

# 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:**

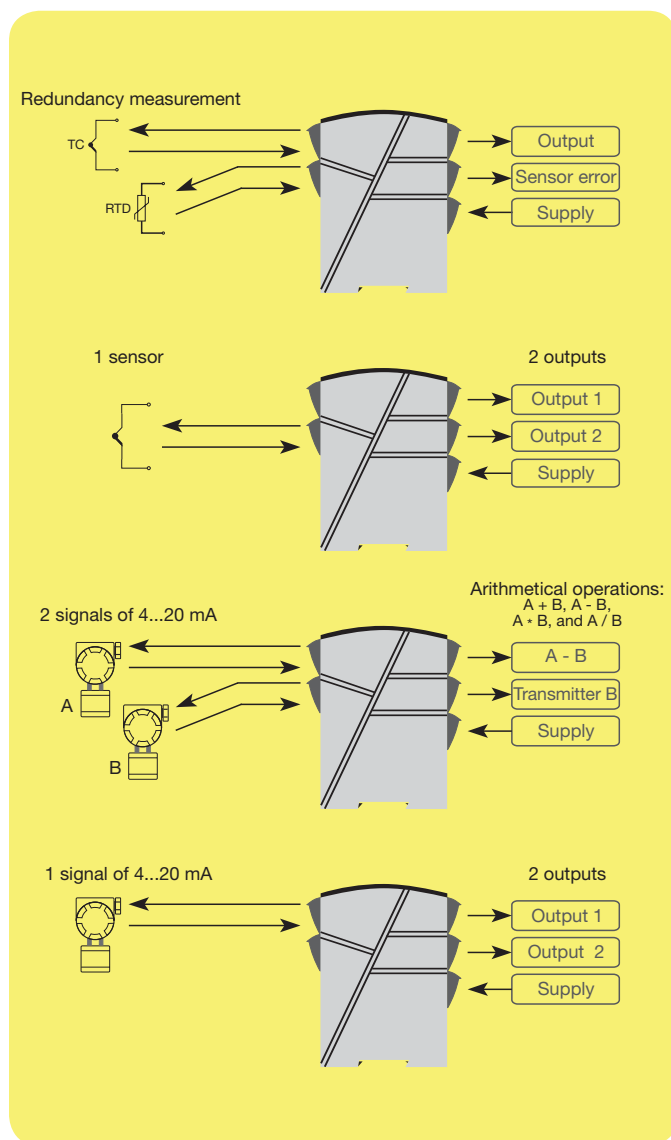
- Redundancy measurement of temperature by means of two sensors, where the secondary sensor takes over the measurement when a sensor error occurs on the primary sensor.
- Duplication of the input signal, e.g. from a temperature sensor or an analogue process signal to two separate analogue outputs.
-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

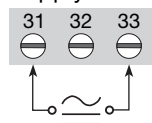
- Mounted vertically or horizontally on a DIN rail. As the modules can be mounted without any distance between neighbouring units, up to 42 modules can be mounted per metre.



**Connections:**

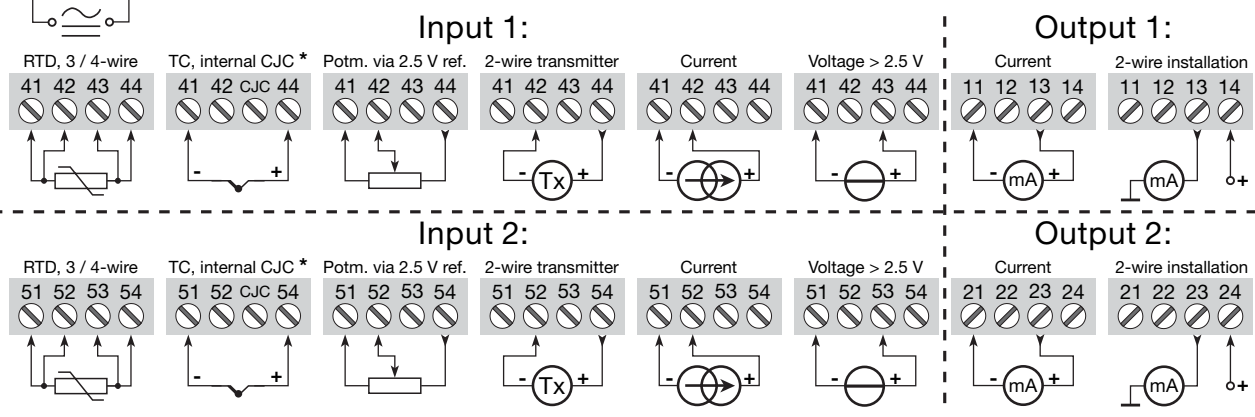
All connection options are shown in the user manual.

**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.



**Electrical specifications:**

**Specifications range:**

-20 to +60°C

**Common specifications:**

- Supply voltage, universal ..... 21.6...253 VAC, 50...60 Hz  
19.2...300 VDC
- Max. consumption..... ≤ 3 W
- Fuse..... 400 mA SB / 250 VAC
- Isolation voltage, test / operation..... 3.75 kVAC / 250 VAC
- Communications interface ..... Loop Link
- 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 ..... ≤ 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	≤ ±0.05% of span	≤ ±0.01% of span / °C

Basic values		
Input type	Basic accuracy	Temperature coefficient
mA	≤ ±4 µA	≤ ±0.4 µA/°C
Volt	≤ ±10 µV	≤ ±1 µV/°C
RTD	≤ ±0.2°C	≤ ±0.01°C/°C
Lin.R	≤ ±0.1 Ω	≤ ±10 mΩ/°C
TC type: E, J, K, L, N, T, U	≤ ±1°C	≤ ±0.05°C/°C
TC type: B, R, S, W3, W5, LR	≤ ±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:
- Reference voltage ..... 2.5 VDC ±0.5% / 15 mA
- 2-wire supply (pin 44...42 and 54...52)..... 28...17.1 VDC/0...20 mA
- Max. wire size..... 1 x 2.5 mm<sup>2</sup> stranded wire
- Screw terminal torsion..... 0.5 Nm
- Relative humidity ..... < 95% RH (non-cond.)
- Dimensions (HxWxD)..... 109 x 23.5 x 130 mm
- Protection degree ..... IP20

**Electrical specifications - INPUT:**

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

**TC input:**

Sensor error current ..... Nom. 30 µA  
 Cold junction compensation ..... < ±1°C

**mV input:**

Measurement range ..... -150...+150 mV  
 Min. measurement range..... 5 mV  
 Input resistance ..... Nom. 10 MΩ

**RTD and linear resistance input:**

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

**Current input:**

Measurement range ..... 0...100 mA  
 Min. measurement range (span)..... 4 mA  
 Input resistance:  
 Supplied unit ..... Nom. 10 Ω + PTC 10 Ω  
 Non-supplied unit..... RSHUNT = ∞, VDROPO < 6 V

**Voltage input:**

Measurement range ..... 0...250 VDC  
 Input resistance ≤ 2.5 VDC ..... Nom. 10 MΩ  
 2.5 VDC ..... Nom. 5 MΩ

**Electrical specifications - OUTPUT:**

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

**Current output:**

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

**Voltage output:**

Signal range ..... 0...10 VDC  
 Min. signal range (span) ..... 500 mV  
 Min. load..... 500 kΩ

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

Signal range ..... 4...20 mA  
 Load stability ..... ≤ 0.01% of span / 100 Ω  
 Load resistance ..... ≤ (Vsupply-3.5) / 0.023 [Ω]  
 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

**Marine approval:**

Det Norske Veritas, Ships & Offshore... Stand. for Certific. No. 2.4

**GOST R approval:**

VNIIM, Cert. No. .... See homepage

**Observed authority requirements: Standard:**

EMC 2004/108/EC ..... EN 61326-1  
 LVD 2006/95/EC ..... EN 61010-1  
 PELV/SELV..... IEC 364-4-41 and EN 60742

**Of span =** Of the presently selected range