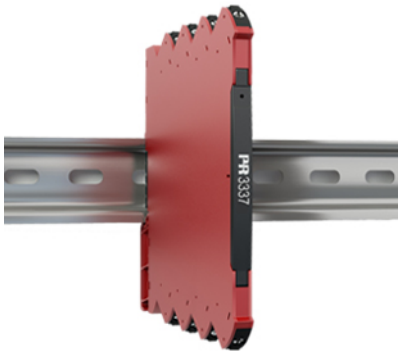
PERFORMANCE MADE SMARTER



# HART 7 temperature converter, loop-powered

## 3337

– High accuracy, better than 0.05% of span
– Slimline housing of 6.1 mm
– Excellent EMC performance
– Selectable 60 ms / 60 s response time
– Pre-calibrated temperature ranges selectable via DIP-switches

### Application

- The 3337 temperature converter measures a standard Pt100, TC J and K temperature sensor, and provides an isolated passive analog current and HART signal output.
- High 2 port isolation provides surge suppression and protects the control system from transients and noise.
- The 3337 can be mounted in the safe area or in Zone 2 / Division 2 areas.
- Approved for marine applications.

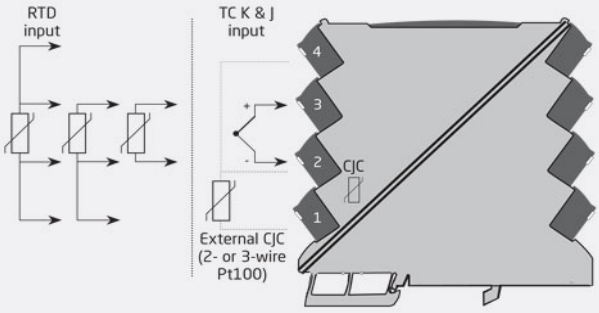
### Technical characteristics

- Flexibly loop powered by 6.2...35 VDC via connectors.
- A 60 ms fast response time with simultaneous sensor error detection when selected.
- Selectable internal/external CJC.
- Excellent conversion accuracy in all available ranges, better than 0.05% of span.
- Meeting the NAMUR NE21 recommendations, the 3337 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.

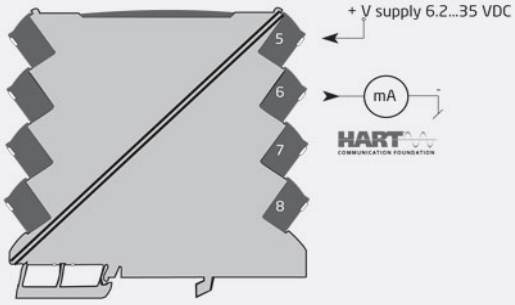
### Mounting / installation / programming

- Selectable HART mode with HART 7 revision protocol enables extended device programming.
- Selectable DIP-mode for easy configuration of more than 1000 factory calibrated measurement ranges with HART read only feature.
- Selectable HART-mode to enable full HART read-write capability.
- The narrow 6.1 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*

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Order:

| Type |
| --- |
| 3337 |

## 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 | 6.2...35 VDC |
| Max. required power | 0.80 W |
| Internal power dissipation | 22 mW...0.8 W |

**Isolation voltage**

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

**Response time**

| | |
| --- | --- |
| HART mode, (0...90%, 100...10%) | 60 ms...60 s, programmable |
| DIP mode, (0...90%, 100...10%) | < 60 ms |
| Voltage drop | 6.2 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 |
| 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 |
| 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 - 6.2) / 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 |
| HART protocol revisions | HART 7 |

## 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 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 & 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 |
| 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 / FM17CA0003X |
| c UL us, UL 61010-1 | E314307 |
| EAC Ex | RU C-DK.HA65.B.00355/19 |
| DNV Marine | TAA00001RW |