



## 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.

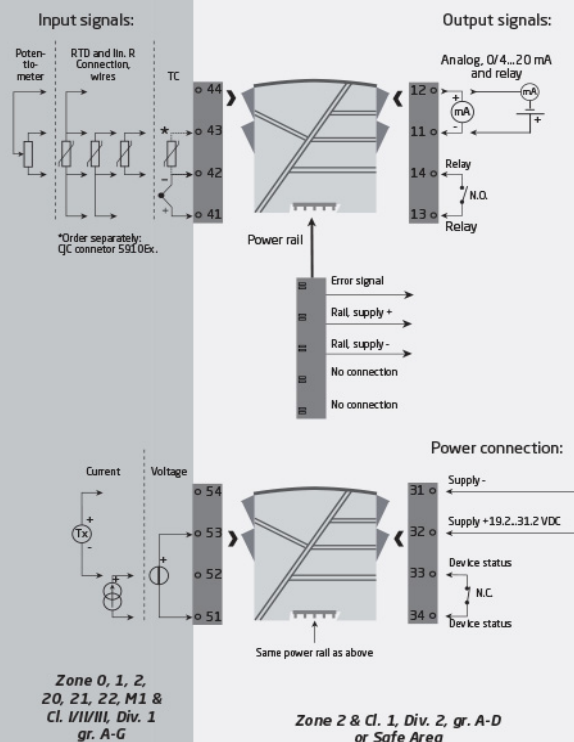
#### Technical characteristics

- 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 | U <sub>o</sub> 28 VDC : 1   | -EMP              |
|       | U <sub>o</sub> 21.4 VDC : 2 |                   |

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/ PR 4500.....      | 109 x 23.5 x 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 <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 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; Pt300/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 |
| EAC LVD..... | TR-CU 004/2011 |

## Approvals

|                          |                                                       |
|--------------------------|-------------------------------------------------------|
| ATEX.....                | KEMA 10ATEX0053 X                                     |
| IECEX.....               | KEM 10.0022X                                          |
| UKEX.....                | DEKRA 21UKEX0177X                                     |
| UKEX.....                | DEKRA 23UKEX0104X                                     |
| c FM us.....             | FM19US0058X /<br>FM19CA0031X                          |
| INMETRO.....             | DEKRA 23.0006X                                        |
| c UL us, UL 61010-1..... | E314307                                               |
| EAC Ex.....              | RU C-DK.HA65.B.00355/19                               |
| DNV Marine.....          | TAA00000JD                                            |
| ClassNK.....             | TA24034M                                              |
| SIL.....                 | SIL 2 certified & fully assessed<br>acc. to IEC 61508 |