

Temperature converter, loop-powered - isolated

3331

- 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 selectable via DIP-switches



Application

- The 3331 temperature converter measures a standard Pt100, TC J and K temperature sensor, and provides an isolated passive analog current output signal.
- High 2 port isolation provides surge suppression and protects the control system from transients and noise.
- The 3331 can be mounted in the safe area or in Zone 2 / Division 2 areas.
- Approved for marine applications.

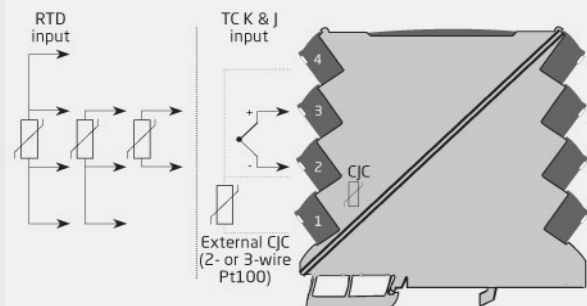
Technical characteristics

- Flexibly loop powered by 5.5...35 VDC via 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 C.J.C.
- Excellent conversion accuracy in all available ranges, better than 0.05% of span.
- Meeting the NAMUR NE21 recommendations, the 3331 provides top measurement performance in harsh EMC environments.
- The device meets the NAMUR NE43 standard defining out of range and sensor error output values.
- All terminals are protected against overvoltage and polarity error.
- High galvanic isolation of 2.5 kVAC.
- Excellent signal/noise ratio of > 60 dB.

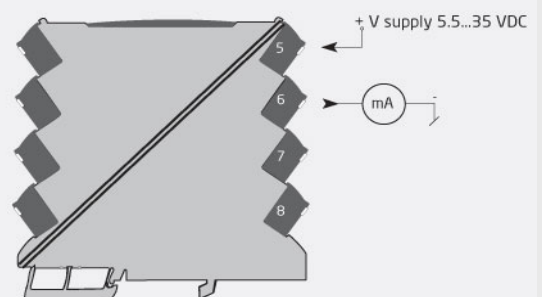
Mounting / installation / programming

- 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°C.

Applications



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



Order:

| |
|------|
| Type |
| 3331 |

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...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..... | 5.5...35 VDC |
| Max. required power..... | 0.80 W |
| Internal power dissipation..... | 19 mW...0.8 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) |
|-----------------------------------------|-------------------------------|

| | |
|------------------------------------------------------------|-----------------|
| Voltage drop..... | 5.5 VDC |
| Signal / noise ratio..... | Min. 60 dB |
| Programming..... | DIP-switches |
| Signal dynamics, input..... | 23 bit |
| Signal dynamics, output..... | 18 bit |
| EMC immunity influence..... | < ±0.5% of span |
| Extended EMC immunity: NAMUR NE21, A criterion, burst..... | < ±1% of span |
| Incorrect DIP-switch setting identification..... | 3.5 mA |

Input specifications

RTD input

| | |
|------------------------------------|------------------------------------|
| Temperature range, Pt100..... | -200...+850°C |
| Min. measurement range (span)..... | 10°C |
| Accuracy: the greater of..... | Better than 0.05% of span or 0.1°C |

| | |
|----------------------------------------------------|---------------------------------|
| Temperature coefficient: the greater of..... | 0.02°C/°C or ≤ ±0.01%/°C |
| Sensor current..... | < 150 µA |
| Sensor cable resistance..... | < 50 Ω per wire |
| Effect of sensor cable resistance (3-/4-wire)..... | < 0.002 Ω / Ω |
| Sensor error detection..... | Yes - selectable via DIP-switch |
| Broken sensor detection..... | > 800 Ω |
| Shorted sensor detection..... | < 18 Ω |

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

| | |
|---------------------------------|---------------------------------------------|
| Programmable signal ranges..... | 4...20 and 20...4 mA |
| Load (@ current output)..... | ≤ (Vsupply - 5.5) / 0.023 [Ω] |
| Load stability..... | ≤ 0.01% of span / 100 Ω |
| Sensor error indication..... | 3.5 mA or 23 mA / acc. to NAMUR NE43 or OFF |

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 |
| EAC Ex..... | 2Ex nA IIC T4 Gc X |

Observed authority requirements

| | |
|-------------|----------------|
| EMC..... | 2014/30/EU |
| LVD..... | 2014/35/EU |
| RoHS..... | 2011/65/EU |
| EAC..... | TR-CU 020/2011 |
| EAC Ex..... | TR-CU 012/2011 |

Approvals

| | |
|--------------------|---------------------------|
| ATEX..... | KEMA 10ATEX0147 X |
| IECEX..... | KEM 10.0068X |
| c FM us..... | FM17US0004X / FM17CA0003X |
| UL..... | UL 61010-1 |
| DNV-GL Marine..... | TAA00001RW |
| EAC Ex..... | RU C-DK.HA65.B.00355/19 |