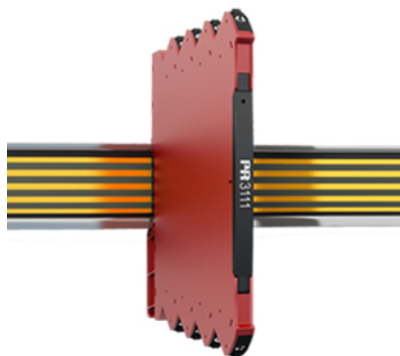




## TC converter - isolated

### 3111

- Excellent accuracy, better than 0.05% of span
- Slimline housing of 6.1 mm
- Excellent EMC performance and 50/60 Hz noise suppression
- Selectable < 30 ms / 300 ms response time
- Pre-calibrated temperature ranges are selectable via DIP-switches



#### Application

- The 3111 temperature converter measures standard TC J and K temperature sensors, and provides an isolated analog voltage or current output.
- High 3 port isolation provides surge suppression and protects the control system from transients and noise.
- The 3111 can be mounted in the safe area or in Zone 2 / Division 2 areas.
- Approved for marine applications.

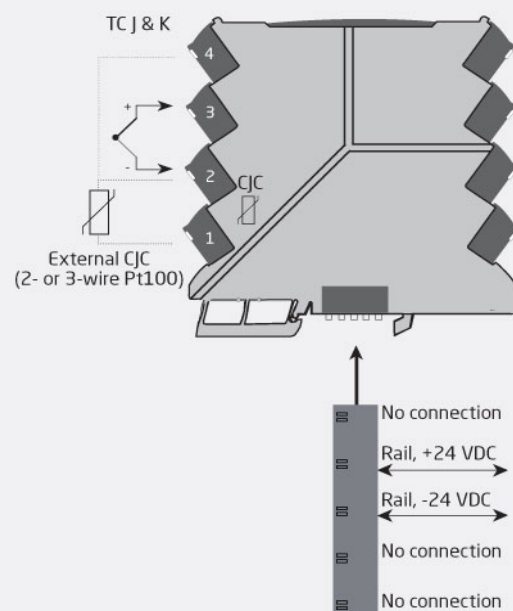
#### Technical characteristics

- Flexibly powered by 24 VDC ( $\pm 30\%$ ) via power rail or connectors.
- < 30 ms fast response time with simultaneous sensor error detection when selected.
- Selectable 300 ms response time when signal dampening is needed.
- Selectable internal/external CJC.
- Excellent conversion accuracy in all available ranges, better than 0.05% of span.
- Meeting the NAMUR NE21 recommendations, the 3111 provides top measurement performance in harsh EMC environments.
- The device meets the NAMUR NE43 standard defining out of range and sensor error output values.
- A visible green LED indicates operational status of the unit and the input sensor.
- All terminals are protected against overvoltage and polarity error.
- High galvanic isolation of 2.5 kVAC.
- Excellent signal/noise ratio of > 60 dB.

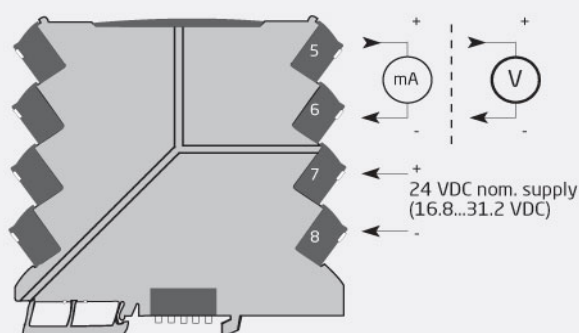
#### Mounting / installation / programming

- Selectable DIP-settings for easy configuration of more than 1000 factory calibrated measurement ranges.
- The narrow 6.1 mm housing allows up to 163 units to be mounted per meter of DIN rail, without any air gap between units.
- Wide ambient temperature range of  $-25...+70^{\circ}\text{C}$ .

#### Applications



#### Safe Area or Zone 2 & Cl. 1, Div. 2, gr. A-D



## Order

| Type | Version                                                                  |
|------|--------------------------------------------------------------------------|
| 3111 | With power rail connector / terminals : -<br>Supplied via terminals : -N |

Example: 3111-N

## Environmental Conditions

|                              |                                                     |
|------------------------------|-----------------------------------------------------|
| Operating temperature.....   | -25°C to +70°C                                      |
| Storage temperature.....     | -40°C to +85°C                                      |
| Calibration temperature..... | 20...28°C                                           |
| Relative humidity.....       | < 95% RH (non-cond.)                                |
| Protection degree.....       | IP20                                                |
| Installation in.....         | Pollution degree 2 & meas. /<br>overvoltage cat. II |

## Mechanical specifications

|                            |                                                           |
|----------------------------|-----------------------------------------------------------|
| Dimensions (HxWxD).....    | 113 x 6.1 x 115 mm                                        |
| Weight approx.....         | 70 g                                                      |
| DIN rail type.....         | DIN EN 60715/35 mm                                        |
| Wire size.....             | 0.13...2.5 mm <sup>2</sup> / AWG 26...12<br>stranded wire |
| Screw terminal torque..... | 0.5 Nm                                                    |
| Vibration.....             | IEC 60068-2-6                                             |
| 2...25 Hz.....             | ±1.6 mm                                                   |
| 25...100 Hz.....           | ±4 g                                                      |

## Common specifications

### Supply

|                             |                 |
|-----------------------------|-----------------|
| Supply voltage.....         | 16.8...31.2 VDC |
| Max. required power.....    | 0.70 W          |
| Max. power dissipation..... | 0.70 W          |

### Isolation voltage

|                                           |                                    |
|-------------------------------------------|------------------------------------|
| Isolation voltage, test /<br>working..... | 2.5 kVAC / 300 VAC<br>(reinforced) |
| Zone 2 / Div. 2.....                      | 250 VAC                            |

### Response time

|                                                               |                                        |
|---------------------------------------------------------------|----------------------------------------|
| Response time (0...90%, 100...10%).....                       | < 30 ms / 300 ms (selectable)          |
| Signal / noise ratio.....                                     | Min. 60 dB                             |
| Programming.....                                              | DIP-switches                           |
| Signal dynamics, input.....                                   | 23 bit                                 |
| Signal dynamics, output.....                                  | 18 bit                                 |
| Accuracy.....                                                 | Better than 0.05% of selected<br>range |
| EMC immunity influence.....                                   | < ±0.5% of span                        |
| Extended EMC immunity: NAMUR<br>NE21, A criterion, burst..... | < ±1% of span                          |
| Incorrect DIP-switch setting<br>identification.....           | 0 V / 0 mA output; LED 0.5 s / 1<br>Hz |

## Input specifications

### TC input

|                                                                              |                                       |
|------------------------------------------------------------------------------|---------------------------------------|
| Temperature range, TC J.....                                                 | -100...+1200°C                        |
| Temperature range, TC K.....                                                 | -180...+1372°C                        |
| Min. measurement range (span)<br>- TC J & K.....                             | 50°C                                  |
| Accuracy: the greater of.....                                                | Better than 0.05% of span or<br>0.5°C |
| Temperature coefficient: the<br>greater of.....                              | 0.1°C/°C or ≤ ±0.01%/°C               |
| Sensor cable resistance.....                                                 | < 5 kΩ per wire                       |
| Cold junction compensation<br>(CJC): Accuracy @ external<br>Pt100 input..... | Better than ±0.15°C                   |
| Cold junction compensation<br>(CJC): Accuracy @ internal<br>CJC.....         | Better than ±2.5°C                    |
| Internal CJC error detection.....                                            | Yes                                   |
| External CJC error detection.....                                            | Yes - selectable via DIP-switch       |
| Open Thermocouple detection.....                                             | Yes - selectable via DIP-switch       |

## Output specifications

### Common output specifications

|                    |       |
|--------------------|-------|
| Updating time..... | 10 ms |
|--------------------|-------|

### Current output

|                                              |                                                |
|----------------------------------------------|------------------------------------------------|
| Signal range.....                            | 0...23 mA                                      |
| Programmable signal ranges.....              | 0 / 4...20 mA                                  |
| Sensor error indication (0...20<br>mA).....  | 0 mA or 23 mA / OFF                            |
| Sensor error indication (4...20<br>mA).....  | 3.5 mA or 23 mA / acc. to<br>NAMUR NE43 or OFF |
| Load (@ current output).....                 | ≤ 600 Ω                                        |
| Load stability.....                          | ≤ 0.01% of span / 100 Ω                        |
| Current limitation @ low output<br>load..... | < 60 mA peak / < 4 mA average                  |

### Voltage output

|                                 |                                    |
|---------------------------------|------------------------------------|
| Programmable signal ranges..... | 0/1...5 and 0/2...10 V             |
| Sensor error indication.....    | 0 V / 10% above the max. /<br>none |
| Open output.....                | < 18 V                             |

## I.S. / Ex marking

|             |                                                                     |
|-------------|---------------------------------------------------------------------|
| ATEX.....   | II 3 G Ex ec IIC T4 Gc                                              |
| IECEx.....  | Ex ec IIC T4 Gc                                                     |
| FM, US..... | Cl. I, Div. 2, Gp. A, B, C, D T4<br>or Cl. I, Zone 2, AEx nA IIC T4 |
| FM, CA..... | Cl. I, Div. 2, Gp. A, B, C, D T4<br>or Cl. I, Zone 2, Ex nA IIC T4  |
| EAC Ex..... | 2Ex nA IIC T4 Gc X                                                  |

## Observed authority requirements

|             |                              |
|-------------|------------------------------|
| EMC.....    | 2014/30/EU & UK SI 2016/1091 |
| LVD.....    | 2014/35/EU & UK SI 2016/1101 |
| ATEX.....   | 2014/34/EU & UK SI 2016/1107 |
| RoHS.....   | 2011/65/EU & UK SI 2012/3032 |
| ATEX.....   | 2014/34/EU                   |
| EAC.....    | TR-CU 020/2011               |
| EAC Ex..... | TR-CU 012/2011               |

## Approvals

|                          |                              |
|--------------------------|------------------------------|
| ATEX.....                | KEMA 10ATEX0147 X            |
| IECEX.....               | KEM 10.0068X                 |
| UKEX.....                | DEKRA 21UKEX0055X            |
| c FM us.....             | FM17US0004X /<br>FM17CA0003X |
| c UL us, UL 61010-1..... | E314307                      |
| DNV Marine.....          | TAA00001RW                   |
| EAC Ex.....              | EAEU KZ 7500361.01.01.08756  |