

PERFORMANCE  
MADE  
SMARTER

# Product manual **9113**

## **Temperature / mA Converter**



Segurança  
**INMETRO**



**ClassNK**  
APPROVED



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

No. 9113V109-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

## 9113

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## 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 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.

## 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.

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.

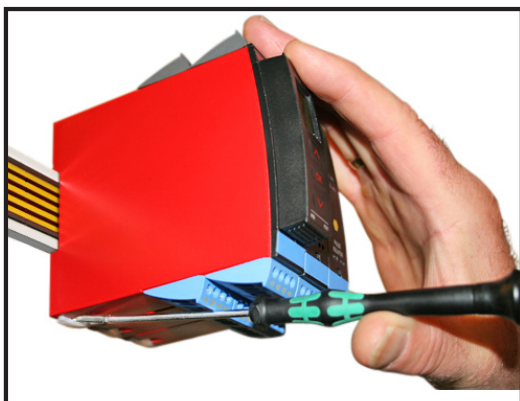
## Cleaning

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.

## How to demount system 9000



**Picture 1:**

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

# Temperature / mA converter

## 9113

- Input for RTD, TC and mA
- Active / passive mA output via the same two terminals
- 1 or 2 channels
- Can be supplied separately or installed on power rail, PR type 9400
- SIL 2-certified via Full Assessment

### Advanced features

- Configuration and monitoring by way of detachable display front (PR 4500); process calibration and signal simulation.
- Copying of the configuration from one device to others of the same type via the display front.
- TC inputs can use either the internal CJC or a terminal with a built-in Pt100 sensor (PR 5910 / PR 5910Ex for channel 1; PR 5913 / PR 5913Ex for 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

- 9113Axx can be mounted in the safe area or in zone 2 / Class I, Division 2, Groups A, B, C, D.
- 9113Bxx 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 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.

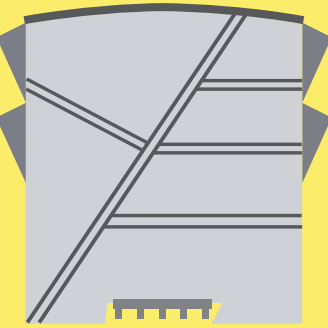
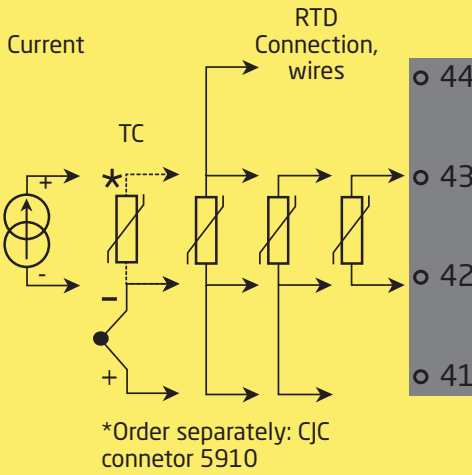
### Technical characteristics

- 1 green and 2 red front LEDs indicate operation status and malfunction.
- 2.6 kVAC galvanic isolation between input, output and supply.

# Applications - 9113Axx

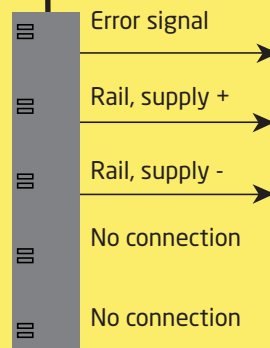
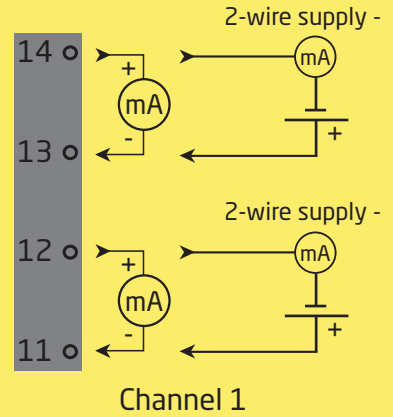
## Input signals:

### Channel 1

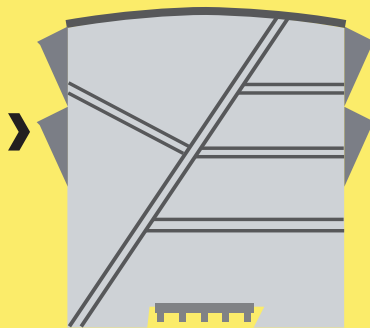
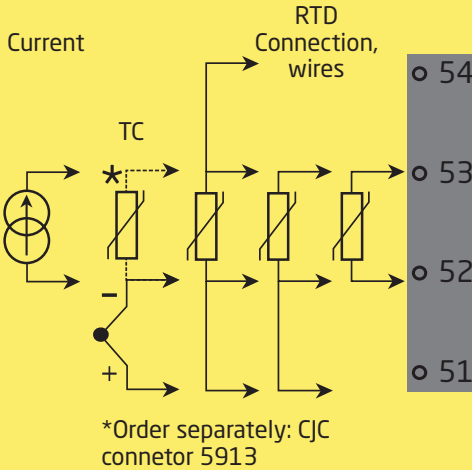


## Output signals:

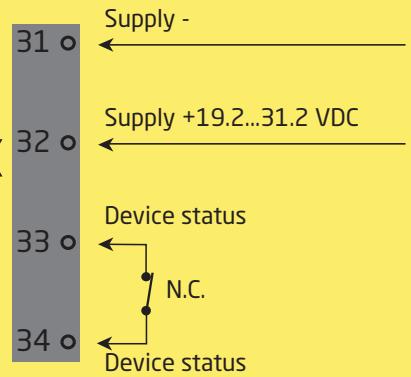
### Analog, 0/4...20 mA Channel 2



### Channel 2



## Power connection:



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

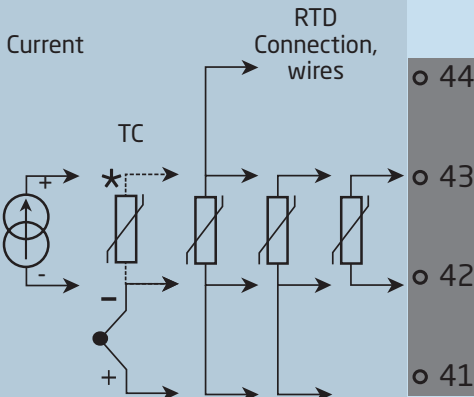


# Applications - 9113Bxx

## Input signals:

### Channel 1

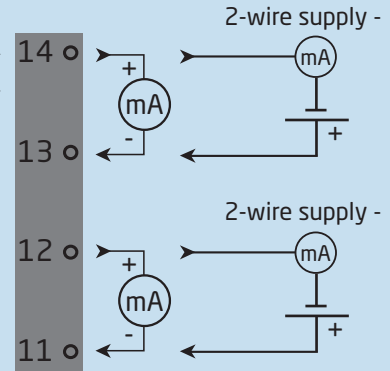
Current



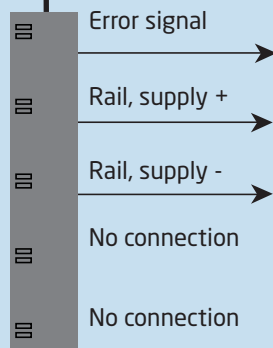
\*Order separately: CJC connector 5910Ex

## Output signals:

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

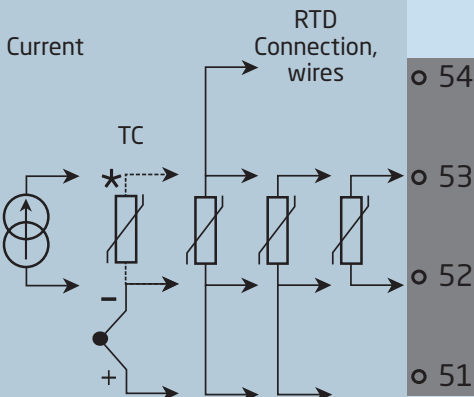


Power rail



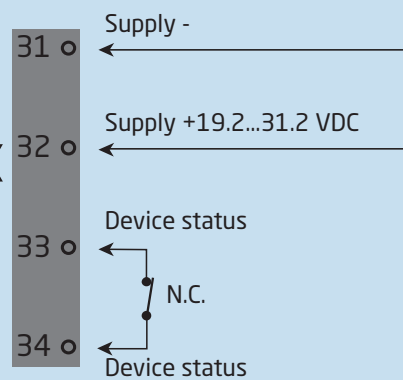
### Channel 2

Current



\*Order separately: CJC connector 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**



## PR 4500 display / programming front



### Functionality

The simple and easily understandable menu structure and the explanatory help texts guide you effortlessly and automatically through the configuration steps, thus making the product very easy to use. Functions and configuration options are described in the section "Configuration / operating the function keys".

### Application

- Communications interface for modification of operational parameters in 9113.
- Can be moved from one 9113 device to another and download the configuration of the first unit to subsequent units.
- When mounted in the process, the display shows process values and device status.

### Technical characteristics

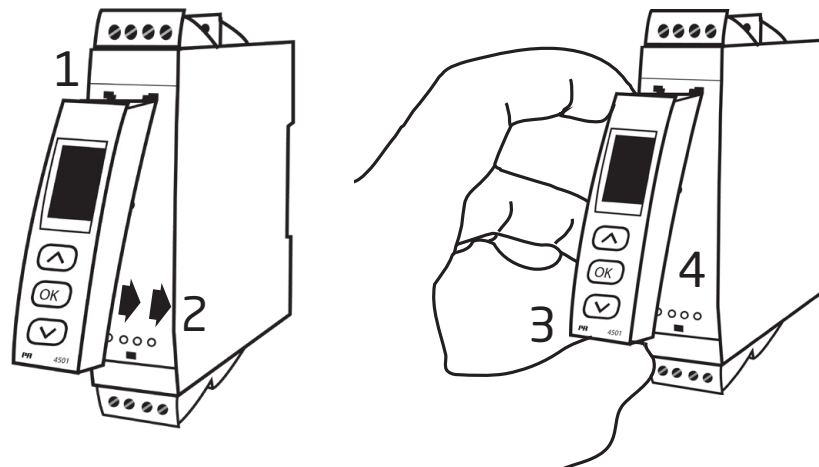
- LCD display with 4 lines:
  - Line 1 (H=5.57 mm) shows input status
  - Line 2 and 3 (H=3.33 mm) show analog input / output value or TAG no. and units.
  - Line 4 shows status for communication and whether the device is SIL-locked.Static dot = SIL-locked and flashing dot = not SIL-locked.
- Programming 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 unauthorized modifications to the configuration.

## Mounting / demounting the PR 4500

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

### Demounting of the PR 4500

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



## Order

Type	Associated apparatus	Channels	I.S. / Ex approvals
9113	No : A	Single : A	ATEX, IECEx, FM, INMETRO, EAC-Ex : -
	Yes : B	Double : B	cULus, ATEX, IECEx, FM, INMETRO, EAC-Ex : -U9

Example: 9113BB

## Accessories

- 4501 = Display / programming front
- 4511 = Modbus communication enabler
- 4512 = Bluetooth communication enabler
- 5910 = CJC connector, channel 1, for 9113AAx
- 5913 = CJC connector, channel 2, for 9113ABx
- 5910Ex = CJC connector, channel 1, for 9113BAx
- 5913Ex = CJC connector, channel 2, for 9113BBx
- 9400 = Power rail
- 9404 = Module stop for rail
- 9410 = Power control unit
- 9421 = Power supply 24 V - Ex nA 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/ 4501 / 451x . . . . .	109 x 23.5 x 116 / 131 mm
Weight approx. . . . .	250 g
Weight incl. 4501 / 451x (approx.) . . . . .	265 g / 280 g
DIN rail type. . . . .	DIN EN 60715 - 35 mm
Wire size. . . . .	0.13...2.08 mm <sup>2</sup> / 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
9113xAx	1 channel	≤ 0.8 W	≤ 0.8 W
9113xBx	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 9113 is used with the PR 4500, 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

Programming . . . . . 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	$\leq \pm 0.1\%$ of span	$\leq \pm 0.01\%$ of span / °C

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

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



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
ATEX . . . . .	2014/34/EU
LVD . . . . .	2014/35/EU
RoHS . . . . .	2011/65/EU

**Approvals**

DNV-GL, Ships & Offshore . . . . .	TAA00000JD
ClassNK . . . . .	TA18527M
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 07ATEX0148 X
IECEX. . . . .	IECEX KEM 09.0052X
c FM us. . . . .	FM19US0059X / FM19CA0032X
INMETRO . . . . .	DEKRA 16.0003 X
c UL us, UL 913 (only 9113xx-U9) . . . . .	E233311
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	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

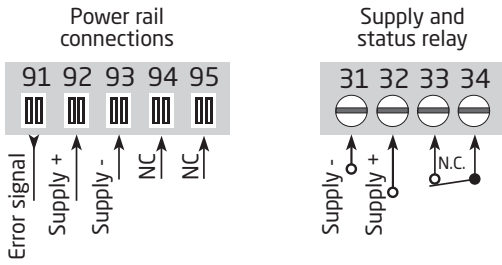
Sensor error detection (SE.BR, SE.SH):			
Input	Range	Readout	Limit
CURR	Loop break (4...20 mA)	SE.BR	<= 3.6 mA; > = 20.75 mA
TEMP	TC	SE.BR	> 10 kΩ...165 kΩ
	RTD: 2-, 3- and 4-wire For Pt10, Pt20, Pt50, Pt100, Pt200, Ni50 and Ni120	SE.BR	> 900...1000 Ω (cable > 50 Ω)
		SE.SH	< app. 15 Ω
	RTD: 2-, 3-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

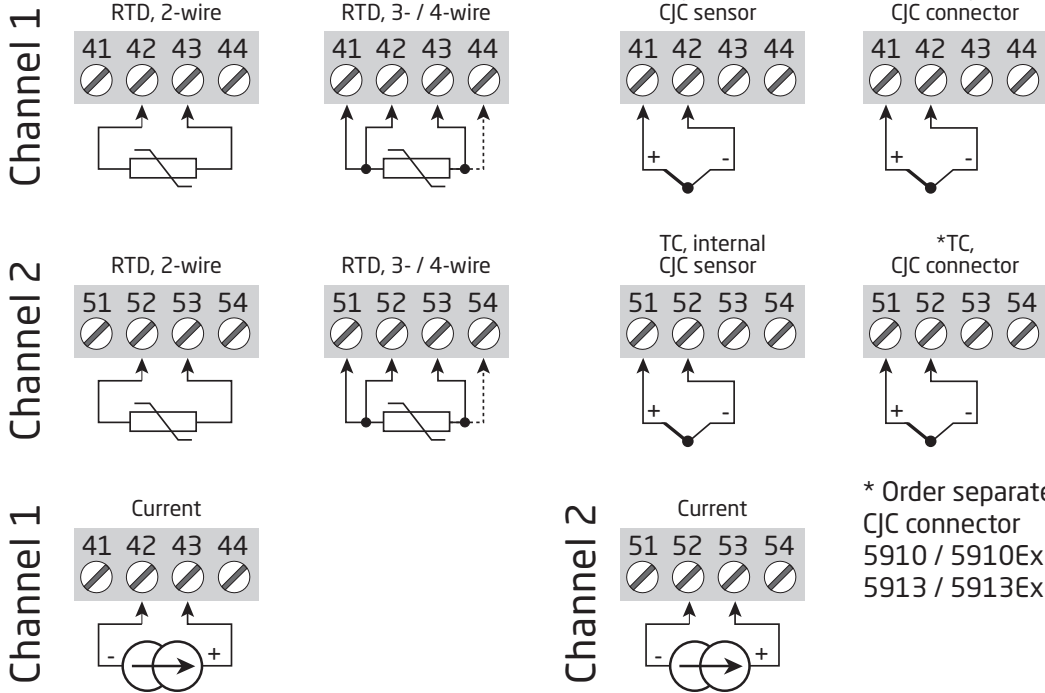
!	All error indications in the display flash once per second. The help text explains the error. If the error is a sensor error, the display backlight flashes as well - this is acknowledged (stopped) by pushing the  button.
*	Error is acknowledged by resetting the device power.
**	Error can be disregarded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

# Connections



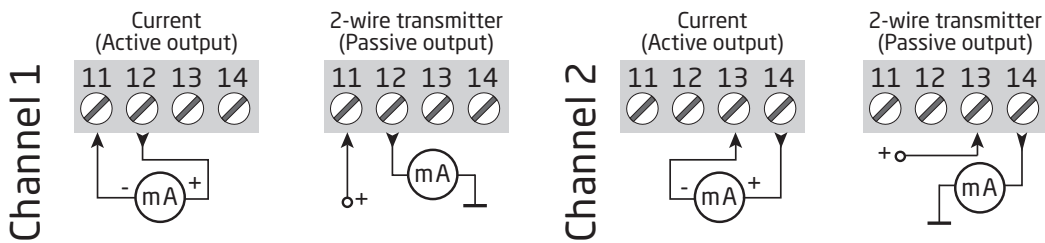
NC = no connection

## Inputs:



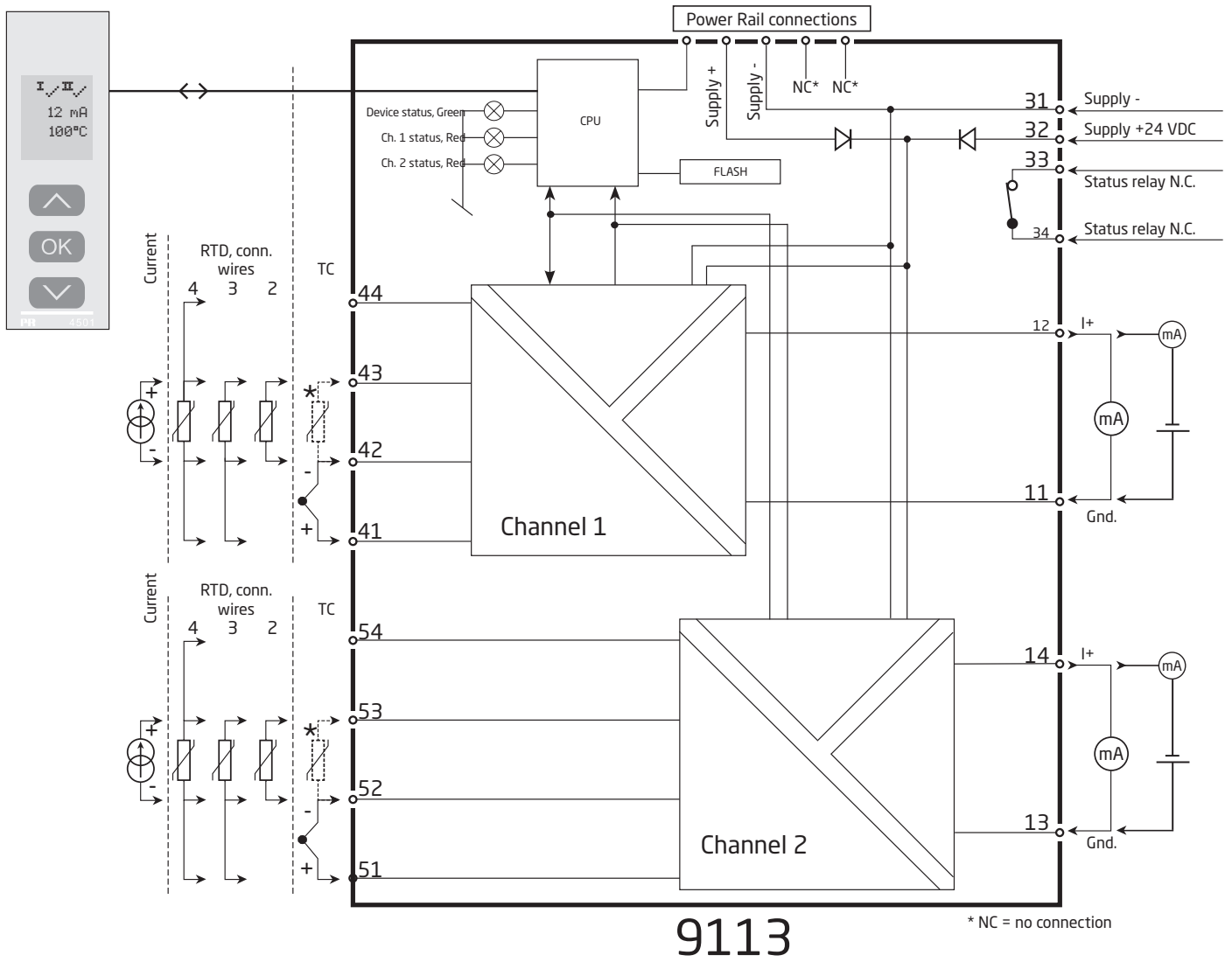
\* Order separately:  
CJC connector  
5910 / 5910Ex (ch. 1) /  
5913 / 5913Ex (ch. 2).

## Outputs:





# Block diagram



## Signal error and cable fault indications without display front

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, 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 unauthorized modifications to the configuration. If the configured password is not known, please contact PR electronics support - [www.prelectronics.com/contact](http://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 display front PR 4500

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 PR 4500.

## Signal and sensor error indication without display front

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 unauthorized 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.

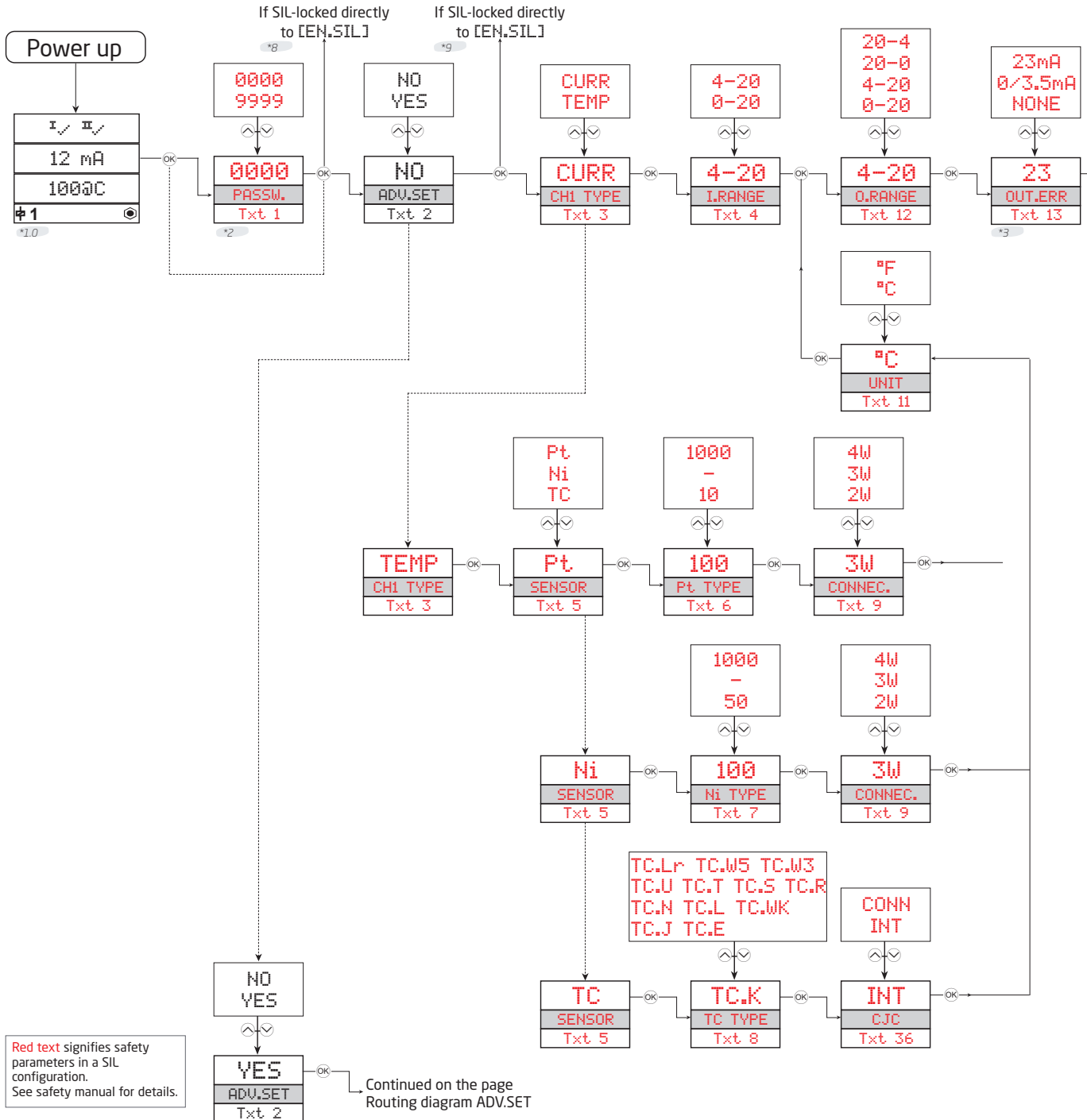
**Safety Integrity Level (SIL):** See Safety Manual for details.



# 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.

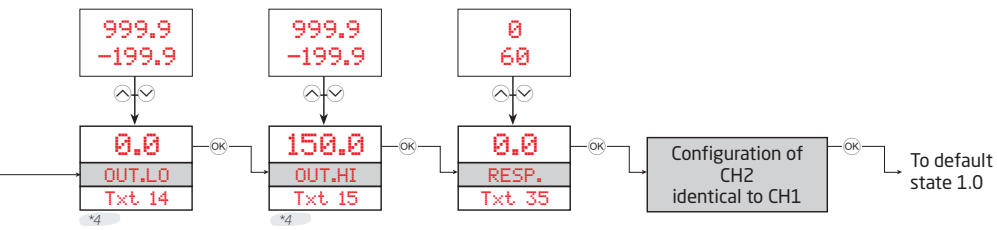
\*2 Only if password-protected.

\*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 4501 devices.  
4511 devices with serial no. lower than 211001001.  
4512 devices with serial no. lower than 211065001.

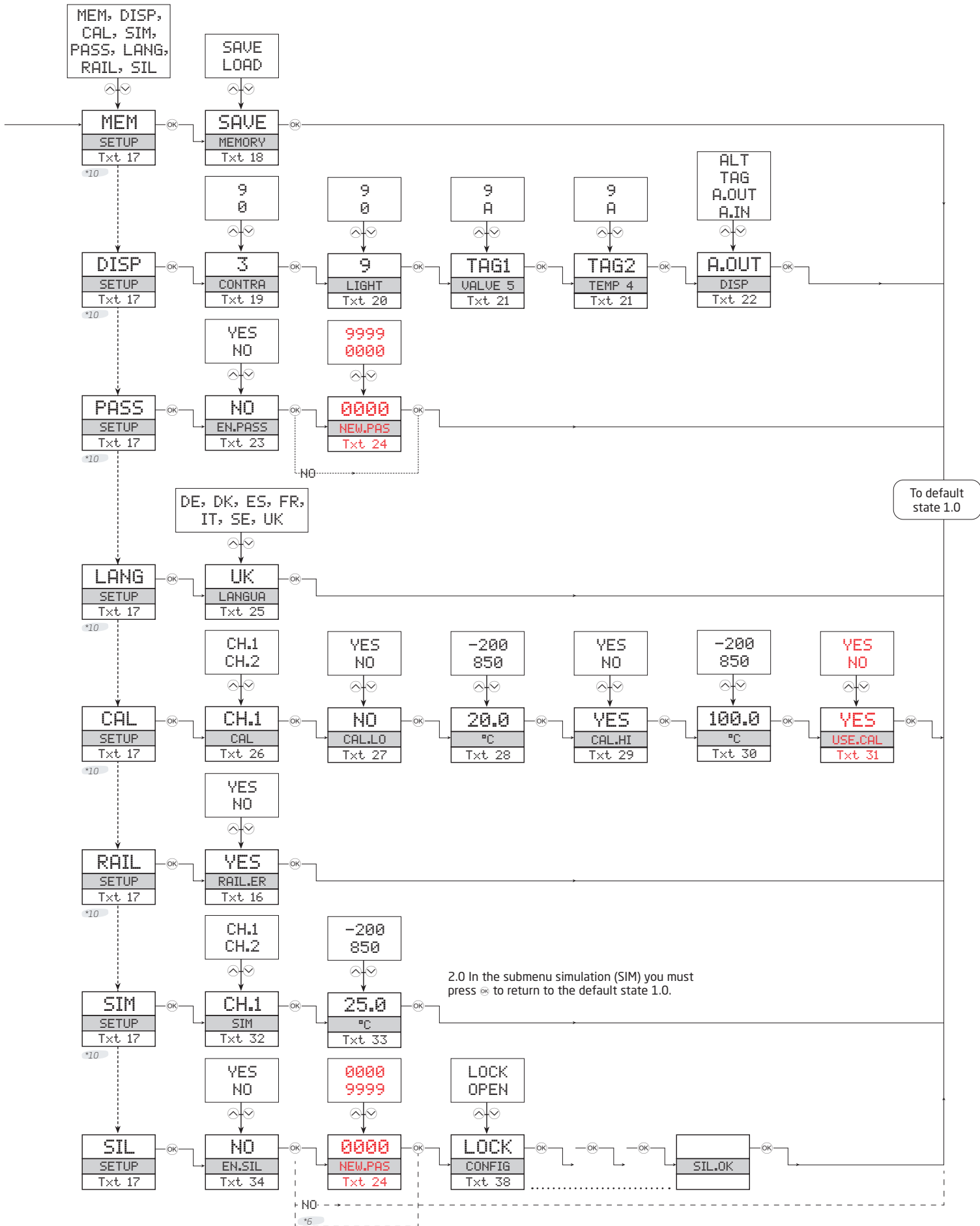
\*9 Branching to SIL from this point valid for:  
4511 devices with serial no from 211001001.  
4512 devices with serial no from 211065001.



\*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  
Save 9113 configuration in PR 4500
- [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



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:** KEM 09.0052 X

**Marking 9113Bx:** [Ex ia Ga] IIC/IIB/IIA  
Ex nA nC IIC T4 Gc  
[Ex ia Da] IIIC  
[Ex ia Ma] I

**Marking 9113Ax** II 3 G Ex nA nC IIC T4 Gc

**Standards:** IEC60079-0:2011, IEC60079-11:2011, IEC60079-15:2010

### Supply terminal (31,32)

Voltage : 19.2 – 31.2 VDC

### Status Relay. terminal (33,34)

		<b>Zone 2 Installation</b>
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 A AC / 0.3 ADC	0.5 A AC / 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.

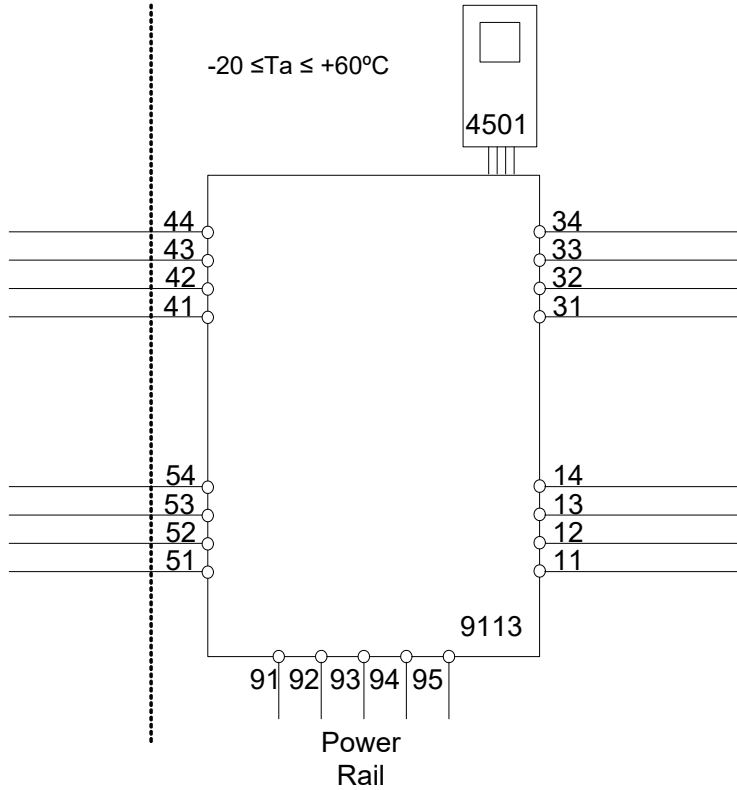
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**9113Bx Installation:**

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<sub>o</sub>: 8.7 V  
I<sub>o</sub>: 18.4 mA  
P<sub>o</sub>: 40 mW  
L<sub>o</sub>/R<sub>o</sub>: 892 μH/Ω

	IIC	IIB	IIA or I
C <sub>o</sub> .	5 μF	50 μF	1000 μF
L <sub>o</sub> .	100 mH	300 mH	700 mH

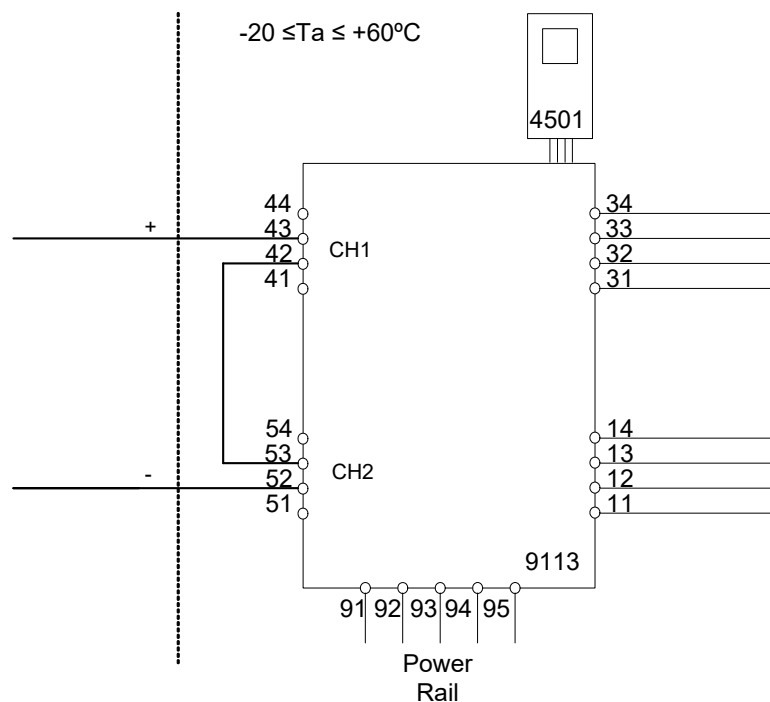
U<sub>i</sub>: 10 V  
I<sub>i</sub>: 30 mA  
C<sub>i</sub>: 30 nF  
L<sub>i</sub>: 820 nH

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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<sub>o</sub>: 17.4 V  
I<sub>o</sub>: 18.4 mA  
P<sub>o</sub>: 80 mW  
Lo/Ro 445 μH/Ω

U<sub>m</sub>: 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 <sub>o</sub> .	0.3 μF	1.6 μF	8 μF
L <sub>o</sub> .	80 mH	250 mH	600 mH

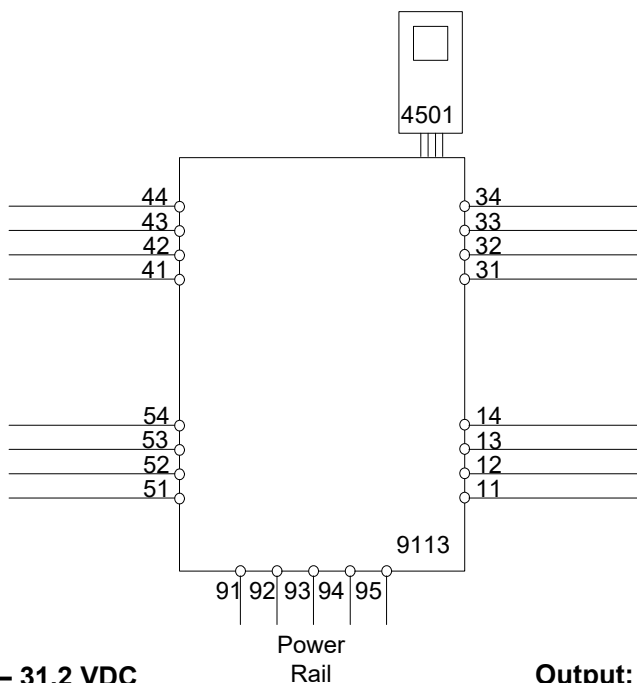
U<sub>i</sub>: 10 V  
I<sub>i</sub>: 30 mA  
C<sub>i</sub>: 15 nF  
L<sub>i</sub>: 1.7 μH

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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 A AC / 0.3 ADC

**Zone 2 Installation**

32 VAC / 32 VDC  
16V A / 32 W  
0.5 A AC / 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 Installation drawing



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 0148 X

**Marking 9113Bx:**



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

**Marking 9113Ax**

II 3 G Ex nA nC IIC T4 Gc

**Standards** EN 60079-0 : 2012, EN 60079-11 : 2012, EN 60079-15 : 2010

### Supply terminal (31,32)

Voltage : 19.2 – 31.2 VDC

### 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

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

### Installation notes:

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 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 KEMA 07ATEX0152 X) is allowed.

Revision date:  
2016-04-07

Version Revision:  
V5 R0

Prepared by:  
PB

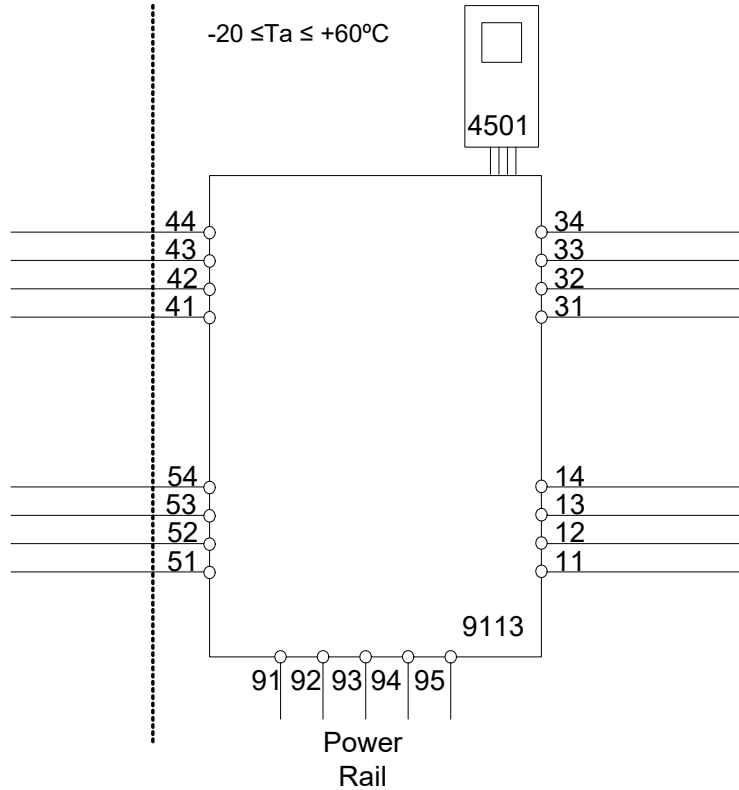
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**9113Bx Installation:**

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<sub>o</sub>: 8.7 V  
I<sub>o</sub>: 18.4 mA  
P<sub>o</sub>: 40 mW  
Lo/Ro 892 μH/Ω

U<sub>m</sub>: 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 <sub>o</sub> .	5 μF	50 μF	1000 μF
L <sub>o</sub> .	100 mH	300 mH	700 mH

U<sub>i</sub>: 10 V  
I<sub>i</sub>: 30 mA  
C<sub>i</sub>: 30 nF  
L<sub>i</sub>: 820 nH

Revision date:  
2016-04-07

Version Revision:  
V5 R0

Prepared by:  
PB

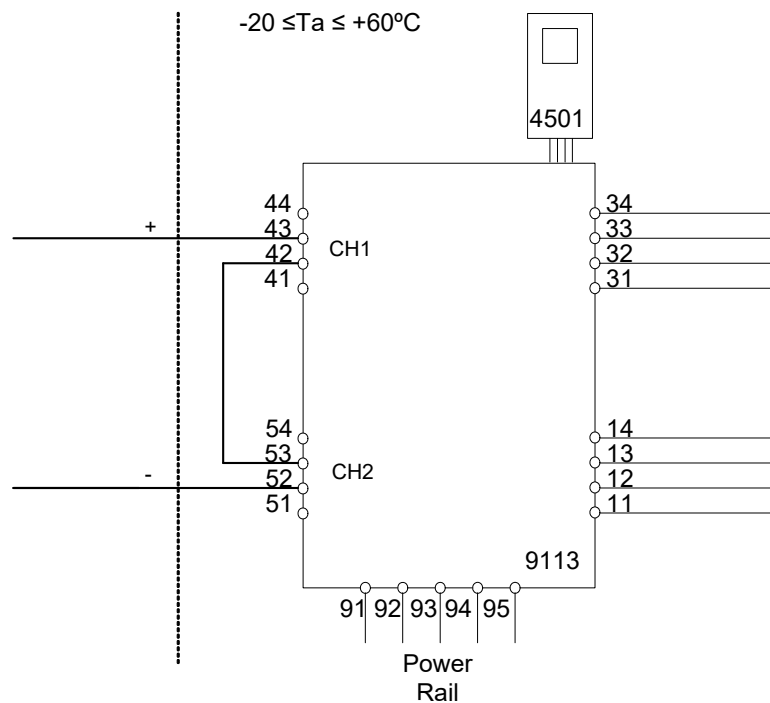
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**9113Bx Installation:**

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

Non Hazardous area  
or Zone 2  
 $-20 \leq T_a \leq +60^\circ\text{C}$



$U_m$ : 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  $\mu\text{H}/\Omega$

**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 $\mu\text{F}$	1.6 $\mu\text{F}$	8 $\mu\text{F}$
$L_o$ .	80 mH	250 mH	600 mH

$U_i$ : 10 V  
 $I_i$ : 30 mA  
 $C_i$ : 15 nF  
 $L_i$ : 1.7  $\mu\text{H}$

Revision date:  
2016-04-07

Version Revision:  
V5 R0

Prepared by:  
PB

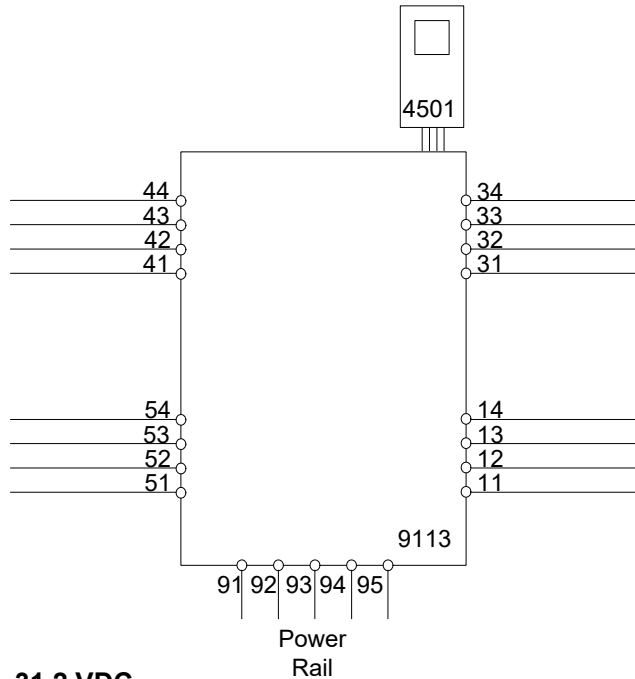
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**9113Ax Installation:**

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: 125 VAC / 110 VDC  
Power max: 62.5 VA / 32 W  
Current max: 0.5 A AC / 0.3 ADC

**Zone 2 Installation**

32 VAC / 32 VDC  
16 VA / 32 W  
0.5 A AC / 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 KEMA 07ATEX0152 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:

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

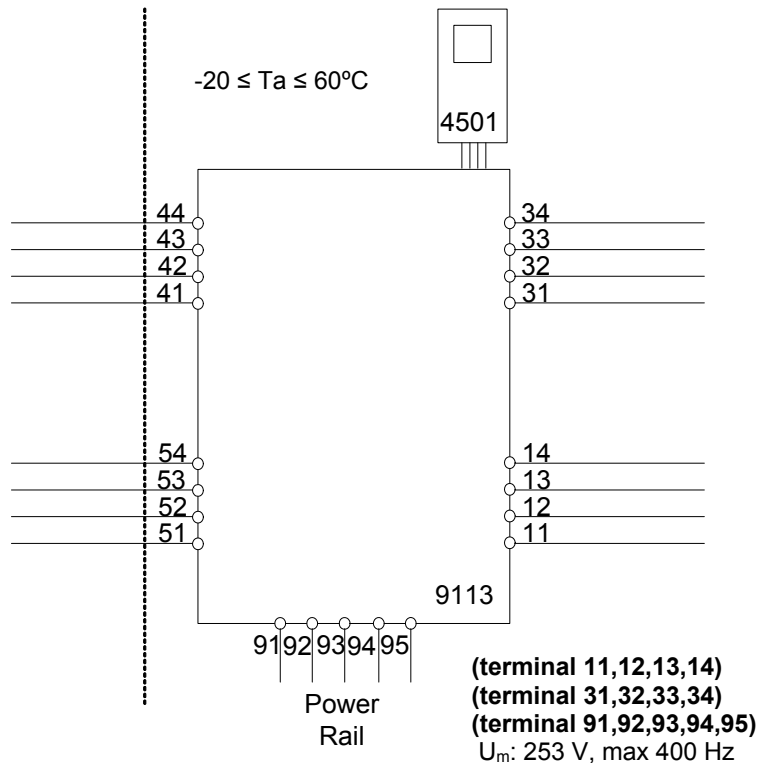
$$I_{max} (I_i) \geq I_t (I_o)$$

$$P_i \geq P_o$$

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

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

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 $\mu\text{F}$	50 $\mu\text{F}$	1000 $\mu\text{F}$
$L_a / L_o$	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:

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

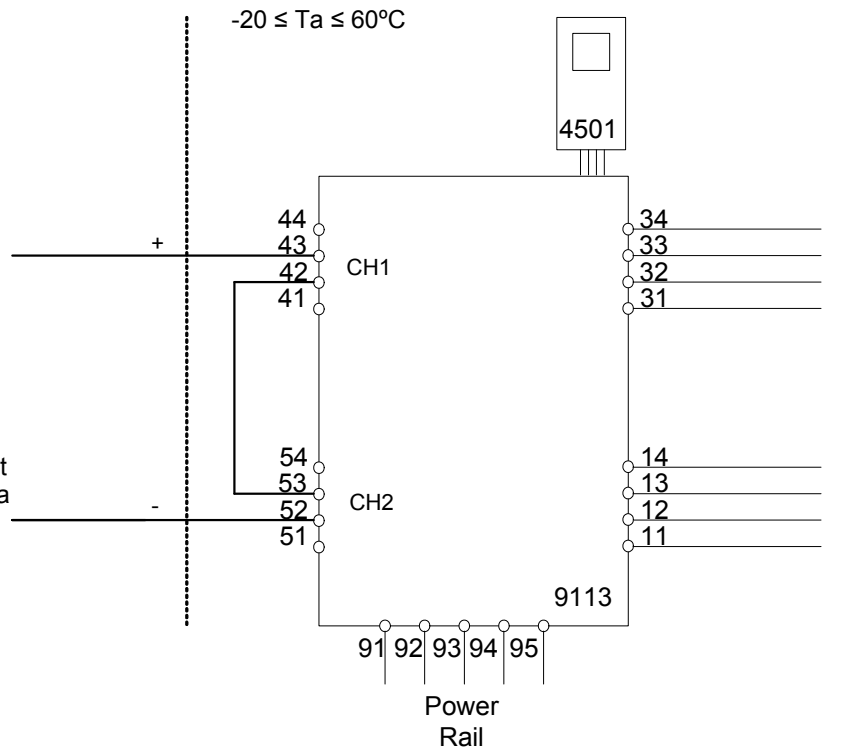
$$I_{max}(I_i) \geq I_t(I_o)$$

$$P_i \geq P_o$$

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

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

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  $\mu$ H/ $\Omega$

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

	IIC / Group A,B	IIB / Group C,E,F	IIA / Group D,G
$C_a / C_o$	0.3 $\mu$ F	1.6 $\mu$ F	8 $\mu$ 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  $\mu$ H

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## UL Installation drawing



For safe installation of associated apparatus 9113Bx-U9 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.



For Installation in Div2/Zone2 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.

9113AA-U9, 9113BA-U9: 1 Channel Temperature / mA Converter  
 9113AB-U9, 9113BB-U9: 2 Channel Temperature / mA Converter

### Marking:



Proc. Cont. Eq. for Use in Haz. Loc.  
 Install in CL I DIV2 GP A-D T4 provide  
 IS circuits to CL I-III DIV 1 GP A-G  
 or CL I Zn2 Gp IIC T4 provides IS  
 circuits for CL I Zn0 Gp IIC/Zn20 Gp IIIC  
 [Exia] Installation Drawing: 9113QU01

The 9113Bx-U9 is a galvanic isolating associated apparatus for installation in non-hazardous locations or Class I, Division 2, Groups A – D hazardous locations with intrinsically safe connections to Class I, II and III hazardous locations.



Proc. Cont. Eq. for Use in Haz. Loc.  
 Install in CL I DIV2 GP A-D T4  
 or CL I Zn2 Gp IIC T4  
 Installation Drawing: 9113QU01

The 9113Ax-U9 is intended for installation in non-hazardous locations or Class I, Division 2, Groups A – D or Zone 2 Group IIC hazardous locations.

### Standards:

- UL 121201 NONINCENDIVE ELECTRICAL EQUIPMENT FOR USE IN CLASS I AND II, DIVISION 2 AND CLASS III, DIVISIONS 1 AND 2 HAZARDOUS (CLASSIFIED) LOCATIONS Edition 9 - Revision Date 2018/08/31
- CSA C22.2 NO. 213 NONINCENDIVE ELECTRICAL EQUIPMENT FOR USE IN CLASS I AND II, DIVISION 2 AND CLASS III, DIVISIONS 1 AND 2 HAZARDOUS (CLASSIFIED) LOCATIONS- Edition 3 - Issue Date 2017/09/01
- UL 913 STANDARD FOR INTRINSICALLY SAFE APPARATUS AND ASSOCIATED APPARATUS FOR USE IN CLASS I, II, III, DIVISION 1, HAZARDOUS (CLASSIFIED) LOCATIONS- Edition 8 - Revision Date 2015/10/16
- CSA C22.2 NO. 60079-0 EXPLOSIVE ATMOSPHERES — PART 0: EQUIPMENT — GENERAL REQUIREMENTS- Edition 3 - Issue Date 2015/10/01
- CSA C22.2 NO. 60079-11:14 EXPLOSIVE ATMOSPHERES — PART 11: EQUIPMENT PROTECTION BY INTRINSIC SAFETY "I"- Edition 2 - Issue Date 2014/02/01

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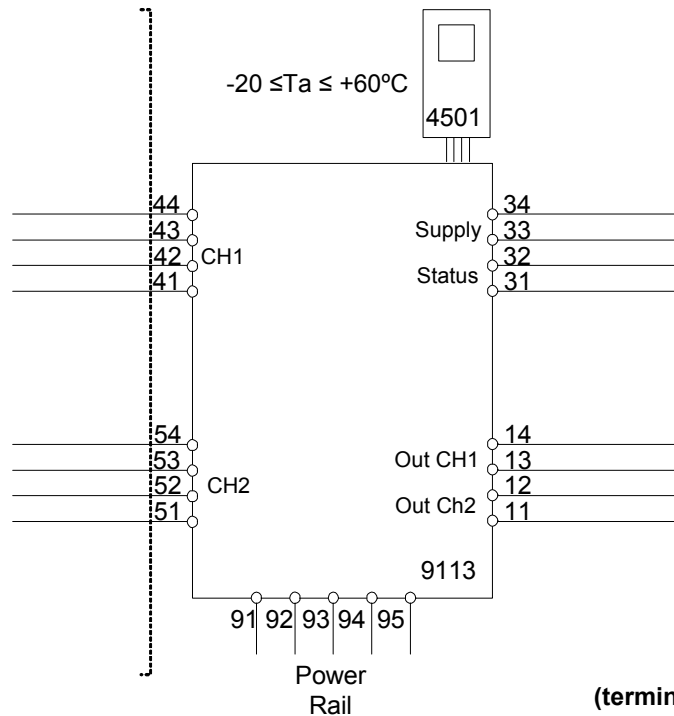
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**9113Bx-U9 Installation**
**Hazardous Classified Location**

 Class I/II/III, Division 1, Group A,B,C,D,E,F,G  
 Zone 0,1, 2 Group IIC, IIB, IIA or  
 Zone 20, 21

**Unclassified Location or**
**Hazardous Classified Location**  
 Class I, Division 2, Group ABCD T4  
 Class I Zone 2 Group IIC T4

 Simple Apparatus or  
 Intrinsic safe apparatus  
 with entity parameters:

 $V_{max} (U_i) \geq V_t (U_o)$   
 $I_{max} (I_i) \geq I_t (I_o)$   
 $P_i \geq P_t (P_o)$   
 $C_a \geq C_{cable} + C_i$   
 $L_a \geq L_{cable} + L_i$ 

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

**Ex input**
**CH1 (terminal 41,42,43,44)**
**CH2 (terminal 51,52,53,54)**
 $V_{oc}$  or  $U_o$ : 8.7 V  
 $I_{sc}$  or  $I_o$ : 18.4 mA  
 $P_o$ : 40 mW  
 $L_o/R_o$ : 892  $\mu$ H/ $\Omega$ 

	IIC or A,B	IIB or C,E,F	IIA or D,G
$C_a$ or $C_o$ .	5 $\mu$ F	50 $\mu$ F	1000 $\mu$ F
$L_a$ or $L_o$ .	100 mH	300 mH	700 mH

 $V_{max}$  or  $U_i$ : 10 V  
 $I_{max}$  or  $I_i$ : 30 mA  
 $C_i$ : 30 nF  
 $L_i$ : 820 nH

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**9113Bx-U9 Splitter Installation**
**Hazardous Classified Location**

 Class I/II/III, Division 1, Group A,B,C,D,E,F,G  
 Zone 0,1, 2 Group IIC, IIB, IIA or  
 Zone 20, 21

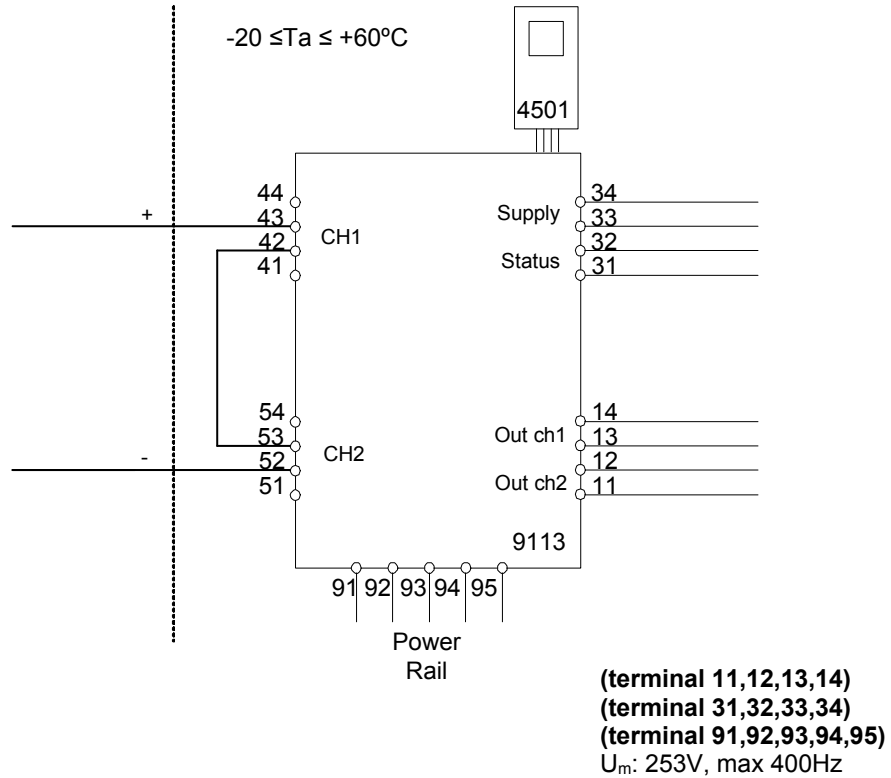
**Unclassified Location or**
**Hazardous Classified Location**

 Class I, Division 2, Group ABCD T4  
 Class I Zone 2 Group IIC T4

 Simple Apparatus or  
 Intrinsic safe apparatus  
 with entity parameters:

 $V_{max}(U_i) \geq V_t(U_o)$   
 $I_{max}(I_i) \geq I_t(I_o)$   
 $P_i \geq P_t(P_o)$   
 $C_a \geq C_{cable} + C_i$   
 $L_a \geq L_{cable} + L_i$ 
**Ex input**
**CH1 (terminal 43 +)**
**CH2 (terminal 52 -)**
 $V_{oc}$  or  $U_o$ : 17.4 V  
 $I_{sc}$  or  $I_o$ : 18.4 mA  
 $P_o$ : 80 mW  
 $L_o/R_o$ : 445  $\mu\text{H}/\Omega$ 

	IIC or A,B	IIB or C,E,F	IIA or D,G
$C_a$ or $C_o$ .	0.3 $\mu\text{F}$	1.6 $\mu\text{F}$	8 $\mu\text{F}$
$L_a$ or $L_o$ .	80 mH	250 mH	600 mH

 $V_{max}$  or  $U_i$ : 10 V  
 $I_{max}$  or  $I_i$ : 30 mA  
 $C_i$ : 15 nF  
 $L_i$ : 1.7  $\mu\text{H}$ 


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**Installation notes 9113Ax-U9 and 9113Bx-U9:**

The module must be installed in a tool-secured enclosure suitable for the application in accordance with the National Electrical Code (ANSI/NFPA 70) for installation in the United States, the Canadian Electrical Code for installations in Canada, or other local codes, as applicable.

The module is galvanically isolated and does not require grounding.

Install in pollution degree 2, overvoltage category II, in accordance with IEC 60664-1.

Use minimum 75 °C copper conductors with wire size AWG: (26-14)

There are no serviceable parts in the equipment and no component substitution is permitted.

**Warning:** Substitution of components may impair intrinsic safety.

**Avertissement:** La substitution de composants peut compromettre la sécurité intrinsèque.

**Warning:** To prevent ignition of the explosive atmospheres, disconnect power before servicing and do not separate connectors, install or remove module from Power Rail when energized and an explosive gas mixture is present.

**Avertissement :** Pour éviter l'inflammation d'atmosphères explosibles, déconnectez l'alimentation avant les opérations d'entretien. Ne montez pas ou n'enlevez pas les connecteurs quand le module est sous tension et en présence d'un mélange de gaz. Ne montez pas ou n'enlevez pas les modules du rail d'alimentation en présence d'un mélange de gaz.

**Installation notes 9113Bx-U9:**

Associated Equipment /Appareillage Associé [Ex ia]

The Ex output current of this associated apparatus is limited by a resistor such that the output voltage-current plot is a straight line drawn between open-circuit voltage and short-circuit current. Selected intrinsically safe equipment must be third party listed as intrinsically safe for the application, and have intrinsically safe entity parameters conforming with Table 1 below.

**TABLE 1:**

<u>I.S. Equipment</u>		<u>Associated Apparatus</u>
V max (or Ui)	≥	Voc or Vt (or Uo)
I max (or Ii)	≥	Isc or It (or Io)
P max, Pi	≥	Po
Ci + Ccable	≤	Ca (or Co)
Li + Lcable	≤	La (or Lo)

The module may also be connected to a simple apparatus as defined in Article 504.2 and installed and temperature classified in accordance with Article 504.10(D) of the National Electrical Code (ANSI/NFPA 70), or other local codes, as applicable.

Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations as shown in Table 1. Cable capacitance, Ccable, plus intrinsically safe equipment capacitance, Ci must be less than the marked capacitance, Ca (or Co), shown on any associated apparatus used. The same applies for inductance (Lcable, Li and La or Lo, respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used: Ccable = 60 pF/ft., Lcable = 0.2 µH/ft.

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Where multiple circuits extend from the same piece of associated apparatus, they must be installed in separate cables or in one cable having suitable insulation. Refer to Article 504.30(B) of the National Electrical Code (ANSI/NFPA 70) and Instrument Society of America Recommended Practice ISA RP12.06 for installing intrinsically safe equipment.

Intrinsically safe circuits must be wired and separated in accordance with Article 504.20 of the National Electrical Code (ANSI/NFPA 70) or other local codes, as applicable.

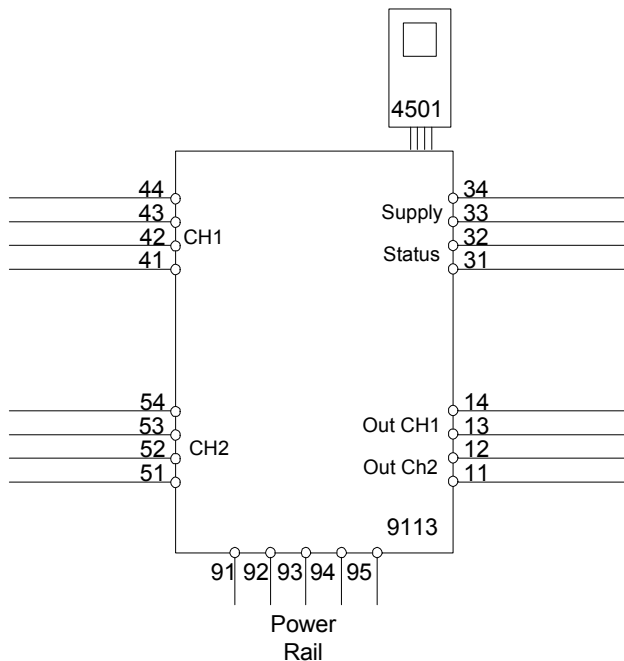
The 9113B has not been evaluated for use in combination with another associated apparatus.

There are no serviceable parts in the equipment and no component substitution is permitted.

For installations in which both the Ci and Li of the intrinsically safe apparatus exceeds 1% of the Ca (or Co) and La (or Lo) parameters of the associated apparatus (excluding the cable), then 50% of Ca (or Co) and La (or Lo) parameters are applicable and shall not be exceeded. The reduced capacitance shall not be greater than 1 µF for Groups C and/or D, and 600 nF for Groups A and B. The values of Ca (or Co) and La (or Lo) determined by this method shall not be exceeded by the sum of all of Ci plus cable capacitances and the sum of all of the Li plus cable inductances in the circuit respectively.

**9113Ax-U9 and 9113Bx-U9 Installation:**

Non Hazardous area or  
Class I, Division 2, Group ABCD T4  
or Zone 2 Group IIC T4



**Supply terminal (31,32)**  
Voltage: 19.2 – 31.2 VDC

**Class I, Division 2 or  
Zone 2 installation:**

**Status relay, terminal (33,34)**  
Voltage max: 32 Vac/ 32 Vdc  
Current max: 0.5 Aac / 0.3A dc



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## INMETRO Desenhos para Instalação



Para instalação segura do 9113B 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 PRelectronics. 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 16.0003X**

Marcasão:

[Ex ia Ga] IIC/IIB/IIA  
Ex nA nC IIC T4 Gc  
[Ex ia Da] IIIC  
[Ex ia Ma] I

**Normas:**

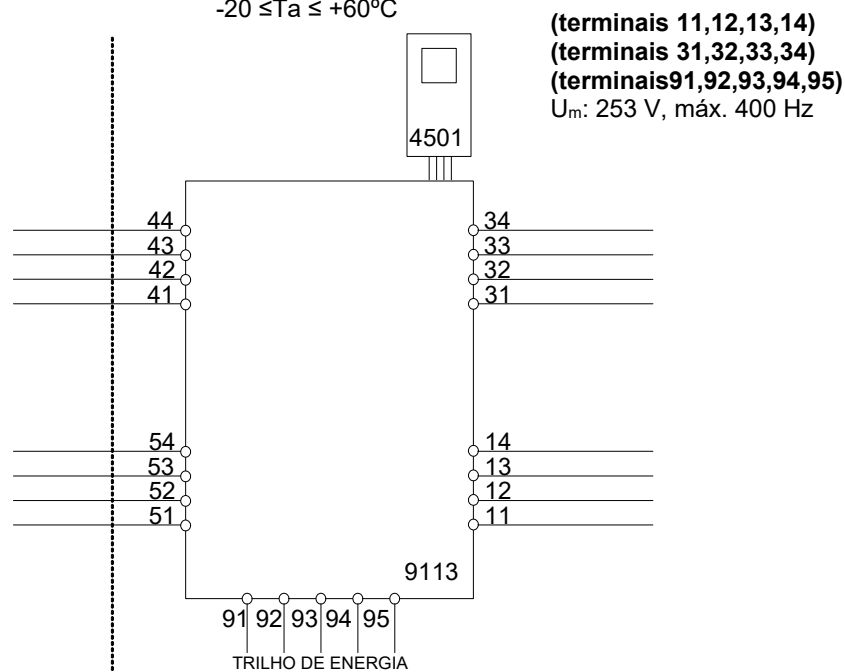
ABNT NBR IEC 60079-0:2013, ABNT NBR IEC60079-11:2013,  
ABNT NBR IEC60079-15:2012.

### Instalação 9113Bx 2 Circuitos

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

Área de não classificada  
ou Zona 2

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



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

U<sub>o</sub>: 8,7 V  
 I<sub>o</sub>: 18,4 mA  
 P<sub>o</sub>: 40 mW  
 L<sub>o</sub>/R<sub>o</sub>: 892 μH/Ω

	IIC	IIB	IIA	I
C <sub>o</sub> .	5 μF	50 μF	1000 μF	1000 μF
L <sub>o</sub> .	100 mH	300 mH	700 mH	700 mH

U<sub>i</sub>: 10 V  
 I<sub>i</sub>: 30 mA  
 C<sub>i</sub>: 30 nF  
 L<sub>i</sub>: 820 nH

**Relê de estado, terminais (33,34)**

Voltagem máx.: 125 VAC / 110 VDC  
 Potencia 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.

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 n' ou 'Ex e', fornecendo no mínimo grau de proteção IP54.

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

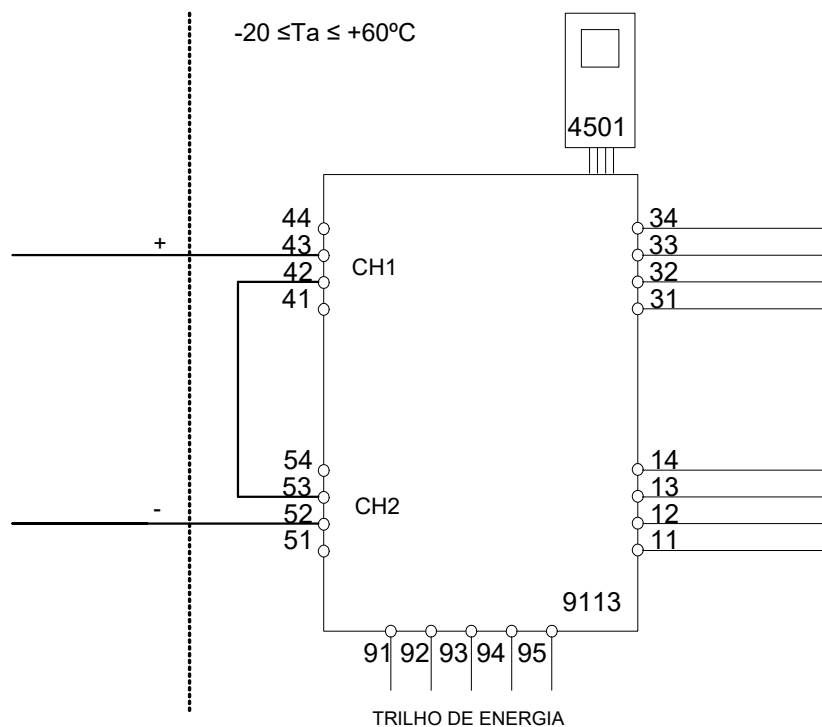
Para a instalação de trilho de energia na Zona 2, apenas o trilho de alimentação Rail 9400 fornecido pela Unidade de Controle de Potência 9410 é permitido.

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**Instalação 9113Bx 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<sub>o</sub>: 17,4 V  
I<sub>o</sub>: 18,4 mA  
P<sub>o</sub>: 80 mW  
Lo/Ro 445 μH/Ω

(terminais 11,12,13,14)  
(terminais 31,32,33,34)  
(terminais 91,92,93,94,95)  
U<sub>m</sub>: 253 V, máx. 400 Hz

	IIC	IIB	IIA	I
C <sub>o</sub> .	0,3 μF	1,6 μF	8 μF	8 μF
L <sub>o</sub> .	80 mH	250 mH	600 mH	600 mH

U<sub>i</sub>: 10 V  
I<sub>i</sub>: 30 mA  
C<sub>i</sub>: 15 nF  
L<sub>i</sub>: 1,7 μH

## Document history

The following list provides notes concerning revisions of this document.

<b>Rev. ID</b>	<b>Date</b>	<b>Notes</b>
107	1722	Specifications for max. required power added New ATEX, IECEX and INMETRO certificates and installation drawings
108	1948	9113A-version included in manual. Variant with UL 913 approval added. CCOE approval discontinued.
109	2103	New FM certificate and installation drawing. Routing diagram updated.

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