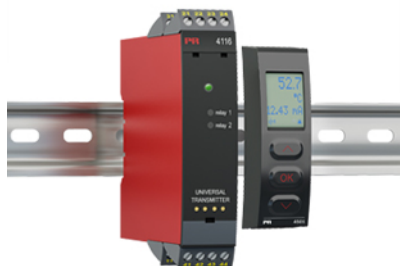


## Universal transmitter



### 4116

- Input for RTD, TC, Ohm, potentiometer, mA and V
- 2-wire supply > 16 V
- FM-approved for installation in Div. 2
- Output for current, voltage and 2 relays
- Universal AC or DC supply



#### Advanced features

- Programmable via detachable display front (4501), process calibration, signal and relay simulation, password protection, error diagnostics and selection of help text in several languages.

#### Application

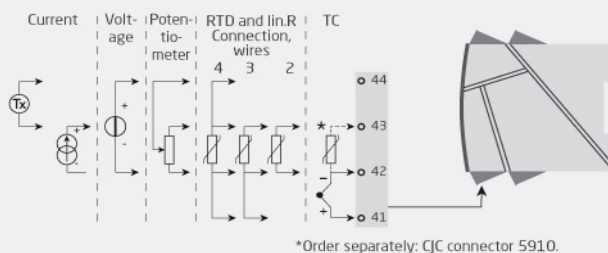
- Linearized, electronic temperature measurement with RTD or TC sensor.
- Conversion of linear resistance variation to a standard analog current / voltage signal, i.e. from solenoids and butterfly valves or linear movements with attached potentiometer.
- Power supply and signal isolator for 2-wire transmitters.
- Process control with 2 pairs of potential-free relay contacts and analog output.
- Galvanic separation of analog signals and measurement of floating signals.
- The 4116 is designed according to strict safety requirements and is therefore suitable for application in SIL 2 installations.

#### Technical characteristics

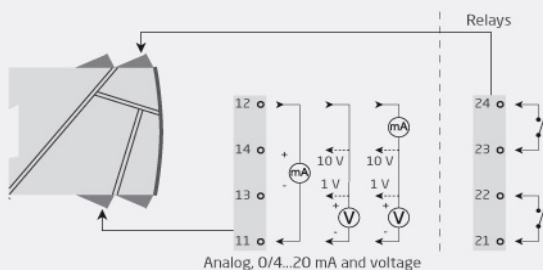
- When 4116 is used in combination with the 4501 display / programming front, all operational parameters can be modified to suit any application. As the 4116 is designed with electronic hardware switches, it is not necessary to open the device for setting of DIP-switches.
- A green / red front LED indicates normal operation and malfunction. A yellow LED is ON for each active output relay.
- Continuous check of vital stored data for safety reasons.
- 4-port 2.3 kVAC galvanic isolation.

#### Applications

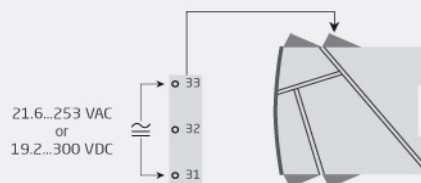
##### Input signals:



##### Output signals:



##### Supply:



Order:

| Type |
|------|
| 4116 |

## 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                 |

## Mechanical specifications

|                                         |                                       |
|-----------------------------------------|---------------------------------------|
| Dimensions (HxWxD).....                 | 109 x 23.5 x 104 mm                   |
| Dimensions (HxWxD) w/ 4501/4511.....    | 109 x 23.5 x 116 / 131 mm             |
| Weight approx.....                      | 170 g                                 |
| Weight incl. 4501 / 4511 (approx.)..... | 185 g / 270 g                         |
| Wire size.....                          | 1 x 2.5 mm <sup>2</sup> 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

|                                |                                                 |
|--------------------------------|-------------------------------------------------|
| <b>Supply</b>                  |                                                 |
| Supply voltage, universal..... | 21.6...253 VAC, 50...60 Hz or<br>19.2...300 VDC |
| Fuse.....                      | 400 mA SB / 250 VAC                             |
| Max. required power.....       | ≤ 2.5 W                                         |

### Isolation voltage

|                                           |                    |
|-------------------------------------------|--------------------|
| Isolation voltage, test /<br>working..... | 2.3 kVAC / 250 VAC |
|-------------------------------------------|--------------------|

### Response time

|                                                |          |
|------------------------------------------------|----------|
| Temperature input (0...90%,<br>100...10%)..... | ≤ 1 s    |
| mA / V input (0...90%, 100...10%).....         | ≤ 400 ms |

### Auxiliary supplies

|                                                               |                                                        |
|---------------------------------------------------------------|--------------------------------------------------------|
| 2-w. supply (term. 44...43).....                              | 25...16 VDC / 0...20 mA                                |
| Programming.....                                              | Communication enabler 4511<br>/ Programming front 4501 |
| Signal / noise ratio.....                                     | Min. 60 dB (0...100 kHz)                               |
| Accuracy.....                                                 | Better than 0.1% of sel. range                         |
| EMC immunity influence.....                                   | < ±0.5% of span                                        |
| Extended EMC immunity: NAMUR<br>NE21, A criterion, burst..... | < ±1% of span                                          |

## Input specifications

### RTD input

|                                                       |                                                                                        |
|-------------------------------------------------------|----------------------------------------------------------------------------------------|
| RTD type.....                                         | Pt10/20/50/100/200/250;<br>Pt300/400/500/1000;<br>Ni50/100/120/1000;<br>Cu10/20/50/100 |
| Cable resistance per wire.....                        | 50 Ω (max.)                                                                            |
| Sensor current.....                                   | Nom. 0.2 mA                                                                            |
| Effect of sensor cable resistance<br>(3-/4-wire)..... | < 0.002 Ω / Ω                                                                          |
| Sensor error detection.....                           | Yes                                                                                    |
| Short circuit detection.....                          | < 15 Ω                                                                                 |

### Linear resistance input

|                                   |               |
|-----------------------------------|---------------|
| Linear resistance min....max..... | 0 Ω...10000 Ω |
|-----------------------------------|---------------|

### Potentiometer input

|                               |               |
|-------------------------------|---------------|
| Potentiometer min....max..... | 10 Ω...100 kΩ |
|-------------------------------|---------------|

### TC input

|                        |                                             |
|------------------------|---------------------------------------------|
| Thermocouple type..... | B, E, J, K, L, N, R, S, T, U,<br>W3, W5, LR |
|------------------------|---------------------------------------------|

Cold junction compensation  
(CJC) via ext. sensor in

|           |                                                   |
|-----------|---------------------------------------------------|
| 5910..... | 20...28°C ≤ ±1°C, -20...20°C /<br>28...70°C ≤ 2°C |
|-----------|---------------------------------------------------|

CJC via int. mounted sensor..... ±(2.0°C + 0.4°C \* Δt)

Δt = ..... Internal temp.-ambient temp.

Sensor error detection..... Yes

Sensor error current: When  
detecting / else..... Nom. 2 μA / 0 μA

### Current input

|                                                      |                      |
|------------------------------------------------------|----------------------|
| Measurement range.....                               | 0...20 mA            |
| Programmable measurement ranges.....                 | 0...20 and 4...20 mA |
| Input resistance.....                                | Nom. 20 Ω + PTC 50 Ω |
| Sensor error detection: Loop<br>break 4...20 mA..... | Yes                  |

### 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...20 mA                      |
| Programmable signal ranges.....                            | 0...20/4...20/20...0/20...4 mA |
| Load (@ current output).....                               | ≤ 800 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                 |
| Output limitation, on 4...20<br>and 20...4 mA signals..... | 3.8...20.5 mA                  |
| Output limitation, on 0...20<br>and 20...0 mA signals..... | 0...20.5 mA                    |
| Current limit.....                                         | ≤ 28 mA                        |

### Voltage output

|                                 |                                                                 |
|---------------------------------|-----------------------------------------------------------------|
| Signal range.....               | 0...10 VDC                                                      |
| Programmable signal ranges..... | 0/0.2...1; 0/1...5; 0/2...10;<br>1...0.2/0; 5...1/0; 10...2/0 V |
| Load (@ voltage output).....    | ≥ 500 kΩ                                                        |

### Relay output

|                      |                                                         |
|----------------------|---------------------------------------------------------|
| Relay functions..... | Setpoint, Window, Sensor<br>error, Latch, Power and Off |
| Max. voltage.....    | 250 VRMS                                                |
| Max. current.....    | 2 AAC or 1 ADC                                          |
| Max. AC power.....   | 500 VA                                                  |

## Observed authority requirements

|          |                |
|----------|----------------|
| EMC..... | 2014/30/EU     |
| LVD..... | 2014/35/EU     |
| EAC..... | TR-CU 020/2011 |

## Approvals

|                                                |                                                  |
|------------------------------------------------|--------------------------------------------------|
| FM.....                                        | 3025177                                          |
| UL.....                                        | UL 508 / C22.2 no. 14                            |
| DNV-GL Marine.....                             | Stand. f. Certific. No. 2.4                      |
| EU RO Mutual Recognition Type<br>Approval..... | MRA000000Z                                       |
| SIL.....                                       | Hardware assessed for use in<br>SIL applications |