

Display Solid-state Temperature Switch

Catalog Numbers 837T-D3x, 837T-D4x

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Summary of Changes

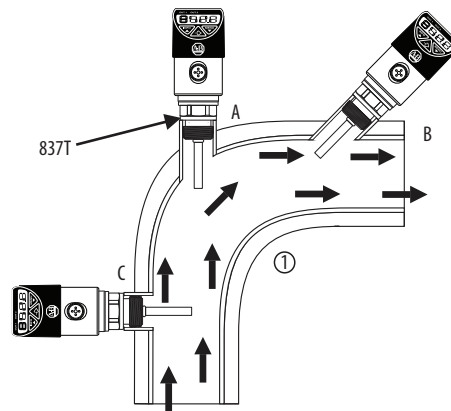
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Safety Considerations

- Read this document for information on installation, handling, mounting, general product specifications, and operation of this product. These installation instructions contain important information on handling the instrument.
- Working safety requires that all safety instructions and work instructions are observed.
- Observe the relevant local accident prevention regulations and general safety regulations for the range of use of the instrument.
- The installation instructions are part of the product and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time.
- Skilled personnel must have carefully read and understood the operating instructions before any work begins.
- The Bulletin 837T-D is a temperature switch that converts temperature into an electrical signal indoors and outdoors. The device has been safely built with state-of-the-art technology and meets the applicable requirements and EC directives. It can, however, be a source of danger if used incorrectly or for anything other than the designated use.

- Qualified individuals are required for installation and commissioning. Failure to comply results in personal injury or equipment damage.
- Before installation, commissioning and operation, be sure that the appropriate temperature switch has been selected in terms of range of measurement, design, and specific conditions of measurement.

Recommended Installation for Optimal Performance



- Installation at angle pieces, against the direction of flow
- Installation in smaller pipes, which are inclined against the direction of flow
- Installation vertical to the direction of flow.

Specifications

Attribute	837T-D3, 837T-D4
Certifications	CE conformity -EMC directive 2014/30/EU, EN 61326 emission (group 1, class B), and interference immunity (industrial application). Roes conformity - 2011/65/EU
Environment: Operating Conditions	
Ambient Temperature Range ⁽¹⁾	-20...+80 °C (-4...+176 °F)
Storage Temperature ⁽¹⁾	-20...+80 °C (-4...+176 °F)
Vibration Resistance	Probe Length ≤150 mm (5.91 in.): 6 g (0.21 oz) (IEC 60068-2-6, under resonance); Probe Length ≥250 mm (9.84 in.): 2 g (0.07 oz) (IEC 60068-2-6, under resonance)
Operating Pressure	150 bar (2175 psi) maximum; With high temperature model (compression fitting is included) 50 bar (725 psi) at 120 °C (248 °F) ⁽²⁾
Shock Resistance	50 g (1.76 oz) (IEC 60068-2-27, mechanical)
Humidity	45...75 % r. h.
Ingress Protection	IP65 and IP67. The stated ingress protection (per IEC 60529) only applies when plugged in with mating connectors that have the appropriate ingress protection.
Electrical	
Power Supply	15...35 V DC
Current Consumption	Switching outputs with: Analog signal 4...20 mA; 70 mA; without analog signal: 45 mA
Total Current Consumption	Maximum 450 mA including switching current
Outputs	
Output Type	IO-Link™ - Version 1.1 (Pin 4). With the IO-Link option, switching output OUT 1 is always PNP.
Zero Offset Adjustment	Maximum 3% of span
Output Thresholds	OUT 1 and OUT 2 are individually adjustable
Output Modes	Selectable - Normally open, normally closed, window, hysteresis
Output Voltage	(Power Supply -1V)
Output Current	OUT1 maximum 100 mA, OUT2 maximum 250 mA
Load	Analog signal 4...20 mA: ≤ 0.5 kΩ
Service Life	100 million switching cycles
Response Time	T05 < 5 s (per DIN EN 60751); T09 < 10 s (per DIN EN 60751)
Accuracy Data	
Analog Signal	≤ ±0.5% of span ± temperature sensor error
Adjustment Accuracy Switching Points	≤ ±0.5% of span
Scaling Analog Signal	0...25% of span; Full scale: 75...100% of span
Switching Output	≤ ±0.8% of span ± temperature sensor error
Display	≤ ±0.8% of span ± temperature sensor error ± 1 digit
Temperature Error ⁽³⁾	±0.15 K + 0.002 t ⁽⁴⁾ for celsius per EN 60751 (±1.8 * (0.15 + 0.002 (t - 32)/1.8) for fahrenheit)
Reference Operation Conditions	
Temperature	15...25 °C (59...77 °F)
Atmospheric Pressure	950...1050 mbar (13.78...15.23 psi)
Humidity	45...75 % r. h.
Nominal Position	Process connection lower mount (LM)
Power Supply	24V DC
Electrical Safety	
Short-circuit protection	4...20 mA, Out 1/Out 2 vs. V-
Reverse polarity protection	V+ vs. V-
Insulation voltage	500V DC
Overvoltage protection	40V DC
Material	
Wetted Parts	
Temperature sensor	Stainless Steel 316Ti
Non-wetted Parts	
Housing	Stainless Steel 304
Keyboard	TPE-E
Display Window	Polycarbonate
Display Head	Personal computer + ABS-blend

- (1) At high medium or ambient temperature, helps confirm (by suitable measures) that the instrument case temperature does not exceed 80 °C (176 °F) in continuous operation. The temperature is a measured hexagon of the process connection. At medium temperatures (above 80 °C [176 °F]), the thread must not be immersed into the medium. The permissible ambient temperature is limited to -20...+40 °C (-4...+104 °F) at the high temperature option.
- (2) High temperature models are only available in 100 mm (3.94 in.) or greater probe lengths. It includes compression fitting that is approximately 55 mm (2.16 in.).
- (3) The mounting situation (immersion depth, sensor length, operating conditions) determines the accuracy. This situation is especially the case for large temperature gradients between the environment and the medium.
- (4) Absolute value of temperature.

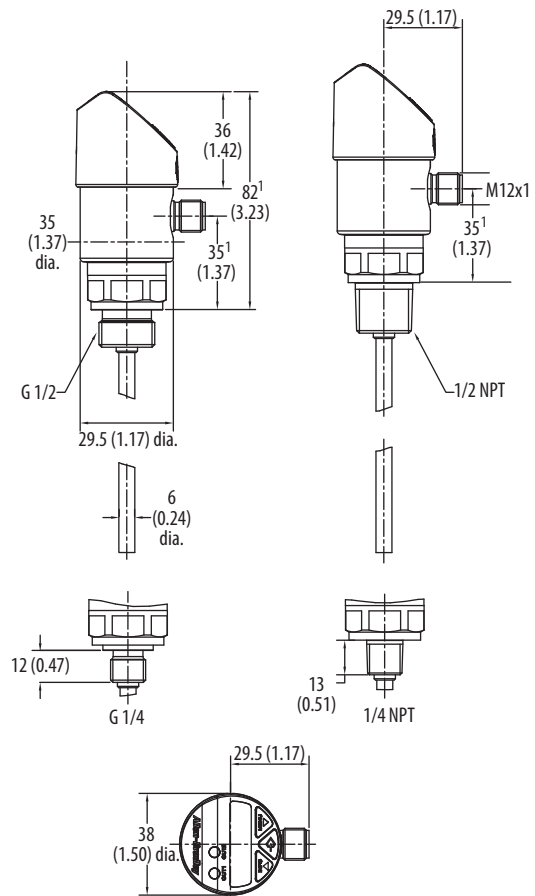
Ranges of Measurement

Model	Temperature
Standard	-20...+80 °C (-4...+176 °F)
High temperature model	0...150 °C (32...302 °F)

Attribute	Description
Element measurement	Pt1000, 2-wire, DIN EN 60751/Class A
Application	Measurement and monitoring of set temperatures
Process connection	Thread - 1/4 in. NPT male - 1/2 in. NPT male - G 1/2 in. BSPP male - G 1/4 in. BSPP male

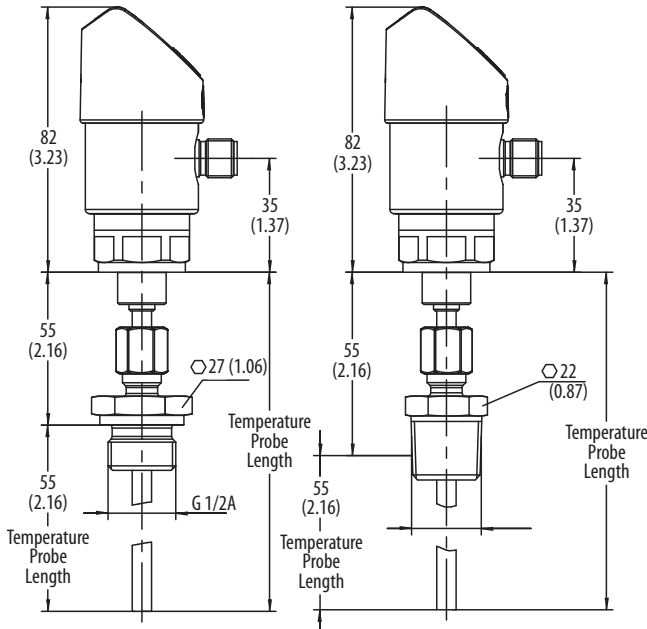
Approximate Dimensions [mm (in.)]

Figure 1 - Standard Model



¹ Dimensions are for reference only and are variable depending on the process connection.

Figure 2 - High Temperature Model



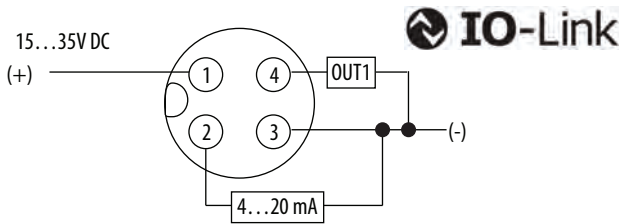
Process Connection [mm (in.)]

G Male		NPT Male		High Temperature Process Connection	
G	L1 [mm (in.)]	G	L1 [mm (in.)]		
G 1/4	12 (0.47)	1/4 in. NPT	13 (0.51)		
G 1/2	14 (0.55)	1/2 in. NPT	19 (0.75)		

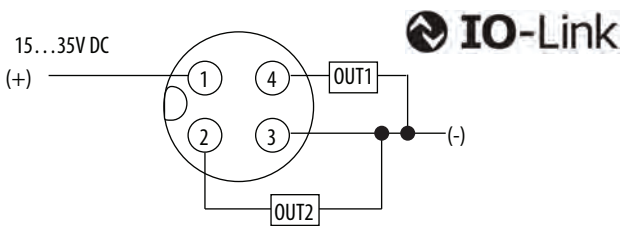
IMPORTANT For high temperature models, the real probe length, which is inside the process, is shorter for the version with compression fitting (high temperature models). This difference is because 55 mm (2.16 in.) of the compression fitting length is subtracted from the total probe length. For example, a probe length of 150 mm (5.91 in.): 150 mm minus 55 mm (compression fitting) > 95 mm (3.74 in.), which is inside the process.

Wiring Diagrams

1 PNP x 4...20 mA



2 PNP



Mating Cables

- 889D – F4AC-2 (M12x1 connector).
- 889D-R4AC-2 (M12x1 right angle connector).

Output Signals

Switching Output 1	Switching Output 2	Analog Signal
PNP	—	4...20 mA (3 wire)
PNP	PNP	—

Commissioning



ATTENTION: Only for use with the temperature switch if it is in perfect condition concerning safety.

Check the following points before commissioning:

- Fluid leakage is indicative of damage.
- Since this switch is a safety-relevant component, check the diaphragm for any visible damage.

Required tool: Spanner size 27 open-ended spanner and screwdriver.

Making the Mechanical Connection

- While mounting, make sure that the sealing faces at the instrument are clean and undamaged.
- Only screw in or unscrew the instrument via the wrench flats. Never use the case as a working surface.
- The correct torque depends on the dimensions of the process connection and the gasket used (form/material).
- When screwing in, be careful not to cross the threads.

Figure 3 - Types of Seals



A correct seal of the process connections with parallel threads at the face of the seal, must be made using suitable flat gaskets and sealing rings.

The seal of the tapered threads (for example, NPT thread) is made to provide the thread with additional sealing material such as, PTFE tape (EN 837-2).

Compression Fitting

Follow these steps while mounting the high-temperature model with compression fittings.

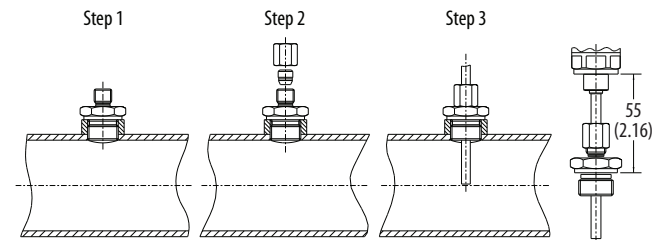
1. Screw the compression fitting (Step 1 in [Figure 4](#)) into the process connection and tighten.
2. Insert the tapered side of the ferrule (Step 2 in [Figure 4](#)) into the fitting and screw the union nut (Step 3 in [Figure 4](#)) hand tight.
3. Insert the temperature switch into the fitting and maintain the required immersion depth. Tighten the union nut (Step 3 in [Figure 4](#)) with approximately 50 N•m (442.5 lb•in).



ATTENTION: The temperature switch can be damaged at high temperatures. At medium temperatures above 80 °C (176 °F), be sure that the distance to the housing (55 mm [2.16 in.]) is maintained when you mount the compression fitting.

4. Optional: Check the assembly and loosen the union nut. The ferrule is firmly connected to the sensor tube.

Figure 4 - Compression Fitting Installation Steps



Making the Electrical Connection

- The instrument must be grounded via the process connection.
- The power supply for the temperature switch must be made via an energy-limited electrical circuit in accordance with section 9.3 of UL/EN/IEC 61010-1 or an LPS to UL/EN/IEC 60950-1 or class 2 in accordance with UL1310/UL1585 (NEC or CEC). The power supply must be suitable for operation above 2000 m (6561.6 ft) in case the temperature switch is used at this altitude.
- For cable outlets, make sure that no moisture enters at the cable end.

Dismantle and Disposal

Let the instrument cool down sufficiently before dismantling.



ATTENTION: Residual media in the dismantled temperature transmitter can result in a risk to persons, the environment, and equipment. Take sufficient precautionary measures.



BURN HAZARD: Let the instrument cool down sufficiently before the dismantle process. During the dismantle process, there is a risk of dangerously hot pressure media escaping.

Incorrect disposal can put the environment at risk.

Dispose of instrument and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.



Programming

Keys and Functions



Note: Short press equals three seconds; long press equals five seconds.

IMPORTANT Short press equals three seconds; long press equals five seconds.

Keys (Simultaneously press the info and menu keys to exit the program mode and return to display mode.)	Function		
	Display Mode	Program Mode (Press the menu key for five seconds to enter programming mode.)	
	Short Press: <ul style="list-style-type: none"> • Display of the unit Long Press: <ul style="list-style-type: none"> • Display of set parameters 	Short press: toggle parameter up (step-wise)	Short press: toggle parameter up (fast scroll)
	Short Press: <ul style="list-style-type: none"> • Display of the unit Long Press: <ul style="list-style-type: none"> • Enters program mode 	Short press: toggle parameter down (step-wise)	Long press: toggle parameter down (fast scroll)

Parameters

Parameter	Description
SP1/SP2	Hysteresis function: Switch point switching output (1 or 2)
FH1/FH2	Window function: Window high switching output (1 or 2)
RP1/RP2	Hysteresis function: reset point switching output (1 or 2)
FL1/FL2	Window function: Window low switch output (1 or 2)
EF	Extended programming functions
RES	Return the set parameter to the factory settings
DS1/DS2	Switch delay time, which must occur without interruption before any electrical signal change occurs (SP1 or SP2)
DR1/DR2	Switch delay time, which must occur without interruption before any electrical signal change occurs (RP1 or RP2)
OU1	Switch function switch output (1 or 2)
OU2	HNO = hysteresis function, normally open HNC = hysteresis function, normally closed FNO = window function, normally open FNC = window function, normally closed

Parameter	Description
UNIT	Unit switching
OSET	Offset adjustment (3% of span)
DISM	Display value in display mode CT= actual temperature value; LOW, HIGH = minimum, maximum temperature value OFF= display off; SP1/FH1 = function switch point 1, RP1/FL1 = function reset point 1, SP2/FH2= function switch point 2, RP2/FL2 = function reset point 2
DISU	Display update 1, 2, 5, 10 updates/second
DISR	Rotate display indicator by 180°
RHL	Clear the minimum and maximum value memories
PAS	Password input, 0000= no password Password input digit by digit
TAG	Input of a 16-figure alphanumeric measuring point number

Menu (Program and Factory Settings)

Display Mode					
▼ ▲	Long press on menu key				
Programming Mode				Factory setting:	
▼ ▲	Enter				
SP1/FH1	→ Value	(Minimum: MBA +0.5% of span, Maximum: MBE)	MBE		
▼ ▲	Enter				
RP1/FL1	→ Value	(Minimum: MBA, Maximum: SP1 -0.5% of span)	MBE -10%		
▼ ▲	Enter				
SP2/FH2	→ Value	(Minimum: MBA +0.5%, Maximum: MBE)	MBE		
▼ ▲	Enter				
RP2/FL2	→ Value	(Minimum: MBA, Maximum: SP2 -0.5% of span)	MBE -10%		
▼ ▲	Enter				
EF	↔ RES	Yes/No	Reset to factory setting		
	▼ ▲ Enter				
	DS1	Value	0...50 s	0 s	
	▼ ▲ Enter				
	DR1	Value	0...50 s	0 s	
	▼ ▲ Enter				
	DS2	Value	0...50 s	0 s	
	▼ ▲ Enter				
	DR2	Value	0...50 s	0 s	
	▼ ▲ Enter				
	OU1	PARA	HNO,HNC,FNO,FNC	HNO	
	▼ ▲ Enter				
	OU2	PARA	HNO,HNC,FNO,FNC	HNO	
	▼ ▲ Enter				
	UNIT	Unit	°C, °F	Order-related	
	▼ ▲ Enter				
	SETR	4 mA/0V → Value	MBA +25% of span	MBA	
	▼ ▲ Enter				
		20 mA/10V → Value	MBA -25% of span	MBE	
	▼ ▲ Enter				
	OFS	Value	Offset setting 3% of span	0 s	
	▼ ▲ Enter				
	DISM	PARA	ACT, HIGH, LOW, OFF, SP1/FH1, RP1/FL1, SP2/FH2, RP2/FL2	ACT	
	▼ ▲ Enter				
	RHL	Yes/No	Reset HIGH, LOW		
	▼ ▲ Enter				
	PAS	Value	Password	without	
	▼ ▲ Enter				
	TAG	Value	Measuring point number	without	
	▼ ▲				

END**END**

Press the enter key to return to display mode and exit program mode.

Display Mode

Legend:

MBA = Start of measuring range

MBE = End of measuring range

Rockwell Automation Support

Use the following resources to access support information.

Technical Support Center	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	https://rockwellautomation.custhelp.com/
Local Technical Support Phone Numbers	Locate the phone number for your country.	http://www.rockwellautomation.com/global/support/get-support-now.page
Direct Dial Codes	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	http://www.rockwellautomation.com/global/support/direct-dial.page
Literature Library	Installation Instructions, Manuals, Brochures, and Technical Data.	http://www.rockwellautomation.com/global/literature-library/overview.page
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	http://www.rockwellautomation.com/global/support/pcdc.page

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Waste Electrical and Electronic Equipment (WEEE)



At the end of life, this equipment should be collected separately from any unsorted municipal waste.

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