

TC converter - isolated

3111

- Excellent accuracy, better than 0.05% of span
- Slimline housing of 6 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.

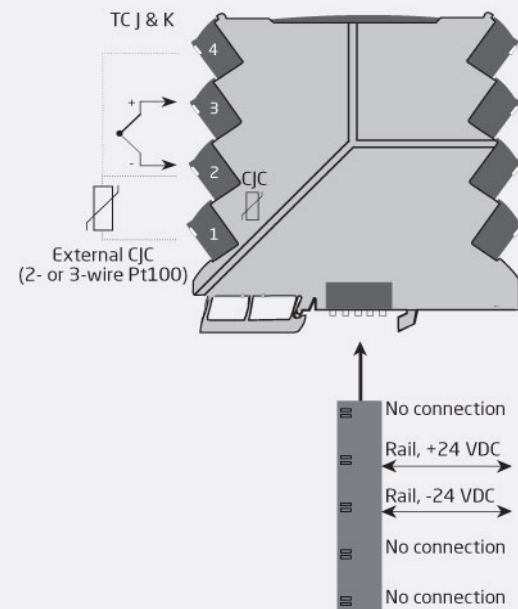
Technical characteristics

- 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.

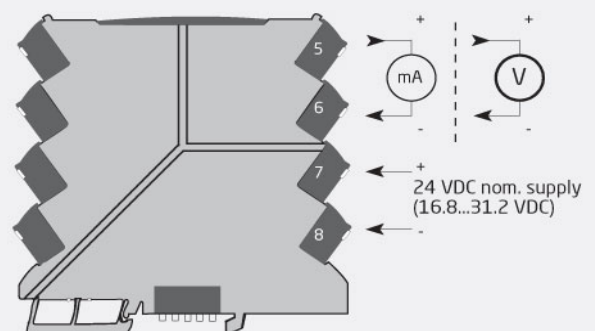
Mounting / installation / programming

- Selectable DIP-settings for easy configuration of more than 1000 factory calibrated measurement ranges.
- The narrow 6 mm housing allows up to 165 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 :- |
| | 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. / 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 x 2.5 mm ² / AWG 26...12 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 / working..... | 2.5 kVAC / 300 VAC (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 range |

| | |
|--|-------------------------------------|
| EMC immunity influence..... | < ±0.5% of span |
| Extended EMC immunity: NAMUR NE21, A criterion, burst..... | < ±1% of span |
| Incorrect DIP-switch setting identification..... | 0 V / 0 mA output; LED 0.5 s / 1 Hz |

Input specifications

TC input

| | |
|---|------------------------------------|
| Temperature range, TC J..... | -100...+1200°C |
| Temperature range, TC K..... | -180...+1372°C |
| Min. measurement range (span) - TC J & K..... | 50°C |
| Accuracy: the greater of..... | Better than 0.05% of span or 0.5°C |

| | |
|--|-------------------------|
| Temperature coefficient: the greater of..... | 0.1°C/°C or ≤ ±0.01%/°C |
| Sensor cable resistance..... | < 5 kΩ per wire |
| Cold junction compensation (CJC): Accuracy @ external Pt100 input..... | Better than ±0.15°C |
| Cold junction compensation (CJC): Accuracy @ internal 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 mA)..... | 0 mA or 23 mA / OFF |
| Sensor error indication (4...20 mA)..... | 3.5 mA or 23 mA / acc. to NAMUR NE43 or OFF |
| Load (@ current output)..... | ≤ 600 Ω |
| Load stability..... | ≤ 0.01% of span / 100 Ω |
| Current limitation @ low output 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. / none |
| Open output..... | < 18 V |

I.S. / Ex marking

| | |
|-------------|--|
| ATEX..... | II 3 G Ex nA IIC T4 Gc |
| IECEX..... | Ex nA IIC T4 Gc |
| FM, US..... | Cl. I, Div. 2, Gp. A, B, C, D T4 or Cl. I, Zone 2, AEx nA IIC T4 |
| FM, CA..... | Cl. I, Div. 2, Gp. A, B, C, D T4 or Cl. I, Zone 2, Ex nA IIC T4 |

Observed authority requirements

| | |
|-----------|----------------|
| EMC..... | 2014/30/EU |
| LVD..... | 2014/35/EU |
| RoHS..... | 2011/65/EU |
| EAC..... | TR-CU 020/2011 |

Approvals

| | |
|----------------------|-----------------------------|
| ATEX 2014/34/EU..... | KEMA 10ATEX0147 X |
| IECEX..... | KEM 10.0068X |
| FM..... | FM17US0004X / FM17CA0003X |
| DNV-GL Marine..... | Stand. f. Certific. No. 2.4 |
| UL..... | UL 61010-1 |