PERFORMANCE MADE SMARTER

## 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 4500); 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 PR 4500.
- Reduced Uo Ex data < 8.3 V for active input signals.
- TC inputs with internal CJC or external CJC for higher accuracy.
- Active / passive mA output via the same two terminals.

### Application

- 9116B-EMP 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 9116B-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.

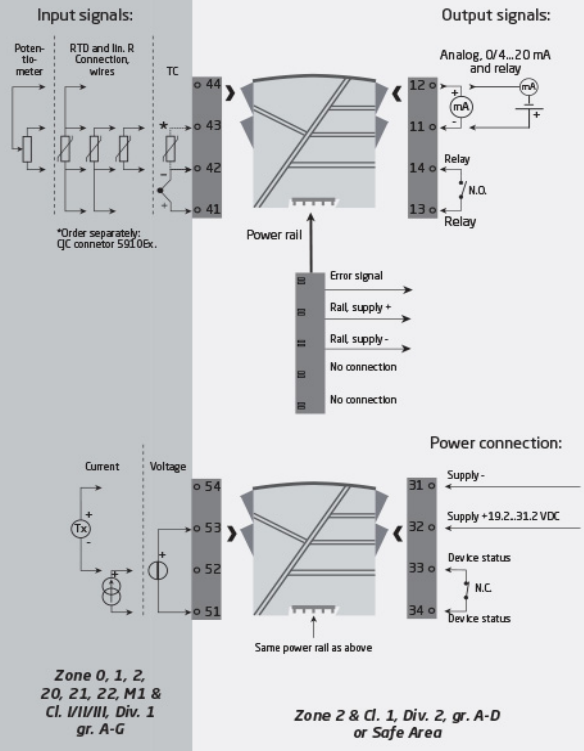
### Technical characteristics

- 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 type 9400.

### Mounting

- The devices can be mounted vertically or horizontally without distance between neighbouring units.

## Applications



## Order

| Type | Max. loop voltage | EMPHASIS-assessed |
|---|---|---|
| 9116B | Uo 28 VDC : 1<br>Uo 21.4 VDC : 2 | -EMP |

Example: 9116B2-EMP

## 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 & meas. / overvoltage cat. II

## Mechanical specifications

Dimensions (HxWxD)..... 109 x 23.5 x 104 mm
Dimensions (HxWxD) w/ 4501/451x..... 109 x 23.5 x 116 / 131 mm
Weight approx..... 185 g
Weight incl. 4501 / 451x (approx.)..... 200 g / 215 g
DIN rail type..... DIN EN 60715/35 mm
Wire size..... 0.13...2.08 $mm^2$ AWG 26...14 stranded wire
Screw terminal torque..... 0.5 Nm
Vibration..... IEC 60068-2-6
2...13.2 Hz..... ±1 mm
13.2...100 Hz..... ±0.7 g

## Common specifications

**Supply**

Supply voltage..... 19.2...31.2 VDC
Fuse..... 1.25 A SB / 250 VAC
Max. required power..... ≤ 2.1 W
Max. power dissipation..... ≤ 1.7 W

**Isolation voltage**

Test /working: Input to any..... 2.6 kVAC / 300 VAC reinforced isolation
Analog output to supply..... 2.6 kVAC / 300 VAC reinforced isolation
Status relay to supply..... 1.5 kVAC / 150 VAC reinforced isolation

**Response time**

Temperature input, programmable (0...90%, 100...10%)..... 1...60 s
mA / V input (programmable)..... 0.4...60 s

**Auxiliary supplies**

9116x1x: 2-w. sup. (term. 54...52)..... 28...16.5 VDC / 0...20 mA
9116x2x: 2-w. sup. (term. 54...52)..... 21.4...16.5 VDC / 0...20 mA

Signal dynamics, input..... 24 bit
Signal dynamics, output..... 16 bit
Signal / noise ratio..... Min. 60 dB (0...100 kHz)
Accuracy..... Better than 0.1% of sel. range

## Input specifications

**RTD input**

RTD type..... Pt10/20/50/100/200/250/300/Pt400/500/1000; Ni50/100/120/1000
Cable resistance per wire..... 50 Ω (max.)
Sensor current..... Nom. 0.2 mA
Effect of sensor cable resistance (3-/4-wire)..... < 0.002 Ω / Ω
Sensor error detection..... Programmable ON / OFF
Short circuit detection..... Yes

**TC input**

Thermocouple type..... B, E, J, K, L, N, R, S, T, U, W3, W5, LR
Cold junction compensation (CJC) via ext. sensor in 5910..... 20...28°C ≤ ±1°C, -20...20°C / 28...70°C ≤ 2°C
CJC via int. mounted sensor..... ±(2.0°C + 0.4°C * Δt)

**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

**Voltage input**

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

## Output specifications

**Current output**

Signal range..... 0...23 mA
Programmable signal ranges..... 0...20/4...20/20...0/20...4 mA
Load (@ current output)..... ≤ 600 Ω
Load stability..... ≤ 0.01% of span / 100 Ω
Sensor error indication..... 0 / 3.5 / 23 mA / none
NAMUR NE43 Upscale/Downscale..... 23 mA / 3.5 mA
Current limit..... ≤ 28 mA

**Passive 2-wire mA output**

Max. external 2-wire supply..... 26 VDC
Effect of external 2-wire supply voltage variation..... < 0.005% of span / V

**Relay output**

Relay functions..... Setpoint, Window, Sensor error, Power and Off
Max. voltage..... 250 VAC / VDC
Max. current..... 2 A
Max. AC power..... 500 VA
Max. DC current, resistive load > 30 VDC..... See manual for details

**Status relay**

Max. voltage..... 125 VAC / 110 VDC
Max. current..... 0.5 AAC / 0.3 ADC
Max. AC power..... 62.5 VA / 32 W

## Observed authority requirements

EMC..... 2014/30/EU
LVD..... 2014/35/EU
ATEX..... 2014/34/EU
RoHS..... 2011/65/EU
EAC..... TR-CU 020/2011
EAC Ex..... TR-CU 012/2011

## Approvals

ATEX..... KEMA 10ATEX0053 X
IECEx..... KEM 10.0022X
c FM us..... FM19US0058X / FM19CA0031X
INMETRO..... DEKRA 16.0004 X
c UL us, UL 61010-1..... E314307
EAC Ex..... RU C-DK.HA65.B.00355/19
DNV Marine..... TAA00000JD
ClassNK..... TA18527M

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|---|---|
| SIL | SIL 2 certified & fully assessed acc. to IEC 61508 |