

**HART**  
COMMUNICATION PROTOCOL



## 2-wire HART 7 temperature transmitter

### 5437D

- 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 up to SIL 2/3



#### 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.

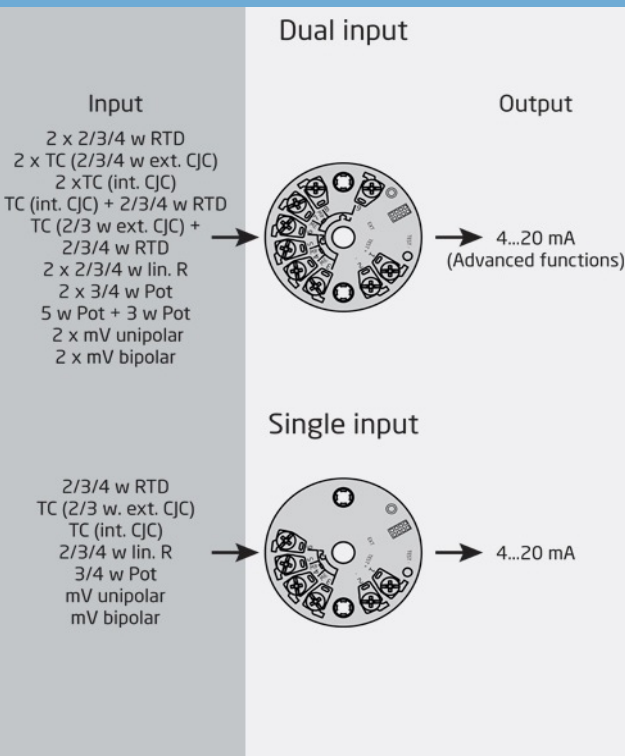
#### Technical characteristics

- 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 with 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.
- Failure rates for 5437xxSx correspond to Performance Level "d" according to ISO-13849.
- Meets NAMUR NE21, NE43, NE44, NE89, NE95, NE130 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 5437D can be mounted in zone 0, 1, 2 and zone 21, 22 including M1 / Class I, Division 1, Groups A, B, C, D.

#### Applications



For pricing or any further information, please contact Omni Instruments Ltd.

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**Order:**

| Type  | Inputs                                                         | SIL approval          | Marine approval   |
|-------|----------------------------------------------------------------|-----------------------|-------------------|
| 5437D | Single input (4 terminals) : 1<br>Dual input (7 terminals) : 2 | SIL : S<br>No SIL : - | Yes : M<br>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 21.45 mm                       |
| Center hole diameter.....  | Ø 6.35 mm / ¼ in                      |
| Weight approx.....         | 50 g                                  |
| Wire size.....             | 1 x 1.5 mm <sup>2</sup> 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*...30** 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 / 42 VAC |
|----------------------------------------|-------------------|

**Response time**

|                                                            |                                                   |
|------------------------------------------------------------|---------------------------------------------------|
| Response time.....                                         | 75 ms                                             |
| Programmable damping.....                                  | 0...60 s                                          |
| Polarity protection.....                                   | All inputs and outputs                            |
| Warm-up time.....                                          | < 5 min.                                          |
| Start-up time.....                                         | < 2.75 s                                          |
| Programming.....                                           | HART & PR 5909 Loop Link communications interface |
| Write protection.....                                      | Jumper or software                                |
| 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...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             |

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### Observed authority requirements

|             |                              |
|-------------|------------------------------|
| EMC.....    | 2014/30/EU & UK SI 2016/1091 |
| 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.....                   | DEKRA 16ATEX0047X                                             |
| IECEX.....                  | IECEX DEK. 16.0029X                                           |
| CSA.....                    | CSA 16.70066266                                               |
| c FM us.....                | FM16US0287X /<br>FM16CA0146X                                  |
| INMETRO.....                | DEKRA 23.0002X                                                |
| NEPSI.....                  | GYJ23.1227X                                                   |
| EAC Ex.....                 | EAEU KZ 7500361.01.01.08756                                   |
| EU RO MR Type Approval..... | MRA0000023                                                    |
| SIL.....                    | SIL 2 / SIL 3 certified & fully<br>assessed acc. to IEC 61508 |

### NB

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

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