

## TC converter

### 3101

- High accuracy, better than 0.1% 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 selectable via DIP-switches



#### Application

- The 3101 temperature converter measures standard TC J and K temperature sensors, and provides an analog voltage or current output.
- The 3101 can be mounted in the safe area or in Zone 2 / Division 2 areas.
- Approved for marine applications.

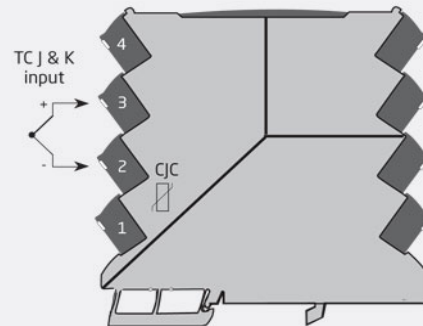
#### Technical characteristics

- Flexibly powered by 24 VDC ( $\pm 30\%$ ) via connectors.
- < 30 ms fast response time with simultaneous sensor error detection when selected.
- Selectable 300 ms response time when signal dampening is needed.
- High conversion accuracy in all available ranges, better than 0.1% of span.
- Meeting the NAMUR NE21 recommendations, the 3101 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.
- Excellent signal/noise ratio of > 60 dB.

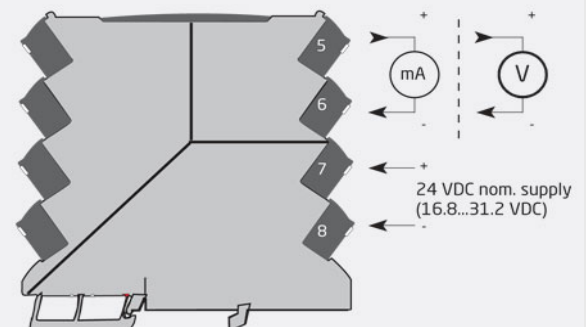
#### Mounting / installation / programming

- 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 |
|------|
| 3101 |

## 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 x 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.....    | 0.52 W          |
| Max. power dissipation..... | 0.52 W          |

### 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 0.1% of sel. 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 /<br>1 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 0.1% of span or<br>1°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 @ internal<br>CJC..... | Better than ±2.5°C                  |
| Internal CJC error detection.....                                    | Yes                                 |
| Open Thermocouple detection.....                                     | Yes - selectable via DIP-<br>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<br>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 |
| Load (@ voltage output).....    | ≥ 10 kΩ                            |
| 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<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  |

## 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 /<br>FM17CA0003X |
| DNV-GL Marine.....   | Stand. f. Certific. No. 2.4  |
| UL.....              | UL 61010-1                   |