-EMP

Table of contents

| | |
|--|----|
| Warning | 4 |
| Symbol identification | 4 |
| Safety instructions | 4 |
| Marking | 5 |
| How to demount system 9000 | 6 |
| Mounting the PR 4500 communication interfaces | 6 |
| Advanced features | 7 |
| Application | 7 |
| Technical characteristics | 7 |
| Applications - 9113Ax-EMP | 8 |
| Applications - 9113Bx-EMP | 9 |
| Order | 10 |
| Accessories | 10 |
| Electrical specifications | 10 |
| Configuration of sensor error check | 14 |
| Input signal outside range | 14 |
| Sensor error detection | 14 |
| Error indications | 15 |
| Connections | 16 |
| Block diagram | 17 |
| Signal error and cable fault indications without PR 4500 | 18 |
| Configuration / operating the function keys | 19 |
| Routing diagram | 21 |
| Routing diagram, advanced settings (ADV.SET) | 23 |
| Help text overview | 24 |
| IECEX Installation Drawing | 25 |
| ATEX / UKEX Installation Drawing | 29 |
| FM Installation Drawing | 33 |
| Desenho de instalação INMETRO | 36 |
| Document history | 41 |

Warning



The following operations should only be carried out on a disconnected device and under ESD-safe conditions:

- General mounting, wire connection and disconnection.
- Troubleshooting the device.

Repair of the device and replacement of circuit breakers must be done by PR electronics A/S only.

Warning



Do not open the front plate of the device as this will cause damage to the connector for the display / programming front PR 4500.

This device contains no DIP-switches or jumpers.

Symbol identification



Triangle with an exclamation mark: Read the manual before installation and commissioning of the device in order to avoid incidents that could lead to personal injury or mechanical damage. Warning/demand. Potentially lethal situations.



The CE mark proves the compliance of the device with the essential requirements of the directives.



The UKCA mark proves the compliance of the device with the essential requirements of the UK regulations.



The double insulation symbol shows that the device is protected by double or reinforced insulation.



Ex devices have been approved acc. to the ATEX directive for use in connection with installations in explosive areas. See installation drawings in appendix.

Safety instructions

Definitions

Hazardous voltages have been defined as the ranges: 75 to 1500 Volt DC, and 50 to 1000 Volt AC.

Technicians are qualified persons educated or trained to mount, operate, and also trouble-shoot technically correct and in accordance with safety regulations.

Operators, being familiar with the contents of this manual, adjust and operate the knobs or potentiometers during normal operation.

Receipt and unpacking

Unpack the device without damaging it and check whether the device type corresponds to the one ordered. The packing should always follow the device until this has been permanently mounted.

Environment

Avoid direct sun light, dust, high temperatures, mechanical vibrations and shock, and rain and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation.

The device must be installed in pollution degree 2 or better.

The device is designed to be safe at least under an altitude up to 2 000 m.

The device is designed for indoor use.

Mounting

Only technicians, who are familiar with the technical terms, warnings, and instructions in the manual and who are able to follow these, should connect the device. Should there be any doubt as to the correct handling of the device, please contact your local distributor or, alternatively,

PR electronics A/S
www.prelectronics.com

The use of stranded wires is not permitted for mains wiring except when wires are fitted with cable ends.

Stranded wire should be installed with an insulation stripping length of 5 mm or via a suitable insulated terminal such as a bootlace ferrule.

Descriptions of input / output and supply connections are shown in the block diagram and on the side label.

The device is provided with field wiring terminals and shall be supplied from a Power Supply having double / reinforced insulation. A power switch shall be easily accessible and close to the device. The power switch shall be marked as the disconnecting unit for the device.

For installation on Power Rail 9400 the power is supplied by Power Control Unit 9410.

Year of manufacture can be taken from the first two digits in the serial number.

Calibration and adjustment

During calibration and adjustment, the measuring and connection of external voltages must be carried out according to the specifications of this manual. The technician must use tools and instruments that are safe to use.

Normal operation

Operators are only allowed to adjust and operate devices that are safely fixed in panels, etc., thus avoiding the danger of personal injury and damage. This means there is no electrical shock hazard, and the device is easily accessible.


Cleaning







When disconnected, the device may be cleaned with a cloth moistened with distilled water.

Liability

To the extent the instructions in this manual are not strictly observed, the customer cannot advance a demand against PR electronics A/S that would otherwise exist according to the concluded sales agreement.

Label example

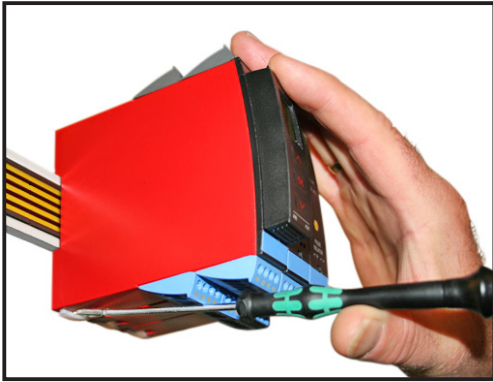
 9113BB
 SN: 123456789
 TAG: Tag1234

| | |
|---|---|
| <p>PR PR electronics A/S, Lerbakken 10, 8410 Roende pr@prelectronics.com, www.prelectronics.com Phone +45 8637 2877, Denmark.</p> <p>LabelRevision   </p> | <p>31: Supply - 15.2 to 31.2 VDC 32: Supply + max. 3 W 33: Status Relay N.C. 34: Status Relay N.C.</p> |
| <p>41: Input ch1 -4W / -3W / TC+ 42: Input ch1 -4W / -3W / 2W / mA- / TC- 43: Input ch1 +4W / +3W / 2W / mA+ 44: Input ch1 +4W</p> <p>51: Input ch2 -4W / -3W / TC+ 52: Input ch2 -4W / -3W / 2W / mA- / TC- 53: Input ch2 +4W / +3W / 2W / mA+ 54: Input ch2 +4W</p> | <p>11: Output ch1 mA - / Loop + 12: Output ch1 mA + / Loop - 13: Output ch2 mA - / Loop + 14: Output ch2 mA + / Loop -</p> |
| <p><input type="checkbox"/> (I) G (Ex ia Ga) IICIB/BIA DEKRA Z3UKE0109X <input type="checkbox"/> (I) D (Ex ia Da) IIC KEMA07ATEX0148X <input type="checkbox"/> (M) I (Ex ia Mb) <input type="checkbox"/> (Ex ia Mb) I <input type="checkbox"/> IBD Ex ec nC IIC T4 Gc DEKRA Z1UKE0175X <input type="checkbox"/> IBD Ex ec nC IIC T4 Gc KEMA07ATEX0148X Install: 9113QA21 IECEx KEM 09.0052X</p> | <p>Install: 9113QB01 <input type="checkbox"/> (Ex ia Ga) IICIB/BIA <input type="checkbox"/> (Ex ia Da) IIC <input type="checkbox"/> (Ex ia Mb) I <input type="checkbox"/> Ex ec nC IIC T4 Gc IECEx KEM 09.0052X</p> |
| <p> FM19CA0032X Install in CL1 DIV2 GP A-D T4 Provides IS circuitry to CL1 IIB DIV 1/2 GP A-G or CL1 Znd AExIEx nA nC [ia Ga] IIC T4 Gc Install: 9113QF01</p> | <p>Attention! Read manual before installation / operation. OPEN-TYPE PROCESSES CONTROL EQUIPMENT 3PLU Lire manuel avant installation / opération.</p> |
| <p>Segurança <input type="checkbox"/> (Ex ia Ga) IICIB/BIA <input type="checkbox"/> (Ex ia Da) IIC <input type="checkbox"/> (Ex ia Mb) I <input type="checkbox"/> Ex ec nC IIC T4 Gc DEKRA Z3.0005X Install: 9113QB01</p> | <p>Ex IIC <input type="checkbox"/> (Ex ia Ga) IICIB/BIA <input type="checkbox"/> (Ex ia Da) IIC <input type="checkbox"/> (Ex ia Mb) I <input type="checkbox"/> Ex ec nC IIC T4 Gc X Ver.: 9113-004</p> |
| <p>    8505 0344 ClassNK APPROVED -20°C ≤ Ta ≤ +60°C</p> | <p>TEMPERATURE /mA CONVERTER 9113</p> |

Marking

When this product has been installed as Ex ia or / and ec, use a permanent marker in the appropriate box to indicate the type of installation on the label.

How to demount system 9000



Picture 1:

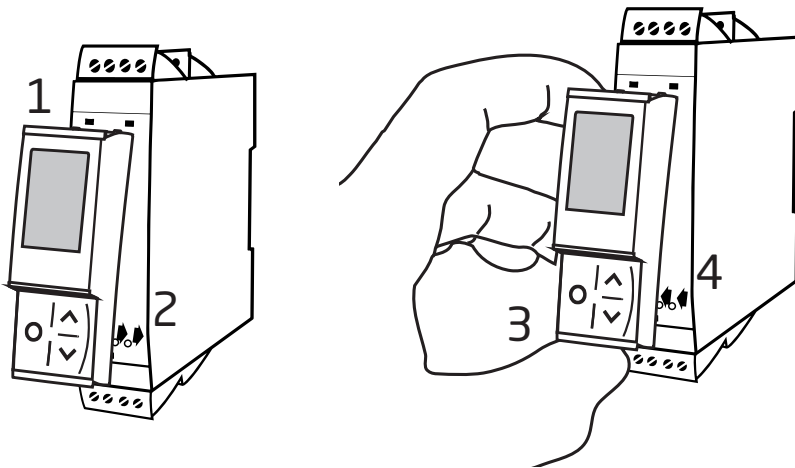
By lifting the bottom lock, the device is detached from the DIN rail.

Mounting the PR 4500 communication interfaces

- 1: Insert the tabs of the PR 4500 into the slots at the top of the device.
- 2: Hinge the PR 4500 down until it snaps into place.

Demounting of the PR 4500 communication interfaces

- 3: Push the release button on the bottom of the PR 4500 and hinge the PR 4500 out and up.
- 4: With the PR 4500 hinged up, remove from the slots at the top of the device.



Temperature / mA converter, EMPHASIS-assessed

9113-EMP

- Input for RTD, TC and mA
- Active / passive mA output via the same two terminals
- 1 or 2 channels
- EMPHASIS-assessed instrument for nuclear industry
- SIL 2-certified via Full Assessment

Advanced features

- Configuration and monitoring by way of PR 4500 detachable communication interfaces; process calibration and signal simulation.
- Copying of the configuration from one device to others of the same type via the PR 4500.
- TC inputs can use either the internal CJC or a terminal with a built-in Pt100 sensor (PR 5910 / PR 5910Ex, channel 1; PR 5913 / PR 5913Ex, channel 2) for higher accuracy.
- Advanced monitoring of internal communication and stored data.
- SIL 2 functionality is optional and must be activated in a menu point.

Application

- 9113Ax-EMP can be mounted in the safe area or in zone 2 / Class I, Division 2, Groups A, B, C, D.
- 9113Bx-EMP can be mounted in the safe area or in zone 2 / Class 1, Division 2 and receive signals from zone 0, 1, 2 and zone 20, 21, 22 including mining / Class I/II/III, Division 1, Gr. A-G.
- Conversion and scaling of temperature (Pt, Ni and TC) and active current signals.
- The 9113-EMP has been designed, developed and certified for use in SIL 2 applications according to the requirements of IEC 61508.
- Suitable for the use in systems up to Performance Level "d" according to ISO-13849.

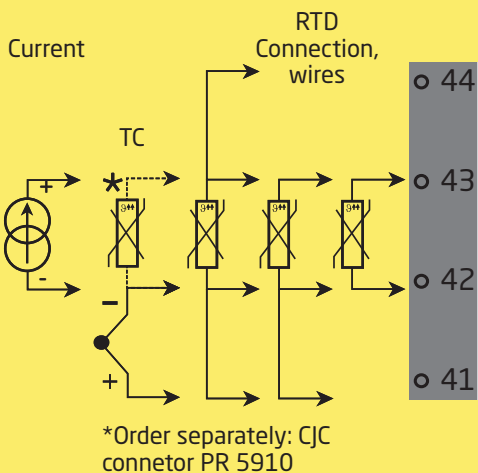
Technical characteristics

- 1 green and 2 red front LEDs indicate operation status and malfunction.
- 2.6 kVAC galvanic isolation between input, output and supply.
- Can be supplied separately or installed on power rail, PR type 9400.

Applications - 9113Ax-EMP

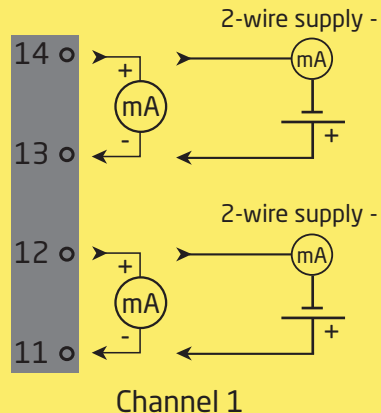
Input signals:

Channel 1

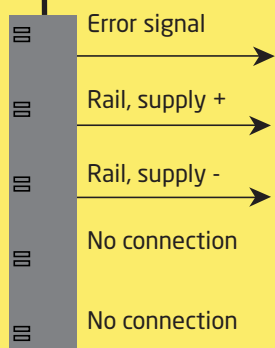


Output signals:

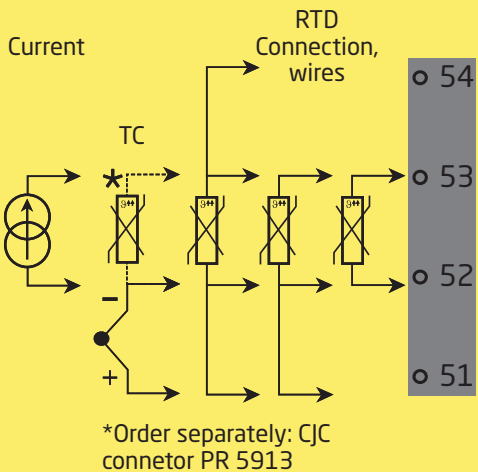
Analog, 0/4...20 mA Channel 2



Power rail

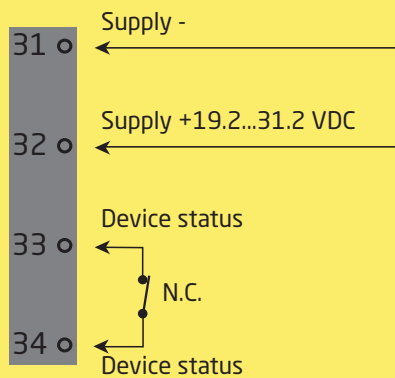


Channel 2



Same power rail as above

Power connection:



**Zone 2 & Cl. 1, Div. 2, gr. A-D
or Safe Area**

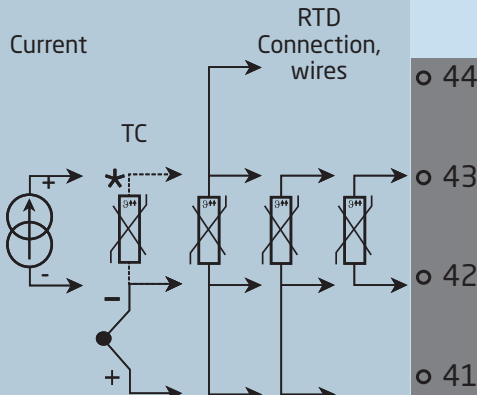


Applications - 9113Bx-EMP

Input signals:

Channel 1

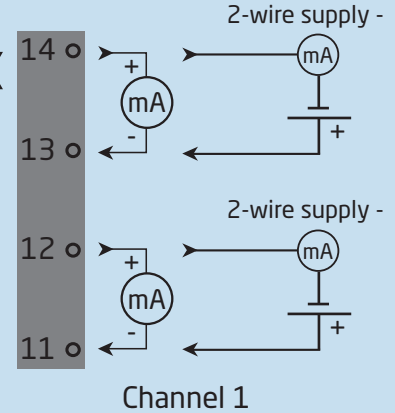
Current



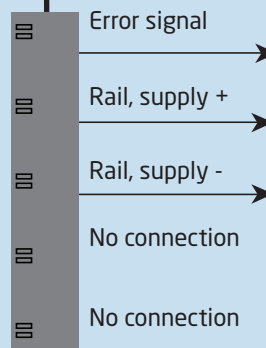
*Order separately: CJC connector PR 5910Ex

Output signals:

Analog, 0/4...20 mA
Channel 2

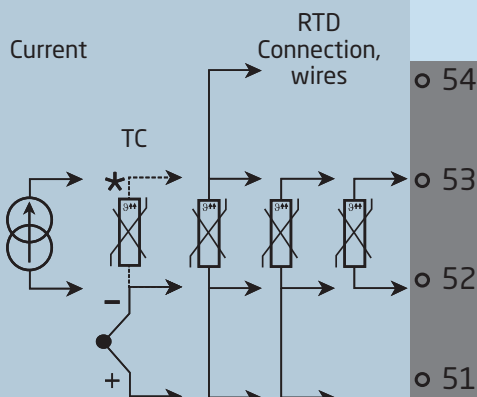


Power rail



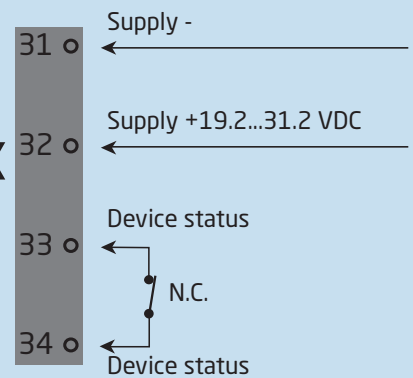
Channel 2

Current



*Order separately: CJC connector PR 5913Ex

Power connection:



Same power rail as above

**Zone 0, 1, 2,
20, 21, 22, M1 &
Cl. I/II/III, Div. 1
gr. A-G**

**Zone 2 & Cl. 1, Div. 2, gr. A-D
or Safe Area**

Order

| Type | Associated apparatus | | Channels | EMPHASIS-assessed |
|------|----------------------|-----|------------|-------------------|
| 9113 | No | : A | Single : A | -EMP |
| | Yes | : B | Double : B | |

Example: 9113BB-EMP

Accessories

- 4510 = Display / programming front
- 4511 = Modbus communication enabler
- 4512 = Bluetooth communication enabler
- 5910 = CJC connector, channel 1, for 9113AA-EMP
- 5913 = CJC connector, channel 2, for 9113AB-EMP
- 5910Ex = CJC connector, channel 1, for 9113BA-EMP
- 5913Ex = CJC connector, channel 2, for 9113BB-EMP
- 9400 = Power rail
- 9404 = Module stop for rail
- 9410 = Power control unit
- 9421 = Power supply 24 V - Ex ec nC

Electrical specifications

Environmental conditions:

| | |
|----------------------------------|---|
| Operating temperature | -20°C to +60°C |
| Storage temperature | -20°C to +85°C |
| Calibration temperature. | 20...28°C |
| Relative humidity | < 95% RH (non-cond.) |
| Protection degree | IP20 |
| Installation in. | Pollution degree 2 & overvoltage category II. |

Mechanical specifications:

| | |
|---|---|
| Dimensions (HxWxD) | 109 x 23.5 x 104 mm |
| Dimensions (HxWxD) w/ PR 4500 | 109 x 23.5 x 131 mm |
| Weight approx. | 250 g |
| DIN rail type. | DIN EN 60715 - 35 mm |
| Wire size. | 0.13...2.08 mm ² / AWG 26...14 stranded wire |
| Screw terminal torque. | 0.5 Nm |
| Vibration. | IEC 60068-2-6 |
| 2...13.2 Hz | ±1 mm |
| 13.2...100 Hz. | ±0.7 g |

Common electrical specifications:

| | |
|--------------------------|---------------------|
| Supply voltage | 19.2...31.2 VDC |
| Fuse | 400 mA SB / 250 VAC |

| Type | Description | Max. power dissipation | Max. required power |
|------------|-------------|------------------------|---------------------|
| 9113xA-EMP | 1 channel | ≤ 0.8 W | ≤ 0.8 W |
| 9113xB-EMP | 2 channels | ≤ 1.4 W | ≤ 1.4 W |

Max. required power is the maximum power needed at terminals 31 and 32.

Max. power dissipation is the maximum power dissipated by the device.

If the 9113B-EMP is used with the PR 4500 communication interfaces, then add 40 mW to the max. power dissipation and 70 mW to the max. required power for each device with the PR 4500.

Isolation - test / working:

| | |
|---|---|
| Input to any. | 2.6 kVAC / 300 VAC reinforced isolation |
| Analog output to supply | 2.6 kVAC / 300 VAC reinforced isolation |
| Status relay to supply. | 1.5 kVAC / 150 VAC reinforced isolation |
| Communications interface | PR 4500 |
| Signal dynamics, input / output | 24 bit / 16 bit |
| Signal / noise ratio. | Min. 60 dB (0...100 kHz) |
| Response time (0...90%, 100...10%): | |
| Temperature input, programmable | 1...60 s |
| mA / V input, programmable | 0.4...60 s |

Accuracy, the greater of the general and basic values:

| General values | | |
|----------------|-------------------|-------------------------|
| Input type | Absolute accuracy | Temperature coefficient |
| All | ≤ ±0.1% of span | ≤ ±0.01% of span / °C |

| Basic values | | |
|---------------------------------|----------------|-------------------------|
| Input type | Basic accuracy | Temperature coefficient |
| mA | ≤ ±16 µA | ≤ ±1.6 µA / °C |
| Pt100, Pt200, Pt 1000 | ≤ ±0.2°C | ≤ ±0.02°C/°C |
| Pt500, Ni100, Ni120, Ni 1000 | ≤ ±0.3°C | ≤ ±0.03°C/°C |
| Pt50, Pt400, Ni50 | ≤ ±0.4°C | ≤ ±0.04°C/°C |
| Pt250, Pt300 | ≤ ±0.6°C | ≤ ±0.06°C/°C |
| Pt20 | ≤ ±0.8°C | ≤ ±0.08°C/°C |
| Pt10 | ≤ ±1.4°C | ≤ ±0.14°C/°C |
| TC type: E, J, K, L, N, T, U | ≤ ±1°C | ≤ ±0.1°C/°C |
| TC type: R, S, W3, W5, LR | ≤ ±2°C | ≤ ±0.2°C/°C |
| TC type: B 160...400°C | ≤ ±4.5°C | ≤ ±0.45°C/°C |
| TC type: B 400...1820°C | ≤ ±2°C | ≤ ±0.2°C/°C |

| | |
|---|-----------------|
| EMC - immunity influence. | < ±0.5% of span |
| Extended EMC immunity: | |
| NAMUR NE 21, A criterion, burst | < ±1% of span |

RTD input:

Input for RTD types:

Pt10*, Pt20*, Pt50*, Pt100, Pt200, Pt250, Pt300, Pt400, Pt500, Pt1000
Ni50, Ni100, Ni120, Ni1000

| Input type | Min. value | Max. value | Standard |
|------------|------------|------------|-----------|
| Pt100 | -200°C | +850°C | IEC 60751 |
| Ni100 | -60°C | +250°C | DIN 43760 |

Cable resistance per wire (max.) 50 Ω
 Sensor current Nom. 0.2 mA
 Effect of sensor cable resistance (3- / 4-wire) < 0.002 Ω / Ω
 Sensor error detection Programmable ON / OFF
 Sensor error current:
 when detecting < 2 µA
 else. 0 µA

* No short circuit detection for Pt10, Pt20 and Pt50

TC input:

| Type | Min. value | Max. value | Standard |
|------|------------|------------|--------------|
| B | 0°C | +1820°C | IEC 60584-1 |
| E | -100°C | +1000°C | IEC 60584-1 |
| J | -100°C | +1200°C | IEC 60584-1 |
| K | -180°C | +1372°C | IEC 60584-1 |
| L | -200°C | +900°C | DIN 43710 |
| N | -180°C | +1300°C | IEC 60584-1 |
| R | -50°C | +1760°C | IEC 60584-1 |
| S | -50°C | +1760°C | IEC 60584-1 |
| T | -200°C | +400°C | IEC 60584-1 |
| U | -200°C | +600°C | DIN 43710 |
| W3 | 0°C | +2300°C | ASTM E988-90 |
| W5 | 0°C | +2300°C | ASTM E988-90 |
| LR | -200°C | +800°C | GOST 3044-84 |

Cold junction compensation (CJC):

via external sensor in connector 5910. 20...28°C ≤ ±1°C
 -20...20°C and 28...70°C ≤ ±2°C
 via internal CJC sensor ±(2.0°C + 0.4°C * Δt)

Δt = internal temperature - ambient temperature

Sensor error detection Programmable ON or OFF
(only wire breakage)

Sensor error current:

when detecting Nom. 2 µA
 else. 0 µA

Current input:

Measurement range 0...23 mA
 Programmable measurement ranges 0...20 and 4...20 mA
 Input resistance Nom. 20 Ω + PTC 50 Ω
 Sensor error detection Programmable ON / OFF
 Only 4...20 mA (NAMUR)

Current output:

Signal range (span) 0...23 mA
 Programmable signal ranges 0...20 / 4...20 / 20...0 and 20...4 mA
 Load ≤ 600 Ω
 Load stability ≤ 0.01% of span / 100 Ω
 Sensor error detection 0 / 3.5 / 23 mA / none
 NAMUR NE 43 Upscale/Downscale. 23 mA / 3.5 mA

| | |
|---|---------------|
| Output limitation: | |
| on 4...20 and 20...4 mA signals | 3.8...20.5 mA |
| on 0...20 and 20...0 mA signals | 0...20.5 mA |
| Current limit. | ≤ 28 mA |

Passive 2-wire output installation:

| | |
|--|---------------------------|
| Max. external 2-wire supply | 26 VDC |
| Max. load resistance [Ω]. | (Vsupply - 3.5) / 0.023 A |
| Effect of external 2-wire supply voltage variation | < 0.005% of span / V |

Status relay in safe area:

| | |
|-------------------------|-------------------|
| Max. voltage | 125 VAC / 110 VDC |
| Max. current. | 0.5 AAC / 0.3 ADC |
| Max. AC power | 62.5 VA / 32 W |

of span = of the currently selected measurement range

Observed authority requirements:

| | |
|----------------|------------------------------|
| EMC. | 2014/30/EU & UK SI 2016/1091 |
| ATEX | 2014/34/EU & UK SI 2016/1107 |
| LVD | 2014/35/EU & UK SI 2016/1101 |
| RoHS | 2011/65/EU & UK SI 2012/3032 |

Approvals:

| | |
|------------------------------------|----------------|
| DNV-GL, Ships & Offshore | TAA00000JD |
| ClassNK | TA24034M |
| c UL us, UL 61010-1. | E314307 |
| EAC | TR-CU 020/2011 |
| EAC LVD | TR-CU 004/2011 |
| EAC Ex | TR-CU 012/2011 |

I.S. / Ex:

| | |
|-------------------|---------------------------------------|
| ATEX | KEMA 07ATEX0148X |
| IECEX. | IECEX KEM 09.0052X |
| UKEX. | DEKRA 21UKEX0175X / DEKRA 23UKEX0109X |
| c FM us. | FM19US0059X / FM19CA0032X |
| INMETRO | DEKRA 23.0005X |
| EAC Ex | RU C-DK.HA65.B.00355/19 |

Functional Safety:

SIL2 Certified & Fully Assessed acc. to IEC 61508

Configuration of sensor error check

| Sensor error check: | | |
|---------------------|---------------|-------------------------|
| Device: | Configuration | Sensor error detection: |
| 9113-EMP | OUT.ERR=NONE. | OFF |
| | Else: | ON |

Visualisation in the PR 4500 of:

Input signal outside range

| Outside range readout (IN.LO, IN.HI): If the valid range of the A/D converter or the polynomial is exceeded | | | |
|--|-----------------------|---------|--------------------------|
| Input | Range | Readout | Limit |
| CURR | 0...20 mA / 4...20 mA | IN.LO | < -1.05 mA |
| | | IN.HI | > 25.05 mA |
| TEMP | TC / RTD | IN.LO | < temperature range -2°C |
| | | IN.HI | > temperature range +2°C |


| Display readout below min. / above max. (-1999, 9999): | | | |
|--|-------|---------|------------------------|
| Input | Range | Readout | Limit |
| All | All | -1999 | Display readout <-1999 |
| | | 9999 | Display readout >9999 |

Sensor error detection

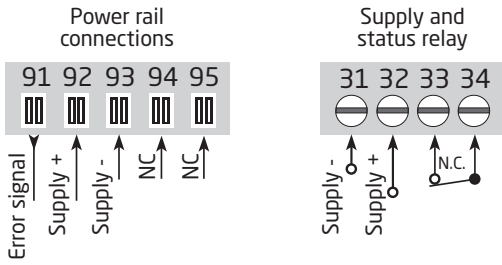
| Sensor error detection (SE.BR, SE.SH): | | | |
|--|---|-------------|----------------------------------|
| Input | Range | Readout | Limit |
| CURR | Loop break (4...20 mA) | SE.BR | <= 3.6 mA; > = 20.75 mA |
| TEMP | TC | SE.BR | > 10 kΩ...165 kΩ |
| | RTD: 2-, 3- and 4-wire For Pt10, Pt20, Pt50, Pt100, Pt200, Ni50 and Ni120 | SE.BR | > 900...1000 Ω (cable > 50 Ω) |
| | | SE.SH | < app. 15 Ω |
| | RTD: 2-, 3- and 4-wire for Pt250, Pt300, Pt400, Pt500, Pt1000 and Ni1000 | SE.BR | > 10...12 kΩ (cable > 50 Ω) |
| SE.SH | | < app. 15 Ω | |

Error indications

| Readout at hardware error | | |
|---|----------------|---|
| Error search | Readout | Cause |
| CJC sensor error - check device temperature | CJ.ER | Defect internal CJC sensor or CJC temperature out of allowed range** |
| CJC connector error - check CJC-connector block | CJ.ER | Defect (or missing) CJC-connector or temperature out of allowed range** |
| Input error - check input connection and reset power | IN.ER | Signal levels on input beyond limits or connected to wrong terminals* |
| Output error - check output connections and reset power | AO.ER | Error in analog output current (SIL mode only)* |
| No communication | NO.CO | No communication with (PR 4500) |
| Flash memory error - check configuration | FL.ER CO.ER | FLASH error (configuration invalid)*** |
| Invalid configuration type or version | TY.ER | Configuration read from EEprom has invalid type or rev. no. |
| Hardware error | RA.ER | RAM error* |
| Hardware error | IF.ER | Internal Flash error* |
| Hardware error | SW.ER | SW monitor error* |
| Hardware error | AD.ER | A/D converter error* |
| Hardware error | AO.SU | Analog output supply error* |
| Hardware error | CA.ER | Factory calibration error* |
| Hardware error | CM.ER | Main CPU error* |
| Hardware error | II.ER | Initialisation check error* |
| Hardware error | RS.ER | Reset error* |
| Hardware error | IC.ER | Input communication error* |
| Hardware error | M1.ER | Main CPU to Ch.1 error* |
| Hardware error | M2.ER | Main CPU to Ch.2 error* |
| Hardware error | MC.ER | Main CPU config. error* |
| Hardware error | MF.ER | Main CPU Flash error* |
| Hardware error | MR.ER | Main CPU RAM error* |
| Hardware error | MS.ER | Main CPU supply error* |
| Hardware error | MP.ER | Main CPU ProgFlow error* |

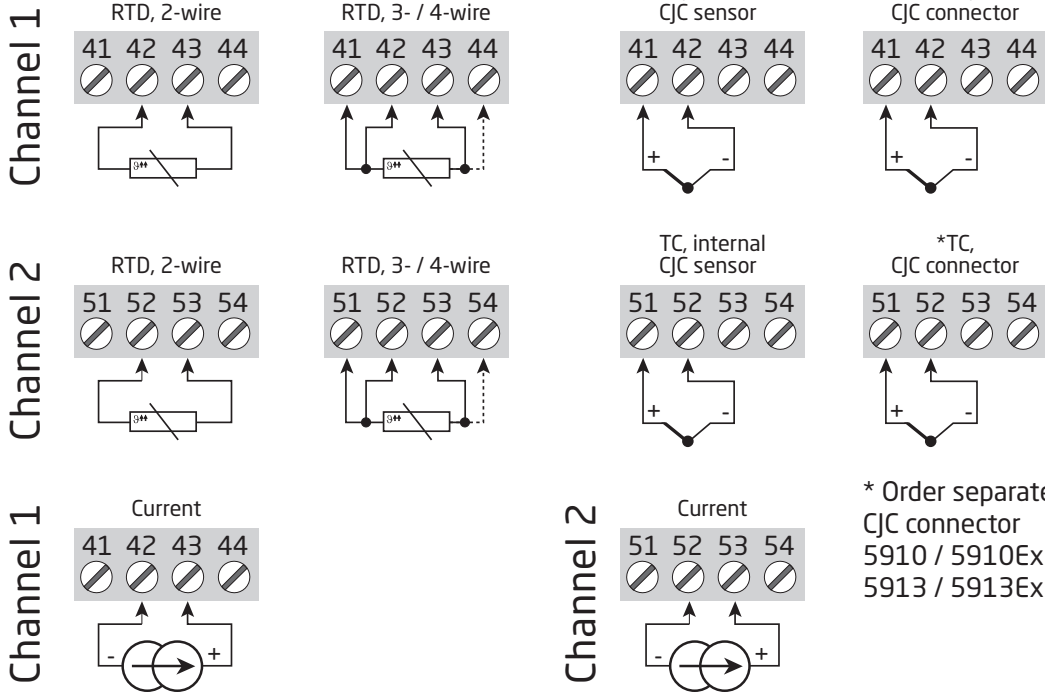
| | |
|-----|---|
| ! | All error indications in the display flash once per second. The help text explains the error. If the error is a sensor error, the display backlight flashes as well - this is acknowledged (stopped) by pushing the  button. |
| * | Error is acknowledged by resetting the device power. |
| ** | Error can be disregarded by selecting input type different than TC. |
| *** | Error is acknowledged by stepping through the basic setup. |

Connections



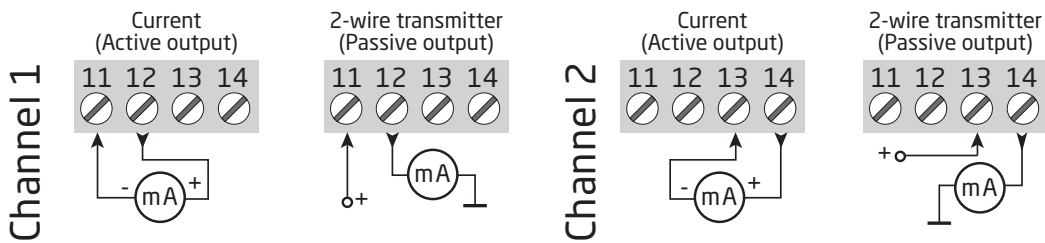
NC = no connection

Inputs:

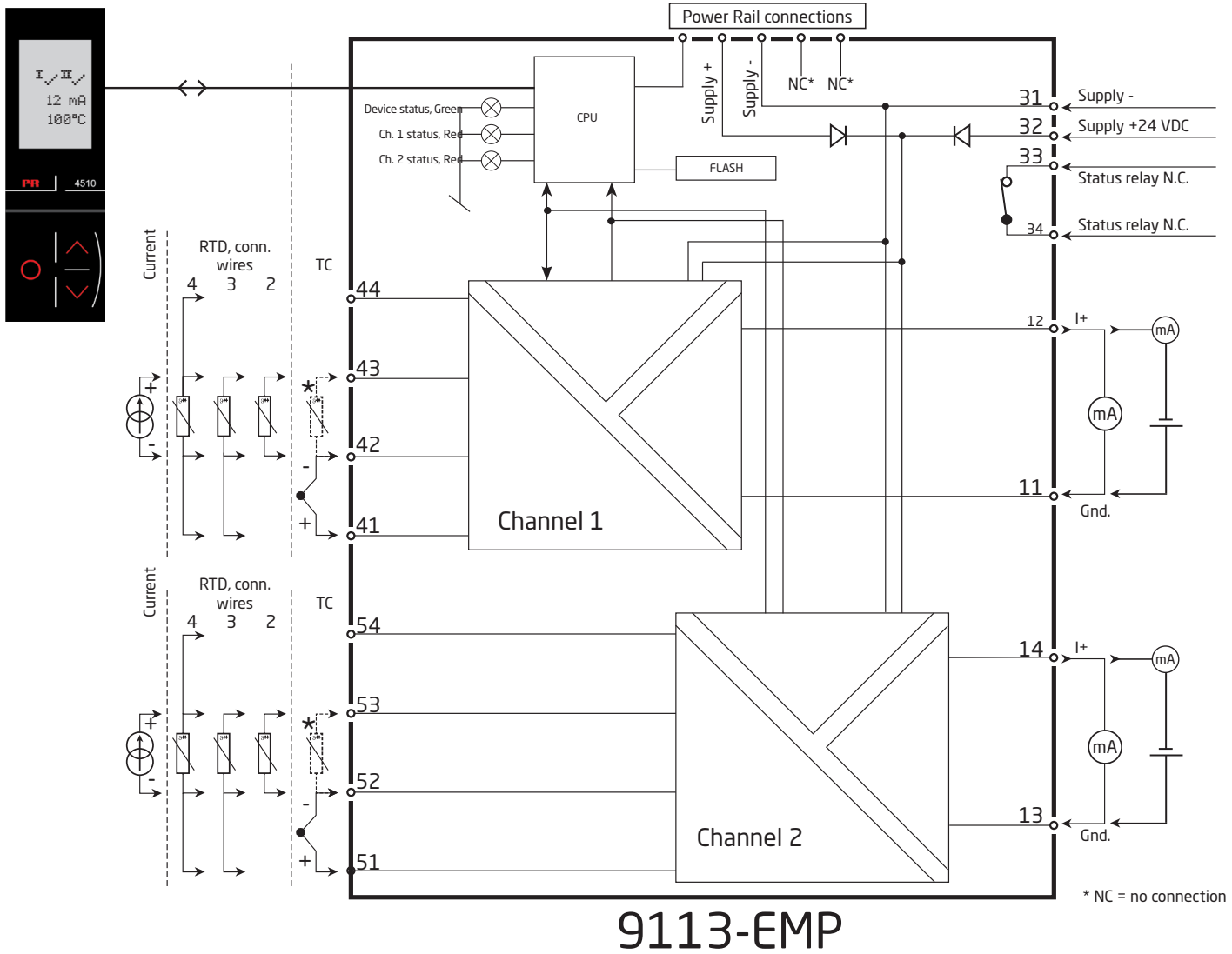


* Order separately:
CJC connector
5910 / 5910Ex (ch. 1) /
5913 / 5913Ex (ch. 2).

Outputs:



Block diagram



Signal error and cable fault indications without PR 4500

| List of LED and error signal indications | | | | | |
|--|-----------|-------------------|-------------------|--------------------|-----------------------------|
| Condition | Green LED | Ch. 1: Red LED | Ch. 2: Red LED | Status relay, N.C. | Power rail signal status |
| Device OK | Flashing | OFF | OFF | Energized | Open |
| No supply | OFF | OFF | OFF | De-energized | Closed |
| Device defective | OFF | ON | ON | De-energized | Closed |
| Ch. 1 defective (ch. 2 OK) | Flashing | ON | OFF | De-energized | Closed |
| Ch. 2 defective (ch. 1 OK) | Flashing | OFF | ON | De-energized | Closed |
| Channel 1, signal OK | Flashing | OFF | OFF | Energized | Open |
| Ch. 1, wire short / break | Flashing | Flashing | OFF | De-energized | Closed (if activated) |
| Channel 2, signal OK | Flashing | OFF | OFF | Energized | Open |
| Ch. 2, wire short / break | Flashing | OFF | Flashing | De-energized | Closed (if activated) |

Configuration / operating the function keys

Documentation for routing diagram.

In general

When configuring the 9113-EMP, you will be guided through all parameters and you can choose the settings which fit the application. For each menu there is a scrolling help text which is automatically shown in line 3 on the display.

Configuration is carried out by use of the 3 function keys:

- ⏪ will increase the numerical value or choose the next parameter
- ⏩ will decrease the numerical value or choose the previous parameter
- ⏹ will save the chosen value and proceed to the next menu

When configuration is completed, the display will return to the default state 1.0. Pressing and holding ⏹ will return to the previous menu or return to the default state (1.0) without saving the changed values or parameters.

If no key is activated for 1 minute, the display will return to the default state (1.0) without saving the changed values or parameters.

Further explanations

Password protection: Programming access can be blocked by assigning a password. The password is saved in the device in order to ensure a high degree of protection against unauthorised modifications to the configuration. If the configured password is not known, please contact PR electronics support - www.prelectronics.com/contact.

Selection of units

By selection of temperature input you can choose which process units should be shown in the display (see table). The process value is always displayed in Celsius or Fahrenheit. This is selected in the menu point after selection of temperature input.

CJC

In the CJC menu you can choose between CJC connector and internal cold junction compensation. The CJC connector (PR 5910 / PR 5910Ex for channel 1; PR 5913 / PR 5913Ex for channel 2) must be ordered separately.

Signal and sensor error indication via PR 4500 communication interface

Sensor error (see limits in the table) is displayed as SE.BR (sensor break) or SE.SH (sensor short). Signals outside the selected range (not sensor error, see table for limits) are displayed as IN.LO indicating low input signal or IN.HI indicating high input signal. The error indication is displayed as text in line 2 for channel 1 and line 3 for channel 2 and at the same time the backlight flashes. Line 4 of the display is a status line which shows whether the device is SIL-locked (static dot = SIL-locked and flashing dot = not SIL-locked) as well as status for communication COM (running circle) indicating correct functioning of the PR 4500.

Signal and sensor error indication without PR 4500 communication interface

Status of the unit can also be read from the 3 LEDs in the front of the device.

Green flashing LED indicates normal operation.

No light in the green LED indicates lack of supply voltage or error in the device.

Steady red LED indicates fatal error.


Flashing red LED indicates sensor error.

Advanced functions

The unit gives access to a number of advanced functions which can be reached by answering "Yes" to the point "ADV.SET".

Display setup: Here you can adjust the brightness contrast and the backlight. Setup of TAG numbers with 5 alphanumeric. Selection of functional readout in line 2 and 3 of the display - choose between readout of analog input, analog output or tag no or alternating display.

Two-point process calibration: The device can be process-calibrated in 2 points to fit a given input signal. A low input signal (not necessarily 0%) is applied and the actual value is entered via PR 4500. Then a high signal (not necessarily 100%) is applied and the actual value is entered via PR 4500. If you accept to use the calibration, the device will work according to this new adjustment. If you later reject this menu point or choose another type of input signal the device will return to factory calibration.

Process simulation function: In the menu point "EN.SIM" it is possible to simulate an input signal by means of the arrow keys and thus control the output signal up or down. You must exit the menu by pressing  (no time-out). The simulation function exits automatically, if the PR 4500 is detached.

Password: Here you can choose a password between 0000 and 9999 in order to protect the unit against unauthorised modifications to the configuration. The unit is delivered default without password.

Memory: In the memory menu you can save the configuration of the device in the PR 4500, and then move the PR 4500 onto another device of the same type and download the configuration in the new device.

Language: In the menu "LANG" you can choose between 7 different language versions of help texts that will appear in the menu. You can choose between UK, DE, FR, IT, ES, SE and DK.

Power rail: In the menu "RAIL" you can choose if sensor errors are transmitted to the central surveillance in the PR 9410 power control unit.

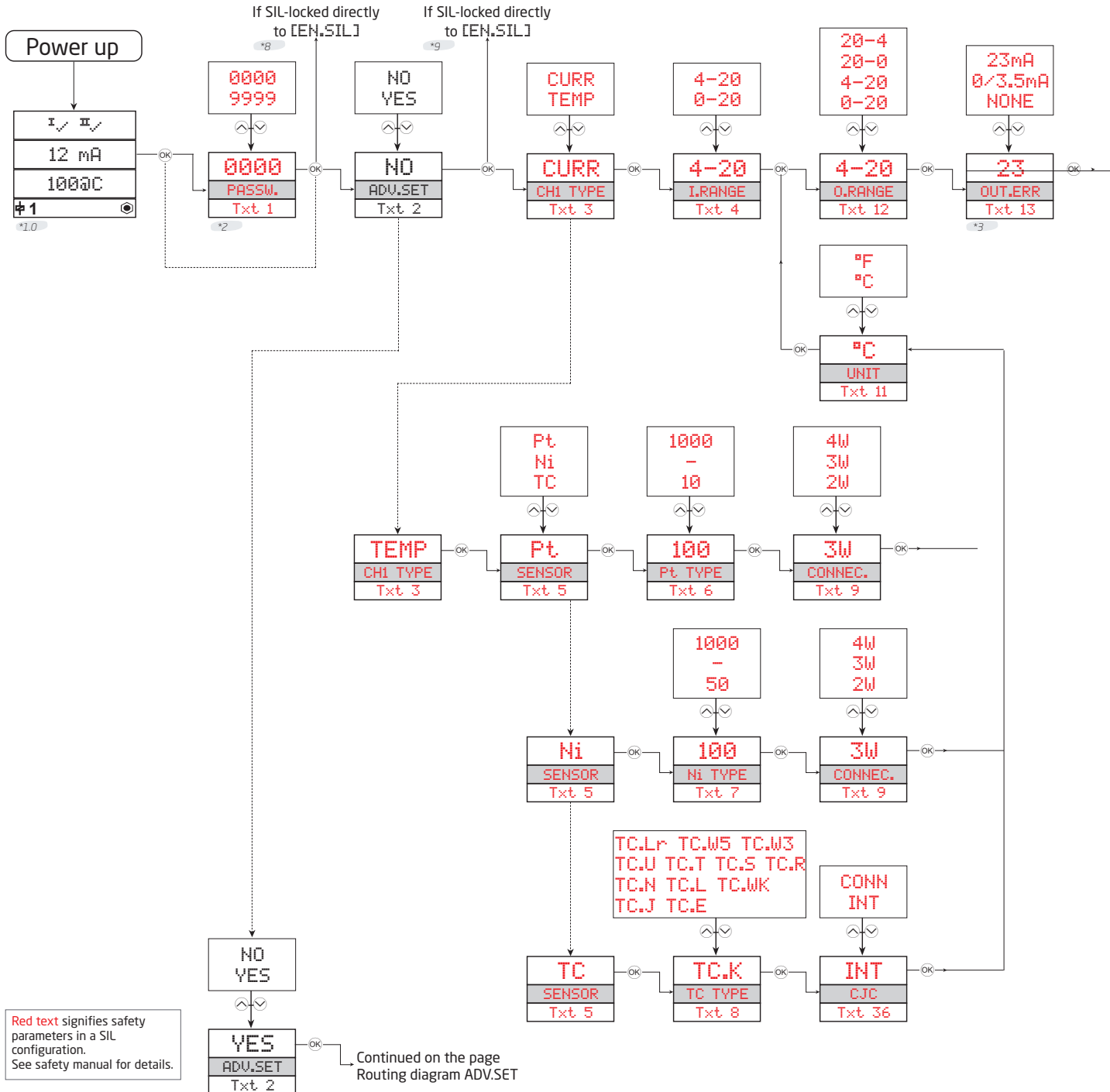
Safety Integrity Level (SIL): See Safety Manual for details.



Routing diagram

If no key is activated for 1 minute, the display will return to the default state 1.0 without saving configuration changes.

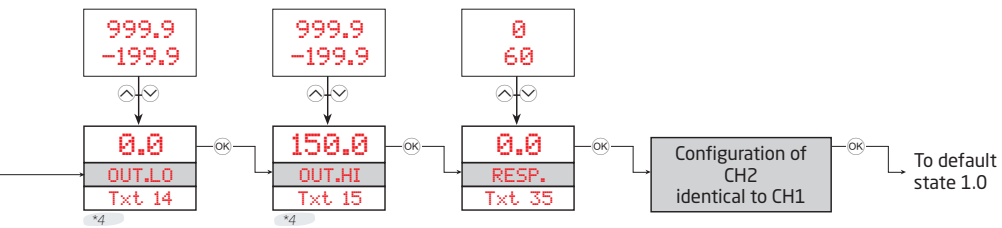
- ⬆ Increase value / choose next parameter
- ⬇ Decrease value / choose previous parameter
- ⊗ Save the chosen value and proceed to the next menu
- Hold ⊗ Back to previous menu / return to menu 1.0 without saving.



*1.0 Default state.
 Line 1 shows input status
 Line 2 and 3 show analog input / output value or TAG no. and units.
 Line 4 shows status for communication and whether the device is SIL-locked.
 Static dot = SIL-locked and flashing dot = not SIL-locked.

- *2 Only if password-protected.
- *3 Not valid for 0...20 mA input signal.
- *4 Only if input signal is temperature.
 Min. and max. acc. to selected sensor type

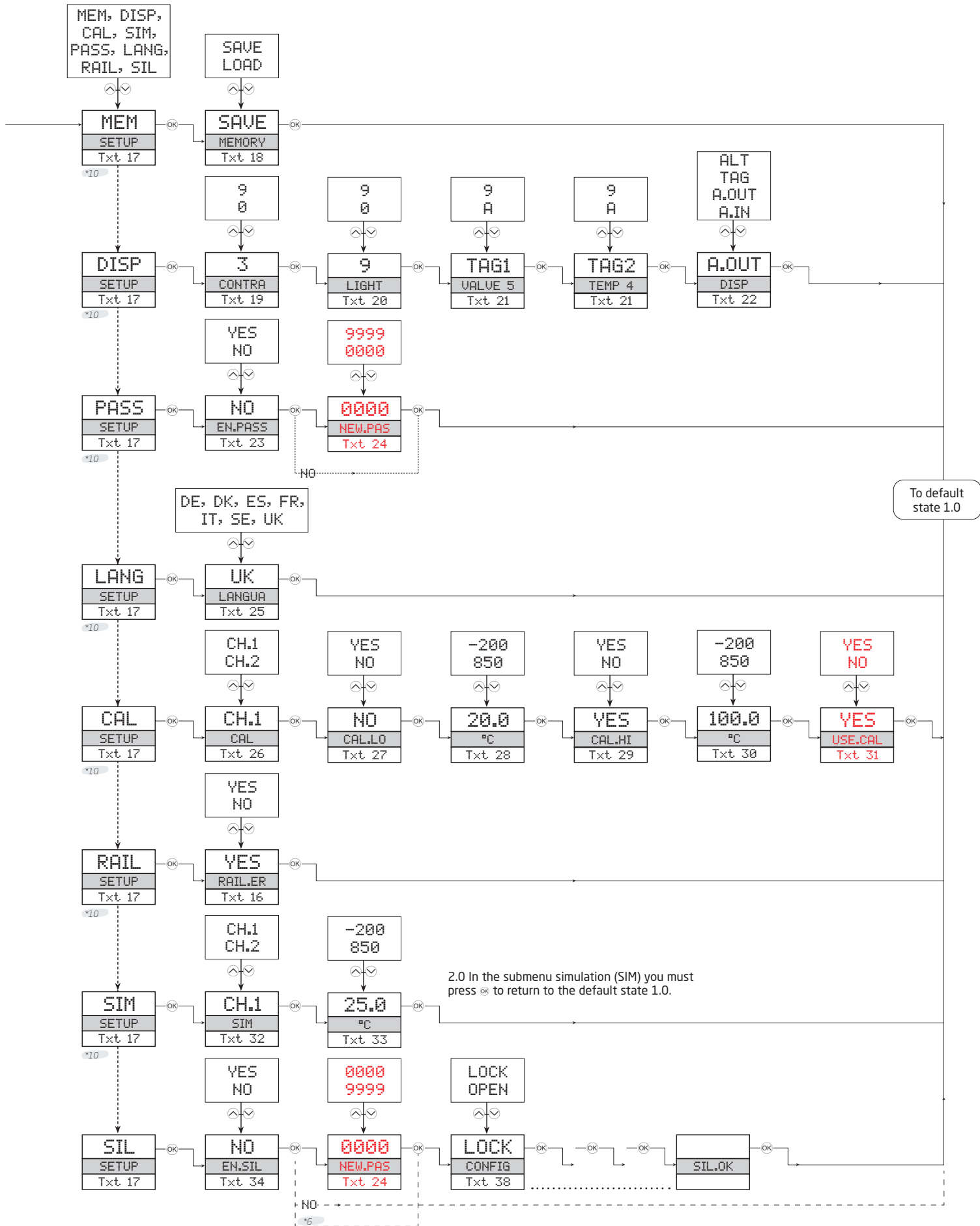
- *8 Branching to SIL from this point valid for:
 All 4510 devices.
 4511 devices with serial no. lower than 211001001.
 4512 devices with serial no. lower than 211065001.
- *9 Branching to SIL from this point valid for:
 4511 devices with serial no from 211001001.
 4512 devices with serial no from 211065001.



*6 Only if the configuration is not protected by a password.

*10 Not available on PR 4500 if SIL-locked.
Only for 4512 devices with serial no. from 211065001 and
for 4511 devices with serial no. from 211001001.

Routing diagram, advanced settings (ADV.SET)



Help text overview

- [01] Set correct password
- [02] Enter advanced setup menu?
- [03] Select temperature input
Select current input
- [04] Select 0-20 mA input range
Select 4-20 mA input range
- [05] Select TC sensor type
Select Ni sensor type
Select Pt sensor type
- [06] Select Pt10 sensor type
Select Pt20 sensor type
Select Pt50 sensor type
Select Pt100 sensor type
Select Pt200 sensor type
Select Pt250 sensor type
Select Pt300 sensor type
Select Pt400 sensor type
Select Pt500 sensor type
Select Pt1000 sensor type
- [07] Select Ni50 sensor type
Select Ni100 sensor type
Select Ni120 sensor type
Select Ni1000 sensor type
- [08] Select TC-B sensor type
Select TC-E sensor type
Select TC-J sensor type
Select TC-K sensor type
Select TC-L sensor type
Select TC-N sensor type
Select TC-R sensor type
Select TC-S sensor type
Select TC-T sensor type
Select TC-U sensor type
Select TC-W3 sensor type
Select TC-W5 sensor type
Select TC-Lr sensor type
- [09] Select 2-wire sensor connection
Select 3-wire sensor connection
Select 4-wire sensor connection
- [11] Select Celsius as temperature unit
Select Fahrenheit as temperature unit
- [12] Select 0-20 mA output range
Select 4-20 mA output range
Select 20-0 mA output range
Select 20-4 mA output range
- [13] Select no error action - output undefined at error
Select downscale at error
Select NAMUR NE43 downscale at error
Select NAMUR NE43 upscale at error
- [14] Set temperature for analog output low
- [15] Set temperature for analog output high
- [16] Enable Rail status signal output?
- [17] Enter SIL setup
Enter simulation mode
Enter RAIL setup
Perform process calibration
Enter language setup
Enter password setup
Enter display setup
Perform memory operations
- [18] Load saved configuration into 9113-EMP
Save 9113-EMP configuration in 4510
- [19] Adjust LCD contrast
- [20] Adjust LCD backlight
- [21] Write a 5-character channel TAG
- [22] Show analog input value in display
Show analog output value in display
Show TAG in display
Alternate shown information in display
- [23] Enable password protection?
- [24] Set new password
- [25] Select language
- [26] Select channel to calibrate
- [27] Calibrate input low to process value?
- [28] Set value for low calibration point
- [29] Calibrate input high to process value?
- [30] Set value for high calibration point
- [31] Use process calibration values?
- [32] Select channel to simulate
- [33] Set the input simulation value
- [34] Enable SIL configuration lock?
0-20 mA is not a valid output range for SIL operation
- [35] Set Analog output response time in seconds
- [36] Select internal temperature sensor
Select CJC connector (accessory)
- [38] Configuration SIL status (Open / Locked)
- [40] Sensor wire breakage
- [41] Sensor short circuit
- [42] Input underrange
- [43] Input overrange
- [44] Input error - check input connections and reset power
- [45] Output error - check connections and reset power
- [46] Flash memory error - check configuration
- [47] Invalid configuration type or version
- [48] Hardware error
- [49] CJC sensor error - check device temperature
- [50] CJC error - check CJC connector block
- [51] No communication

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IECEX Installation drawing 9113QI01 V6R0



For safe installation of 9113 the following must be observed. The module shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.
Year of manufacture can be taken from the first two digits in the serial number.



For Installation in Zone 2 the following must be observed.
The 4501 programming module is to be used solely with PR electronics modules. It is important that the module is undamaged and has not been altered or modified in any way. Only 4501 modules free of dust and moisture shall be installed.

IECEX Certificate: IECEx KEM 09.0052 X

Marking 9113Bx: [Ex ia Ga] IIC/IIB/IIA
[Ex ia Da] IIIC
[Ex ia Ma] I

Marking 9113Bxx, 9113Axx II 3 G Ex ec nC IIC T4 Gc

Standards: IEC60079-0:2017, IEC60079-11:2011,
IEC60079-15:2017, IEC60079-7:2015-A1:2017

Supply terminal (31,32)

Voltage: 19.2 – 31.2 VDC

Status Relay. terminal (33,34)

| | | |
|--------------|-------------------|----------------------------|
| | | Zone 2 Installation |
| Voltage max: | 125 VAC / 110 VDC | 32 VAC / 32 VDC |
| Power max: | 62,5 VA / 32 W | 16 VA / 32 W |
| Current max: | 0.5 AAC / 0.3 ADC | 0.5 AAC / 1 ADC |

Installation notes:

Install in pollution degree 2, overvoltage category II as defined in IEC60664-1

Do not separate connectors when energized and an explosive gas mixture is present.
Do not mount or remove modules from the Power Rail when an explosive gas mixture is present.
Disconnect power before servicing.
The wiring of unused terminals is not allowed.

In type of protection [Ex ia Da] the parameters for intrinsic safety for gas group IIB are applicable.

For installation in Zone 2, the module shall be installed in an enclosure in type of protection Ex n or Ex e, providing a degree of protection of at least IP54. Cable entry devices and blanking elements shall fulfill the same requirements.

For installation on Power Rail in Zone 2, only Power Rail type 9400 supplied by Power Control Unit type 9410 (Type Examination Certificate IECEx KEM 08.0025X) is allowed.

Max. screw terminal torque 0.5 Nm.

Stranded wire should be installed with an insulation stripping length of 5 mm or via a suitable insulated terminal such as a bootlace ferrule.

Revision date:
2022-07-08

Version Revision:
V6 R0

Prepared by:
MMA

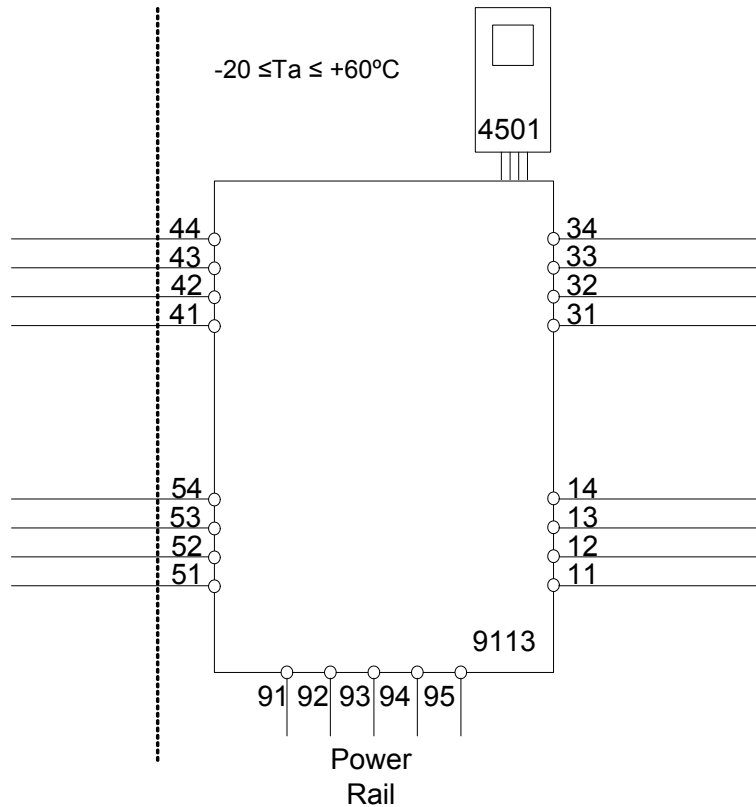
Page:
1/4

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9113Bx Installation:

Hazardous area
Zone 0,1,2, 20, 21, 22

Non Hazardous area
or Zone 2



Ex input

CH1 (terminal 41,42,43,44)

CH2 (terminal 51,52,53,54)

U_o: 8.7 V
I_o: 18.4 mA
P_o: 40 mW
Lo/Ro 892 μH/Ω

| | IIC | IIB | IIA or I |
|------------------|--------|--------|----------|
| C _o . | 5 μF | 50 μF | 1000 μF |
| L _o . | 100 mH | 300 mH | 700 mH |

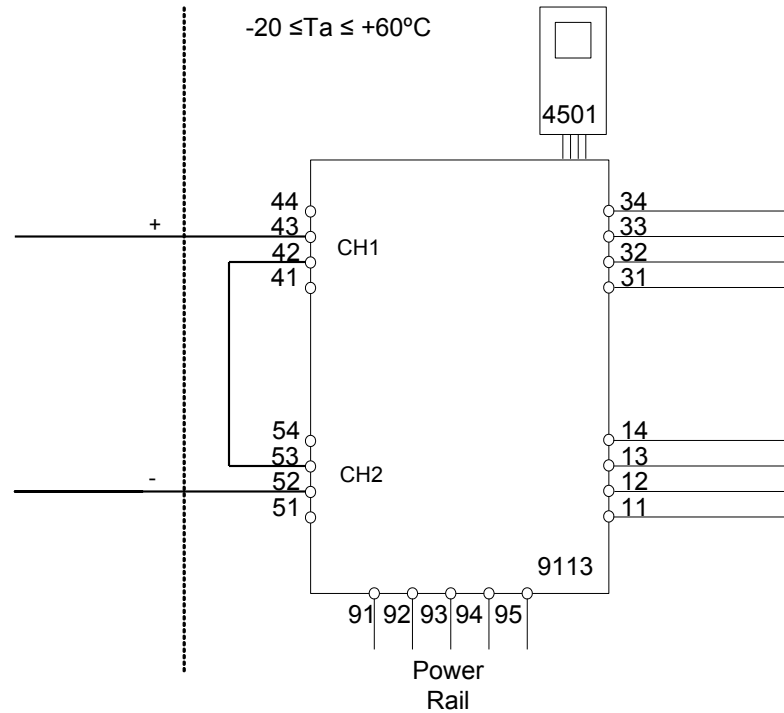
U_i: 10 V
I_i: 30 mA
C_i: 30 nF
L_i: 820 nH

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9113Bx Installation:

Hazardous area
Zone 0,1,2, 20, 21, 22

Non Hazardous area
or Zone 2



Ex input

CH1 (terminal 43 +)

CH2 (terminal 52 -)

U_o: 17.4 V
I_o: 18.4 mA
P_o: 80 mW
Lo/Ro 445 μH/Ω

U_m: 253 V max. 400 Hz

Supply / Output:

(terminal 11,12,13,14)
(terminal 31,32,33,34)
(terminal 91,92,93,94,95)

| | IIC | IIB | IIA |
|------------------|--------|--------|--------|
| C _o . | 0.3 μF | 1.6 μF | 8 μF |
| L _o . | 80 mH | 250 mH | 600 mH |

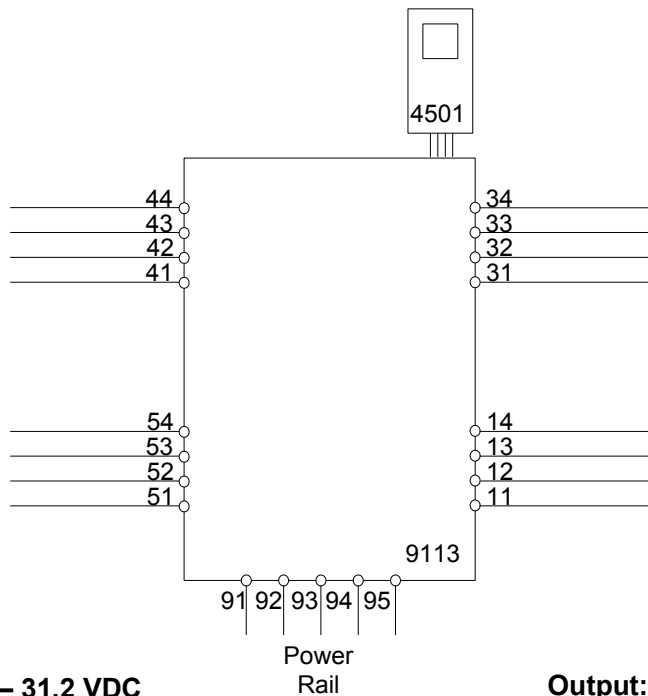
U_i: 10 V
I_i: 30 mA
C_i: 15 nF
L_i: 1.7 μH

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9113Ax Installation:

Non Hazardous area or Zone 2

-20 ≤ Ta ≤ 60°C



Supply: 19.2 – 31.2 VDC
(terminal 31,32)
(terminal 91,92,93,94,95)

Output:
(terminal 11,12,13,14)

Input
CH1 (terminal 41,42,43,44)
CH2 (terminal 51,52,53,54)

Status Relay. terminal (33,34)

Voltage max.: 125 VAC / 110 VDC
Power max.: 62,5 VA / 32 W
Current max.: 0.5 AAC / 0.3 ADC

Zone 2 Installation

32 VAC / 32 VDC
16 VA / 32 W
0.5 AAC / 1 ADC

For installation in Zone 2, the module shall be installed in an enclosure in type of protection Ex n or Ex e, providing a degree of protection of at least IP54. Cable entry devices and blanking elements shall fulfill the same requirements.

For installation on Power Rail in Zone 2, only Power Rail type 9400 supplied by Power Control Unit type 9410 (Type Examination Certificate IECEx KEM 08.0025X) is allowed.

For Installation in Zone 2 the following must be observed.

The 4501 programming module is to be used solely with PRelectronics modules. It is important that the module is undamaged and has not been altered or modified in any way. Only 4501 modules free of dust and moisture shall be installed.

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ATEX/UKEX Installation drawing 9113QA01 V7R1



For safe installation of 9113 the following must be observed. The module shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.

Year of manufacture can be taken from the first two digits in the serial number.



For Installation in Zone 2 the following must be observed.

The 4501 programming module is to be used solely with PR electronics modules. It is important that the module is undamaged and has not been altered or modified in any way. Only 4501 modules free of dust and moisture shall be installed.

| | |
|--|-------------------|
| ATEX Certificate: | KEMA 07ATEX 0148X |
| UKEX Certificate, 9113Bx | DEKRA 23UKEX0109X |
| UKEX Certificate, 9113Ax, 9113Bx: | DEKRA 21UKEX0175X |

Marking 9113Bx:



II (1) G [Ex ia Ga] IIC/IIB/IIA
 II (1) D [Ex ia Da] IIIC
 I (M1) [Ex ia Ma] I
 II 3 G Ex ec nC IIC T4 Gc

Marking 9113Bxx, 9113Axx:

Standards

EN 60079-0 : 2018, EN 60079-11 : 2012,
 EN 60079-15 : 2019, EN60079-7:2015+A1:2018

Supply terminal (31,32)

Voltage : 19.2 – 31.2 VDC

Status Relay. terminal (33,34)

| | | |
|--------------|-------------------|---|
| Voltage max: | 125 VAC / 110 VDC | Zone 2 Installation 32 VAC / 32 VDC |
| Power max: | 62.5 VA / 32 W | 16 VA / 32 W |
| Current max: | 0.5 AAC / 0.3 ADC | 0.5 AAC / 1 ADC |

Specific Conditions of Use

Install in pollution degree 2, overvoltage category II as defined in EN60664-1.

Do not separate connectors when energized and an explosive gas mixture is present.
 Do not mount or remove modules from the Power Rail when an explosive gas mixture is present.
 Disconnect power before servicing.
 The wiring of unused terminals is not allowed.

In type of protection [Ex ia Da] the parameters for intrinsic safety for gas group IIB are applicable.

For installation in Zone 2, the module shall be installed in an enclosure in type of protection Ex e, providing a degree of protection of at least IP54. Cable entry devices and blanking elements shall fulfill the same requirements.

For installation on Power Rail in Zone 2, only Power Rail type 9400 supplied by Power Control Unit type 9410 (Type Examination Certificate KEMA 07ATEX0152 X, DEKRA 21UKEX0169 X) is allowed.

Max. screw terminal torque 0.5 Nm.

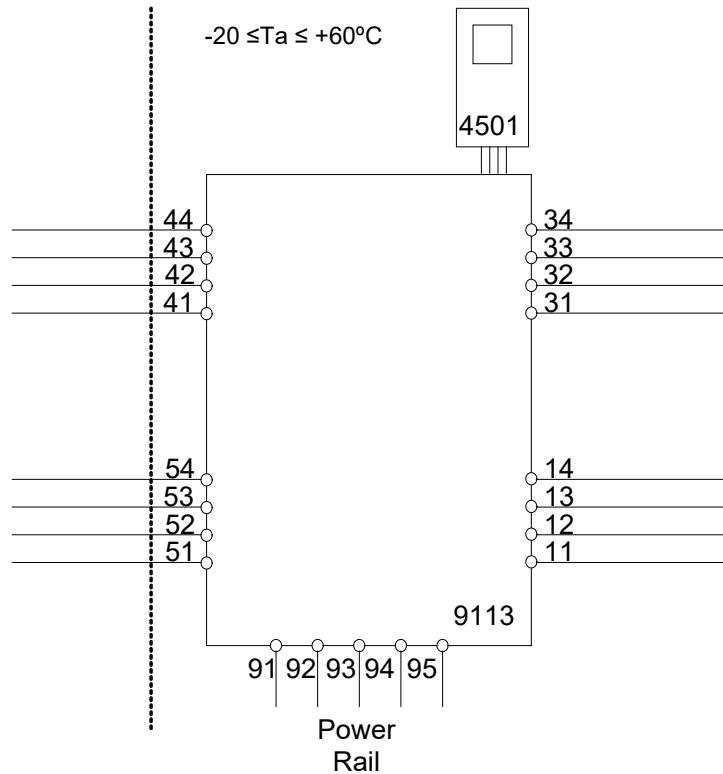
Stranded wire should be installed with an insulation stripping length of 5 mm or via a suitable insulated terminal such as a bootlace ferrule.

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9113Bx Installation:

Hazardous area
Zone 0,1,2, 20, 21, 22

Non Hazardous area
or Zone 2



Ex input

CH1 (terminal 41,42,43,44)

CH2 (terminal 51,52,53,54)

U_o: 8.7 V
I_o: 18.4 mA
P_o: 40 mW
Lo/Ro: 892 μH/Ω

U_m: 253 V max. 400 Hz

Supply / Output:

(terminal 11,12,13,14)

(terminal 31,32,33,34)

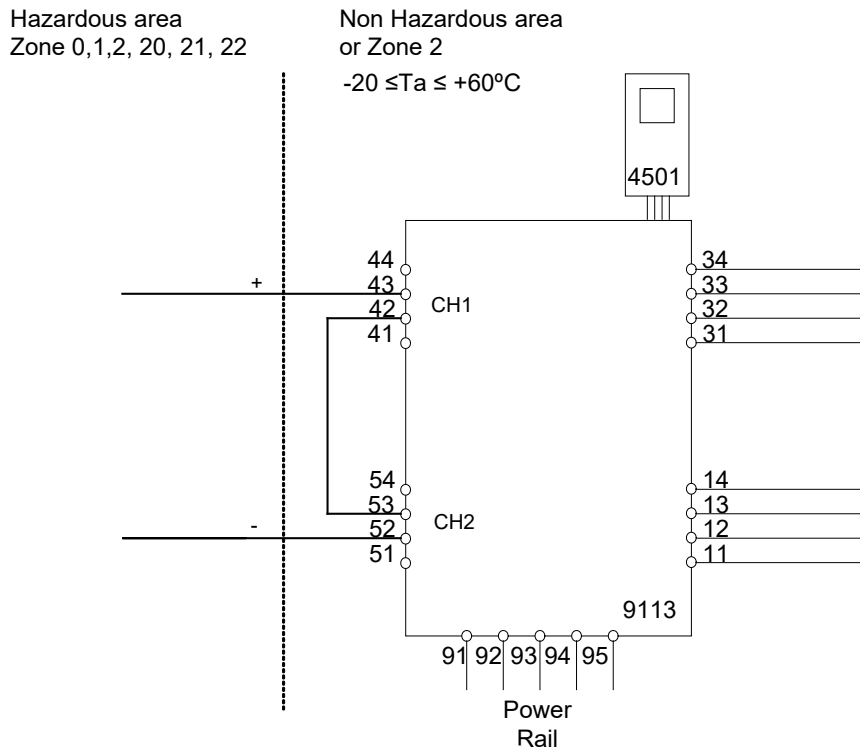
(terminal 91,92,93,94,95)

| | IIC | IIB | IIA or I |
|------------------|--------|--------|----------|
| C _o . | 5 μF | 50 μF | 1000 μF |
| L _o . | 100 mH | 300 mH | 700 mH |

U_i: 10 V
I_i: 30 mA
C_i: 30 nF
L_i: 820 nH

LERBAKKEN 10, 8410 RØNDE DENMARK

9113Bx Installation:



U_m : 253 V max. 400 Hz

Ex input

CH1 (terminal 43)

CH2 (terminal 52)

U_o : 17,4 V
 I_o : 18.4 mA
 P_o : 80 mW
 L_o/R_o : 445 μ H/ Ω

Supply / Output:

(terminal 11,12,13,14)
(terminal 31,32,33,34)
(terminal 91,92,93,94,95)

| | IIC | IIB | IIA or I |
|-------|-------------|-------------|-----------|
| C_o | 0.3 μ F | 1.6 μ F | 8 μ F |
| L_o | 80 mH | 250 mH | 600 mH |

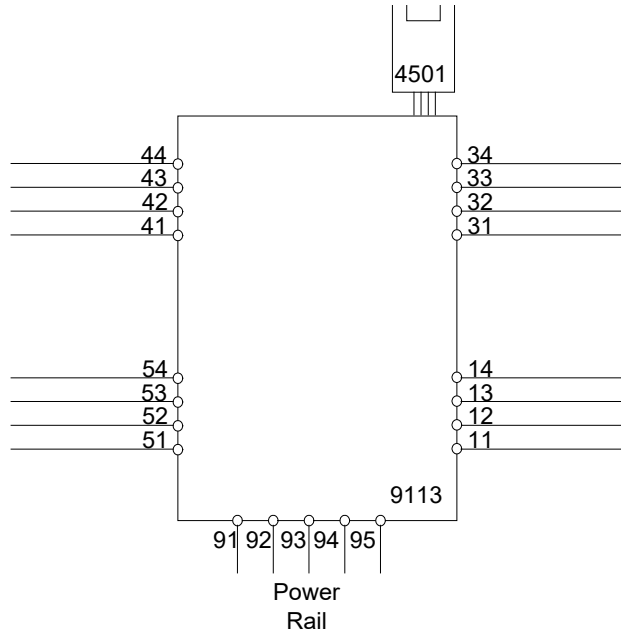
U_i : 10 V
 I_i : 30 mA
 C_i : 15 nF
 L_i : 1.7 μ H

LERBAKKEN 10, 8410 RØNDE DENMARK

9113Ax Installation:

Non Hazardous area or Zone 2

$-20 \leq T_a \leq 60^\circ\text{C}$



Supply: 19.2 – 31.2 VDC
(terminal 31,32)
(terminal 91,92,93,94,95)

Output:
(terminal 11,12,13,14)

Input
CH1 (terminal 41,42,43,44)
CH2 (terminal 51,52,53,54)

Status Relay. terminal (33,34)

Voltage max: 125VAC / 110VDC
Power max: 62,5VA / 32W
Current max: 0.5A AC / 0.3ADC

Zone 2 Installation

32VAC / 32VDC
16VA / 32W
0.5A AC / 1ADC

For installation in Zone 2, the module shall be installed in an enclosure in type of protection Ex e, providing a degree of protection of at least IP54. Cable entry devices and blanking elements shall fulfill the same requirements.

For installation on Power Rail in Zone 2, only Power Rail type 9400 supplied by Power Control Unit type 9410 (Type Examination Certificate KEMA 07ATEX0152 X, DEKRA 21UKEX0169 X) is allowed.

For Installation in Zone 2 the following must be observed. The 4501 programming module is to be used solely with PRelectronics modules. It is important that the module is undamaged and has not been altered or modified in any way. Only 4501 modules free of dust and moisture shall be installed.

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FM Installation drawing



9113

For safe installation of 9113B the following must be observed. The module shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.

Year of manufacture can be taken from the first two digits in the serial number.



4501

For Installation in Zone 2 / Division 2 the following must be observed.

The 4501 programming module is to be used solely with PR electronics modules. It is important that the module is undamaged and has not been altered or modified in any way.

Only 4501 modules free of dust and moisture shall be installed.

Hazardous Classified Location

Class I/II/III, Division 1, Group A,B,C,D,E,F,G
or Class I, Zone 0/1 Group IIC, [AEx ia] IIC
or Group IIC, [Ex ia Gc] IIC Gc

Unclassified Location or

Hazardous Classified Location

Class I, Division 2, Group A,B,C,D T4
or Class I Zone 2 Group IIC T4 Gc

Intrinsically safe apparatus
entity parameters:

$$V_{max}(U_i) \geq V_t(U_o)$$

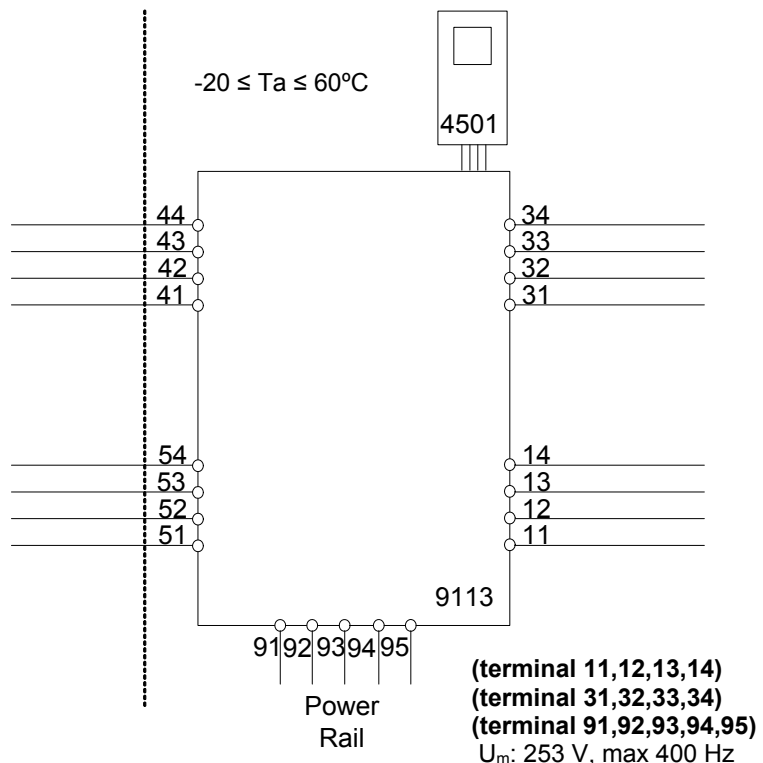
$$I_{max}(I_i) \geq I_t(I_o)$$

$$P_i \geq P_o$$

$$C_a \geq C_{cable} + C_i$$

$$L_a \geq L_{cable} + L_i$$

The sum of capacitance and inductance of cable and intrinsic safe equipment must be less or equal to C_a and L_a



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Ex input
CH1 (terminal 41,42,43,44)
CH2 (terminal 51,52,53,54)

$V_t (U_o)$: 8.7 V
 $I_t (I_o)$: 18.4 mA
 P_o : 40 mW
 L_o/R_o : 892 $\mu\text{H}/\Omega$

| | IIC / Group A,B | IIB / Group C,E,F | IIA / Group D,G |
|-------------|--------------------|----------------------|--------------------|
| C_a / C_o | 5 μF | 50 μF | 1000 μF |
| L_a / L_o | 100 mH | 300 mH | 700 mH |

U_i : 10 V
 I_i : 30 mA
 C_i : 30 nF
 L_i : 820 nH

Status Relay. terminal (33,34)

Voltage max: 125 VAC / 110 VDC
 Power max: 62,5 VA / 32 W
 Current max: 0.5 A AC / 0.3 ADC

Zone 2 installation:

Voltage max: 32 VAC / 32 VDC
 Power max: 16 VA / 32 W
 Current max: 0.5 A AC / 1 ADC

Installation notes:

In Class I, Division 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Division 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70) or the Canadian Electrical Code (C22.1).
 In Class I, Zone 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Zone 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70) or the Canadian Electrical Code (C22.1). Where installed in outdoor or potentially wet locations, the enclosure shall, at a minimum, meet the requirements of IP54.
 In Class I, Zone 2 installations, the installer shall ensure protection of supply terminals against transient voltages exceeding 140% of the rated supply voltage.

Install in environments rated Pollution Degree 2 or better; overvoltage category I or II.

The module must be supplied from a Power Supply having double or reinforced insulation.

The use of stranded wires is not permitted for mains wiring except when wires are fitted with cable ends.

For installation on the 9400 Power Rail the power must be supplied from Power Control Module Unit 9410.

The module is galvanic isolated and does not require grounding.

Use 60 / 75 °C Copper Conductors with wire Size AWG: (26-14).

Warning: Substitution of components may impair intrinsic safety.

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Warning: To prevent ignition of the explosive atmospheres, disconnect power before servicing and do not separate connectors when energized and an explosive gas mixture is present.

Hazardous Classified Location

Class I/II/III, Division 1, Group A,B,C,D,E,F,G
or Class I, Zone 0/1 Group IIC, [AEx ia] IIC
or Group IIC, [Ex ia Ga] IIC Gc

**Unclassified Location or
Hazardous Classified Location**

Class I, Division 2, Group A,B,C,D T4
or Class I Zone 2 Group IIC T4 Gc

Intrinsically safe apparatus
entity parameters:

$$V_{max}(U_i) \geq V_t(U_o)$$

$$I_{max}(I_i) \geq I_t(I_o)$$

$$P_i \geq P_o$$

$$C_a \geq C_{cable} + C_i$$

$$L_a \geq L_{cable} + L_i$$

The sum of capacitance and inductance of cable and intrinsic safe equipment must be less or equal to C_a and L_a

Ex input

CH1 (terminal 42,43)

CH2 (terminal 52,53)

$V_t(U_o)$: 17.4 V

$I_t(I_o)$: 18.4 mA

P_o : 80 mW

L_o/R_o : 445 μ H/ Ω

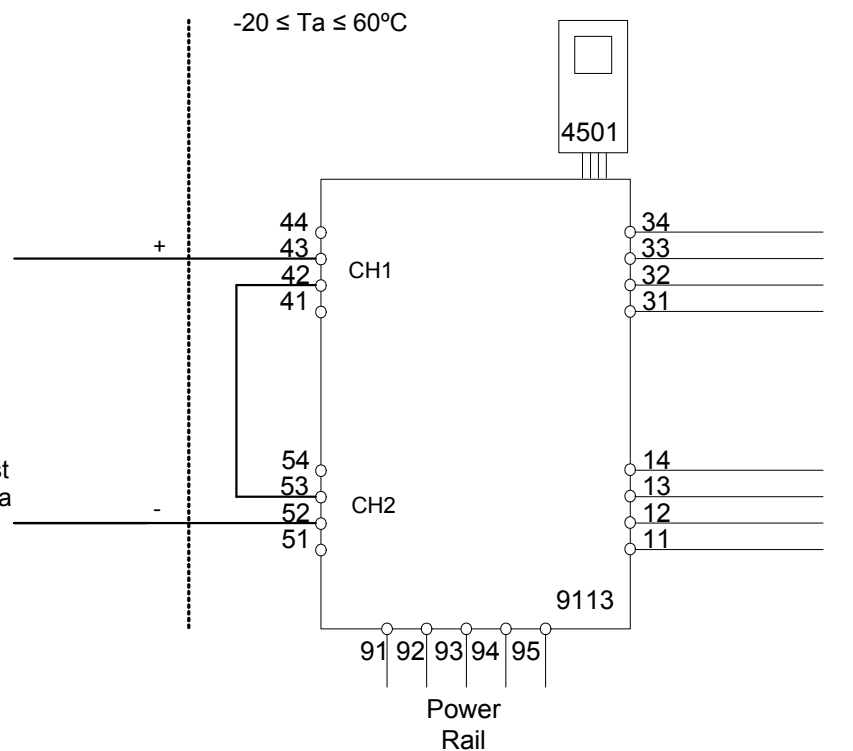
| | IIC / Group A,B | IIB / Group C,E,F | IIA / Group D,G |
|-------------|--------------------|----------------------|--------------------|
| C_a / C_o | 0.3 μ F | 1.6 μ F | 8 μ F |
| L_a / L_o | 80 mH | 250 mH | 600 mH |

U_i : 10 V

I_i : 30 mA

C_i : 15 nF

L_i : 1.7 μ H



(terminal 11,12,13,14)
(terminal 31,32,33,34)
(terminal 91,92,93,94,95)
 U_m : 253 V, max 400 Hz

LERBAKKEN 10, 8410 RØNDE DENMARK

INMETRO Desenhos para Instalação



Para instalação segura do 9113B. e 9113A. o manual seguinte deve ser observado. O módulo deve ser instalado somente por profissionais qualificados que estão familiarizados com as leis nacionais e internacionais, diretrizes e normas que se aplicam a esta área. Ano de fabricação pode ser obtido a partir dos dois primeiros dígitos do número de série.



4501

Para a instalação na Zona 2 o seguinte deve ser observado. O módulo de programação de 4501 deve ser utilizado apenas com os módulos PR electronics. É importante que o módulo esteja intacto e não tenha sido alterado ou modificado de qualquer maneira. Apenas os módulos 4501 livres de poeira e umidade devem ser instalados.

INMETRO Certificado DEKRA 23.0005X

Marcas: 9113B.

[Ex ia Ga] IIC/IIB/IIA
[Ex ia Da] IIIC
[Ex ia Ma] I

Marcas: 9113B., 9113A.

Ex ec nC IIC T4 Gc

Normas:

ABNT NBR IEC 60079-0:2020 Versão Corrigida:2023
ABNT NBR IEC 60079-7:2018 Versão Corrigida:2022
ABNT NBR IEC 60079-11:2013 Versão Corrigida:2017
ABNT NBR IEC 60079-15:2019

Terminal de fonte de alimentação (31,32)

Voltagem: 19,2 – 31,2 VDC

Relê de Estado terminais (33,34)

Voltagem máx.: 125 VAC / 110 VDC

Potência máx.: 62,5 VA / 32 W

Corrente máx.: 0,5 A AC / 0,3 ADC

Instalação Zone 2:

Voltagem máx.: 32 VAC / 32 VDC

Potência máx.: 16 VA / 32 W

Corrente máx.: 0,5 A AC / 1 ADC

Notas de Instalação:

Instalação em grau de poluição 2, categoria de sobretensão II conforme definido no IEC 60664-1. Os circuitos não intrinsecamente seguros só pode ser connectado para sobretensão limitado ao categoria I/II como definido na IEC 60664-1.

Não separe conectores quando energizado ou quando uma mistura de gás explosivo estiver presente.

Não monte ou remova módulos do trilho de alimentação quando uma mistura explosiva de gás estiver presente.

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Desligue a alimentação antes da manutenção.
A fiação de terminais sem uso não é permitida.
A fonte de Loop e terminais de entrada de corrente para o mesmo canal não deve ser aplicada ao mesmo tempo.

Em tipo de proteção [Ex ia Da] os parâmetros para a segurança intrínseca para grupo de gás IIB são aplicáveis.

Para a instalação em Zona 2, o módulo deve ser instalado em um invólucro conformidade com o tipo de proteção 'Ex e', fornecendo no mínimo grau de proteção IP54.

Dispositivos de entrada de cabo e elementos de vedação devem cumprir com os mesmos requisitos.

Para a instalação de trilho de energia na Zona 2, apenas o trilho de alimentação Rail 9400 fornecido pela Unidade de Controle de Potência 9410 é permitido.

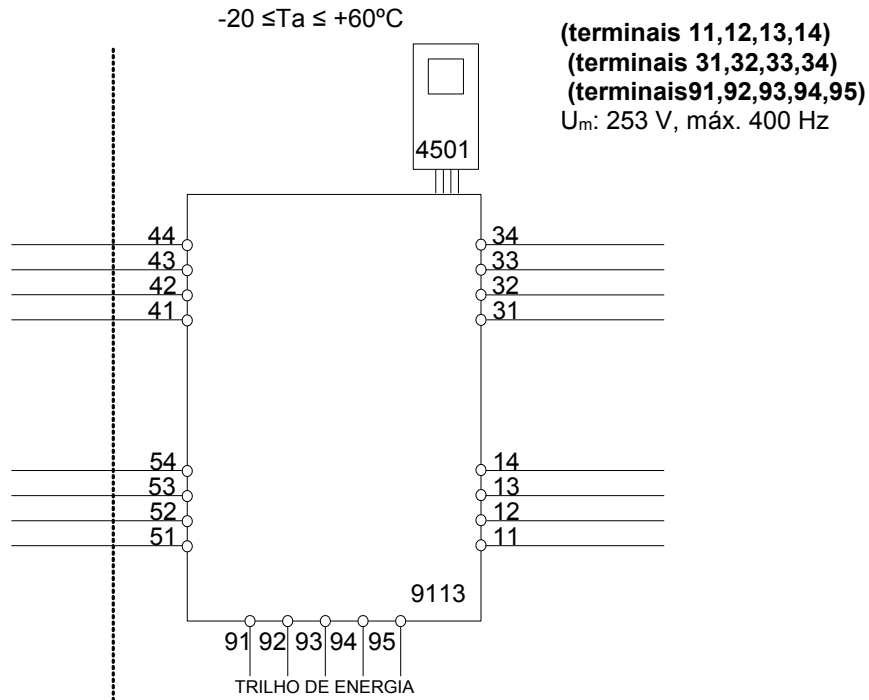
Máx. torque terminal de parafuso 0,5 Nm. O fio trançado deve ser instalado com um comprimento de isolamento de 5 mm ou através de um terminal isolado adequado, como um terminal de cadaço.

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Instalação 9113B. 2 Circuitos

Área de classificada
Zona 0,1,2, 20, 21, 22

Área de nao classificada
ou Zona 2



entrada Ex

CN1 (terminais 41,42,43,44)

CN2 (terminais 51,52,53,54)

U_o: 8,7 V
I_o: 18,4 mA
P_o: 40 mW
Lo/Ro 892 μH/Ω

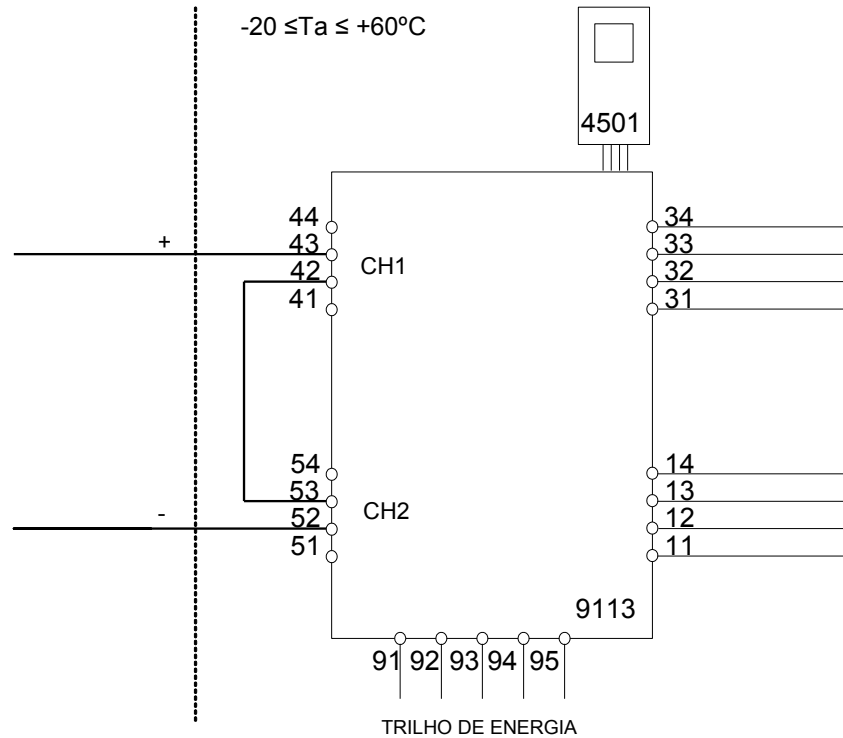
| | IIC | IIB | IIA | I |
|-----|--------|--------|---------|---------|
| Co. | 5 μF | 50 μF | 1000 μF | 1000 μF |
| Lo. | 100 mH | 300 mH | 700 mH | 700 mH |

U_i: 10 V
I_i: 30 mA
C_i: 30 nF
L_i: 820 nH

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Instalação 9113B. 2 Circuitos combinado

 Área de classificada
 Zona 0,1,2, 20, 21, 22

 Área de nao classificada
 ou Zona 2

entrada EX
CN1 (terminais 43 +)
CN2 (terminais 52 -)
 $U_o:$ 17,4 V
 $I_o:$ 18,4 mA
 $P_o:$ 80 mW
 L_o/R_o 445 $\mu\text{H}/\Omega$
(terminais 11,12,13,14)
(terminais 31,32,33,34)
(terminais 91,92,93,94,95)
 $U_m:$ 253 V, máx. 400 Hz

| | IIC | IIB | IIA | I |
|-------|-------------------|-------------------|-----------------|-----------------|
| C_o | 0,3 μF | 1,6 μF | 8 μF | 8 μF |
| L_o | 80 mH | 250 mH | 600 mH | 600 mH |

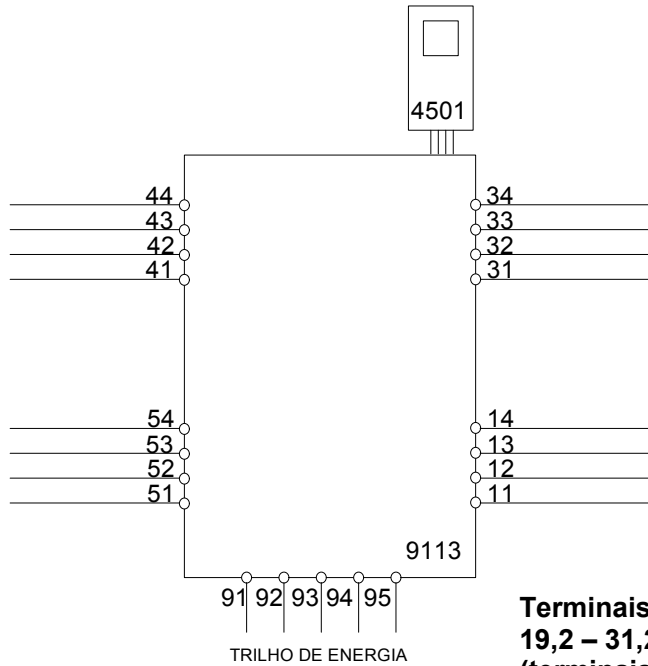
 $U_i:$ 10 V
 $I_i:$ 30 mA
 $C_i:$ 15 nF
 $L_i:$ 1,7 μH

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Instalação 9113A.:

Área de não Risco
ou Zona 2

$-20 \leq T_a \leq 60^\circ\text{C}$



Terminais de alimentação:
19,2 – 31,2 VDC
(terminais 31,32)
(terminais 91,92,93,94,95)

Input

CN1 (terminais 41,42,43,44)
CN2 (terminais 51,52,53,54)

Saida:

(terminais 11,12,13,14)

Para a instalação em Zona 2, o módulo deve ser instalado em um invólucro conformidade com o tipo de proteção 'Ex e', fornecendo no mínimo grau de proteção IP54. Dispositivos de entrada de cabo e elementos de vedação devem cumprir com os mesmos requisitos.

Para a instalação de trilho de energia na Zona 2, apenas o trilho de alimentação Rail 9400 fornecido pela Unidade de Controle de Potência 9410 é permitido.

Máx. torque terminal de parafuso 0,5 Nm. O fio trançado deve ser instalado com um comprimento de isolamento de 5 mm ou através de um terminal isolado adequado, como um terminal de cadarço.

Document history

The following list provides notes concerning revisions of this document.

| Rev. ID | Date | Notes |
|----------------|-------------|---|
| 107 | 1848 | Release of the 9113xx-EMP version. |
| 108 | 1948 | 9113A-version included in manual. CCOE approval discontinued. New FM certificate and installation drawing. |
| 109 | 2103 | Routing diagram updated. |
| 110 | 2242 | ATEX and IECEx approvals updated - Ex na changed to Ex ec. UKEX approval added. |
| 111 | 2411 | ATEX / UKEX installation drawing updated - UKEX certificate for 9113B-EMP added. INMETRO approval updated - Ex nA replaced by Ex ec. |

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