

# SIGNAL CALCULATOR



- Redundancy measurement with 2 input signals
- Signal calculator with the four arithmetical operations
- Duplication of the input signal
- Input for RTD, Ohm, TC, mV, mA, and V
- Universal AC or DC supply



## Application:

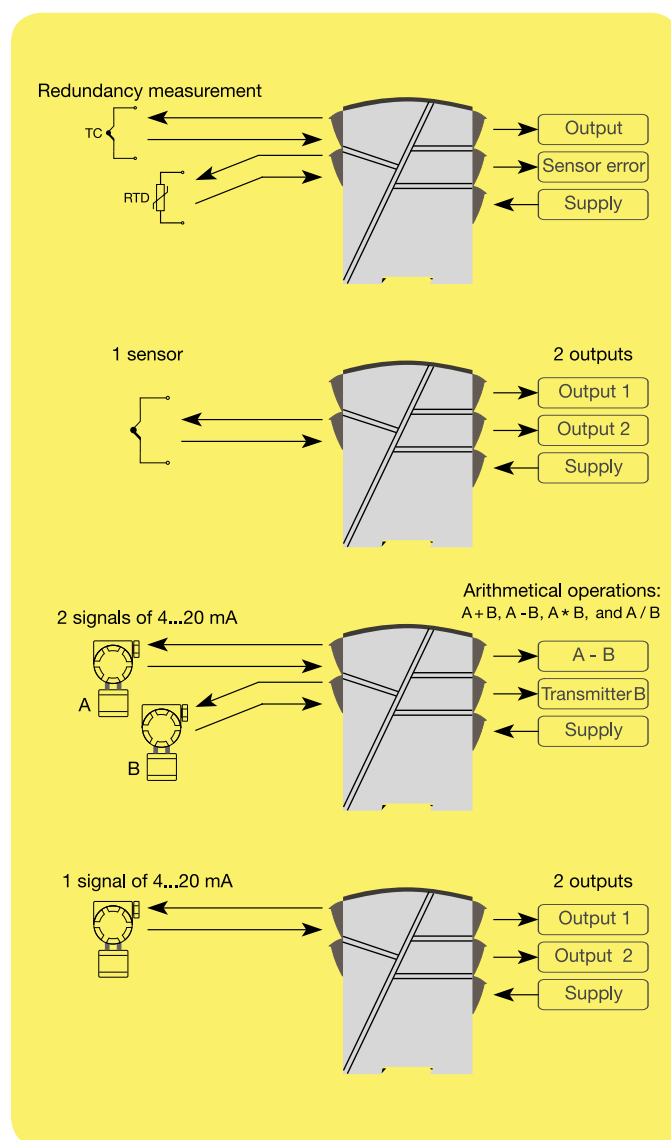
- Redundancy measurement of temperature by means of two sensors, where the secondary sensor takes over the measurement when a sensor error occurs on the primary sensor.
- Duplication of the input signal, e.g. from a temperature sensor or an analogue process signal to two separate analogue outputs.
- Signal calculator with four arithmetical operations: Addition, subtraction, multiplication and division.
- Example: Differential measurement:  
 $(\text{Input 1} \times K1) - (\text{Input 2} \times K2) + K4$
- Example: Average measurement:  
 $(\text{Input 1} \times 0.5) + (\text{Input 2} \times 0.5) + K4$
- Example: Different functions on the outputs:  
 Output 1 = input 1 - input 2, and  
 Output 2 = input 1 + input 2

## Technical characteristics:

- Within a few seconds the user can program PR5115A to a selected application using the configuration program PReset.
- A green front LED that indicates normal operation, sensor error on each sensor, and functional error.
- Continuous check of vital stored data for safety reasons.
- 5-port 3.75 kVAC galvanic isolation.

## Mounting / installation:

- Mounted vertically or horizontally on a DIN rail. As the modules can be mounted without any distance between neighbouring units, up to 42 modules can be mounted per metre.

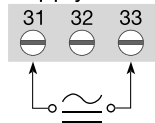


Order: 5115A

## Connections:

All connection options are shown in the user manual.

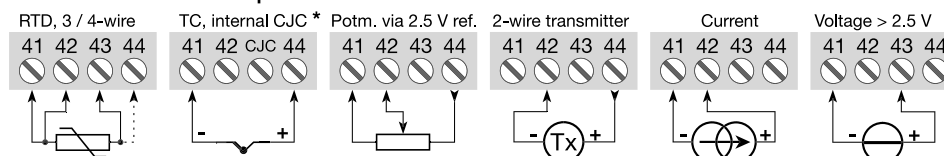
### Supply:



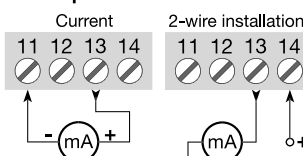
Type	Input
5115A	RTD / TC / mV / R / mA / V : _

**\*NB!** Please remember to order CJC connectors type 5910 (input 1) and 5913 (input 2) for TC inputs with an internal CJC.

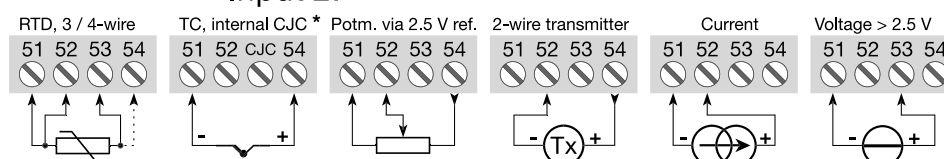
### Input 1:



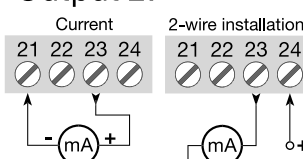
### Output 1:



### Input 2:



### Output 2:



## Electrical specifications:

### Specifications range:

-20 to +60°C

### Common specifications:

Supply voltage, universal .....	24...230 VAC $\pm 10\%$ 50...60 Hz 24...250 VDC $\pm 20\%$
Max. consumption.....	$\leq 3$ W
Fuse.....	400 mA SB / 250 VAC
Isolation voltage, test / operation.....	3.75 kVAC / 250 VAC
Communications interface .....	Loop Link 5905A
Signal / noise ratio.....	Min. 60 dB (0...100 kHz)
Response time (0...90%, 100...10%), programmable:	
Temperature input .....	400 ms...60 s
mA / V / mV input.....	250 ms...60 s
Redundancy switch-over time .....	$\leq 400$ ms
Signal dynamics, input .....	22 bit
Signal dynamics, output.....	16 bit
Calibration temperature.....	20...28°C
Accuracy, the greater of general and basic values:	

General values		
Input type	Absolute accuracy	Temperature coefficient
All	$\leq \pm 0.05\%$ of span	$\leq \pm 0.01\%$ of span / °C

Basic values		
Input type	Basic accuracy	Temperature coefficient
mA	$\leq \pm 4$ $\mu$ A	$\leq \pm 0.4$ $\mu$ A/°C
Volt	$\leq \pm 10$ $\mu$ V	$\leq \pm 1$ $\mu$ V/°C
RTD	$\leq \pm 0.2$ °C	$\leq \pm 0.01$ °C/°C
Lin.R	$\leq \pm 0.1$ $\Omega$	$\leq \pm 10$ m $\Omega$ /°C
TC type:		
E, J, K, L, N, T, U	$\leq \pm 1$ °C	$\leq \pm 0.05$ °C/°C
TC type:		
B, R, S, W3, W5	$\leq \pm 2$ °C	$\leq \pm 0.2$ °C/°C

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

### Auxiliary supplies:

Reference voltage .....	2.5 VDC $\pm 0.5\%$ / 15 mA
2-wire supply.....	28...18 VDC / 0...20 mA
Max. wire size.....	1 x 2.5 mm <sup>2</sup>
Screw terminal torsion.....	0.5 Nm
Relative humidity.....	$< 95\%$ RH (non-cond.)
Dimensions (HxWxD).....	109 x 23.5 x 130 mm
Tightness (enclosure / terminals).....	IP50 / IP20

## Electrical specifications - INPUT:

Max. offset..... 50% of selec. max. value

### TC input:

Sensor error current ..... Nom. 30  $\mu$ A  
Cold junction compensation .....  $< \pm 1$ °C

### mV input:

Measurement range ..... -150...+150 mV  
Min. measurement range..... 5 mV  
Input resistance ..... Nom. 10 M $\Omega$

### RTD and linear resistance input:

Max. cable resistance per wire..... 10  $\Omega$   
Sensor current..... Nom. 0.2 mA  
Effect of sensor cable resistance (3- / 4-wire).....  $< 0.002$   $\Omega$  /  $\Omega$

### Current input:

Measurement range ..... 0...100 mA  
Min. measurement range (span)..... 4 mA  
Input resistance:  
Supplied unit ..... Nom. 10  $\Omega$  + PTC 10  $\Omega$   
Non-supplied unit..... RSHUNT =  $\infty$ , VDROPP < 6 V

### Voltage input:

Measurement range ..... 0...250 VDC  
Input resistance  $\leq 2.5$  VDC ..... Nom. 10 M $\Omega$   
2.5 VDC ..... Nom. 5 M $\Omega$

## Electrical specifications - OUTPUT:

Max. offset..... 50% of selec. max. value

### Current output:

Signal range (span)..... 0...20 mA  
Min. signal range (span) ..... 10 mA  
Max. load..... 20 mA / 600  $\Omega$  / 12 VDC

### Voltage output:

Signal range (span)..... 0...10 VDC  
Min. signal range (span) ..... 500 mV  
Min. load..... 500 k $\Omega$

### 2-wire 4...20 mA output:

Signal range ..... 4...20 mA  
Load stability .....  $\leq 0.01\%$  of span / 100  $\Omega$   
Load resistance .....  $\leq (V_{\text{supply}} - 3.5) / 0.023$  [ $\Omega$ ]  
Max. external 2-wire supply ..... 29 VDC

### Sensor error detection:

Programmable..... 0...23 mA  
NAMUR NE43 Upscale ..... 23 mA  
NAMUR NE43 Downscale..... 3.5 mA

### Observed authority requirements: Standard:

EMC 89/336/EEC, Emission ..... EN 50 081-1, EN 50 081-2  
Immunity ..... EN 50 082-2, EN 50 082-1  
Emission and immunity ..... EN 61 326  
LVD 73/23/EEC..... EN 61 010-1  
PELV/SELV..... IEC 364-4-41 and EN 60 742

Of span = Of the presently selected range