

# Ex 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:**

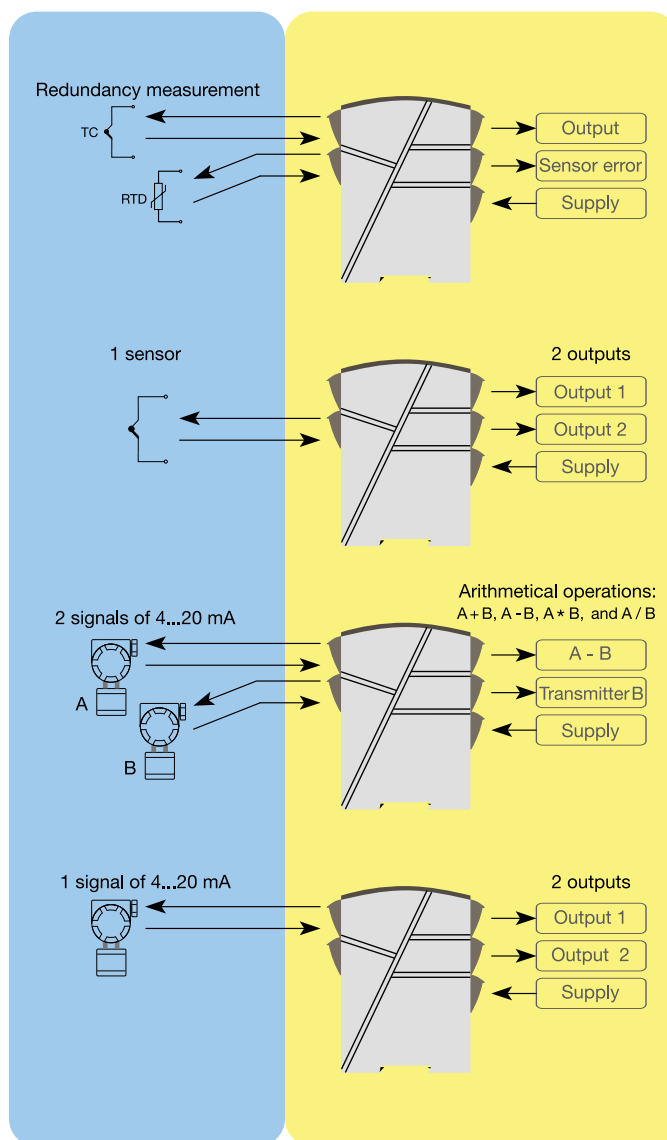
- Redundancy measurement of temperature by means of two sensors, where the secondary sensor takes over the measurement when a sensor error occurs on the primary sensor.
- Duplication of the input signal, e.g. from a temperature sensor or an analogue process signal to two separate analogue outputs.
- 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
- Ex safety barrier and power supply for 2-wire transmitters.

**Technical characteristics:**

- Within a few seconds the user can program PR5115B 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.
- 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.

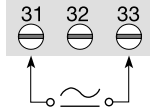


Order: 5115B

**Connexions:**

All connexion options are shown in the user manual.

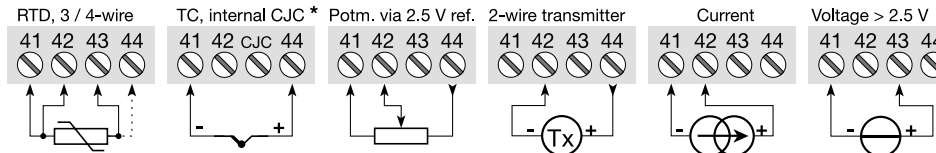
**Supply:**



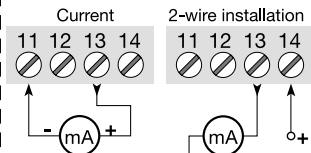
Type	Input
5115B	RTD / TC / mV / R : 1
	mA / V / mV : 2
	Input 1, RTD / TC / mV / R Input 2, mA / V / mV : 3

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

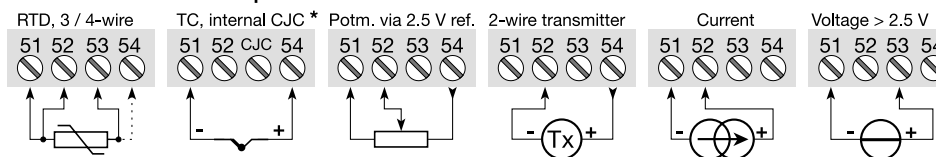
**Input 1:**



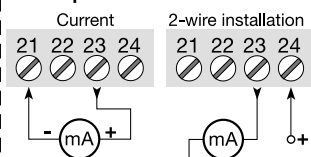
**Output 1:**



**Input 2:**



**Output 2:**



**Electrical specifications:**

**Specifications range:**

-20 to +60°C

**Common specifications:**

Supply voltage universal ..... 24...230 VAC ±10%  
 24...250 VDC ±20%  
 Max. consumption..... ≤ 3 W)  
 Fuse..... 400 mA SB / 250 VAC  
 Isolation voltage, test / operation..... 3.75 kVAC / 250 VAC  
 Communications interface ..... Loop Link 5905  
 Signal / noise ratio..... Min. 60 dB (0...100 kHz)  
 Redundancy switch-over time ..... ≤ 400 ms  
 Signal dynamics, input ..... 22 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	≤ ±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..... 28...18 VDC / 0...20 mA  
 Dimensions (HxWxD)..... 109 x 23.5 x 130 mm

**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/min. measurement range. -150...+150 mV / 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

**Current input:**

Measurement range/min. measurement range. 0...100 mA / 4 mA  
 Input resistance..... Nom. 10 Ω + PTC 10 Ω

**Voltage input:**

Measurement range/min. measurement range. 0...250 VDC / 5 mVDC  
 Input resistance ≤ 2.5 VDC..... Nom. 10 MΩ

**Electrical specifications - OUTPUT:**

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

**Current output:**

Signal range / min. signal range..... 0...20 mA / 10 mA  
 Max. load..... 20 mA / 600 Ω / 12 VDC

**Voltage output:**

Signal range / min. signal range..... 0...10 VDC / 500 mVDC

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

Max. external 2-wire supply ..... 29 VDC

**Sensor error detection:**

Programmable..... 0...23 mA

**Ex data for 5115 B1 (input 1 for 5115 B3) terminal 41, 42, 44 to 43 (51, 52, 54 to 53), and 5115 B2 (input 2 for 5115 B3) terminal 42, 43 to 41 (52, 53 to 51)**

U<sub>m</sub>..... : 250 V  
 U<sub>o</sub>..... : 7.5 VDC  
 I<sub>o</sub>..... : 6.0 mADC  
 P<sub>o</sub>..... : 11.25 mW  
 L<sub>o</sub>..... : 200 mH  
 C<sub>o</sub>..... : 6.0 µF

**Ex data for 5115 B2 (input 2 for 5115 B3):**

Terminal 44 to 41 (54 to 51)  
 U<sub>m</sub>..... : 250 V  
 U<sub>o</sub>..... : 28 VDC  
 I<sub>o</sub>..... : 87 mADC  
 P<sub>o</sub>..... : 0.62 W  
 L<sub>o</sub>..... : 4.2 mH  
 C<sub>o</sub>..... : 0.08 µF

**EEx approval CENELEC:**

DEMKO 00 ..... ATEX 128567  
 ATEX ..... 0539 (Ex) II (1) G

[EEx ia] IIC  
 Zone 0, 1, or 2

**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

ATEX 94/9/EC..... EN 50 014 and EN 50 020

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