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

Applications

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 CJC.
- 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.
Environmental Conditions

Operating temperature: -25°C to +70°C
Storage temperature: -40°C to +85°C
Calibration temperature: 20°C to 28°C
Relative humidity: < 95% RH (non-cond.)
Protection degree: IP20
Installation: 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 mm² / AWG 26...12 stranded wire
Screw terminal torque: 0.5 Nm
Vibration: 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: 16 bit
EMC immunity influence: < ±0.5% of span
Extended EMC immunity: NAMUR NE43 or OFF
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: < 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

Output specifications

Common output specifications
Updation time: 10 ms
Current output
Programmable signal ranges: 4...20 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

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... FM17CA0003X
DNV-GL Marine... Stand. I Certific. No. 2.4
UL... UL 61010-1

Min. measurement range (span)
- TC J & K: Better than 0.05% of span or 0.5°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 @ internal
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

Order:

Type
3331