

PERFORMANCE  
MADE  
SMARTER

# Product manual **9116B-EMP**

## **Universal converter, EMPHASIS-assessed**



CCOE



EAC

CE

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

No. 9116B-EMPV107-UK  
Product version: 9116-003

**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.

# Universal converter, EMPHASIS-assessed 9116B-EMP

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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 4511/4501.

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](http://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.

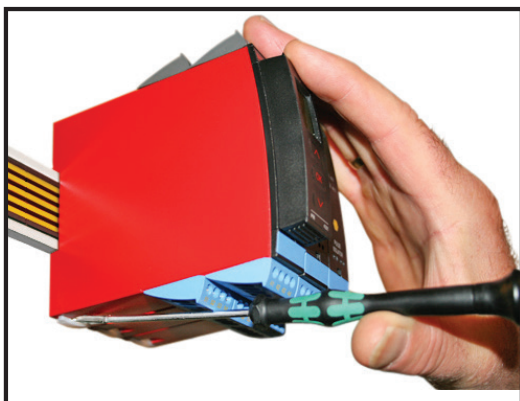
## Cleaning

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.

# Universal converter, EMPHASIS-assessed 9116B-EMP

- Input for RTD, TC, Ohm, potentiometer, mA and V
- Supply for 2-wire transmitters
- Active / passive mA output and relay output
- EMPHASIS-assessed instrument for nuclear industry
- SIL 2-certified via Full Assessment

## Advanced features

- Configuration and monitoring by way of detachable display front (PR 4511/4501); process calibration, signal and relay simulation.
- Advanced relay configuration, e.g. setpoint, window, delay, sensor error indication and power monitoring
- Copying of the configuration from one device to others of the same type via the display front.
- Reduced Uo Ex data < 8.3 V for active input signals.
- TC inputs with internal or external CJC for higher accuracy.
- Active / passive mA output via the same two terminals.

## Application

- The device can be mounted in the safe area and in zone 2 / cl. 1 div. 2 and receive signals from zone 0, 1, 2 and zone 20, 21, 22 including M1 / Class I/II/III, Div. 1, Gr. A-G.
- Conversion and scaling of temperature, voltage, potentiometer and linear resistance signals.
- Power supply and signal isolator for 2-wire transmitters.
- Monitoring of error events and cable breakage via the individual status relay and/or a collective electronic signal via the power rail.
- The 9116-EMP has been designed, developed and certified for use in SIL 2 applications according to the requirements of IEC 61508.
- Suitable for the use in systems up to Performance Level "d" according to ISO-13849.

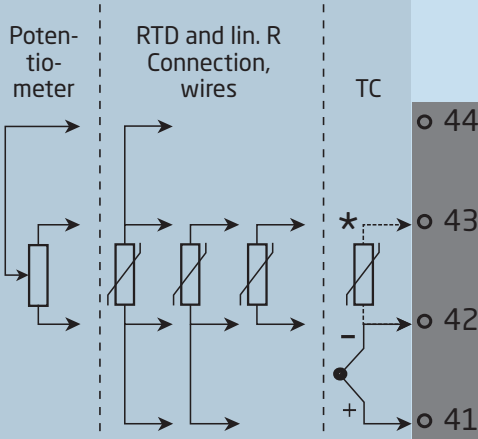
## Technical characteristics

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



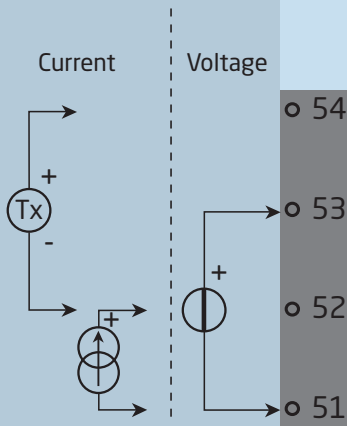
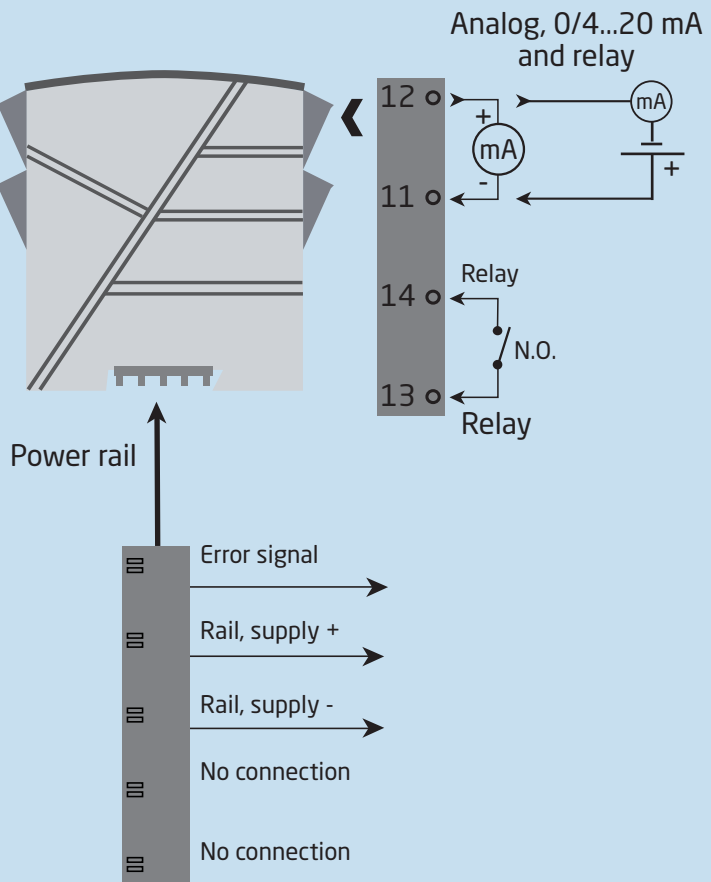
# Applications

## Input signals:

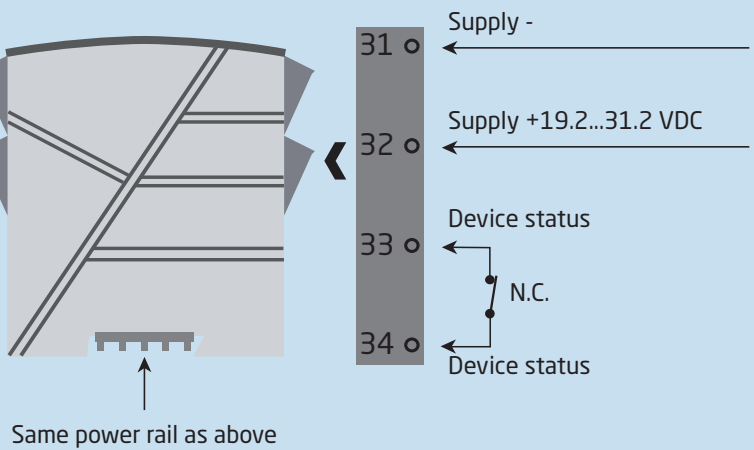


\*Order separately:  
CJC connector 5910Ex.

## Output signals:



## Power connection:



**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 4511/4501 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 9116B-EMP.
- Can be moved from one 9116B-EMP 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

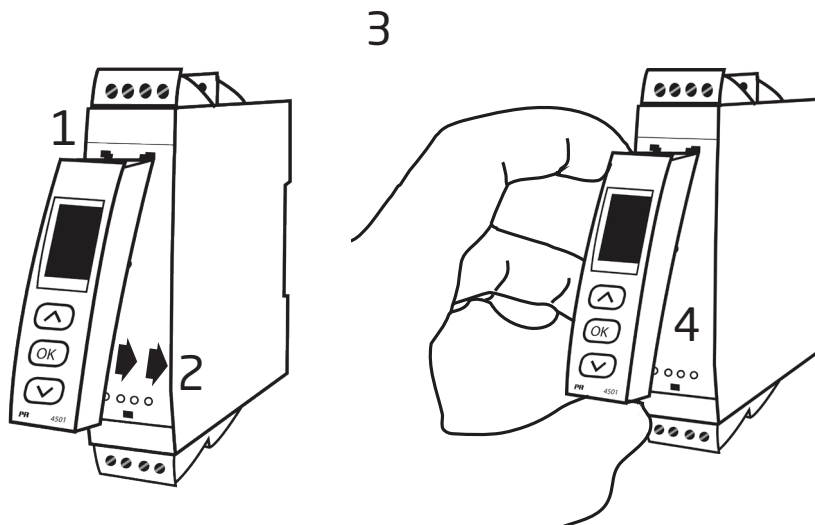
- LCD display with 4 lines:
  - Line 1 (H=5.57 mm) shows input status
  - Line 2 (H=3.33 mm) toggles between input value and tag. no.
  - Line 3 (H=3.33 mm) shows output value and UNIT.
  - Line 4 shows status for relay and communication and whether the device is SIL-locked. Static dot = SIL-locked and 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 unauthorised modifications to the configuration.

## Mounting / demounting the PR 4511/4501

- 1: Insert the tabs of the PR 4511/4501 into the holes at the top of the device.
- 2: Hinge the PR 4511/4501 down until it snaps into place.

### Demounting of the PR 4511/4501

- 3: Push the release button on the bottom of the PR 4511/4501 and hinge the the PR 4511/4501 out and up.
- 4: With the PR 4511/4501 hinged up, remove from holes at the top of the device.





## Order

Type	Max. loop voltage	EMPHASIS-assessed
9116B	U <sub>o</sub> 28 VDC : 1	-EMP
	U <sub>o</sub> 21.4 VDC : 2	

Example: 9116B2-EMP

## Accessories

4501	=	Display / programming front
4511	=	Communication enabler
5910Ex	=	CJC connector
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 / 4511	109 x 23.5 x 116 / 131 mm
Weight approx.	185 g
Weight incl. 4501 / 4511 (approx.)	200 g / 285 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	1.25 A SB / 250 VAC

Type	Description	Max. power dissipation	Max. required power
9116B1-EMP	1 channel (Ex Uo 28 V)	≤ 1.7 W	≤ 2.1 W
9116B2-EMP	1 channel (Ex Uo 21.4 V)	≤ 1.7 W	≤ 2.1 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 9116B-EMP is used with the 4511 / 4501, then add 40 mW to the max. power dissipation and 70 mW to the max. required power for each device with the 4511 / 4501.

Isolation - test / working:

Input to any. . . . .	2.6 kVAC / 300 VAC reinforced isolation
Analog output to supply . . . . .	2.6 kVAC / 300 VAC reinforced isolation
Output relay to analog output. . . . .	1.5 kVAC / 150 VAC reinforced isolation or 300 VAC basic isolation
Status relay to supply. . . . .	1.5 kVAC / 150 VAC reinforced isolation
Communications interface . . . . .	Communication enabler 4511 / Programming front 4501
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
Volt	≤ ±20 µV	≤ ±2 µV / °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

Auxiliary supplies for 9116B1-EMP:

2-wire supply (terminal 54...52). . . . . 28...16.5 VDC / 0...20 mA

Auxiliary supplies for 9116B2-EMP:

2-wire supply (terminal 54...52). . . . . 21.4...16.5 VDC / 0...20 mA

**RTD, linear resistance and potentiometer input:**

Input type	Min. value	Max. value	Standard
Pt100	-200°C	+850°C	IEC 60751
Ni100	-60°C	+250°C	DIN 43760
Linear resist.	0 Ω	10000 Ω	-
Potentiometer	10 Ω	10000 Ω	-

Input for RTD types:

Pt10\*, Pt20\*, Pt50\*, Pt100, Pt200, Pt250, Pt300, Pt400, Pt500, Pt1000

Ni50, Ni100, Ni120, Ni1000

Cable resistance per wire (max.), RTD . . . . . 50 Ω

Sensor current; RTD . . . . . Nom. 0.2 mA

Effect of sensor cable resistance (3- / 4-wire), RTD . . . . . < 0.002 Ω / Ω

Sensor error detection, RTD . . . . . Programmable ON / OFF

Short circuit detection, RTD . . . . . Yes

\* No short circuit detection for Pt10, Pt20 and Pt50

\* No short circuit detection for Lin. R<sub>0</sub>% ≤ app. 18 Ω

**TC input:**

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

Cold junction compensation (CJC):

via external sensor in connector 5910. . . . . 20...28°C ≤ ±1°C

-20...20°C and 28...70°C ≤ ±2°C

via internal CJC sensor . . . . . ±(2.0°C + 0.4°C \* Δt)

Δt = internal temperature - ambient temperature

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

Sensor error current:

when detecting . . . . . Nom. 2 μA

else. . . . . 0 μA

**Current input:**

Measurement range . . . . . 0...23 mA

Programmable measurement ranges . . . . . 0...20 and 4...20 mA

Input resistance . . . . . Nom. 20 Ω + PTC 50 Ω

Sensor error detection:

Loop break 4...20 mA . . . . . Yes

NB: Only when input is selected as 4...20 mA

**Voltage input:**

Measurement range . . . . . 0...12 VDC  
Programmable measurement ranges . . . . . 0...1 / 0.2...1 / 0...5 / 1...5 / 0...10 and 2...10 VDC  
Input resistance . . . . . Nom. >10 MΩ

**Current output:**

Signal range (span) . . . . . 0...23 mA  
Programmable signal ranges . . . . . 0...20 / 4...20 / 20...0 and 20...4 mA  
Load . . . . . ≤ 600 Ω  
Load stability . . . . . ≤ 0.01% of span / 100 Ω  
Sensor error detection . . . . . 0 / 3.5 / 23 mA / none  
NAMUR NE 43 Upscale/Downscale. . . . . 23 mA / 3.5 mA  
Output limitation:  
on 4...20 and 20...4 mA signals . . . . . 3.8...20.5 mA  
on 0...20 and 20...0 mA signals . . . . . 0...20.5 mA  
Current limit. . . . . ≤ 28 mA

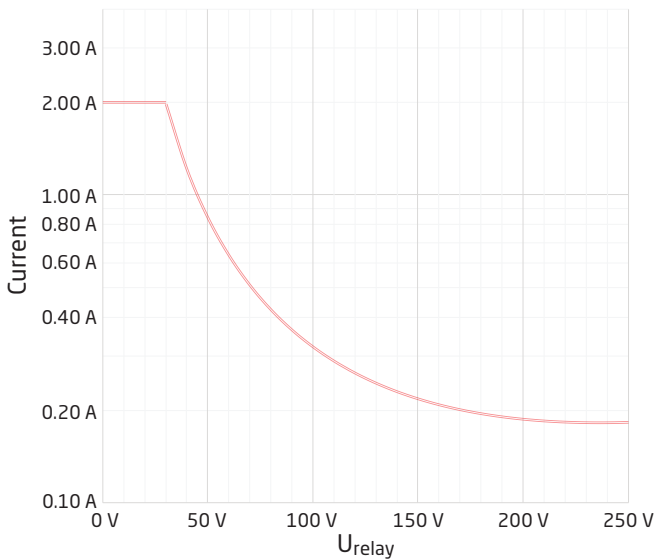
**Passive 2-wire output installation:**

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

**Relay output in safe area:**

Relay functions. . . . . Setpoint, Window, Sensor error, Power and Off  
Hysteresis, in % of span / display range . . . . . 0.1...25 / 1...25  
On and Off delay . . . . . 0...3600 s  
Sensor error reaction . . . . . Break / Make / Hold  
Max. voltage . . . . . 250 VAC / VDC  
Max. AC current. . . . . 2 A  
Max. AC power . . . . . 500 VA  
Max. DC current, resistive load:  
@ U<sub>relay</sub> ≤ 30 VDC . . . . . 2 ADC  
@ U<sub>relay</sub> >30 VDC. . . . . [1380 x U<sub>relay</sub><sup>-2</sup> x 1.0085<sup>U<sub>relay</sub></sup>] ADC

Graphic depiction of [1380 x U<sub>relay</sub><sup>-2</sup> x 1.0085<sup>U<sub>relay</sub></sup>]:



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

**Approvals:**

DNV-GL, Ships & Offshore . . . . .	Standard for Certification No. 2.4
ClassNK . . . . .	TA18527M
c UL us, Standard for Safety . . . . .	UL 61010-1
EAC . . . . .	TR-CU 020/2011

**I.S. / Ex:**

ATEX . . . . .	KEMA 10ATEX0053 X
IECEX . . . . .	IECEX KEM 10.0022X
c FM us. . . . .	3038267-C
INMETRO . . . . .	DEKRA 16.0004 X
CCOE . . . . .	P337349/4
EAC Ex TR-CU 012/2011 . . . . .	RU C-DK.GB08.V.00410

**Functional Safety:**

SIL2 Certified & Fully Assessed acc. to IEC 61508

## Configuration of sensor error check

Sensor error check:		
Device:	Configuration	Sensor error detection:
9116	ERR.ACT=NONE - OUT.ERR=NONE.	OFF
	Else:	ON

## Visualisation in the 4511/4501 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
VOLT	0...1 V / 0.2...1 V	IN.LO	< -25 mV
		IN.HI	> 1.2 V
	0...10 V / 2...10 V	IN.LO	< -25 mV
		IN.HI	> 12 V
CURR	0...20 mA / 4...20 mA	IN.LO	< -1.05 mA
		IN.HI	> 25.05 mA
LIN.R	0...800 Ω	IN.LO	< -10 Ω
		IN.HI	> 900 Ω
	0...10 kΩ	IN.LO	< -10 Ω
		IN.HI	> 11 kΩ
POTM	0 - 100%	IN.LO	< -0.5 %
		IN.HI	> 100.5 %
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

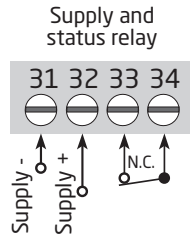
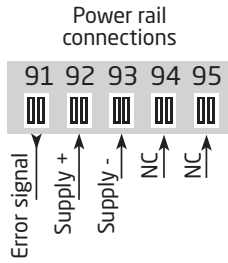
Sensor error detection (SE.BR, SE.SH):			
Input	Range	Readout	Condition
CURR	Loop break (4...20 mA)	SE.BR	<= 3.6 mA; > = 21 mA
POTM	All, SE.BR on all 3-wire	SE.BR	Sensor broken
		SE.SH	Sensor shorted
LIN.R	All	SE.BR	Sensor broken or wire resistance too high
	For Lin. R_0% ≥ app. 18 Ω	SE.SH	Sensor shorted
TEMP	All	SE.BR	Sensor broken or wire resistance too high
	Pt100 to Pt1000 and Ni50 to Ni1000	SE.SH	Sensor shorted

## 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 analogue output current (SIL mode only)*
No communication	NO.CO	No communication with (4511/4501)
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	RE.ER	Relay readback 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	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*
Hardware error	MI.ER	Main CPU initialization check error*
Hardware error	DE.ER	Device error*
Hardware error	FC.ER	Invalid code checksum in 4511/4501

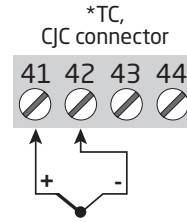
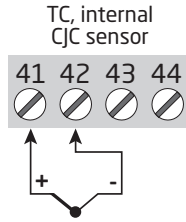
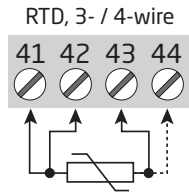
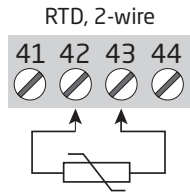
!	All error indications in the display flash once per second. The help text explains the error. If the error is a sensor error, the display backlight flashes as well - this is acknowledged (stopped) by pushing the  button.
*	Error is acknowledged by resetting the device power.
**	Error can be disregarded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

# Connections

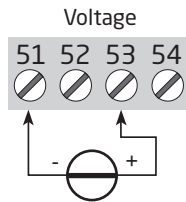
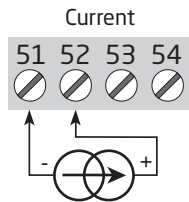
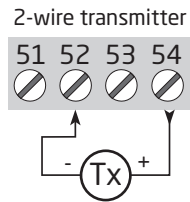
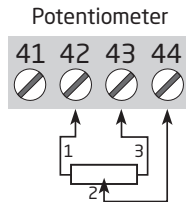
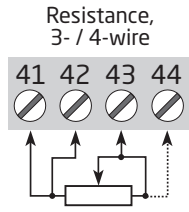
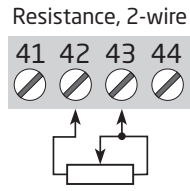


NC = no connection

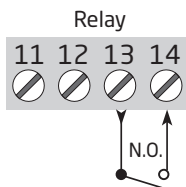
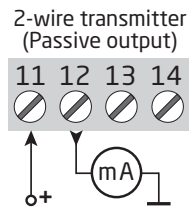
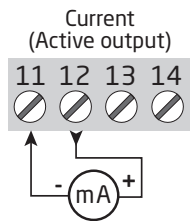
## Inputs:



\* Order separately:  
CJC connector 5910Ex

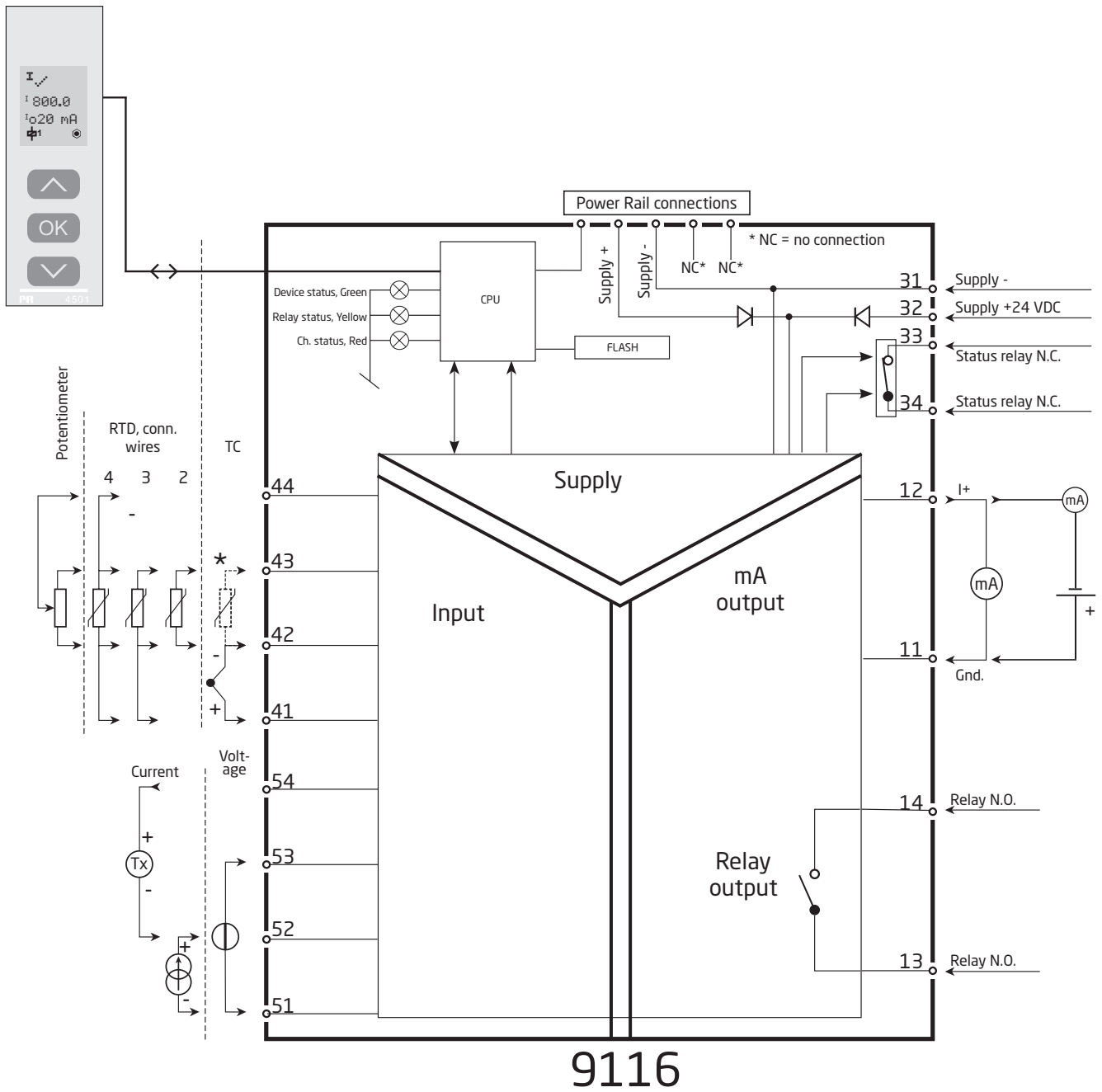


## Outputs:





# Block diagram



## Signal error and cable fault indications without display front

List of LED and error signal indications					
Condition	Green LED	Relay: Yellow LED	Error: Red LED	Status relay, N.C.	Power rail signal status
No supply	OFF	OFF	OFF	De-energized	Closed
Device defective	OFF		ON	De-energized	Closed
Device OK	Flashing			Energized	Open
Signal OK	Flashing		OFF	Energized	Open
Output relay energized	Flashing	ON	OFF	Energized	Open
Output relay energized w. wire short/break	Flashing	ON	Flashing	De-energized	Closed (if activated)
Output relay de-energized w. wire short/break	Flashing	OFF	Flashing	De-energized	Closed (if activated)
Output relay de-energized	Flashing	OFF	OFF	Energized	Open

# Configuration / operating the function keys

Documentation for routing diagram.

## In general

When configuring the 9116B-EMP, you will be guided through all parameters and you can choose the settings which fit the application. For each menu there is a scrolling help text which is automatically shown in line 3 on the display.

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

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

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

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

## Further explanations

**Password protection:** Programming access can be blocked by assigning a password. The password is saved in the device in order to ensure a high degree of protection against unauthorised modifications to the configuration. Default password 2008 allows access to all configuration menus.

Password protection is mandatory in SIL applications.

## Selection of units

After choosing the input signal type you can choose which process units should be shown in the display (see table). By selection of temperature input 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 5910Ex) must be ordered separately.

## Signal and sensor error indication via display front 4511/4501

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 1 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 relay status and status for communication COM (running circle) indicating correct functioning of 4511/4501.

## 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.

## Relay functions

5 different settings of relay function can be selected.

**Setpoint:** The unit works as a single trip amplifier

**Window:** The relay has a window that is defined by a low and a high setpoint. On both sides of the window the relay has the same status.

**Error function:** The relay is activated by sensor error.

**Power:** The relay is activated as long as the power is on.

**Off:** The relay is deactivated.

**Increasing/decreasing:** The relay can be set to activate at increasing or decreasing input signal.

**Delay:** An ON and an OFF delay can be set in the range 0...3600 s.

**Hysteresis:** A hysteresis can be set at 0.1...25% of the span or between 1 and 25% of display range.

**Window:** The window function is selected by choosing "window" in the menu and defining a high and a low setpoint. See the graphic depiction of the window functions on page 27.

**Setpoint:** The setpoint function is selected by choosing "setpoint" in the menu and entering the desired limit. The device then works as a single limit switch. See the graphic depiction of the setpoint functions on page 28.

An activated relay means that the contact is closed if the contact function "normally open" is selected, and the contact is open if the contact function "normally closed" is selected. The delay time for activation and deactivation can be set independently of each other in the menus ON.DEL and OFF DEL respectively.

### 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. Input value is always shown in line 2. Selection of functional readout in line 3 of the display - choose between readout of 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 4511/4501. Then a high signal (not necessarily 100%) is applied and the actual value is entered via 4511/4501. 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 or the relay state OFF and ON. You must exit the menu by pressing ⓧ (no time-out). The simulation function exits automatically, if the 4511/4501 is detached.

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

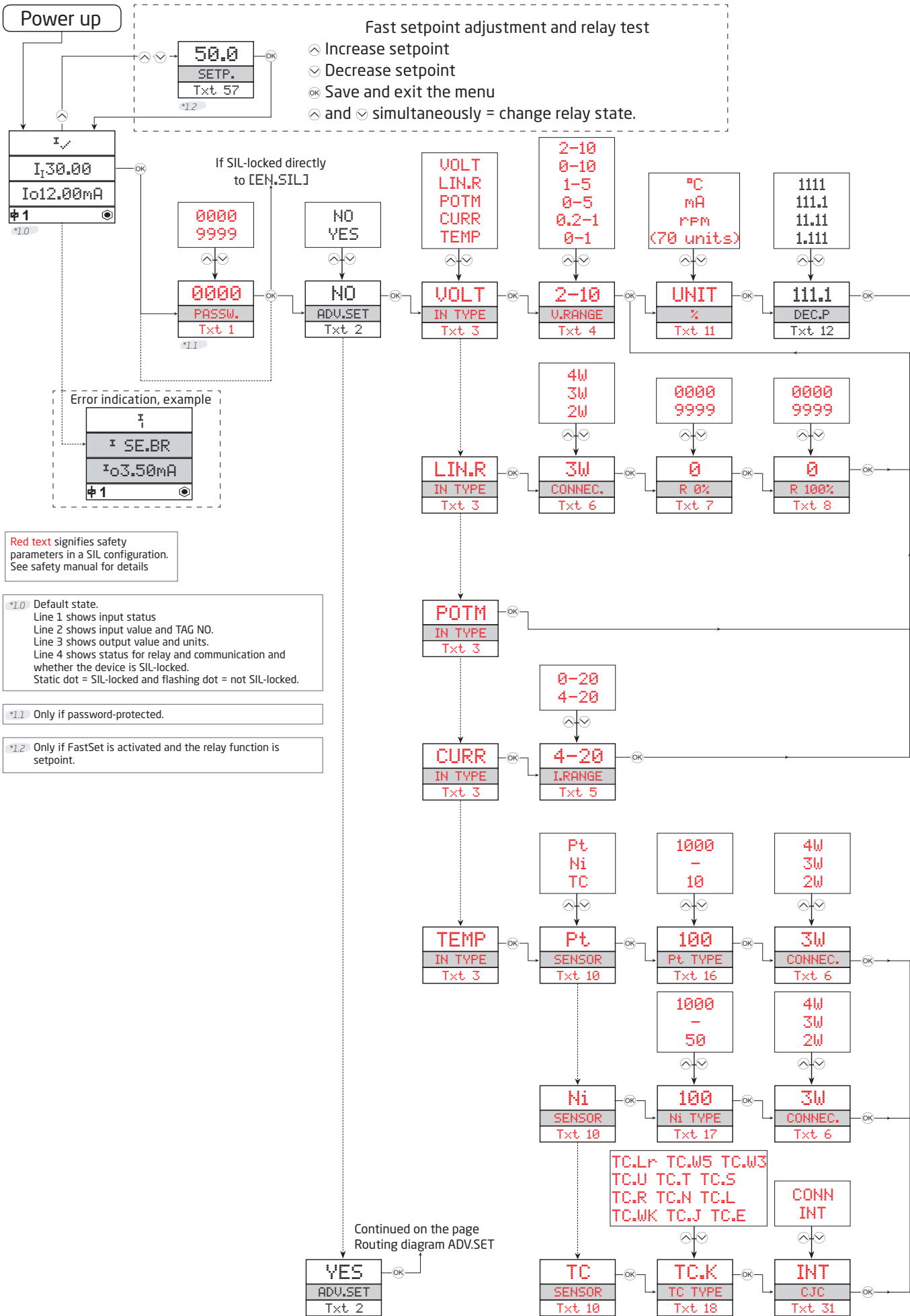
**Memory:** In the memory menu you can save the configuration of the device in the 4511/4501, and then move the 4511/4501 onto another device of the same type and download the configuration in the new device.

**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.

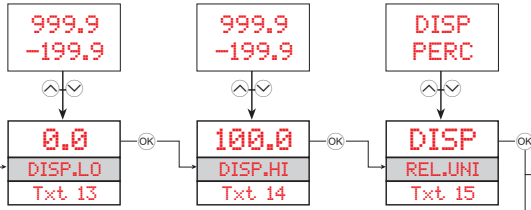




# Routing diagram

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

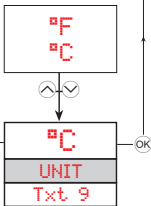
- ⬆ Increase value / choose next parameter
- ⬇ Decrease value / choose previous parameter
- ⊞ Save the chosen value and proceed to the next menu
- Hold ⊞ Back to previous menu / return to menu 1.0 without saving.

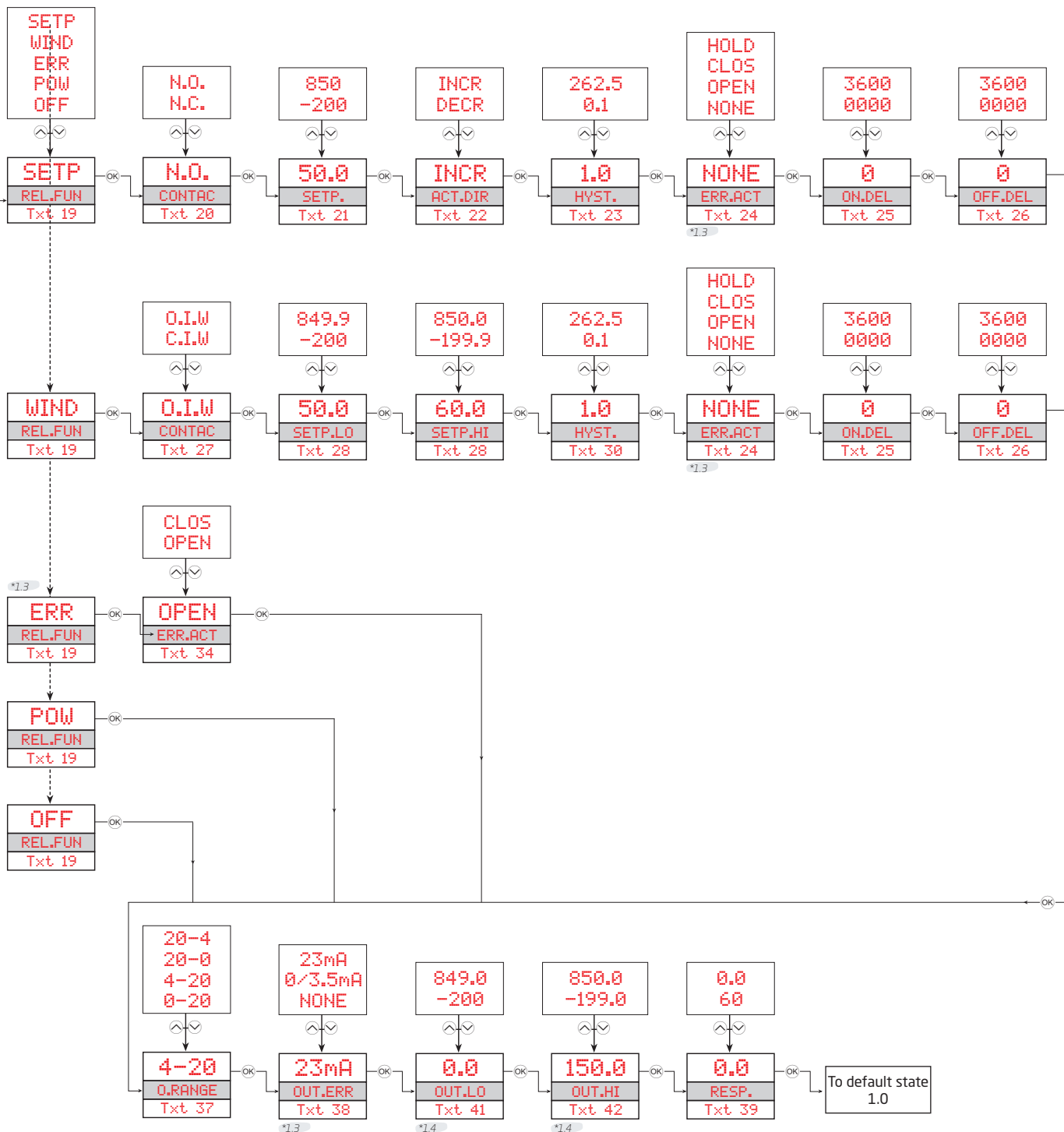


Continued on the next page

## Selectable UNITS:

°C	s	rpm	MUh	ohm
°F	min	Hz	kUh	S
K	m/s	t	U	uS
%	mm/s	kg	GU	m <sup>3</sup> /min
m	m/min	g	MU	m <sup>3</sup> /h
cm	m/h	N	kU	l/s
mm	in/s	Pa	hP	l/min
um	ips	MPa	A	l/h
ft	ft/s	kPa	kA	gal/min
in	in/min	hPa	mA	gal/h
mils	ft/min	bar	uA	t/h
yd	in/h	mbar	V	mol
m <sup>3</sup>	ft/h	kJ	kU	pH
l	m/s <sup>2</sup>	Uh	mU	[blank]



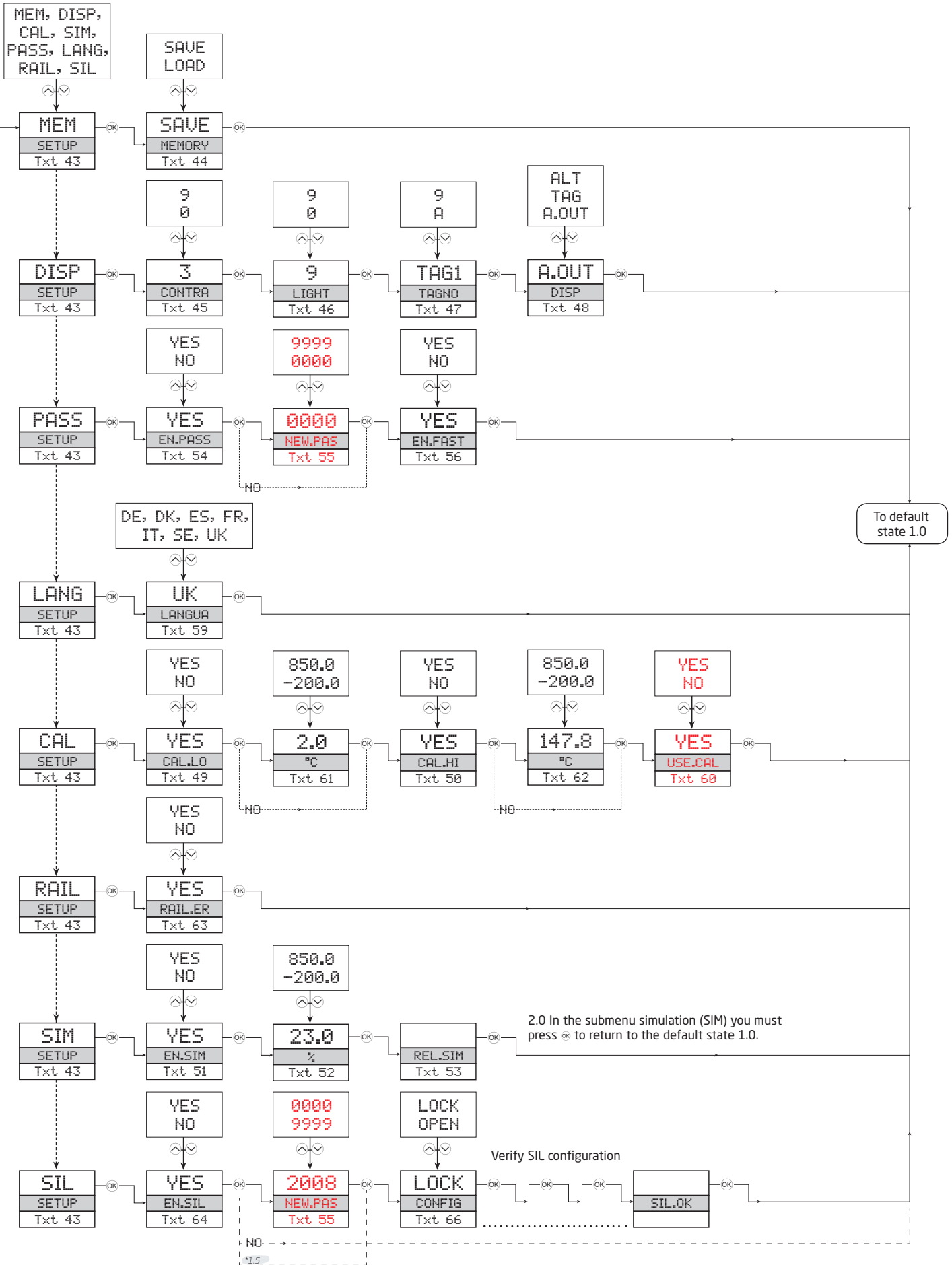


\*1.3 Only if input types support sensor error check.  
Not valid for these input signals: 0...20 mA and voltage.

\*1.5 Only if the configuration is not protected by a password.

\*1.4 Only if input signal is temperature.



# Routing diagram, advanced settings (ADV.SET)



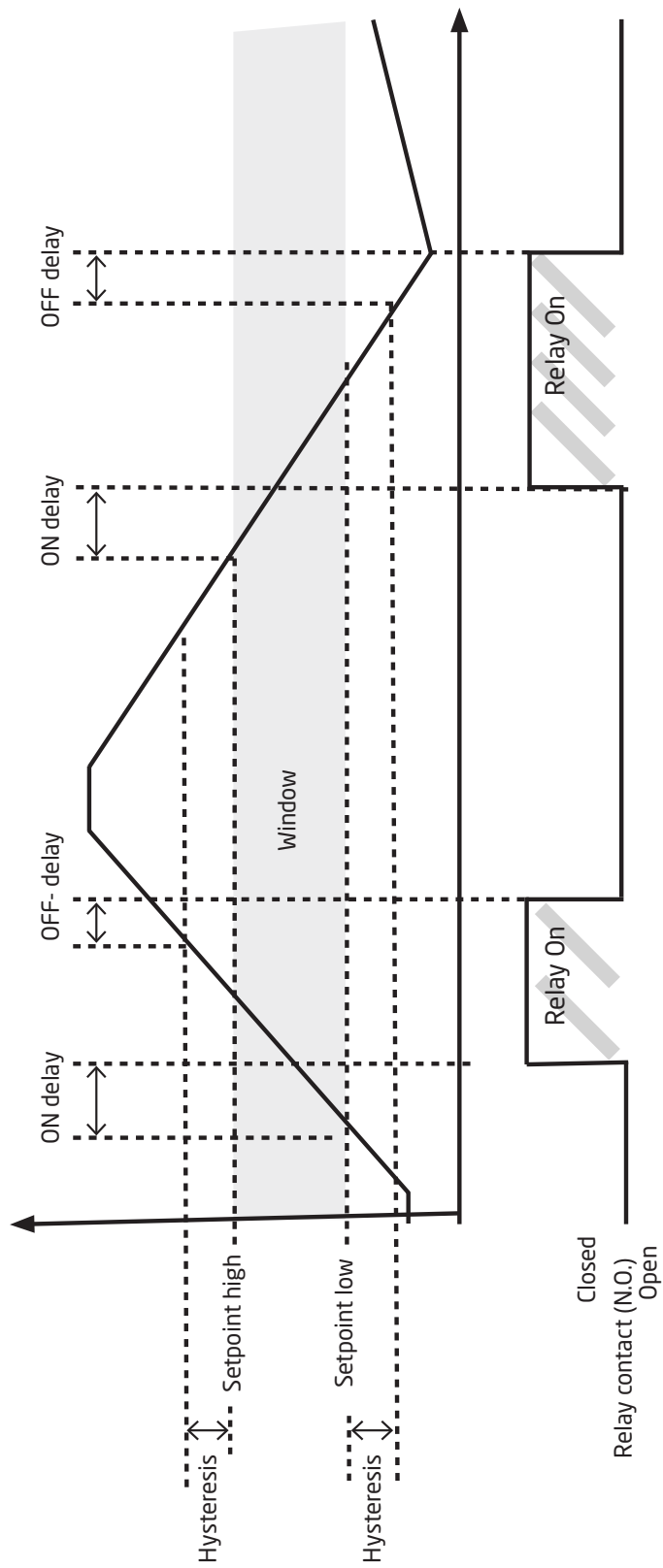


## Help text overview

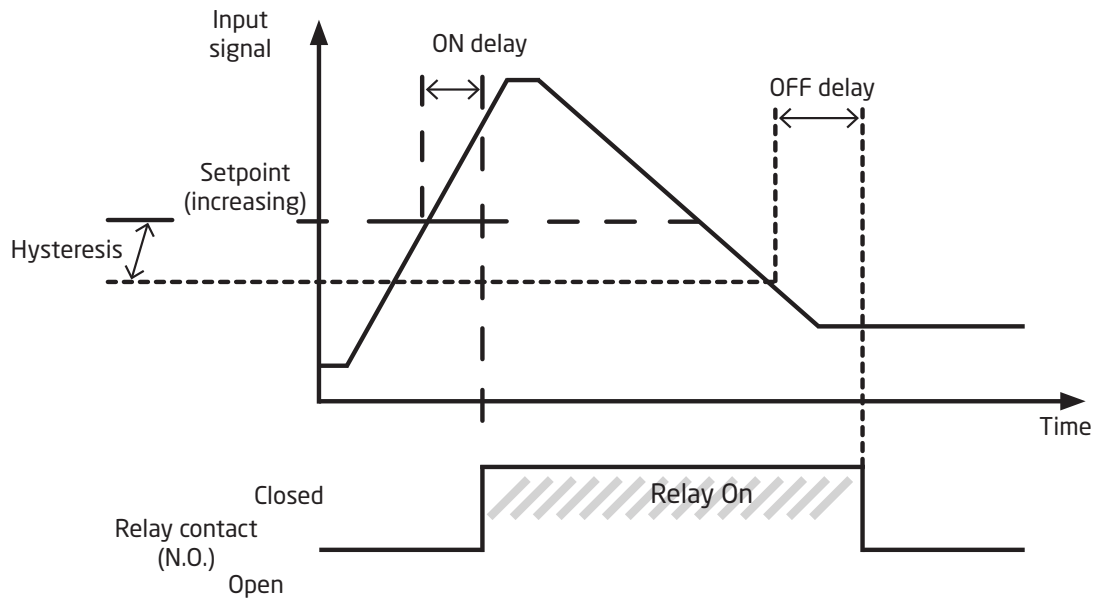
- [01] Set correct password
- [02] Enter Advanced setup menu?
- [03] Select Temperature input
  - Select Potentiometer input
  - Select Linear resistance input
  - Select Current input
  - Select Voltage input
- [04] Select 0.0-1 V input range
  - Select 0.2-1 V input range
  - Select 0-5 V input range
  - Select 1-5 V input range
  - Select 0-10 V input range
  - Select 2-10 V input range
- [05] Select 0-20 mA input range
  - Select 4-20 mA input range
- [06] Select 2-Wire sensor connection
  - Select 3-Wire sensor connection
  - Select 4-Wire sensor connection
- [07] Set Resistance value low
- [08] Set Resistance value high
- [09] Select Celsius as temperature unit
  - Select Fahrenheit as temperature unit
- [10] Select TC sensor type
  - Select Ni sensor type
  - Select Pt sensor type
- [11] Select Display unit
- [12] Select Decimal point position
- [13] Set Display range low
- [14] Set Display range high
- [15] Select Relay setpoint in % of input range
  - Select Relay setpoint in display units
- [16] 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
- [17] Select Ni50 sensor type
  - Select Ni100 sensor type
  - Select Ni120 sensor type
  - Select Ni1000 sensor type
- [18] 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
- [19] Select OFF function - relay is permanently off
  - Select POWER function - relay indicates power status OK
  - Select ERROR function - relay indicates sensor error only
  - Select WINDOW function - relay is controlled by 2 setpoints
  - Select SETPOINT function - relay is controlled by 1 setpoint
- [20] Select Normally Closed contact
  - Select Normally Open contact
- [21] Set Relay setpoint
- [22] Select Action on decreasing signal
  - Select Action on increasing signal
- [23] Set Relay hysteresis
- [24] Select No error action - undefined status at error
  - Select Open relay contact at error
  - Select Close relay contact at error
  - Select Hold relay status at error
- [25] Set Relay ON delay in seconds
- [26] Set Relay OFF delay in seconds
- [27] Select Contact is Closed Inside Window
  - Select Contact is Open Inside Window
- [28] Set Relay window setpoint low
- [29] Set Relay window setpoint high
- [30] Set Relay window hysteresis
- [31] Select Internal temperature sensor
  - Select CJC connector (Accessory)
- [34] Select Open relay contact at error
  - Select Close relay contact at error
- [37] Select 0-20 mA output range
  - Select 4-20 mA output range
  - Select 20-0 mA output range
  - Select 20-4 mA output range
- [38] Select No error action - output undefined at error
  - Select Downscale at error
  - Select Namur NE43 downscale at error
  - Select Namur NE43 upscale at error
- [39] Select Analogue output response time in seconds.
- [41] Set Temperature for analogue output low
- [42] Set Temperature for analogue output high
- [43] Enter SIL setup
  - Enter Simulation mode
  - Enter Rail setup
  - Perform Process Calibration
  - Enter Language setup
  - Enter Password setup
  - Enter Display setup
  - Perform Memory operations
- [44] Load saved configuration into module
  - Save configuration in display front
- [45] Adjust LCD contrast
- [46] Adjust LCD backlight
- [47] Write a 5-character channel TAG
- [48] Show Analog output value in display
  - Show TAG on display
  - Alternate shown information in display

- [49] Calibrate Input low to process value?
- [50] Calibrate Input high to process value?
- [51] Enable input simulation?
- [52] Set the input simulation value
- [53] Relay simulation - use  to toggle relay
- [54] Enable Password protection?
- [55] Set New password
- [56] Enable Fastset functionality?
- [57] Relay setpoint - press  to save
- [58] Relay setpoint - Read only
- [59] Select Language
- [60] Use process calibration values?
- [61] Set value for low calibration point
- [62] Set value for high calibration point
- [63] Enable Rail status signal output?
- [64] Enable SIL configuration lock?  
0...20 mA is not a valid output range for SIL operation
- [65] is channel using process-compensated calibration data?
- [66] Configuration SIL status (Open / Locked)
- [80] Sensor short circuit
- [81] Sensor wire breakage
- [82] Display underrange
- [83] Display overrange
- [84] Input underrange
- [85] Input overrange
- [86] Input error - check input connections and reset power
- [87] Output error - check connentions and reset power
- [88] Flash memory error - chek configuration
- [89] Invalid configuration type or version
- [90] Hardware error
- [91] CJC sensor error - check device temperature
- [92] CJC error - check CJC connector block
- [93] No communication

# Graphic depiction of window



# Graphic depiction of setpoint



## **Appendix**

**IECEx installation drawing**

**ATEX Installation Drawing**

**FM Installation Drawing**

**Desenho de Instalação INMETRO**

**Safety Manual**

LERBAKKEN 10, 8410 ROENDE DENMARK

## IECEX Installation drawing



For safe installation of 9116 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.

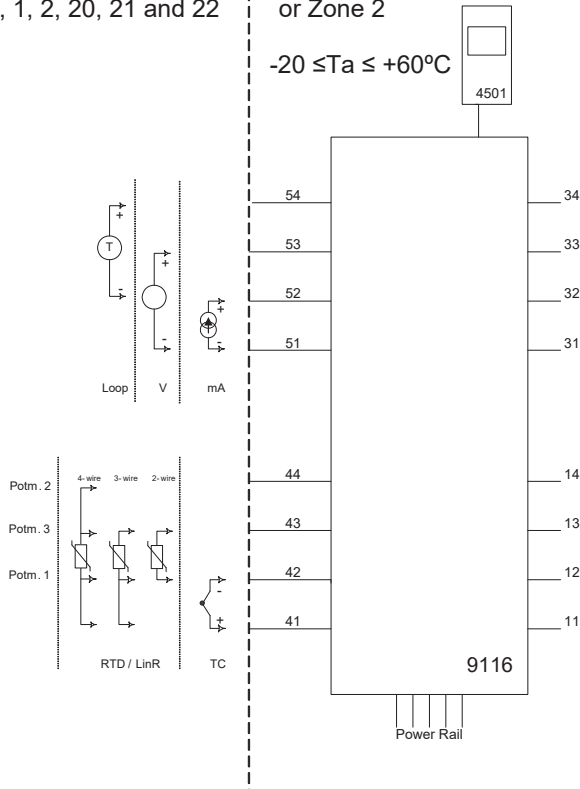
<b>IECEX Certificate:</b>	KEM 10.0022X
<b>Marking 9116Bxx:</b>	[Ex ia Ga] IIC/IIB/IIA Ex nA nC IIC T4 Gc [Ex ia Da] IIIC [Ex ia Ma] I
<b>Marking 9116Axx:</b>	Ex nA nC IIC T4 Gc
<b>Standards</b>	IEC60079-11:2011, IEC60079-0:2011, IEC60079-15:2010

### 9116Bxx Installation:

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

Non Hazardous area  
or Zone 2

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



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

**Status relay, terminal (33,34)**  
**Zone 2 installation:**  
Voltage max: 32 VAC / 32 VDC  
Power max: 16 VA / 32 W  
Current max: 0.5 A AC / 1 A DC

**Relay output, terminal (13,14)**  
**Zone 2 installation**  
Voltage max: 32 V AC / 30 VDC  
Power max: 64 VA / 60 W  
Current max: 2 A AC / 2 ADC

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

Revision date:  
2018-03-01

Version Revision  
V8 R0

Prepared by:  
PB

Page:  
1/5

LERBAKKEN 10, 8410 ROENDE DENMARK

Module 9116B1	
Terminal 51-52, 51-53	
Ui	30 V
li	120 mA
Pi	900 mW
Ci	3 nF
Li	1 μH

Module 9116B2	
Terminal 51-52, 51-53	
Ui	30 V
li	120 mA
Pi	900 mW
Ci	3 nF
Li	1 μH

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 51-54, 52-54					
Uo	28 V	IIC	80 nF	4 mH	54 μH/Ω
lo	93 mA	IIB	640 nF	16 mH	218 μH/Ω
Po	650 mW	IIA	2.1 μF	32 mH	436 μH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 51-54, 52-54					
Uo	21.4 V	IIC	0.16 μF	4 mH	54 μH/Ω
lo	93 mA	IIB	1.13 μF	16 mH	218 μH/Ω
Po	650 mW	IIA	4.15 μF	32 mH	436 μH/Ω

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 51-53					
Uo	28 V	IIC	80 nF	1000 mH	4 mH/Ω
lo	1.1 mA	IIB	640 nF	1000 mH	17 mH/Ω
Po	8 mW	IIA	2.1 μF	1000 mH	35 mH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 51-53					
Uo	21.4 V	IIC	0.16 μF	1000 mH	4 mH/Ω
lo	1.1 mA	IIB	1.13 μF	1000 mH	17 mH/Ω
Po	8 mW	IIA	4.15 μF	1000 mH	35 mH/Ω

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 51-52					
Uo	8.3 V	IIC	7 μF	1000 mH	100 mH/Ω
lo	0.2 mA	IIB	73 μF	1000 mH	400 mH/Ω
Po	0.4 mW	IIA	1000 μF	1000 mH	800 mH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 51-52					
Uo	8.3 V	IIC	7 μF	1000 mH	100 mH/Ω
lo	0.2 mA	IIB	73 μF	1000 mH	400 mH/Ω
Po	0.4 mW	IIA	1000 μF	1000 mH	800 mH/Ω

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 41,42,43,44					
Uo	8.3 V	IIC	7 μF	207 mH	1 mH/Ω
lo	13.1 mA	IIB	73 μF	828 mH	5 mH/Ω
Po	27.3 mW	IIA	1000 μF	1000 mH	10 mH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 41,42,43,44					
Uo	8.3 V	IIC	7 μF	207 mH	1 mH/Ω
lo	13.1 mA	IIB	73 μF	828 mH	5 mH/Ω
Po	27.3 mW	IIA	1000 μF	1000 mH	10 mH/Ω

**Installation notes:**

For group I (mines), the parameters for group IIA apply.

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.

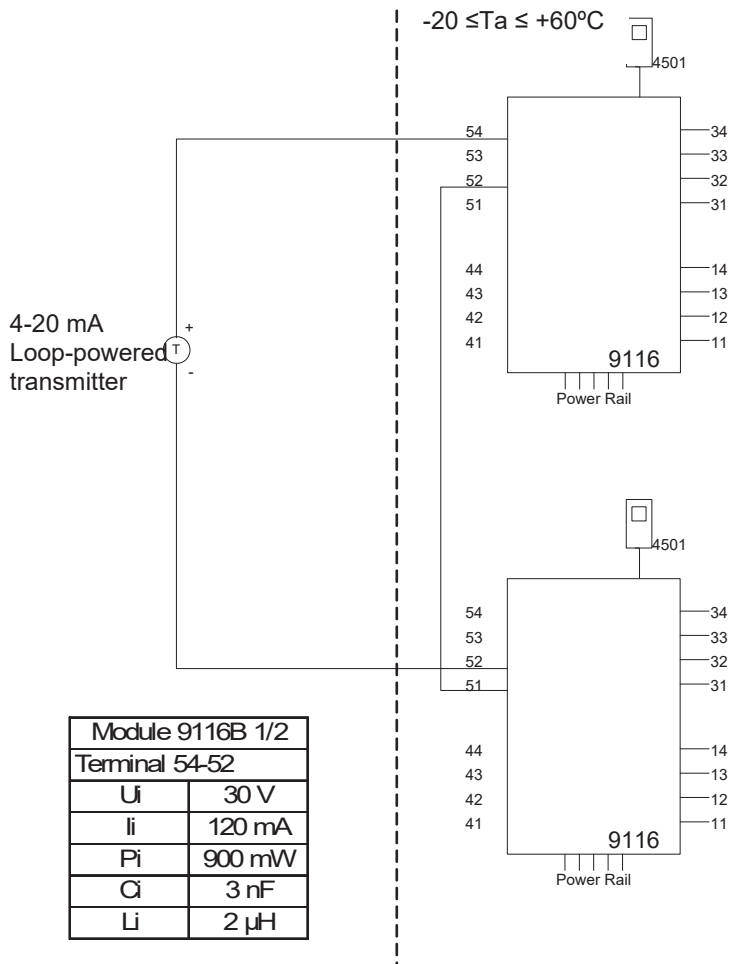
For installation on Power Rail in Zone 2, only Power Rail type 9400 supplied by Power Control Unit type 9410 (Type Examination Certificate KEMA 07ATEX0152 X) is allowed.

LERBAKKEN 10, 8410 ROENDE DENMARK

**9116Bxx Installation:**

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

Non Hazardous area  
or Zone 2



Module 9116B 1/2	
Terminal 54-52	
U <sub>i</sub>	30 V
I <sub>i</sub>	120 mA
P <sub>i</sub>	900 mW
C <sub>i</sub>	3 nF
L <sub>i</sub>	2 μH

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

**Status relay, terminal (33,34)**  
**Zone 2 installation:**  
Voltage max: 32 VAC / 32 VDC  
Power max: 16 VA / 32 W  
Current max: 0.5 A AC / 1 A DC

**Relay output, terminal (13,14)**  
**Zone 2 installation**  
Voltage max: 32 V AC / 30 VDC  
Power max: 64 VA / 60 W  
Current max: 2 A AC / 2 ADC

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

Module 9116B1		Group	Co	Lo	Lo/Ro
Term. 54-52; 51-52					
U <sub>o</sub>	28 V	IIC	80 nF	4 mH	54 μH/Ω
I <sub>o</sub>	93 mA	IIB	640 nF	16 mH	218 μH/Ω
P <sub>o</sub>	650 mW	IIA	2.1 μF	32 mH	436 μH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Term. 54-52; 51-52					
U <sub>o</sub>	21.4 V	IIC	0.16 μF	4 mH	54 μH/Ω
I <sub>o</sub>	93 mA	IIB	1.13 μF	16 mH	218 μH/Ω
P <sub>o</sub>	650 mW	IIA	4.15 μF	32 mH	436 μH/Ω



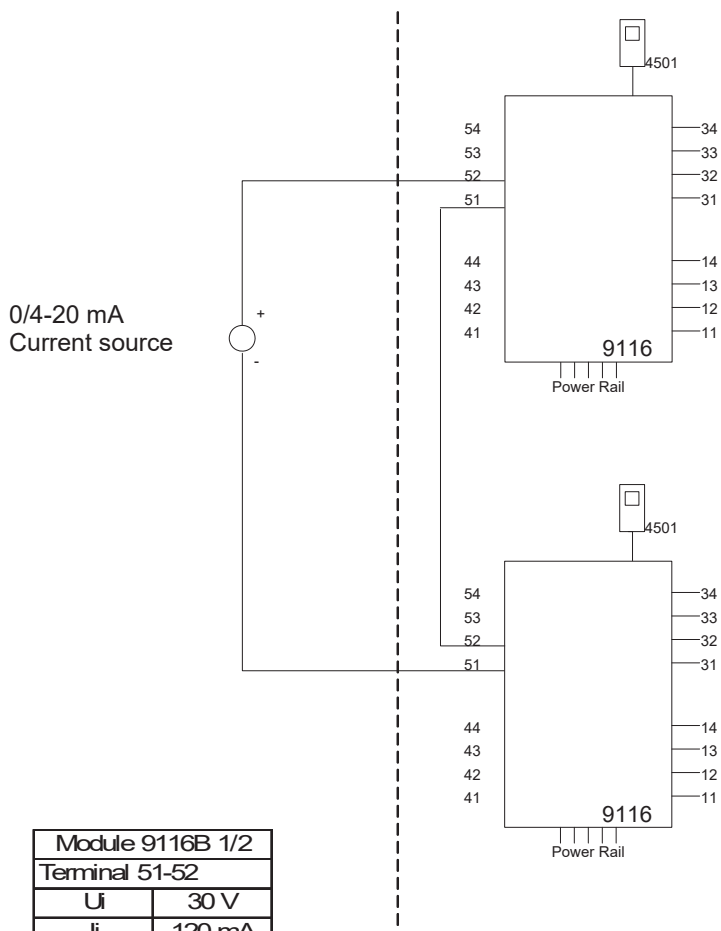
LERBAKKEN 10, 8410 ROENDE DENMARK

**9116Bxx Installation:**

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

Non Hazardous area  
or Zone 2

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



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

**Status relay, terminal (33,34)**

**Zone 2 installation:**  
Voltage max: 32 VAC / 32 VDC  
Power max: 16 VA / 32 W  
Current max: 0.5 A AC / 1 A DC

**Relay output, terminal (13,14)**

**Zone 2 installation**  
Voltage max: 32 V AC / 30 VDC  
Power max: 64 VA / 60 W  
Current max: 2 A AC / 2 ADC

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

Module 9116B 1/2	
Terminal 51-52	
$U_i$	30 V
$I_i$	120 mA
$P_i$	900 mW
$C_i$	3 nF
$L_i$	2 $\mu$ H

Module 9116B 1/2		Group	$C_o$	$L_o$	$L_o/R_o$
Term. 52-51, 51-52					
$U_o$	16.6 V	IIC	0.4 $\mu$ F	100 mH	25mH/ $\Omega$
$I_o$	0.2 mA	IIB	2.3 $\mu$ F	100 mH	100mH/ $\Omega$
$P_o$	0.8 mW	IIA	9.5 $\mu$ F	100 mH	200mH/ $\Omega$

Revision date:  
2018-03-01

Version Revision  
V8 R0

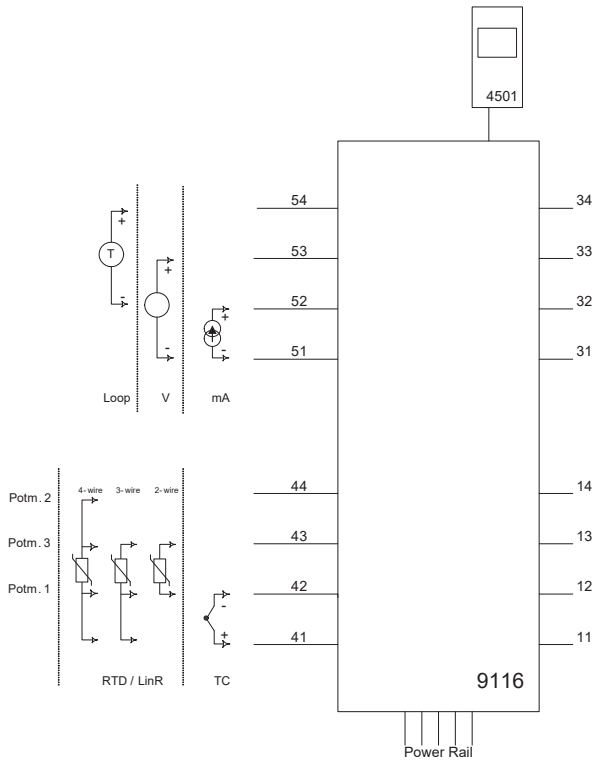
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PB

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LERBAKKEN 10, 8410 ROENDE DENMARK

**9116Axx Installation:**

Non Hazardous area or Zone 2



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

**Status relay, terminal (33,34)**  
**Zone 2 installation:**  
Voltage max: 32 VAC / 32 VDC  
Power max: 16 VA / 32 W  
Current max: 0.5 A AC / 1 A DC

**Relay output, terminal (13,14)**  
**Zone 2 installation**  
Voltage max: 32 V AC / 30 VDC  
Power max: 64 VA / 60 W  
Current max: 2 A AC / 2 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.

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.

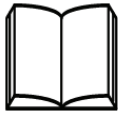
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## ATEX Installation drawing



For safe installation of 9116 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 10 ATEX 0053 X

**Marking 9116Bxx:**



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 9116Axx:**

II 3G Ex nA nC IIC T4 Gc

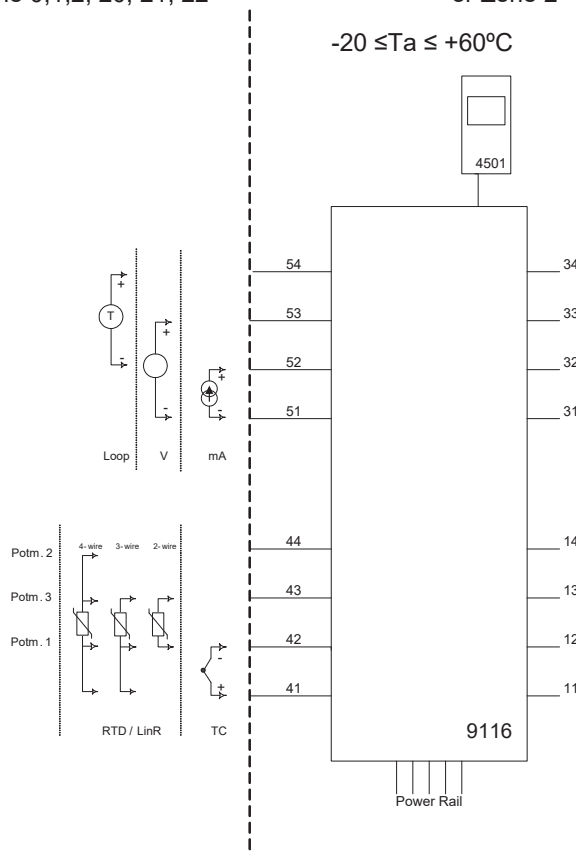
**Standards**

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

### 9116Bxx Installation:

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

Non Hazardous area  
or Zone 2



#### Supply terminal (31,32)

Voltage: 19.2 – 31.2 VDC

#### Status relay, terminal (33,34)

##### Zone 2 installation:

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

#### Relay output, terminal (13,14)

##### Zone 2 installation

Voltage max: 32 V AC / 30 VDC  
Power max: 64 VA / 60 W  
Current max: 2 A AC / 2 ADC

(terminal 11,12,13,14)

(terminal 31,32,33,34)

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

U<sub>m</sub>: 253 V max. 400 Hz

Revision date:  
2018-03-01

Version Revision  
V8 R0

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Module 9116B1 Terminal 51-52, 51-53	
Ui	30 V
Ii	120 mA
Pi	900 mW
Ci	3 nF
Li	1 µH

Module 9116B2 Terminal 51-52, 51-53	
Ui	30 V
Ii	120 mA
Pi	900 mW
Ci	3 nF
Li	1 µH

Module 9116B1 Terminal 51-54, 52-54		Group	Co	Lo	Lo/Ro
Uo	28 V	IIC	80 nF	4 mH	54 µH/Ω
Io	93 mA	IIB	640 nF	16 mH	218 µH/Ω
Po	650 mW	IIA	2.1 µF	32 mH	436 µH/Ω

Module 9116B2 Terminal 51-54, 52-54		Group	Co	Lo	Lo/Ro
Uo	21.4 V	IIC	0.16 µF	4 mH	54 µH/Ω
Io	93 mA	IIB	1.13 µF	16 mH	218 µH/Ω
Po	650 mW	IIA	4.15 µF	32 mH	436 µH/Ω

Module 9116B1 Terminal 51-53		Group	Co	Lo	Lo/Ro
Uo	28 V	IIC	80 nF	1000 mH	4 mH/Ω
Io	1.1 mA	IIB	640 nF	1000 mH	17 mH/Ω
Po	8 mW	IIA	2.1 µF	1000 mH	35 mH/Ω

Module 9116B2 Terminal 51-53		Group	Co	Lo	Lo/Ro
Uo	21.4 V	IIC	0.16 µF	1000 mH	4 mH/Ω
Io	1.1 mA	IIB	1.13 µF	1000 mH	17 mH/Ω
Po	8 mW	IIA	4.15 µF	1000 mH	35 mH/Ω

Module 9116B1 Terminal 51-52		Group	Co	Lo	Lo/Ro
Uo	8.3 V	IIC	7 µF	1000 mH	100 mH/Ω
Io	0.2 mA	IIB	73 µF	1000 mH	400 mH/Ω
Po	0.4 mW	IIA	1000 µF	1000 mH	800 mH/Ω

Module 9116B2 Terminal 51-52		Group	Co	Lo	Lo/Ro
Uo	8.3 V	IIC	7 µF	1000 mH	100 mH/Ω
Io	0.2 mA	IIB	73 µF	1000 mH	400 mH/Ω
Po	0.4 mW	IIA	1000 µF	1000 mH	800 mH/Ω

Module 9116B1 Terminal 41,42,43,44		Group	Co	Lo	Lo/Ro
Uo	8.3 V	IIC	7 µF	207 mH	1 mH/Ω
Io	13.1 mA	IIB	73 µF	828 mH	5 mH/Ω
Po	27.3 mW	IIA	1000 µF	1000 mH	10 mH/Ω

Module 9116B2 Terminal 41,42,43,44		Group	Co	Lo	Lo/Ro
Uo	8.3 V	IIC	7 µF	207 mH	1 mH/Ω
Io	13.1 mA	IIB	73 µF	828 mH	5 mH/Ω
Po	27.3 mW	IIA	1000 µF	1000 mH	10 mH/Ω

**Installation notes:**

For group I (mines), the parameters for group IIA apply.

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.

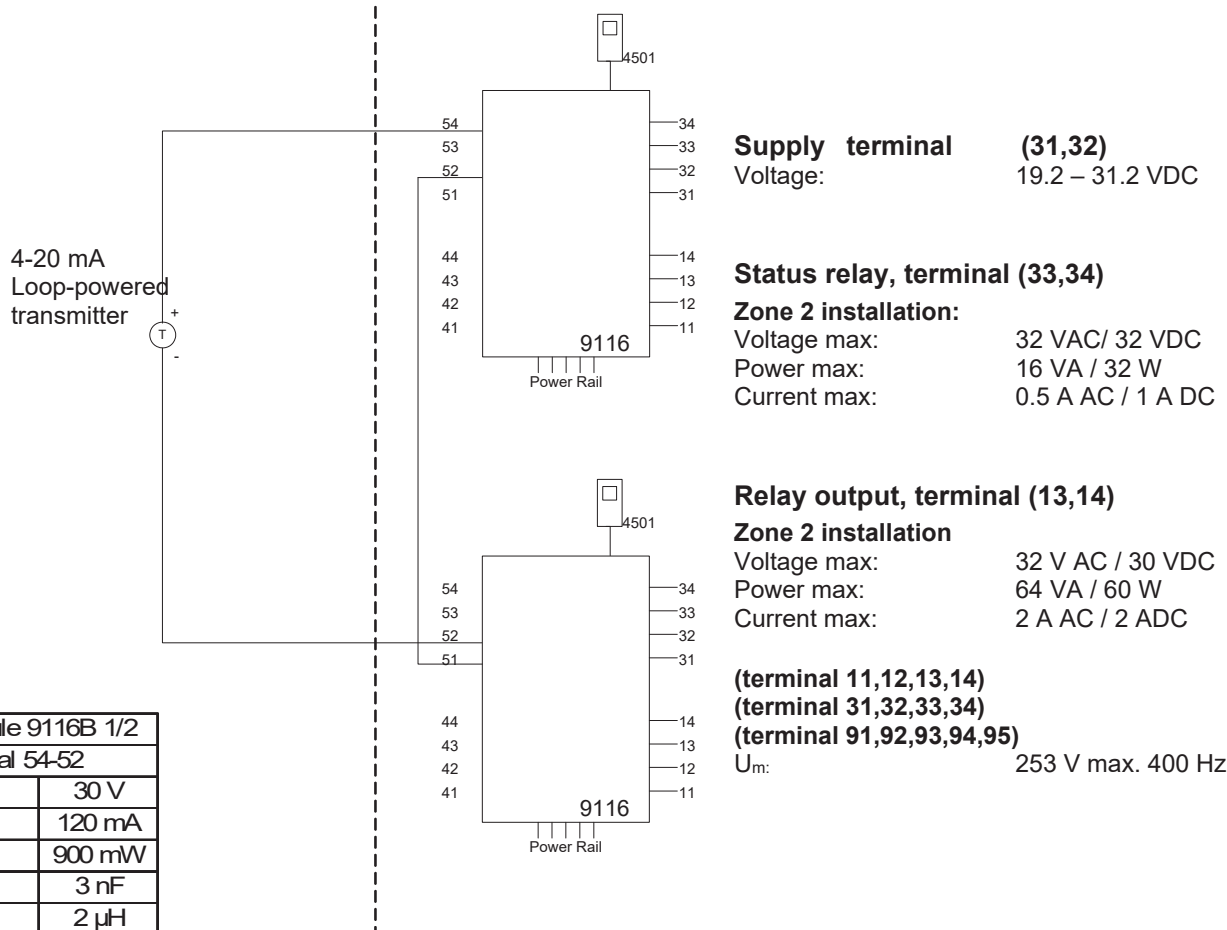
LERBAKKEN 10, 8410 RØNDE DENMARK

**9116Bxx Installation:**

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

Non Hazardous area  
or Zone 2

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



Module 9116B 1/2	
Terminal 54-52	
$U_i$	30 V
$I_i$	120 mA
$P_i$	900 mW
$C_i$	3 nF
$L_i$	2 $\mu$ H

Module 9116B1					
Term. 54-52; 51-52		Group	$C_o$	$L_o$	$L_o/R_o$
$U_o$	28 V	IIC	80 nF	4 mH	54 $\mu$ H/ $\Omega$
$I_o$	93 mA	IIB	640 nF	16 mH	218 $\mu$ H/ $\Omega$
$P_o$	650 mW	IIA	2.1 $\mu$ F	32 mH	436 $\mu$ H/ $\Omega$

Module 9116B2					
Term. 54-52; 51-52		Group	$C_o$	$L_o$	$L_o/R_o$
$U_o$	21.4 V	IIC	0.16 $\mu$ F	4 mH	54 $\mu$ H/ $\Omega$
$I_o$	93 mA	IIB	1.13 $\mu$ F	16 mH	218 $\mu$ H/ $\Omega$
$P_o$	650 mW	IIA	4.15 $\mu$ F	32 mH	436 $\mu$ H/ $\Omega$

Revision date:  
2018-03-01

Version Revision  
V8 R0

Prepared by:  
PB

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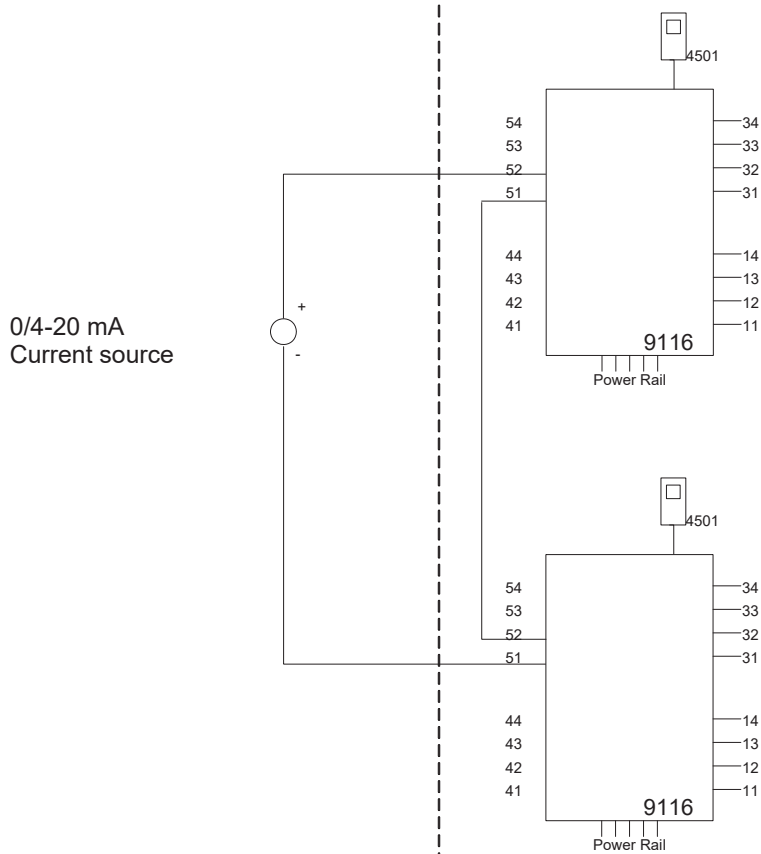
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**9116Bxx Installation:**

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

Non Hazardous area  
or Zone 2

-20 °C ≤ Ta ≤ +60°C



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

**Status relay, terminal (33,34)**  
**Zone 2 installation:**  
Voltage max: 32 VAC / 32 VDC  
Power max: 16 VA / 32 W  
Current max: 0.5 A AC / 1 A DC

**Relay output, terminal (13,14)**  
**Zone 2 installation**  
Voltage max: 32 V AC / 30 VDC  
Power max: 64 VA / 60 W  
Current max: 2 A AC / 2 ADC

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

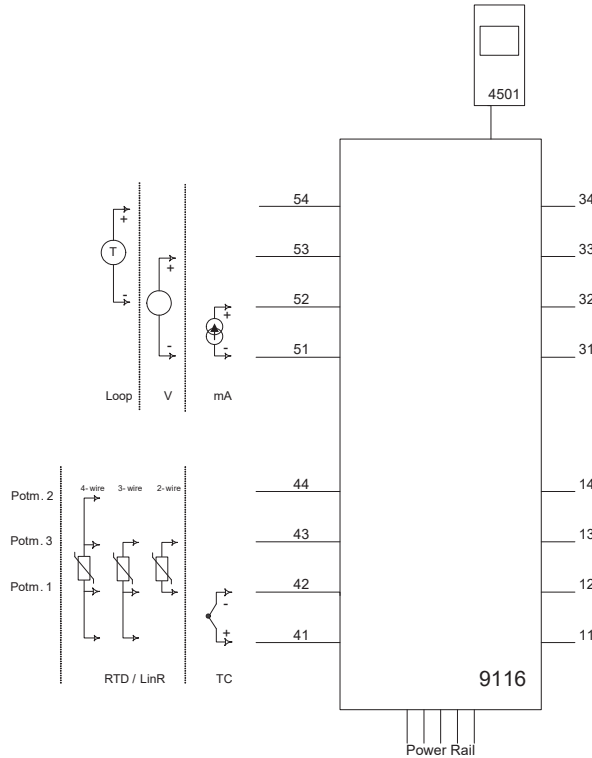
Module 9116B 1/2	
Terminal 51-52	
U <sub>i</sub>	30 V
I <sub>i</sub>	120 mA
P <sub>i</sub>	900 mW
C <sub>i</sub>	3 nF
L <sub>i</sub>	2 μH

Module 9116B 1/2	Group	Co	Lo	Lo/Ro
Term. 52-51, 51-52				
U <sub>o</sub>	IIC	0.4 μF	100 mH	25mH/Ω
I <sub>o</sub>	IIB	2.3 μF	100 mH	100mH/Ω
P <sub>o</sub>	IIA	9.5 μF	100 mH	200mH/Ω

LERBAKKEN 10, 8410 RØNDE DENMARK

**9116Axx Installation:**

Non Hazardous area or Zone 2



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

**Status relay, terminal (33,34)**  
**Zone 2 installation:**  
Voltage max: 32 VAC / 32 VDC  
Power max: 16 VA / 32 W  
Current max: 0.5 A AC / 1 A DC

**Relay output, terminal (13,14)**  
**Zone 2 installation**  
Voltage max: 32 V AC / 30 VDC  
Power max: 64 VA / 60 W  
Current max: 2 A AC / 2 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.

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.

LERBAKKEN 10, 8410 ROENDE DENMARK

## FM Installation drawing

### 9116



For safe installation of 9116B 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.

c-FM-us Certificate ..... 3038267

#### 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 Class I, Zone 0/1 Group IIC, [Ex ia] IIC

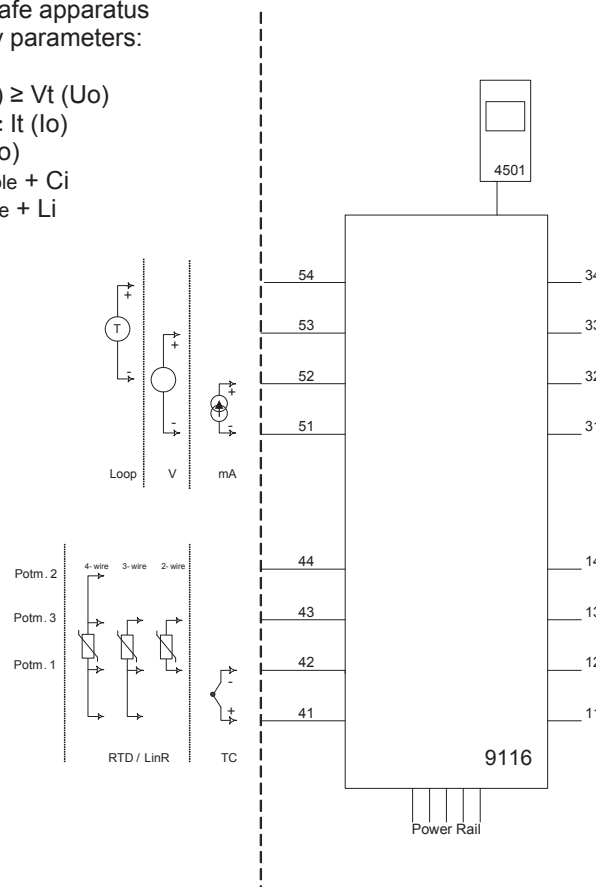
#### Unclassified Location or Hazardous Classified Location

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

Simple Apparatus or  
Intrinsic safe apparatus  
with entity parameters:

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

$-20 \leq T_a \leq +60^\circ C$



#### Status relay, terminal (33,34)

**Non hazardous area installation**  
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 A DC

#### Relay output, terminal (13,14)

**Non hazardous area installation**  
Voltage max: 250 VAC / 30 VDC  
Power max: 500 VA / 60 W  
Current max: 2 A AC / 2 ADC

#### Zone 2 installation

Voltage max: 32 VAC / 30 VDC  
Power max: 64 VA / 60 W  
Current max: 2 A AC / 2 ADC

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

Revision date:  
2012-06-08

Version Revision  
V6 R0

Prepared by:  
PB

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Module 9116B1	
Terminal 51-52, 51-53	
Ui, Vmax	30 V
Ii, Imax	120 mA
Pi	900 mW
Ci	3 nF
Li	1 µH

Module 9116B2	
Terminal 51-52, 51-53	
Ui, Vmax	30 V
Ii, Imax	120 mA
Pi	900 mW
Ci	3 nF
Li	1 µH

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 51-54, 52-54					
Uo, Voc	28 V	IIC or A,B	80 nF	4 mH	54 µH/Ω
Io, Isc	93 mA	IIB or C,E,F	640 nF	16 mH	218 µH/Ω
Po	650 mW	IIA or D,G	2.1 µF	32 mH	436 µH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 51-54, 52-54					
Uo, Voc	21.4 V	IIC or A,B	0.16 µF	4 mH	54 µH/Ω
Io, Isc	93 mA	IIB or C,E,F	1.13 µF	16 mH	218 µH/Ω
Po	650 mW	IIA or D,G	4.15 µF	32 mH	436 µH/Ω

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 51-53					
Uo, Voc	28 V	IIC or A,B	80 nF	1000 mH	4 mH/Ω
Io, Isc	1.1 mA	IIB or C,E,F	640 nF	1000 mH	17 mH/Ω
Po	8 mW	IIA or D,G	2.1 µF	1000 mH	35 mH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 51-53					
Uo, Voc	21.4 V	IIC or A,B	0.16 µF	1000 mH	4 mH/Ω
Io, Isc	1.1 mA	IIB or C,E,F	1.13 µF	1000 mH	17 mH/Ω
Po	8 mW	IIA or D,G	4.15 µF	1000 mH	35 mH/Ω

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 51-52					
Uo, Voc	8.3 V	IIC or A,B	7 µF	1000 mH	100 mH/Ω
Io, Isc	0.2 mA	IIB or C,E,F	73 µF	1000 mH	400 mH/Ω
Po	0.4 mW	IIA or D,G	1000 µF	1000 mH	800 mH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 51-52					
Uo, Voc	8.3 V	IIC or A,B	7 µF	1000 mH	100 mH/Ω
Io, Isc	0.2 mA	IIB or C,E,F	73 µF	1000 mH	400 mH/Ω
Po	0.4 mW	IIA or D,G	1000 µF	1000 mH	800 mH/Ω

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 41,42,43,44					
Uo, Voc	8.3 V	IIC or A,B	7 µF	207 mH	1 mH/Ω
Io, Isc	13.1 mA	IIB or C,E,F	73 µF	828 mH	5 mH/Ω
Po	27.3 mW	IIA or D,G	1000 µF	1000 mH	10 mH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 41,42,43,44					
Uo, Voc	8.3 V	IIC or A,B	7 µF	207 mH	1 mH/Ω
Io, Isc	13.1 mA	IIB or C,E,F	73 µF	828 mH	5 mH/Ω
Po	27.3 mW	IIA or D,G	1000 µF	1000 mH	10 mH/Ω

**Installation notes:**

The installation and wiring shall be in accordance with the Canadian Electrical Code for Canada and National Electrical Code NFPA 70, Article 500 or 505 for installation in USA.

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.

Install in pollution degree 2 or better, overvoltage category I or II.

The module must be installed in an enclosure suitable for the environment for which it is used.

In Class I, Division 2 /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, Division 2 wiring methods specified in the National Electrical Code for USA or the Canadian Electrical Code for Canada

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.

**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.

**Warning:** Do not mount or remove modules from the Power Rail when an explosive gas mixture is present.

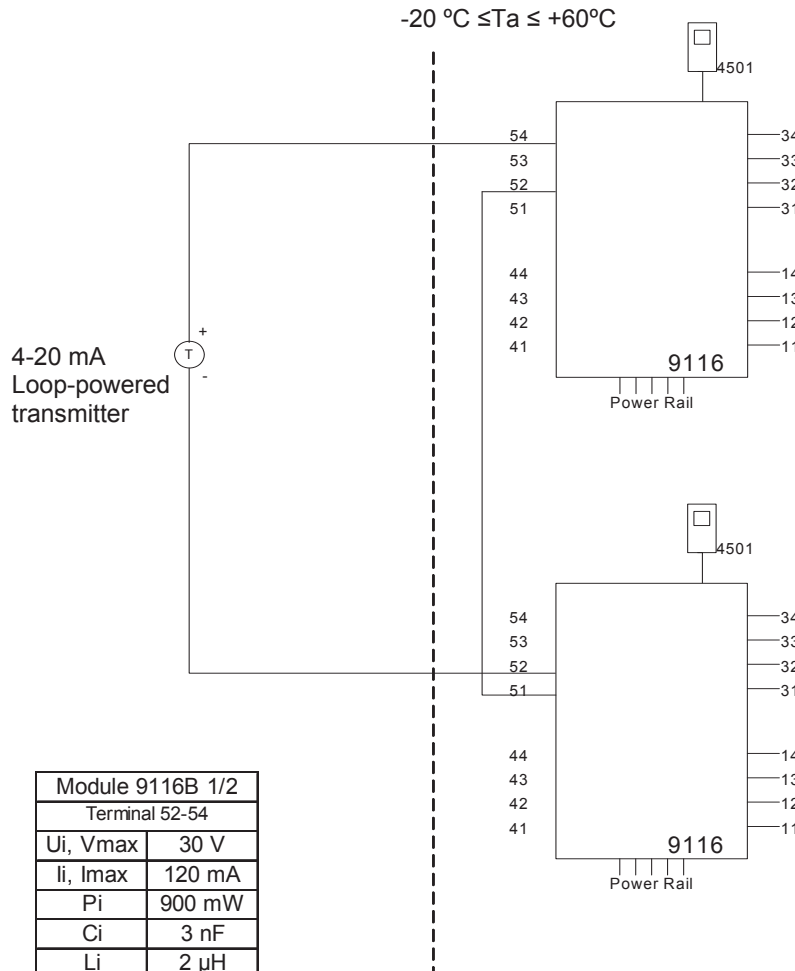
LERBAKKEN 10, 8410 ROENDE DENMARK

**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 Class I, Zone 0/1 Group IIC, [Ex ia] IIC

**Unclassified Location or**

**Hazardous Classified Location**  
Class I, Division 2 Group A,B,C,D T4  
or Class I, Zone 2, Group IIC T4



**Status relay, terminal (33,34)**

**Non hazardous area installation**

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 A DC

**Relay output, terminal (13,14)**

**Non hazardous area installation**

Voltage max: 250 VAC / 30 VDC  
Power max: 500 VA / 60 W  
Current max: 2 A AC / 2 ADC

**Zone 2 installation**

Voltage max: 32 VAC / 30 VDC  
Power max: 64 VA / 60 W  
Current max: 2 A AC / 2 ADC

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminals 52-54					
Uo, Voc	28 V	IIC or A,B	80 nF	4 mH	54 μH/Ω
Io, Isc	93 mA	IIB or C,E,F	640 nF	16 mH	218 μH/Ω
Po	650 mW	IIA or D,G	2.1 μF	32 mH	436 μH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 52-54					
Uo, Voc	21.4 V	IIC or A,B	0.16 μF	4 mH	54 μH/Ω
Io, Isc	93 mA	IIB or C,E,F	1.13 μF	16 mH	218 μH/Ω
Po	650 mW	IIA or D,G	4.15 μF	32 mH	436 μH/Ω

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

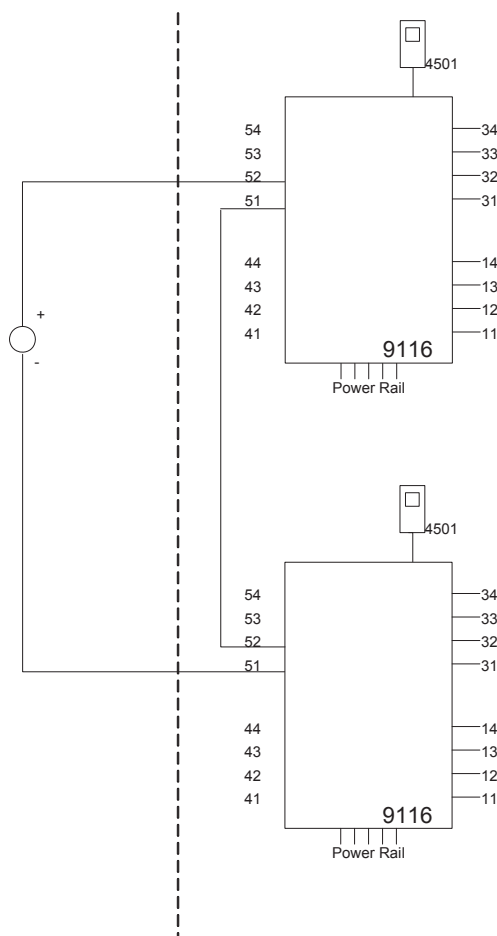
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**Hazardous Classified Location**

 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 Class I, Zone 0/1 Group IIC, [Ex ia] IIC

**Unclassified Location or**
**Hazardous Classified Location**  
 Class I, Division 2 Group A,B,C,D T4  
 or Class I, Zone 2, Group IIC T4

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

 0/4-20 mA  
 Current Source

**Status relay, terminal (33,34)**
**Unclassified location installation:**

 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 A DC

**Relay output, terminal (13,14)**
**Unclassified location installation:**

 Voltage max: 250 VAC / 30 VDC  
 Power max: 500 VA / 60 W  
 Current max: 2 A AC / 2 ADC

**Zone 2 installation**

 Voltage max: 32 VAC / 30 VDC  
 Power max: 64 VA / 60 W  
 Current max: 2 A AC / 2 ADC

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

Module 9116B 1/2	
Terminal 51-52	
$U_i, V_{max}$	30 V
$I_i, I_{max}$	120 mA
$P_i$	900 mW
$C_i$	3 nF
$L_i$	2 $\mu$ H

Module 9116B 1/2		Group	$C_o$	$L_o$	$L_o/R_o$
Terminals 51-52					
$U_o, V_{oc}$	16.6 V	IIC or A,B	0.4 $\mu$ F	100 mH	25mH/ $\Omega$
$I_o, I_{sc}$	0.2 mA	II B or C,E,F	2.3 $\mu$ F	100 mH	100mH/ $\Omega$
$P_o$	0.8 mW	II A or D,G	9.5 $\mu$ F	100 mH	200mH/ $\Omega$

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 2012-06-08

 Version Revision  
 V6 R0

 Prepared by:  
 PB

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LERBAKKEN 10, 8410 RØNDE DENMARK

## INMETRO Desenhos para Instalação



Para instalação segura do 9116B 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



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 16.0004X**

Marcasão:

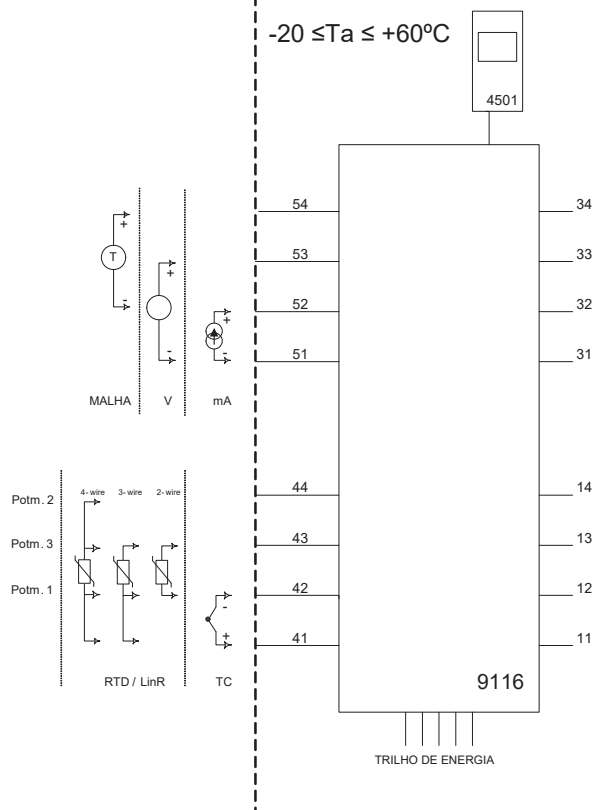
[Ex ia Ga] IIC/IIB/IIA  
Ex nA nC IIC T4 Gc  
[Ex ia Da] IIIC  
[Ex ia Ma] I

**Normas:**

ABNT NBR IEC60079-0:2013, ABNT NBR IEC60079-11:2013,  
ABNT NBR IEC60079-15:2012

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

Área de não classificada  
ou Zona 2



### Relê de estado, terminais (33,34)

#### Instalação em área não classificada:

Voltagem máx.: 125 VAC / 110 VDC  
Power máx.: 62,5 VA / 32 W  
Corrente máx.: 0,5 A AC / 0,3 ADC

#### Instalação em Zona 2:

Voltagem máx.: 32 VAC / 32 VDC  
Potência máx.: 16 VA / 32 W

### Rele de estado, terminais (13,14)

#### Instalação em área não classificada:

Voltagem máx.: 250 VAC / 30 VDC  
Potência máx.: 500 VA / 60 W  
Corrente máx.: 2 A AC / 2 ADC

#### Instalação em Zona 2:

Voltagem máx.: 32 VAC / 30 VDC  
Potência máx.: 64 VA / 60 W  
Corrente máx.: 2 A AC / 2 ADC

**(terminais 11,12,13,14)**  
**(terminais 31,32,33,34)**  
**(terminais 91,92,93,94,95)**  
Um: 253 V; máx. 400 Hz

LERBAKKEN 10, 8410 RØNDE DENMARK

Module 9116B1	
Terminal 51-52, 51-53	
U <sub>i</sub>	30 V
I <sub>i</sub>	120 mA
P <sub>i</sub>	900 mW
C <sub>i</sub>	3 nF
L <sub>i</sub>	1 µH

Module 9116B2	
Terminal 51-52, 51-53	
U <sub>i</sub>	30 V
I <sub>i</sub>	120 mA
P <sub>i</sub>	900 mW
C <sub>i</sub>	3 nF
L <sub>i</sub>	1 µH

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 51-54, 52-54					
U <sub>o</sub>	28 V	IIC	80 nF	4 mH	54 µH/Ω
I <sub>o</sub>	93 mA	IIB	640 nF	16 mH	218 µH/Ω
P <sub>o</sub>	650 mW	IIA	2.1 µF	32 mH	436 µH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 51-54, 52-54					
U <sub>o</sub>	21.4 V	IIC	0.16 µF	4 mH	54 µH/Ω
I <sub>o</sub>	93 mA	IIB	1.13 µF	16 mH	218 µH/Ω
P <sub>o</sub>	650 mW	IIA	4.15 µF	32 mH	436 µH/Ω

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 51-53					
U <sub>o</sub>	28 V	IIC	80 nF	1000 mH	4 mH/Ω
I <sub>o</sub>	1.1 mA	IIB	640 nF	1000 mH	17 mH/Ω
P <sub>o</sub>	8 mW	IIA	2.1 µF	1000 mH	35 mH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 51-53					
U <sub>o</sub>	21.4 V	IIC	0.16 µF	1000 mH	4 mH/Ω
I <sub>o</sub>	1.1 mA	IIB	1.13 µF	1000 mH	17 mH/Ω
P <sub>o</sub>	8 mW	IIA	4.15 µF	1000 mH	35 mH/Ω

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 51-52					
U <sub>o</sub>	8.3 V	IIC	7 µF	1000 mH	100 mH/Ω
I <sub>o</sub>	0.2 mA	IIB	73 µF	1000 mH	400 mH/Ω
P <sub>o</sub>	0.4 mW	IIA	1000 µF	1000 mH	800 mH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 51-52					
U <sub>o</sub>	8.3 V	IIC	7 µF	1000 mH	100 mH/Ω
I <sub>o</sub>	0.2 mA	IIB	73 µF	1000 mH	400 mH/Ω
P <sub>o</sub>	0.4 mW	IIA	1000 µF	1000 mH	800 mH/Ω

Module 9116B1		Group	Co	Lo	Lo/Ro
Terminal 41,42,43,44					
U <sub>o</sub>	8.3 V	IIC	7 µF	207 mH	1 mH/Ω
I <sub>o</sub>	13.1 mA	IIB	73 µF	828 mH	5 mH/Ω
P <sub>o</sub>	27.3 mW	IIA	1000 µF	1000 mH	10 mH/Ω

Module 9116B2		Group	Co	Lo	Lo/Ro
Terminal 41,42,43,44					
U <sub>o</sub>	8.3 V	IIC	7 µF	207 mH	1 mH/Ω
I <sub>o</sub>	13.1 mA	IIB	73 µF	828 mH	5 mH/Ω
P <sub>o</sub>	27.3 mW	IIA	1000 µF	1000 mH	10 mH/Ω

### Notas de instalação:

Para o grupo I (minas), aplicam-se os parâmetros do grupo IIA.

Instalação em grau de poluição 2, categoria de sobretensão II conforme definido no IEC 60664-1. Os circuitos não intrinsecamente seguros só pode ser conectado 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 de gás explosivo estiver presente.

Desligue a alimentação antes da manutenção.

A fiação de terminais sem uso não é permitida.

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.

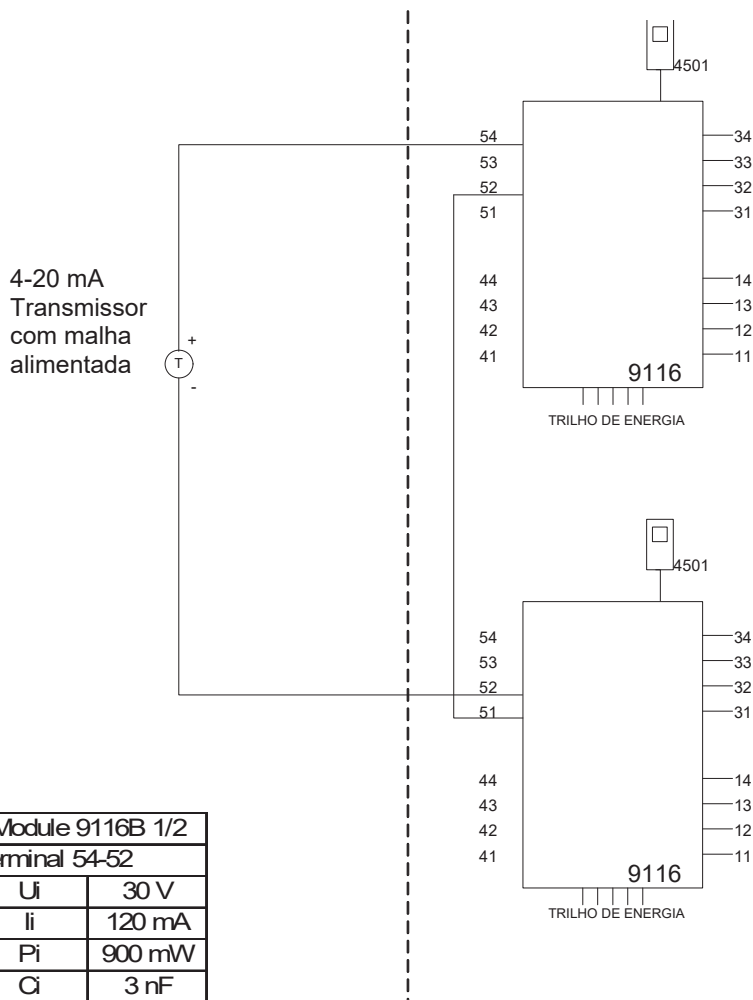
Para a instalação de trilho de energia na Zona 2, apenas o trilho de alimentação Rail 9400 fornecido pela Unidade de Controle de Potência 9410 é permitido.

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

Área de não classificada  
ou Zona 2

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



4-20 mA  
Transmissor  
com malha  
alimentada

**Rele de estado, terminais (33,34)**

**Instalação em área não classificada:**

Voltagem máx.: 125 VAC / 110 VDC  
Potência máx.: 62.5 VA / 32 W  
Corrente máx.: 0,5 A AC / 0,3 ADC

**Instalação em Zona 2:**

Voltagem máx.: 32 VAC / 32 VDC  
Potência máx.: 16 VA / 32 W  
Corrente máx.: 0,5 A AC / 1 A DC

**Rele de estado, terminais (13,14)**

**Instalação em área não classificada:**

Voltagem máx.: 250 VAC / 30 VDC  
Potência máx.: 500 VA / 60 W  
Corrente máx.: 2 A AC / 2 A DC

**Instalação em Zona 2:**

Voltagem máx.: 32 V AC / 30 VDC  
Potência máx.: 64 VA / 60 W  
Corrente máx.: 2 A AC / 2 ADC

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

Module 9116B 1/2	
Terminal 54-52	
$U_i$	30 V
$I_i$	120 mA
$P_i$	900 mW
$C_i$	3 nF
$L_i$	2 $\mu$ H

Module 9116B1					
Term. 54-52; 51-52		Group	$C_o$	$L_o$	$L_o/R_o$
$U_o$	28 V	IIC	80 nF	4 mH	54 $\mu$ H/ $\Omega$
$I_o$	93 mA	IIB	640 nF	16 mH	218 $\mu$ H/ $\Omega$
$P_o$	650 mW	IIA	2.1 $\mu$ F	32 mH	436 $\mu$ H/ $\Omega$

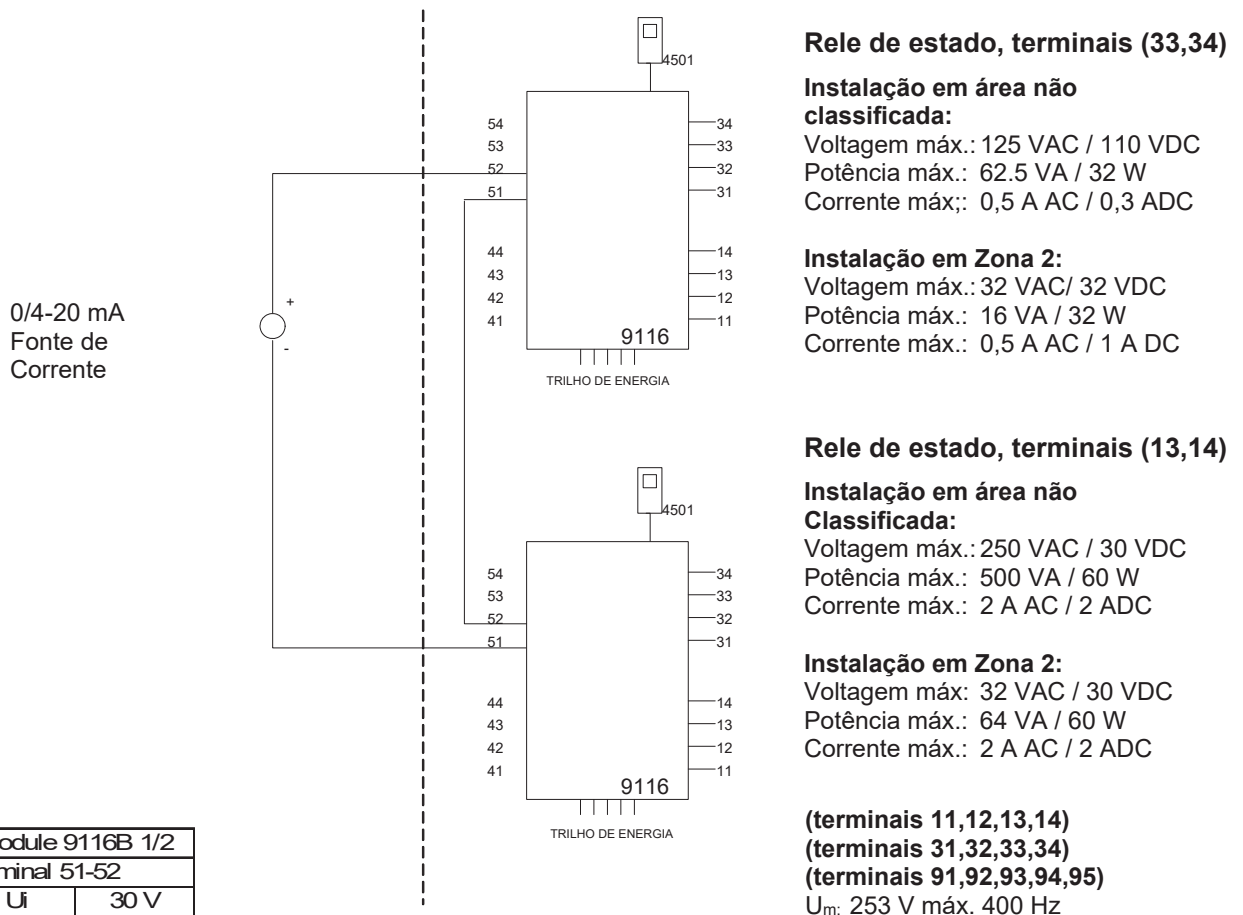
Module 9116B2					
Term. 54-52; 51-52		Group	$C_o$	$L_o$	$L_o/R_o$
$U_o$	21.4 V	IIC	0.16 $\mu$ F	4 mH	54 $\mu$ H/ $\Omega$
$I_o$	93 mA	IIB	1.13 $\mu$ F	16 mH	218 $\mu$ H/ $\Omega$
$P_o$	650 mW	IIA	4.15 $\mu$ F	32 mH	436 $\mu$ H/ $\Omega$

LERBAKKEN 10, 8410 RØNDE DENMARK

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

Área de não classificada  
ou Zona 2

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



Module 9116B 1/2	
Terminal 51-52	
$U_i$	30 V
$I_i$	120 mA
$P_i$	900 mW
$C_i$	3 nF
$L_i$	2 $\mu$ H

Module 9116B 1/2		Group	Co	Lo	Lo/Ro
Term. 52-51, 51-52					
$U_o$	16.6 V	IIC	0.4 $\mu$ F	100 mH	25mH/ $\Omega$
$I_o$	0.2 mA	IIB	2.3 $\mu$ F	100 mH	100mH/ $\Omega$
$P_o$	0.8 mW	IIA	9.5 $\mu$ F	100 mH	200mH/ $\Omega$

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2016-04-07

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V7 R0

Prepared by:  
PB

Page:  
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## Document history

The following list provides notes concerning revisions of this document.

<b>Rev. ID</b>	<b>Date</b>	<b>Notes</b>
107	1848	Release of the 9113xx-EMP version



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