

PERFORMANCE
MADE
SMARTER

Product manual **9113**

Temperature / mA Converter



Segurança
INMETRO



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

No. 9113V110-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

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 - 9113Axx	8
Applications - 9113Bxx	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 display front	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
UL Installation Drawing	36
Desenho de instalação INMETRO	41
KCs IECEX Installation Drawing	44
Document history	48

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.

9113BB
SN: YYZZZZZZ
TAG:

PR electronics AIS, Lerbakken 10, 8410 Roende
pr@prelectronics.com, www.prelectronics.com,
Phone +45 8637 2677, Denmark.

41: Input ch1 42: Input ch1 43: Input ch1 44: Input ch1	4W / 3W / TC+ 4W / 3W / 2W / mA- / TC- 4W / 3W / 2W / mA+ 4W	31: Supply - 32: Supply + 33: Status 34: Status	19,2 to 31,2 VDC max. 3 W Relay Relay N.C.
51: Input ch2 52: Input ch2 53: Input ch2 54: Input ch2	4W / 3W / TC+ 4W / 3W / 2W / mA- / TC- 4W / 3W / 2W / mA+ 4W	11: Output ch1 12: Output ch1 13: Output ch2 14: Output ch2	mA- / Loop + mA+ / Loop - mA- / Loop + mA+ / Loop -

[Ex ia Ga] IIC/IIIB/IIA
 [Ex ia Da] IIIC
 [Ex ia Ma] I
 Ex ec nC IIC T4 Gc

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

IECEX KEM 09.0052X Install: 9113Q01

FM
 Install in CL I DIV2 GP A-D T4
 Provides IS circuits to CL I-III
 DIV 1/2 GP A-D or CL I 2n2
 APPROVED
 FM19US0059X AEx/Ex nC [ia Ga] IIC T4 Gc
 FM19CA0032X Install: 9113QF01

US LISTED
 Attention!
 Read manual before
 installation / operation.
 OPEN TYPE PROCESS
 CONTROL EQUIPMENT
 3PLU

Ex
 [Ex ia Ga] IIC/IIIB/IIA
 [Ex ia Da] IIIC
 [Ex ia Ma] I
 Ex ec nC IIC T4 Gc X

Segurancas
 [Ex ia Ga] IIC/IIIB/IIA
 Ex nA nC IIC T4 Gc
 [Ex ia Da] IIIC
 DEKRA 16.0003X [Ex ia Ma] I Install: 9113QB01

EX **ClassNK**
 [Ex ia Ga] IIC/IIIB/IIA
 Ex nA nC IIC T4 Gc X

TEMPERATURE /mA CONVERTER 9113
Ver.: 9113-004 9113S206 -20°C ≤ Ta ≤ +60°C

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

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 series); 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.

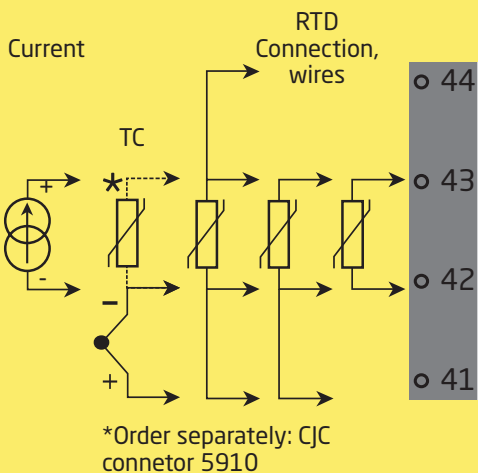
Technical characteristics

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

Applications - 9113Axx

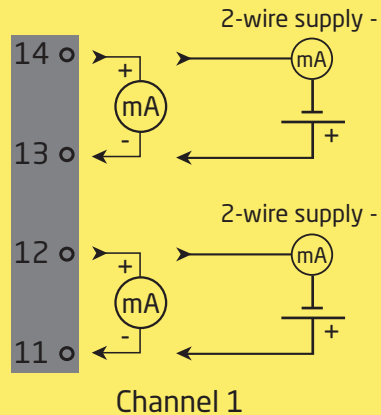
Input signals:

Channel 1

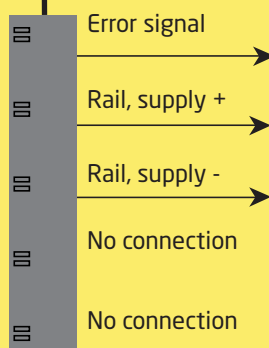


Output signals:

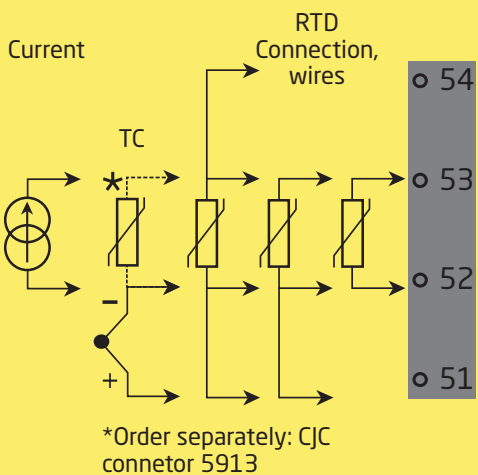
Analog, 0/4...20 mA Channel 2



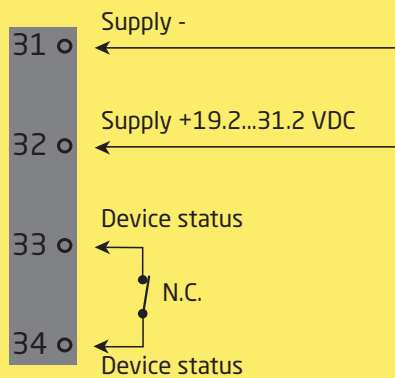
Power rail



Channel 2



Power connection:



Same power rail as above

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

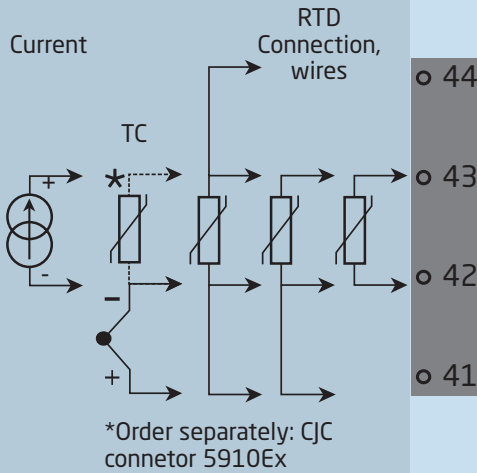


Applications - 9113Bxx

Input signals:

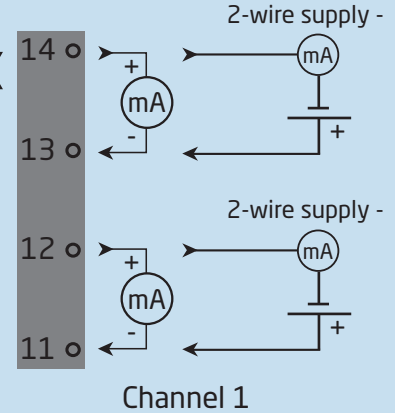
Channel 1

Current

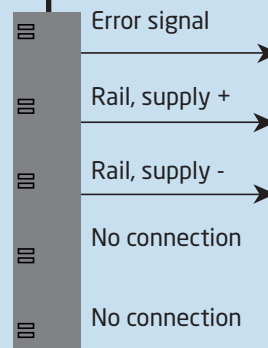


Output signals:

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

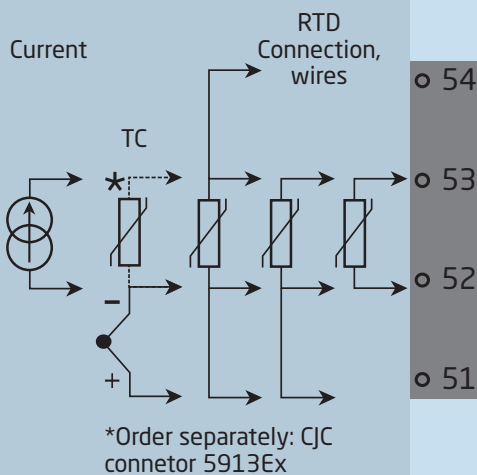


Power rail

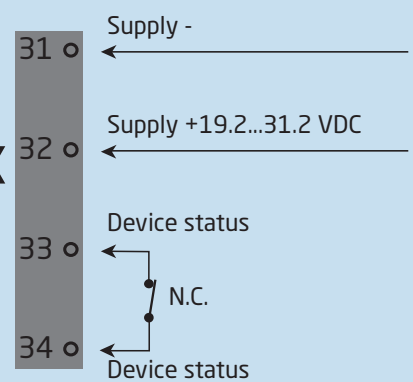


Channel 2

Current



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	I.S. / Ex approvals
9113	No : A	Single : A	ATEX, IECEx, FM, : - INMETRO, EAC-Ex, UKEX
	Yes : B	Double : B	UL 913, ATEX, IECEx, FM, : -U9 INMETRO, EAC-Ex, UKEX
			KCs, ATEX, IECEx, FM, : -KCs INMETRO, EAC-Ex, UKEX

Example: 9113BB

Accessories

- 4510 = 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 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
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	≤ ±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 μ A
 else. 0 μ A

* 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 \leq \pm 1°C
 -20...20°C and 28...70°C \leq \pm 2°C
 via internal CJC sensor \pm (2.0°C + 0.4°C * Δ t)

Δ t = internal temperature - ambient temperature

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

Sensor error current:

when detecting Nom. 2 μ A
 else. 0 μ A

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 \leq 600 Ω
 Load stability \leq 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, 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 07ATEX0148 X
IECEX.	IECEX KEM 09.0052X
UKEX	DEKRA 21UKEX0175 X / DEKRA *22UKEXYYYY X
c FM us.	FM19US0059X / FM19CA0032X
INMETRO	DEKRA 16.0003 X
c UL us, UL 913 (only 9113xx-U9)	E233311
KCs (only 9113xx-KCs)	21-AV4B0-0173X / 21-AV4B0-0174X / 21-AV4B0-0175X
EAC Ex	RU C-DK.HA65.B.00355/19

Functional Safety

SIL2 Certified & Fully Assessed acc. to IEC 61508

* Pending

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

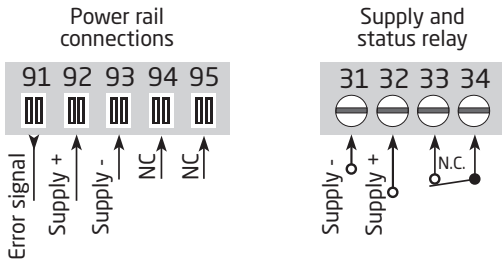
Sensor error detection (SE.BR, SE.SH):			
Input	Range	Readout	Limit
CURR	Loop break (4...20 mA)	SE.BR	<= 3.6 mA; > = 20.75 mA
TEMP	TC	SE.BR	> 10 kΩ...165 kΩ
	RTD: 2-, 3- and 4-wire For Pt10, Pt20, Pt50, Pt100, Pt200, Ni50 and Ni120	SE.BR	> 900...1000 Ω (cable > 50 Ω)
		SE.SH	< app. 15 Ω
	RTD: 2-, 3-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

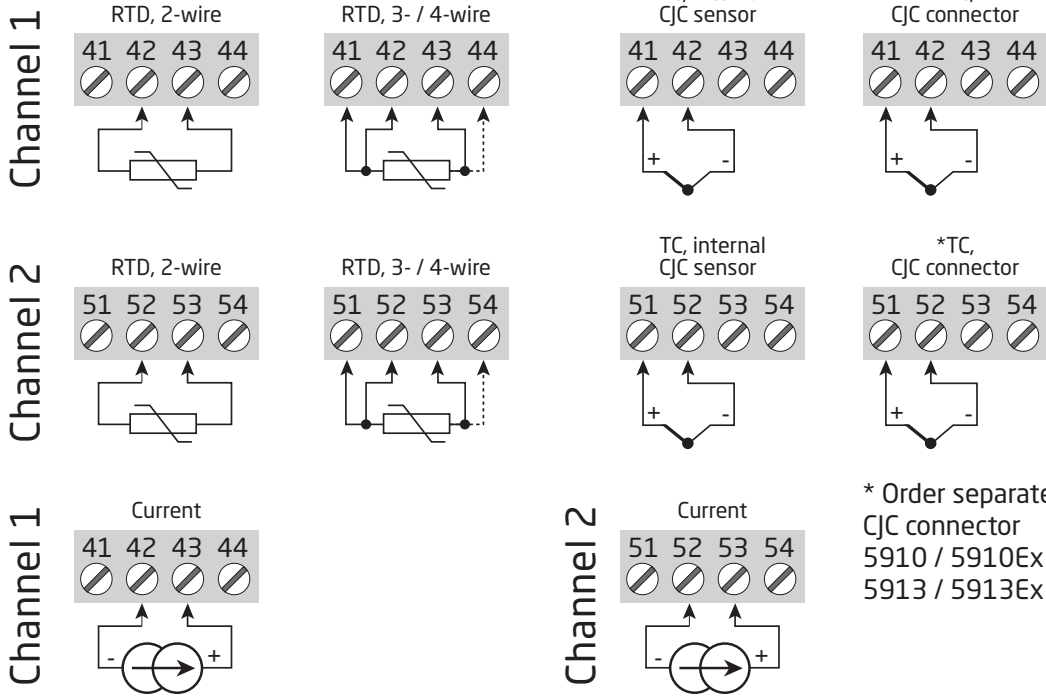
!	All error indications in the display flash once per second. The help text explains the error. If the error is a sensor error, the display backlight flashes as well - this is acknowledged (stopped) by pushing the  button.
*	Error is acknowledged by resetting the device power.
**	Error can be disregarded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

Connections



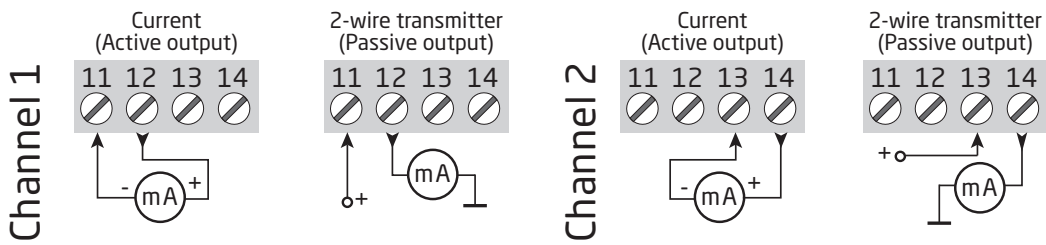
NC = no connection

Inputs:

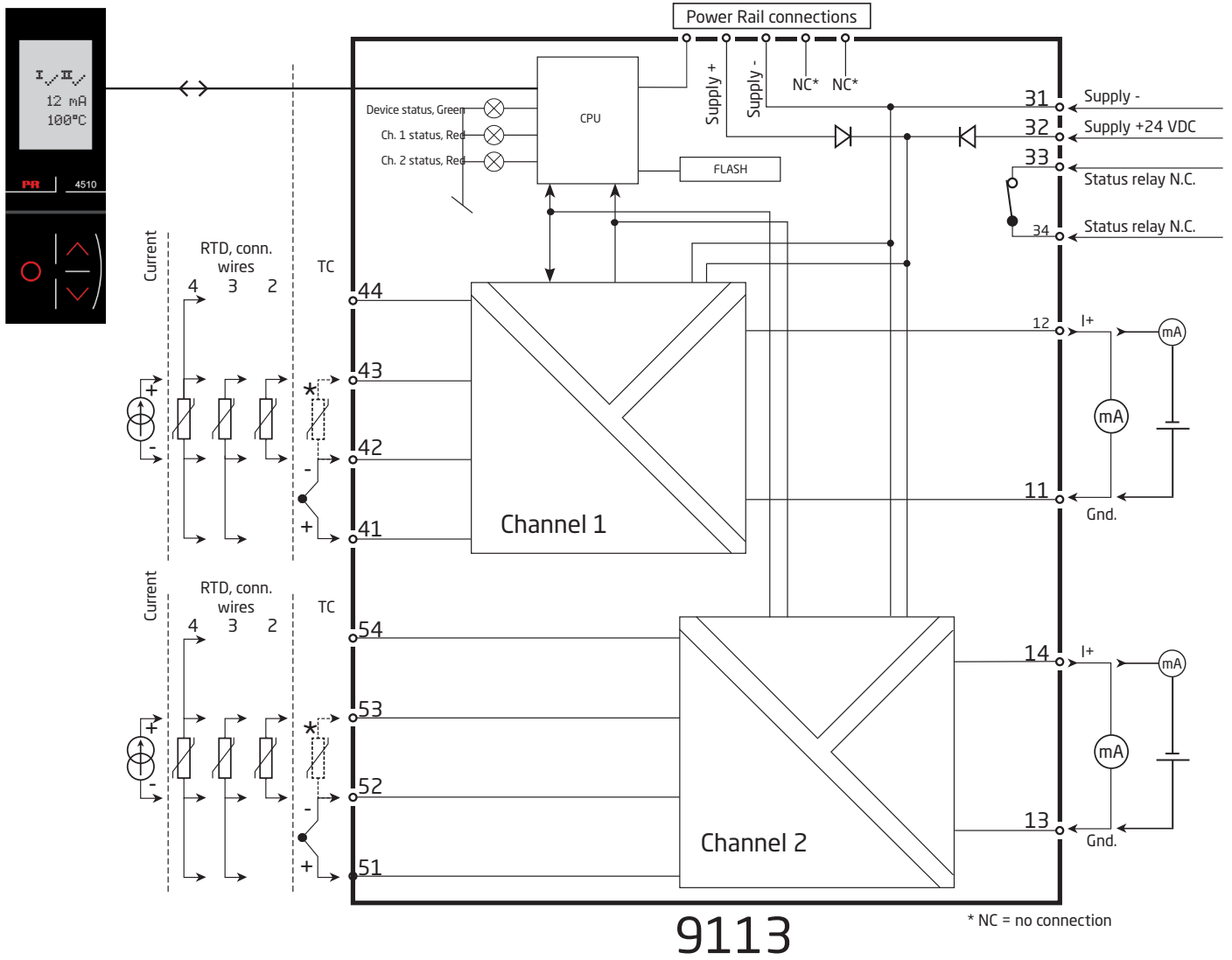


* Order separately:
CJC connector
5910 / 5910Ex (ch. 1) /
5913 / 5913Ex (ch. 2).

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.

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.

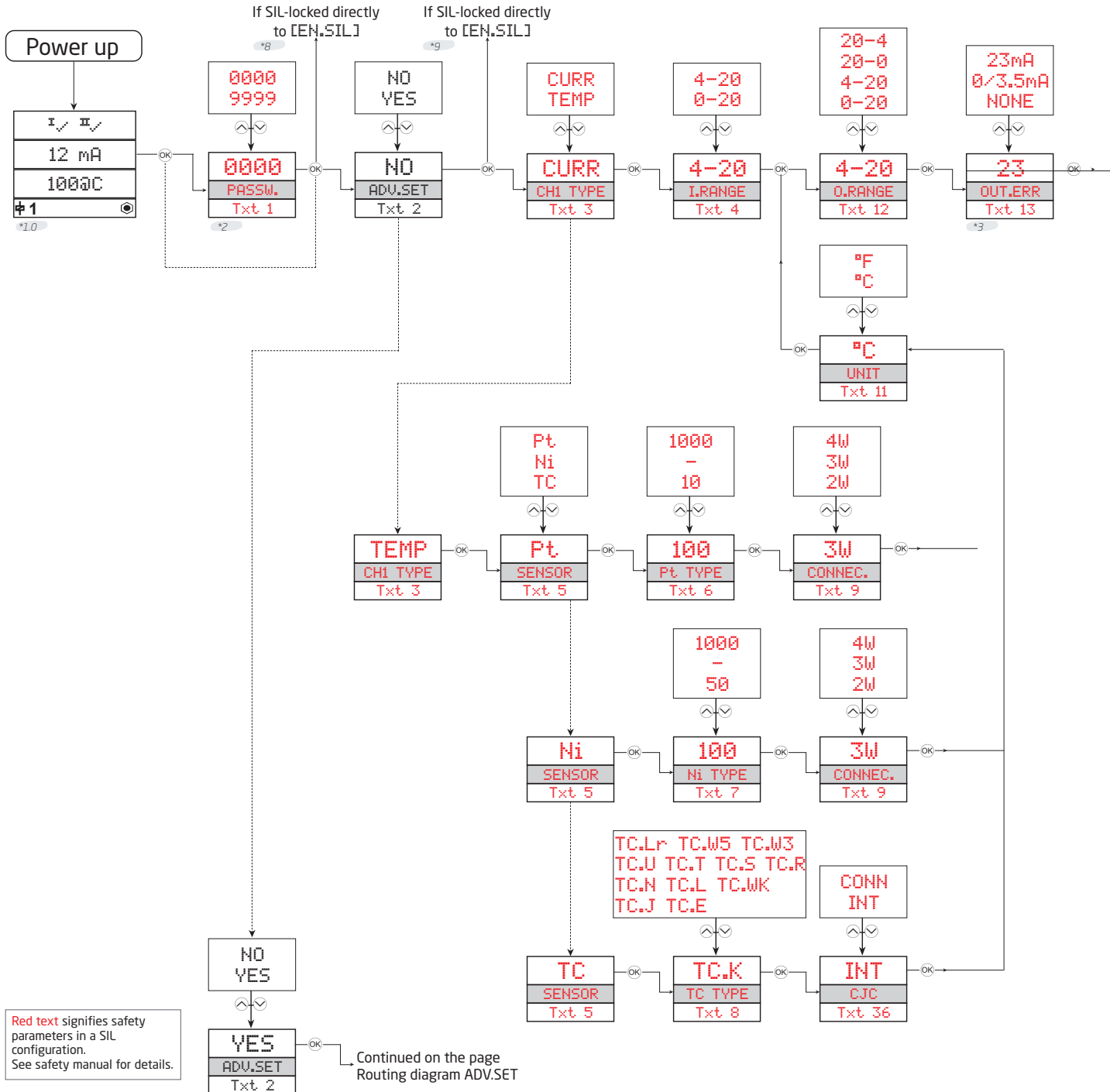
Safety Integrity Level (SIL): See Safety Manual for details.



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.

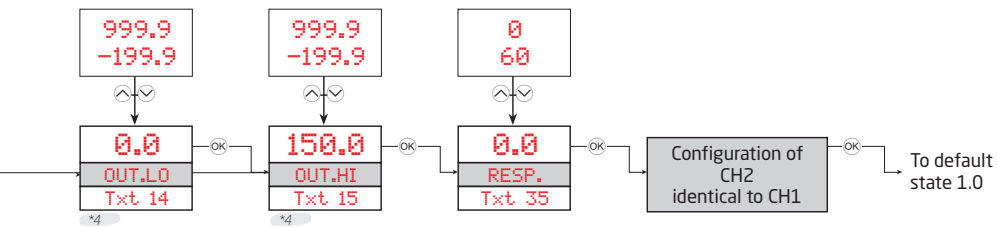
***2** Only if password-protected.

***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 4510 devices.
 4511 devices with serial no. lower than 211001001.
 4512 devices with serial no. lower than 211065001.

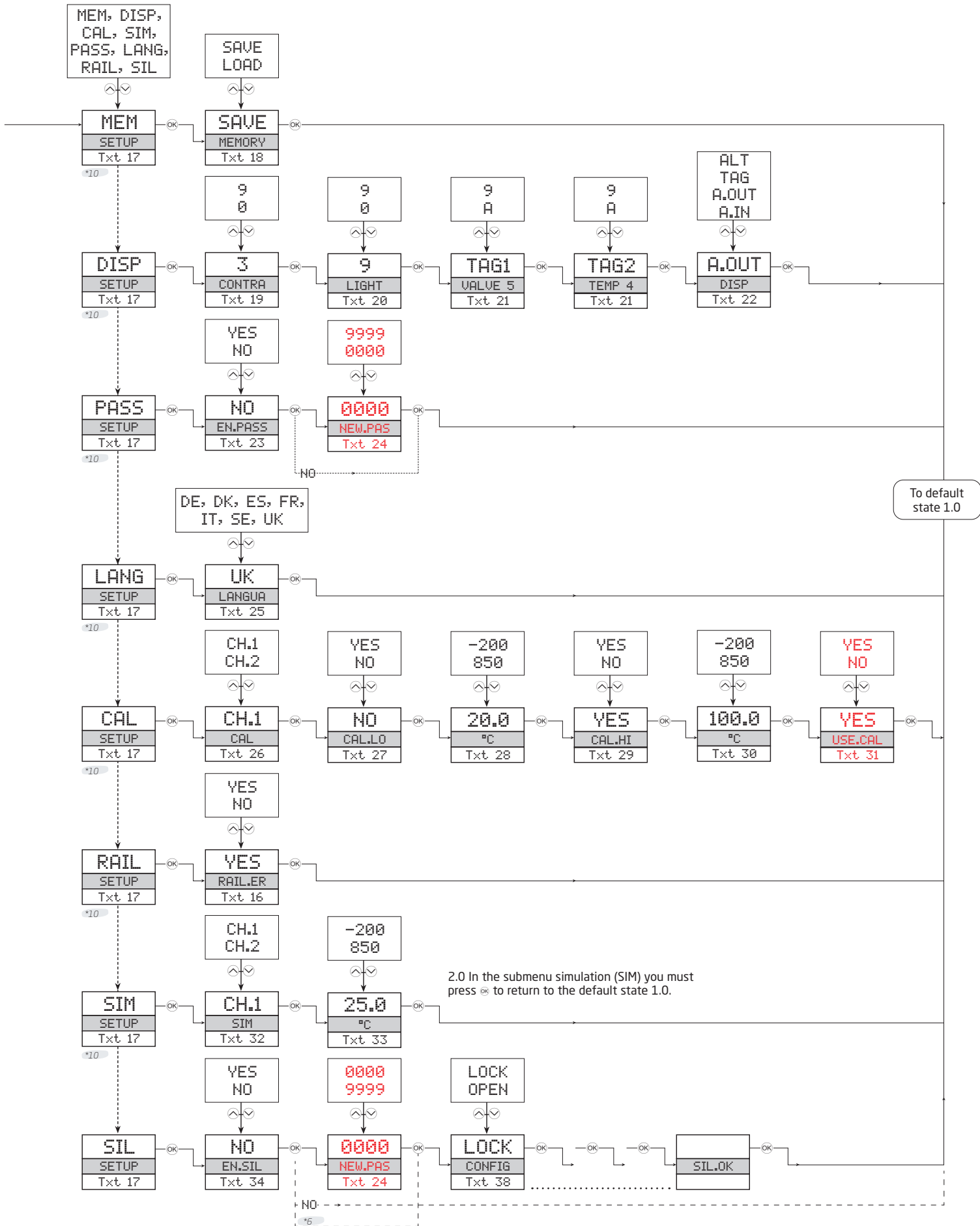
***9** Branching to SIL from this point valid for:
 4511 devices with serial no from 211001001.
 4512 devices with serial no from 211065001.



*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
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

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)

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

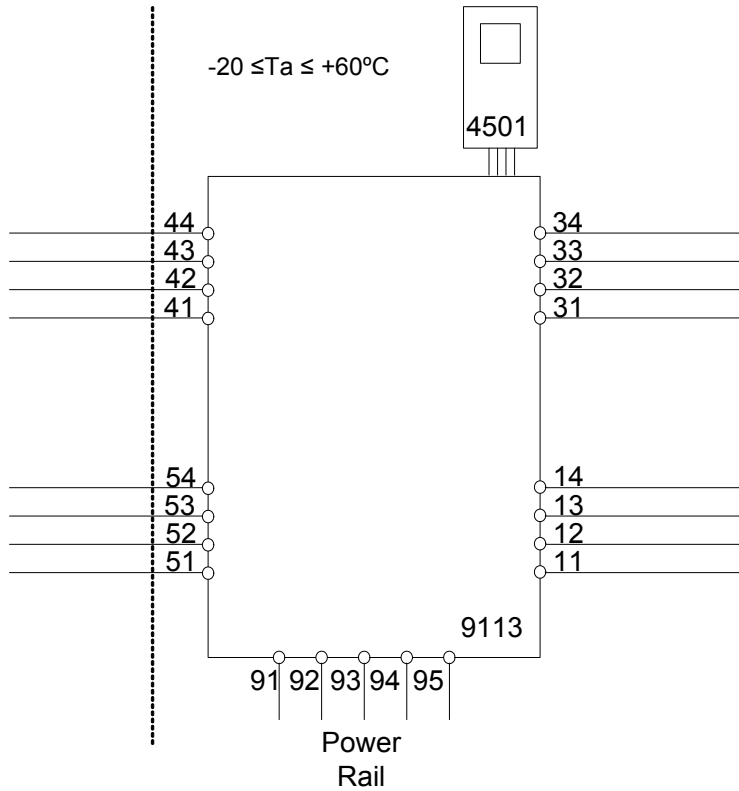
Revision date:	Version Revision:	Prepared by:	Page:
2022-07-08	V6 R0	MMA	1/4

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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
L_o/R_o 892 μH/Ω

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

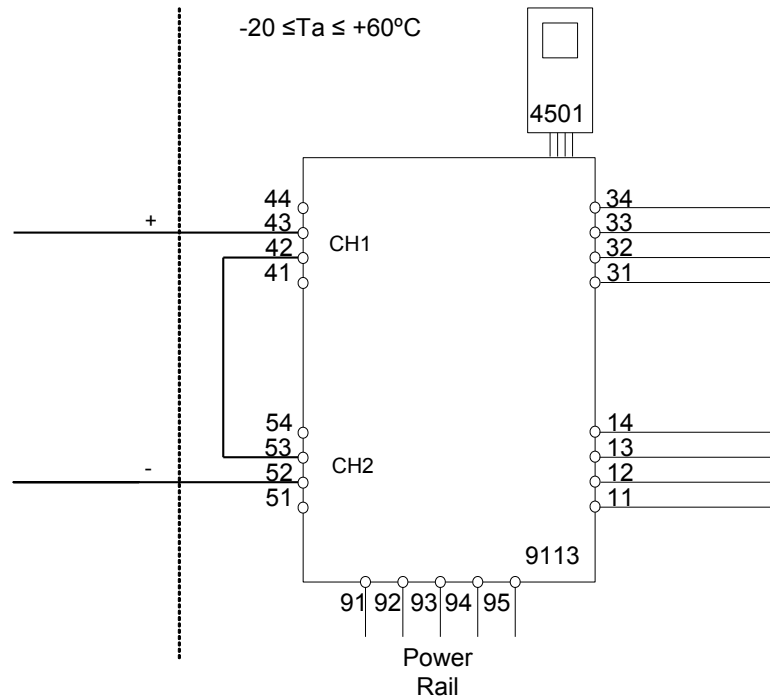
U_i: 10 V
I_i: 30 mA
C_i: 30 nF
L_i: 820 nH

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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

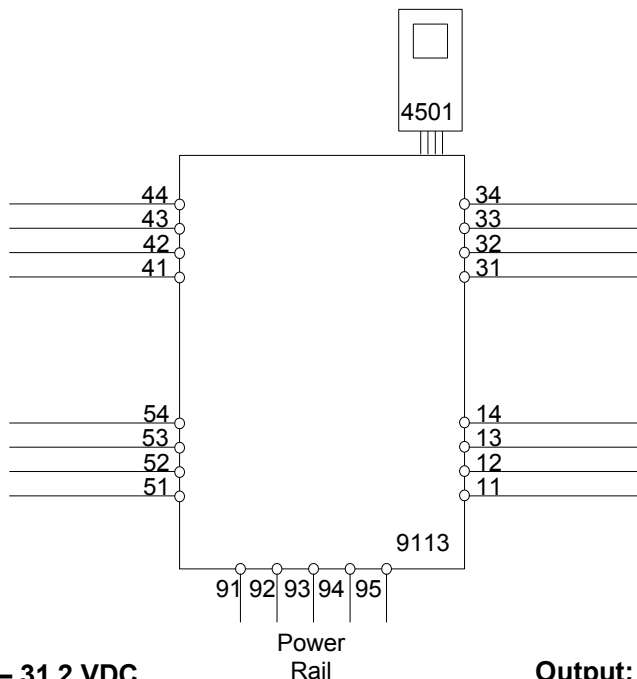
U_i: 10 V
I_i: 30 mA
C_i: 15 nF
L_i: 1.7 μH

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9113Ax Installation:

Non Hazardous area or Zone 2

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



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 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 V7R0



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

UKEX Certificate, 9113Bx

DEKRA 22UKEXYYYY X - *Pending*

UKEX Certificate, 9113Ax, 9113Bx:

DEKRA 21UKEX0175 X

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

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

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.

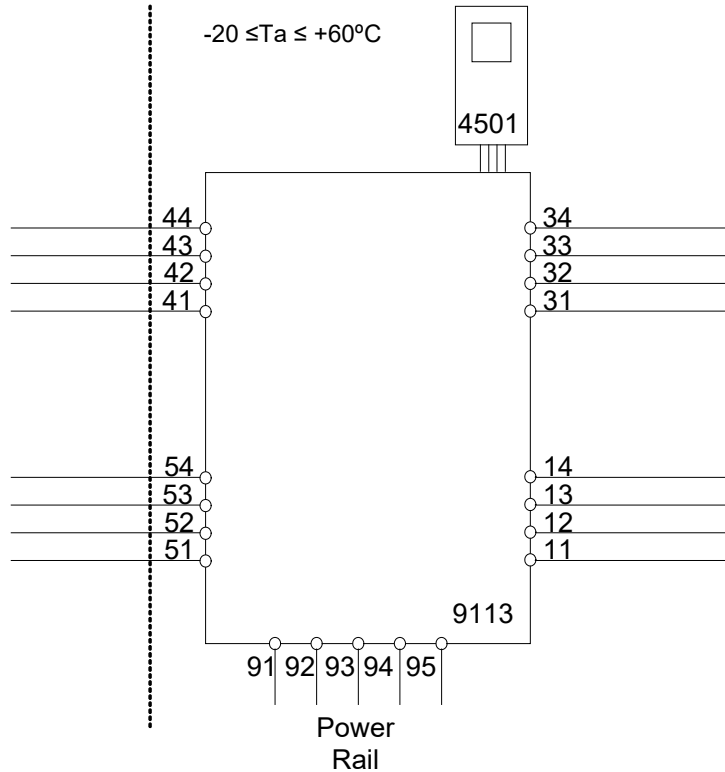
Stranded wire should be installed with an insulation stripping length of 5 mm or via a suitable insulated terminal such as a bootlace ferrule.

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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)

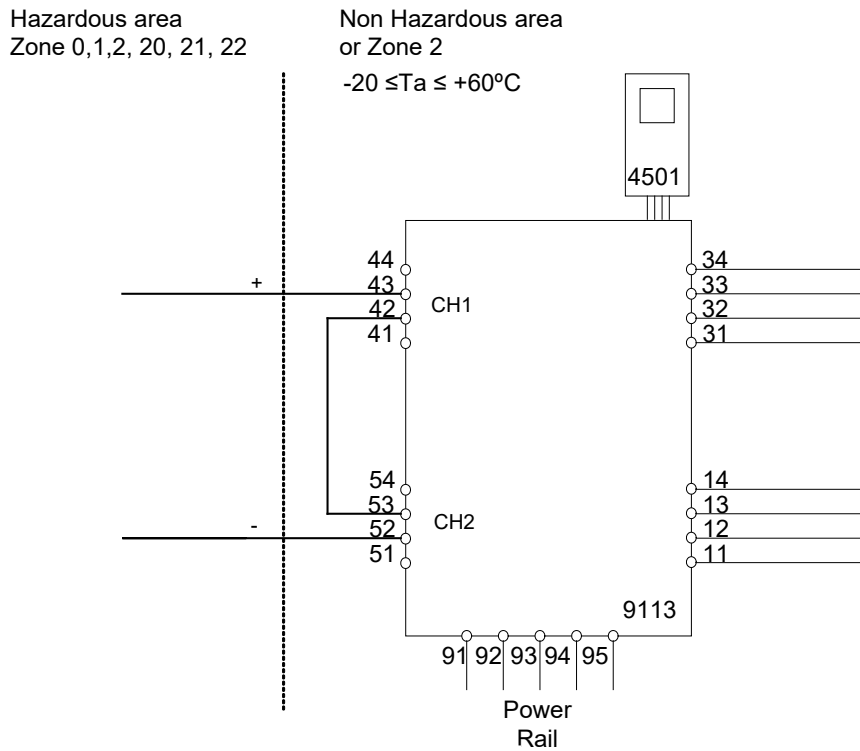
(terminal 91,92,93,94,95)

	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

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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

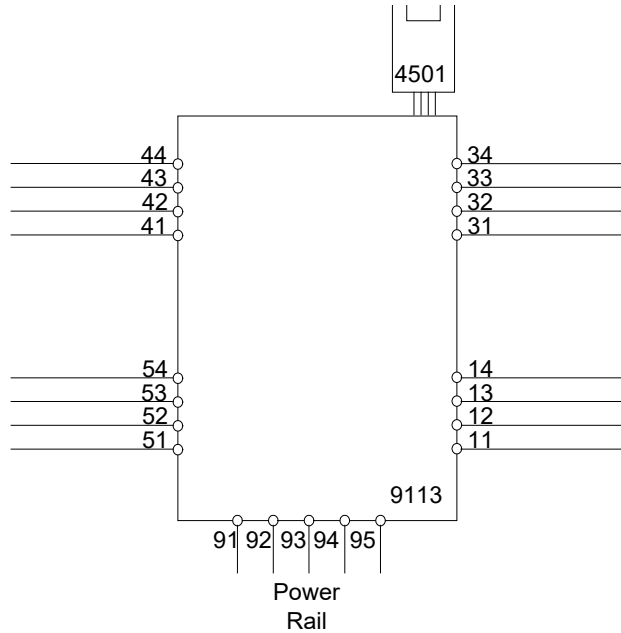
U_i : 10 V
 I_i : 30 mA
 C_i : 15 nF
 L_i : 1.7 μ H

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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: 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 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:

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

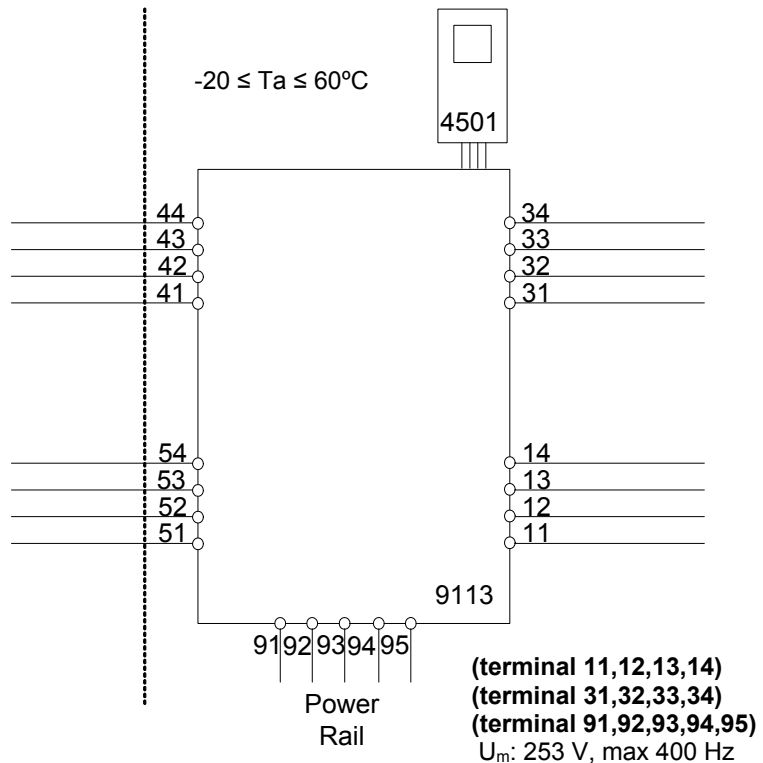
$$I_{max}(I_i) \geq I_t(I_o)$$

$$P_i \geq P_o$$

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

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

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



LERBAKKEN 10, 8410 RØNDE DENMARK

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

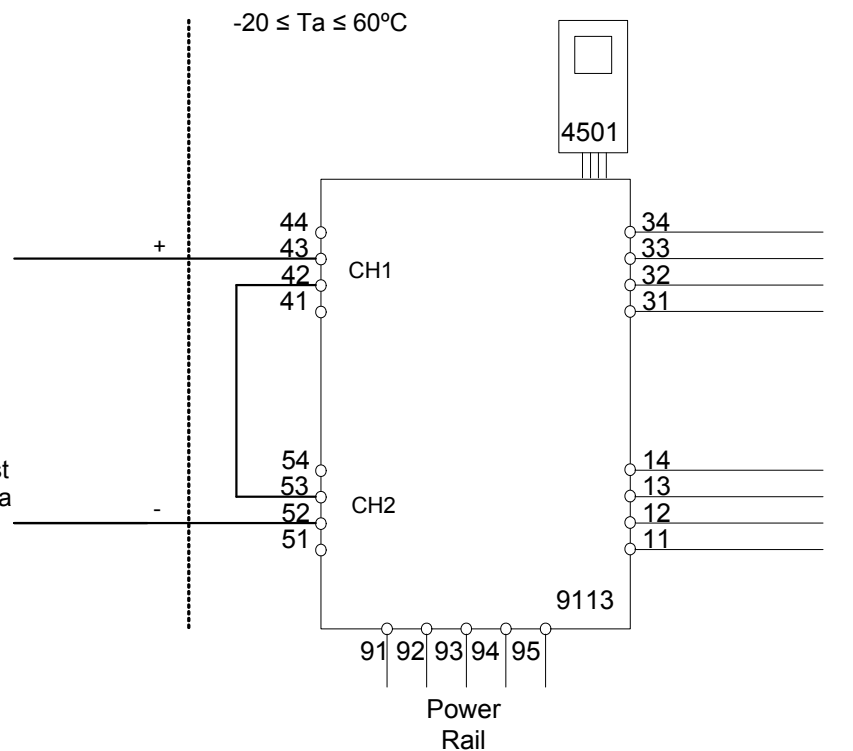
	IIC / Group A,B	IIB / Group C,E,F	IIA / Group D,G
C_a / C_o	0.3 μ F	1.6 μ F	8 μ F
L_a / L_o	80 mH	250 mH	600 mH

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

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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

Revision date:
2019-11-26

Version Revision
V1 R0

Prepared by:
PB

Page:
1/5

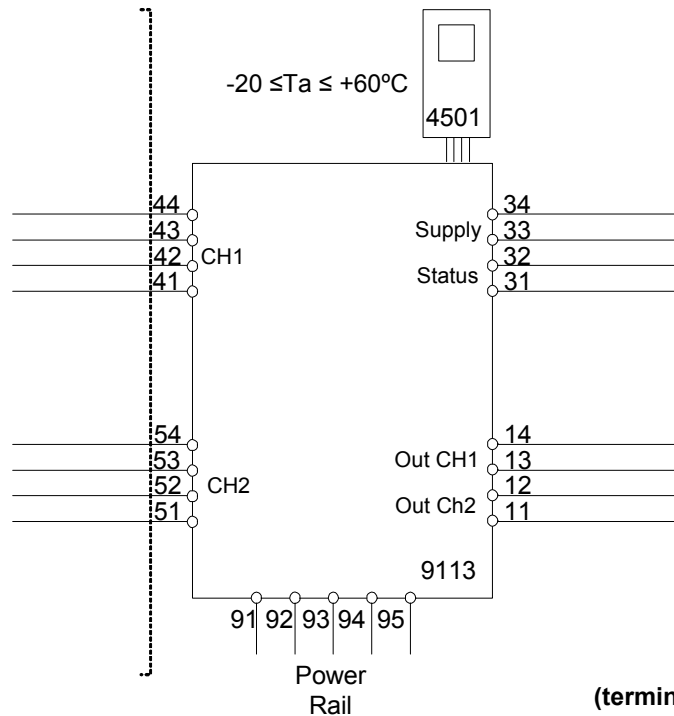
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9113Bx-U9 Installation
Hazardous Classified Location

 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 μ H/ Ω

	IIC or A,B	IIB or C,E,F	IIA or D,G
C_a or C_o .	5 μ F	50 μ F	1000 μ 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

 Revision date:
 2019-11-26

 Version Revision
 V1 R0

 Prepared by:
 PB

 Page:
 2/5

LERBAKKEN 10, 8410 RØNDE DENMARK

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

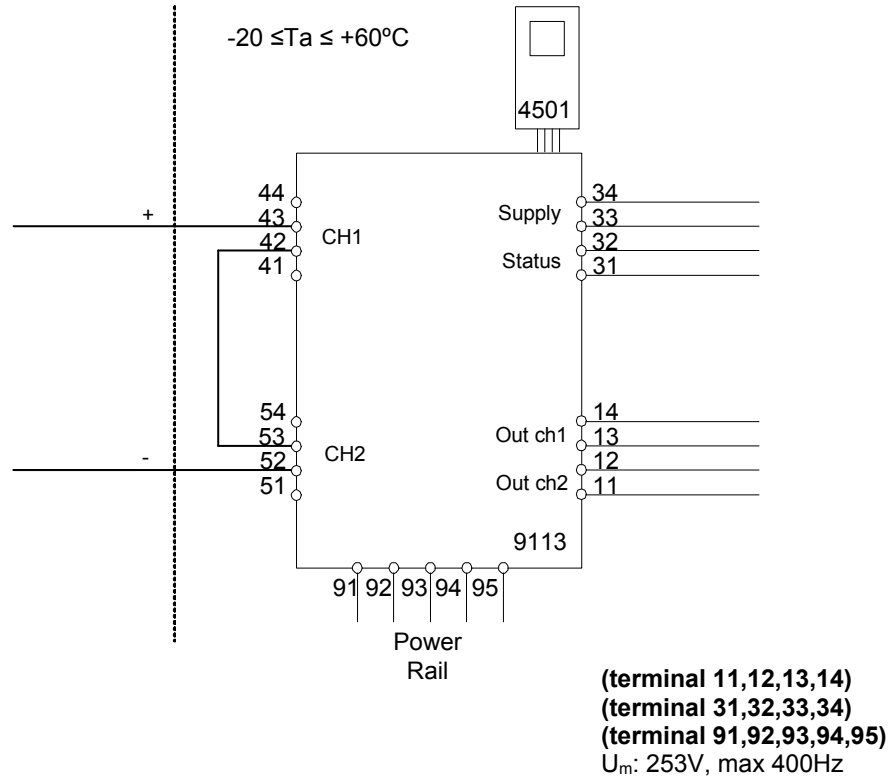
Unclassified Location or
Hazardous Classified Location

 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 μ H/ Ω

	IIC or A,B	IIB or C,E,F	IIA or D,G
C_a or C_o .	0.3 μ F	1.6 μ F	8 μ 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 μ 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.

Revision date:
2019-11-26

Version Revision
V1 R0

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Page:
4/5

LERBAKKEN 10, 8410 RØNDE DENMARK

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.

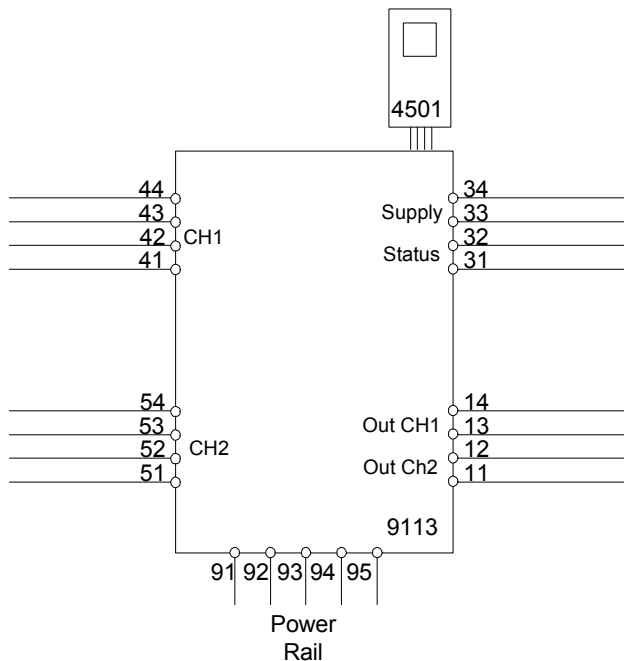
The 9113B has not been evaluated for use in combination with another associated apparatus.

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:

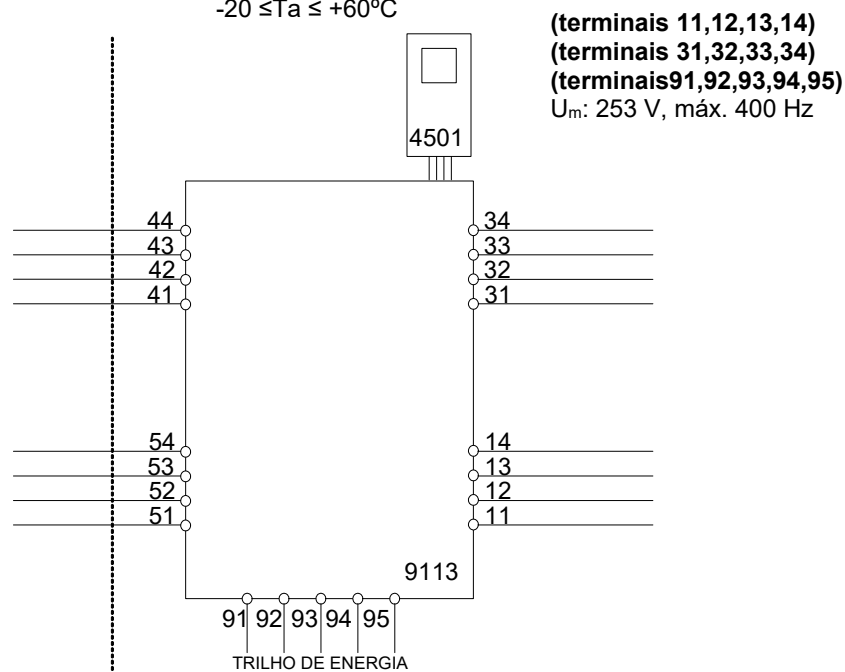
ABNT NBR IEC 60079-0:2013, ABNT NBR IEC60079-11:2013,
ABNT NBR IEC60079-15:2012.

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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V5 R0

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PB

Page:
1/3

LERBAKKEN 10, 8410 RØNDE DENMARK

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
 L_o/R_o : 892 μ H/ Ω

	IIC	IIB	IIA	I
C_o .	5 μ F	50 μ F	1000 μ F	1000 μ F
L_o .	100 mH	300 mH	700 mH	700 mH

U_i : 10 V
 I_i : 30 mA
 C_i : 30 nF
 L_i : 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.

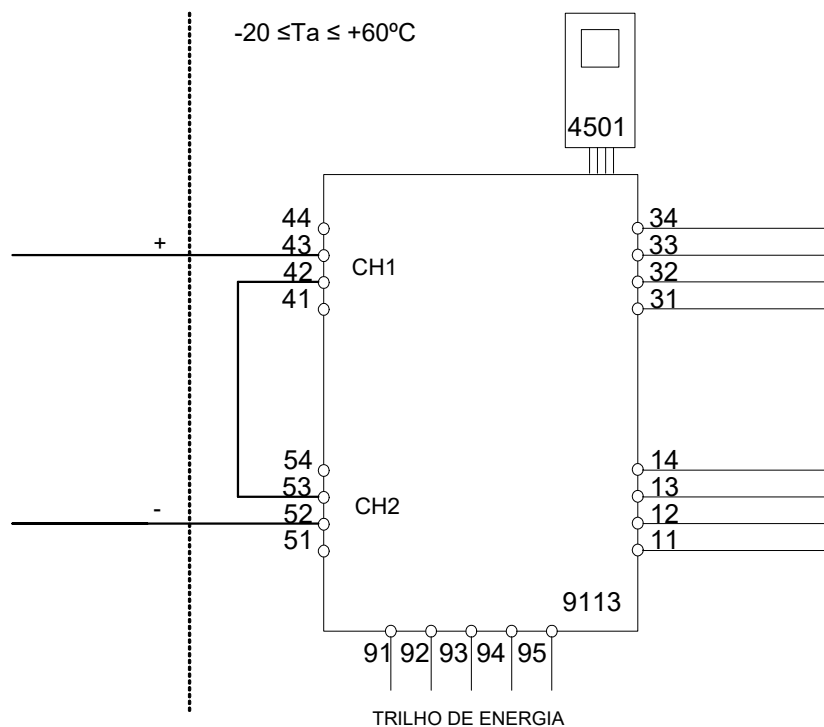
Para a instalação de trilho de energia na Zona 2, apenas o trilho de alimentação Rail 9400 fornecido pela Unidade de Controle de Potência 9410 é permitido.

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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_o: 17,4 V
I_o: 18,4 mA
P_o: 80 mW
Lo/Ro 445 μH/Ω

(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

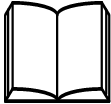
U_i: 10 V
I_i: 30 mA
C_i: 15 nF
L_i: 1,7 μH

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IECEx 설치 도면



9113의 안전한 설치를 위해 다음 사항을 준수해야 합니다. 이 모듈은 이 지역에 적용되는 국내 및 국제 법률, 지침 및 표준에 정통한 유자격자만 설치해야 합니다. 제조연도는 일련번호의 처음 두 자리입니다.



구역 2에 설치하려면 다음 사항을 준수해야 합니다. 4501 프로그래밍 모듈은 PR 제품의 모듈과 함께 사용해야 합니다. 모듈이 손상되지 않았고, 어떤 식으로든 변경 또는 수정되지 않는 것이 중요합니다. 먼지와 습기가 없는 상태에서 4501 모듈을 설치해야 합니다.

IECEx 인증서:	KEM 09.0052 X	
마킹 9113Bx:	[Ex ia Ga] IIC/IIB/IIA Ex nA nC IIC T4 Gc [Ex ia Da] IIIC [Ex ia Ma] I	
마킹 9113Ax	II 3 G Ex nA nC IIC T4 Gc	
표준:	IEC60079-0:2011, IEC60079-11:2011, IEC60079-15:2010	
공급 단자(31,32)		
전압:	19.2 – 31.2 VDC	
상태 릴레이. 단자(33,34)		구역 2 설치
최대 전압:	125 VAC / 110 VDC	32 VAC / 32 VDC
최대 출력:	62.5 VA / 32 W	16 VA / 32 W
최대 전류:	0.5 AAC / 0.3 ADC	0.5 AAC / 1 ADC

설치 참고 사항:

IEC60664-1에 정의된 대로 오염 등급 2, 과전압 범주 II에 설치하십시오.

전원이 공급되고 폭발성 가스 혼합물이 있는 경우, 커넥터를 분리하지 마십시오.
폭발성 가스 혼합물이 있는 경우, 파워 레일에 모듈을 장착하거나 제거하지 마십시오.
수리하기 전에 전원을 분리하십시오.

사용하지 않는 단자의 배선은 허용되지 않습니다.

보호 유형 [Ex ia Da]에서는 가스 그룹 IIB의 본질 안전 매개변수를 적용할 수 있습니다.

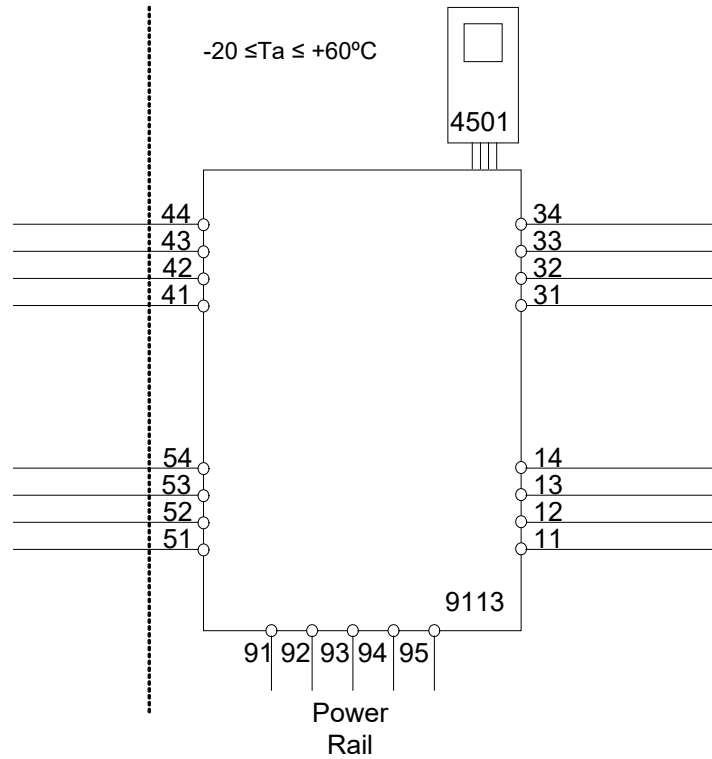
구역 2에 설치하는 경우, 모듈을 보호 유형 Ex n 또는 Ex e인 인클로저에 설치하고, 최소한 IP54의 보호 수준을 제공해야 합니다. 케이블 인입 장치와 밀폐 요소는 동일한 요구 사항을 충족해야 합니다.

구역 2의 파워 레일에 설치하는 경우, 전력 제어 장치 유형 9410(유형 시험 인증서 IECEx KEM 08.0025X)의 공급을 받는 파워 레일 유형 9400만 허용됩니다.

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9113Bx 설치:

위험 지역	비위험 지역
구역 0,1,2, 20, 21, 22	또는 구역 2



Ex 입력

CH1(단자 41,42,43,44)

CH2(단자 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 또는 I
C _o .	5 μF	50 μF	1000 μF
L _o .	100 mH	300 mH	700 mH

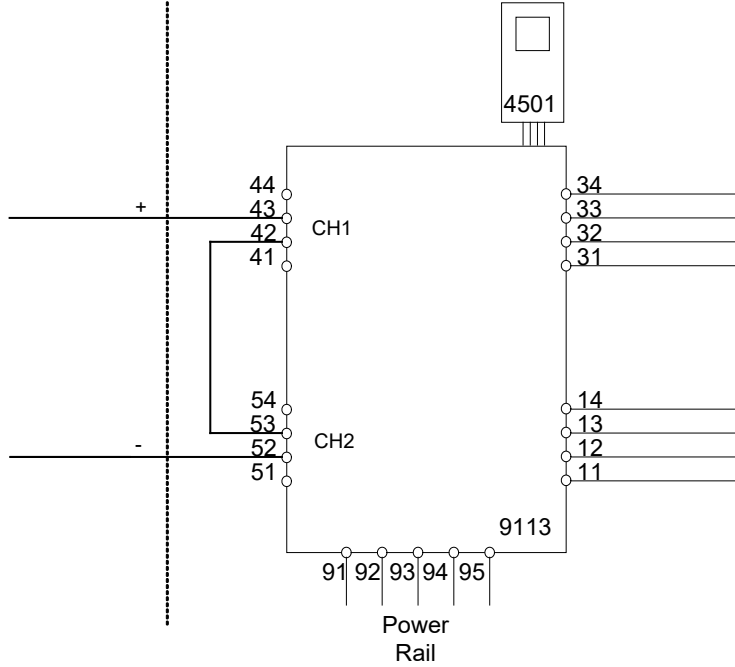
U_i: 10 V
 I_i: 30 mA
 C_i: 30 nF
 L_i: 820 nH

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9113Bx 설치:

위험 지역
구역 0,1,2, 20, 21, 22

비위험 지역
또는 구역 2
 $-20 \leq Ta \leq +60^{\circ}\text{C}$



Ex 입력

CH1(단자 43 +)

CH2(단자 52 -)

U_o: 17.4 V
I_o: 18.4 mA
P_o: 80 mW
L_o/R_o: 445 μH/Ω

U_m: 253 V 최대 400 Hz

공급 / 출력:

(단자 11,12,13,14)

(단자 31,32,33,34)

(단자 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

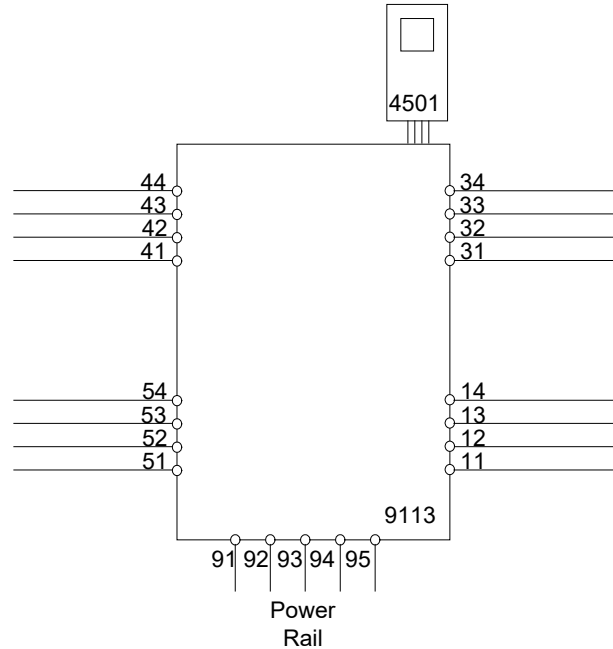
U_i: 10 V
I_i: 30 mA
C_i: 15 nF
L_i: 1.7 μH

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9113Ax 설치:

비위험 지역 또는 구역 2

-20 ≤ Ta ≤ 60°C



공급: 19.2 – 31.2 VDC
(단자 31,32)
(단자 91,92,93,94,95)

출력:
(단자 11,12,13,14)

입력
CH1(단자 41,42,43,44)
CH2(단자 51,52,53,54)

상태 릴레이. 단자(33,34)		구역 2 설치
최대 전압:	125 VAC / 110 VDC	32 VAC / 32 VDC
최대 출력:	62.5 VA / 32 W	16 VA / 32 W
최대 전류:	0.5 AAC / 0.3 ADC	0.5 AAC / 1 ADC

구역 2에 설치하는 경우, 모듈을 보호 유형 Ex n 또는 Ex e인 인클로저에 설치하고, 최소한 IP54의 보호 수준을 제공해야 합니다. 케이블 인입 장치와 밀폐 요소는 동일한 요구 사항을 충족해야 합니다.

구역 2의 파워 레일에 설치하는 경우, 전력 제어 장치 유형 9410(유형 시험 인증서 IECEx KEM 08.0025X)의 공급을 받는 파워 레일 유형 9400만 허용됩니다.

구역 2에 설치하려면 다음 사항을 준수해야 합니다.

4501 프로그래밍 모듈은 PR electronics 모듈과 함께만 사용해야 합니다. 모듈이 손상되지 않았고, 어떤 식으로든 변경 또는 수정되지 않는 것이 중요합니다. 먼지와 습기가 없는 상태에서 4501 모듈을 설치해야 합니다.

Document history

The following list provides notes concerning revisions of this document.

Rev. ID	Date	Notes
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. 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. Variant with Korean KCs approval added.

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