

HART
COMMUNICATION PROTOCOL



2-wire HART 7 temperature transmitter

5437A

- RTD, TC, potentiometer, linear resistance and bipolar mV input
- Single or true dual inputs with sensor redundancy and drift detection
- Wide ambient operating temperature of -50 to +85°C
- Total accuracy from 0.014%
- 2.5 kVAC galvanic isolation
- Full assessment to IEC61508 : 2010 for use in SIL 2/3 applications



Application

- Temperature measurement of a wide range of TC and RTD types.
- Conversion of wide span linear resistance and potentiometer inputs.
- Conversion of bipolar mV signals to 4...20 mA.
- Integration into asset management schemes.
- Critical applications requiring superior accuracy and/or sensor redundancy and drift detection.

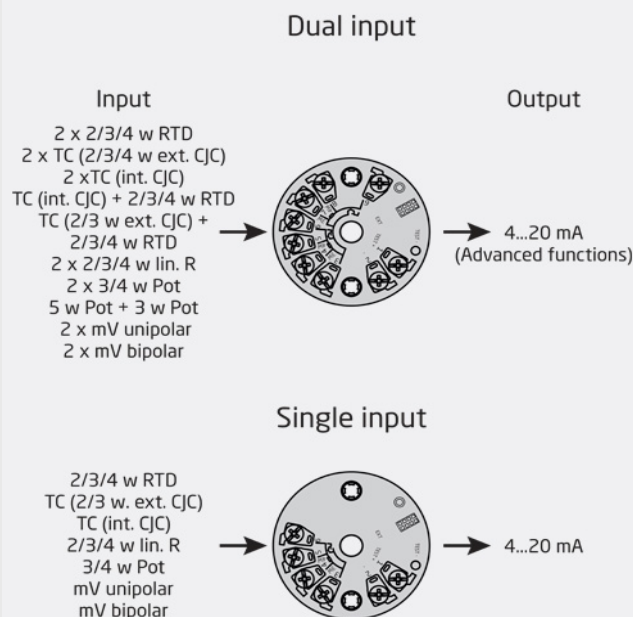
Technical characteristics

- True dual input transmitter. High density 7-terminal design accepts the widest range of dual input combinations.
- Sensor redundancy - output automatically switches to secondary sensor in event of primary sensor failure, maintaining uptime.
- Sensor drift detection - alerts when sensor differential exceeds user-defined limits, for maintenance optimization.
- Dynamic variable mapping for process data in addition to the primary variable e.g. dual input features such as average, differential and min./max. tracking.
- Groundbreaking digital and analog signal accuracy over full input span and ambient conditions.
- Extensive sensor matching including Callendar Van Dusen and custom linearizations.
- Programmable input limits and runtime metering ensure maximum process traceability and sensor out of range protection.
- IEC 61508 : 2010 full assessment up to SIL 3 together with enhanced EMC Functional Safety testing to IEC 61236-3-1.
- Meets NAMUR NE21, NE43, NE44, NE89, NE95 and NE107 compliant diagnostics information.

Mounting / installation

- For DIN form B sensor head mounting.
- Configuration via standard HART communication interfaces or by PR 5909 Loop Link.
- The 5437A can be mounted in zone 2 and 22 / Class I, Division 2, Groups A, B, C, D.

Applications



Order:

| Type | Inputs | SIL approval | Marine approval |
|-------|--------------------------------|--------------|-----------------|
| 5437A | Single input (4 terminals) : 1 | SIL : S | Yes : M |
| | Dual input (7 terminals) : 2 | No SIL : - | No : - |

Environmental Conditions

| | |
|---|---------------------------|
| Operating temperature..... | -50°C to +85°C (standard) |
| Operating temperature..... | -40°C to +80°C (SIL) |
| Storage temperature..... | -50°C to +85°C |
| Calibration temperature..... | 23...25°C |
| Relative humidity..... | < 99% RH (non-cond.) |
| Protection degree (encl./terminal)..... | IP68 / IP00 |

Mechanical specifications

| | |
|----------------------------|---------------------------------------|
| Dimensions..... | Ø 44 x 20.2 mm |
| Center hole diameter..... | Ø 6.35 mm / ¼ in |
| Weight approx..... | 50 g |
| Wire size..... | 1 x 1.5 mm ² stranded wire |
| Screw terminal torque..... | 0.4 Nm |
| Vibration..... | IEC 60068-2-6 |
| 2...25 Hz..... | ±1.6 mm |
| 25...100 Hz..... | ±4 g |

Common specifications

Supply

| | |
|---|------------------------|
| Supply voltage..... | 7.5*...48** VDC |
| Internal power dissipation..... | ≤ 850 mW |
| Additional min. supply voltage when using test terminals..... | 0.8 V |
| Min. load resistance at >37 V supply..... | (Vsupply – 37) / 23 mA |

Isolation voltage

| | |
|--|-------------------|
| Isolation voltage, test / working..... | 2.5 kVAC / 55 VAC |
|--|-------------------|

Response time

| | |
|--|---|
| Response time..... | 70 ms |
| Programmable damping..... | 0...60 s |
| Polarity protection..... | All inputs and outputs |
| Write protection..... | Jumper or software |
| Warm-up time..... | < 5 min. |
| Start-up time..... | < 2.75 s |
| Programming..... | Loop Link & HART |
| Signal / noise ratio..... | > 60 dB |
| Long-term stability, better than..... | ±0.05% of span / year (±0.18% of span / 5 years) |
| Signal dynamics, input..... | 24 bit |
| Signal dynamics, output..... | 18 bit |
| Effect of supply voltage change..... | < 0.005% of span / VDC |
| Accuracy..... | See manual for details |
| EMC immunity influence..... | < ±0.1% of span |
| Extended EMC immunity: NAMUR NE21, A criterion, burst..... | < ±1% |

Input specifications

RTD input

| | |
|--|--|
| RTD type..... | Pt10...10000, Ni10...10000, Cu5...1000 |
| Cable resistance per wire..... | 50 Ω (max.) |
| Effect of sensor cable resistance (3-/4-wire)..... | < 0.002 Ω / Ω |
| Sensor current..... | < 0.15 mA |
| Sensor error detection..... | None, Shorted, Broken, Shorted or Broken |

TC input

| | |
|------------------------|--|
| Thermocouple type..... | B, E, J, K, L, N, R, S, T, U, W3, W5, LR |
|------------------------|--|

| | |
|---------------------------------------|--|
| Cold junction compensation (CJC)..... | Constant, internal or external via a Pt100 or Ni100 sensor |
| Sensor error detection..... | None, Shorted, Broken, Shorted or Broken |

Linear resistance input

| | |
|--|---------------------|
| Measurement range / min. range (span)..... | 0 Ω...100 kΩ / 25 Ω |
| Cable resistance per wire (max.)..... | 50 Ω |
| Sensor current..... | < 0.15 mA |
| Sensor error detection..... | None, Broken |

Potentiometer input

| | |
|--|--|
| Potentiometer min...max..... | 10 Ω...100 kΩ |
| Measurement range / min. range (span)..... | 0...100% / 10% |
| Cable resistance per wire (max.)..... | 50 Ω |
| Sensor current..... | < 0.15 mA |
| Sensor error detection..... | None, Shorted, Broken, Shorted or Broken |

mV input

| | |
|------------------------------------|--------------------------|
| Measurement range..... | -800...+800 mV (bipolar) |
| Measurement range..... | -100 to 1700 mV |
| Min. measurement range (span)..... | 2.5 mV |
| Input resistance..... | 10 MΩ |
| Sensor error detection..... | None, Broken |

Output specifications

Common output specifications

| | |
|---|-------------------------------|
| Normal range, programmable..... | 3.8...20.5 / 20.5...3.8 mA |
| Extended range (output limits), programmable..... | 3.5...23 / 23...3.5 mA |
| Updating time..... | 10 ms |
| Load (@ current output)..... | ≤ (Vsupply - 7.5) / 0.023 [Ω] |
| Load stability..... | < 0.01% of span / 100 Ω |
| Sensor error indication..... | Programmable 3.5...23 mA |
| NAMUR NE 43 Upscale/Downscale..... | > 21 mA / < 3.6 mA |
| HART protocol revisions..... | HART 7 and HART 5 |

Observed authority requirements

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

Approvals

| | |
|-----------------------------|--|
| ATEX..... | DEKRA 18ATEX0135X |
| IECEx..... | IECEx DEK. 16.0029X |
| CSA..... | 70066266 |
| c FM us..... | FM16US0287X / FM16CA0146X |
| INMETRO..... | DEKRA 16.0008 X |
| NEPSI..... | GYJ18.1054X |
| EAC Ex..... | RU C-DK.GB.98.V.00192 |
| EU RO MR Type Approval..... | MRA0000023 |
| SIL..... | SIL 2 / SIL 3 certified & fully assessed acc. to IEC 61508 |

NB

| | |
|------------------------|------------------------|
| NAMUR NE95 report..... | Please contact us |
| * / **..... | See manual for details |