

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%*, long-term stability <0.05% per year
- 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.

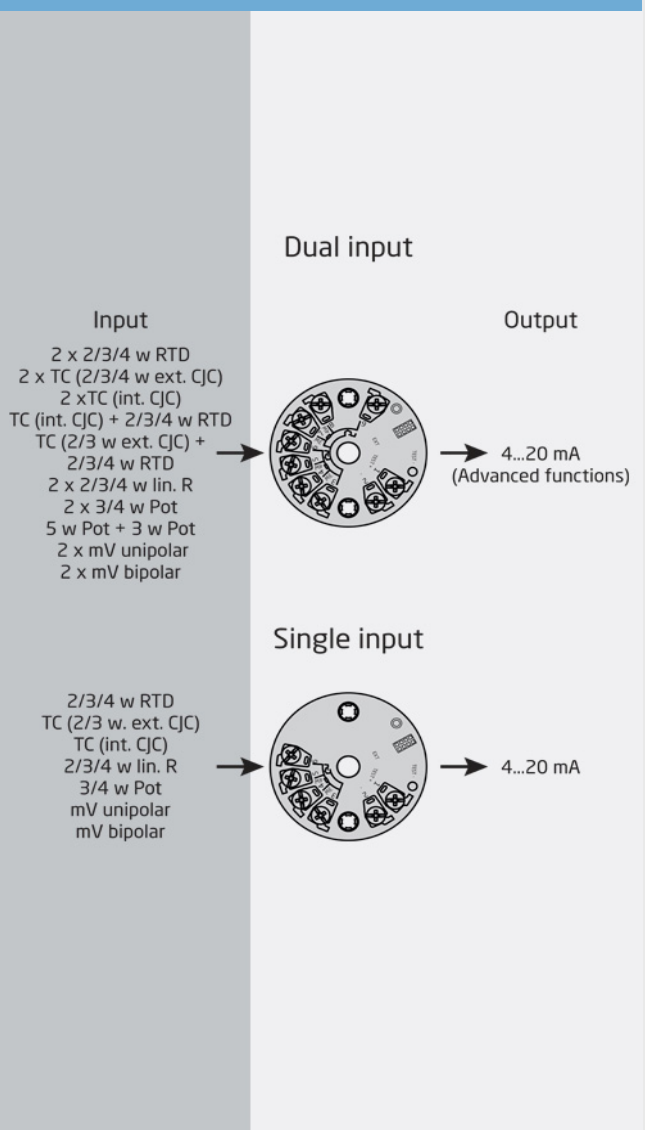
Technical characteristics

- 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 certification up to SIL 3 together with enhanced EMC Functional Safety testing to IEC 61236-3-1.
- Meets NAMUR NE21, NE43, NE44, NE89 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 20, 21, 22 including M1 / Class I, Division 1, Groups A, B, C, D.

Applications



Order:

Type	Inputs	SIL approval	Marine approval
5437D	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*...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
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Response time

Response time.....	70 ms
Programmable damping.....	0...60 s
Polarity protection.....	All inputs and outputs
Warm-up time.....	< 5 min.
Start-up time.....	< 2.75 s
Programming.....	Loop Link & HART
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
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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 2014/34/EU.....	DEKRA 16ATEX0047X
IECEX.....	IECEX DEK. 16.0029X
CSA.....	70066266
FM.....	FM16US0287X / FM16CA0146X
INMETRO.....	DEKRA 16.0008X
NEPSI.....	GYJ18.1054X
EAC Ex TR-CU 012/2011.....	RU C-DK.GB.98.V.00192
EU RO Mutual Recognition Type Approval.....	Pending
SIL.....	SIL 2 / SIL 3 certified & fully assessed acc. to IEC 61508

NB

* / **..... See manual for details