

Display Solid-state Temperature Switch

Catalog Numbers 837T-D3x

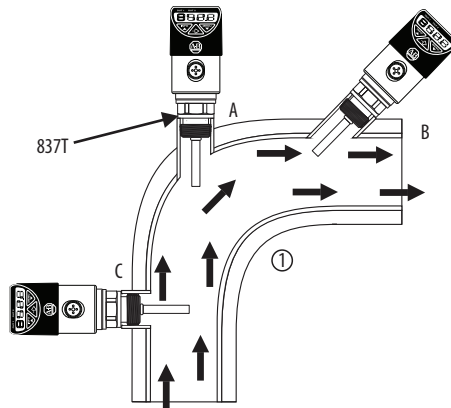
Safety Considerations

- 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 for converting 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 measuring range, design, and specific measuring conditions.

Qualified Personnel

Qualified personnel are required to conduct the work described and recognize potential hazards.

Recommended Installation for Optimal Performance



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

Specifications

Certifications	CE conformity -EMC directive 2004/108/EC, EN 61326 emission (group 1, class B), and interference immunity (industrial application) RoHS 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
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 using 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;
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 ⁽²⁾	±0.15 K + 0.002 t ⁽³⁾ per EN 60751 (±1.8 * (0.15 + 0.002 (t - 32)/1.8))
Reference Operation Conditions	
Temperature	15...25 °C (59...77 °F)
Atmospheric Pressure	950...1,050 mbar (13.78...15.23 psi)
Humidity	45...75 % r. h.
Nominal Position	Process connection lower mount (LM)
Power Supply	24V DC

⁽¹⁾ At high, medium, or ambient temperature, helps ensure (by suitable measures) that the instrument case temperature does not exceed 80°C (176°F) in continuous operation (the temperature is measured hexagon of the process connection). At medium temperatures (above 80°C (176°F)), the thread must not be immersed into the medium.

⁽²⁾ The achievable accuracy is determined by the mounting situation (immersion depth, sensor length, operating conditions). This is especially the case for large temperature gradients between the environment and the medium.

⁽³⁾ Absolute value of temperature.

Specifications (continued)

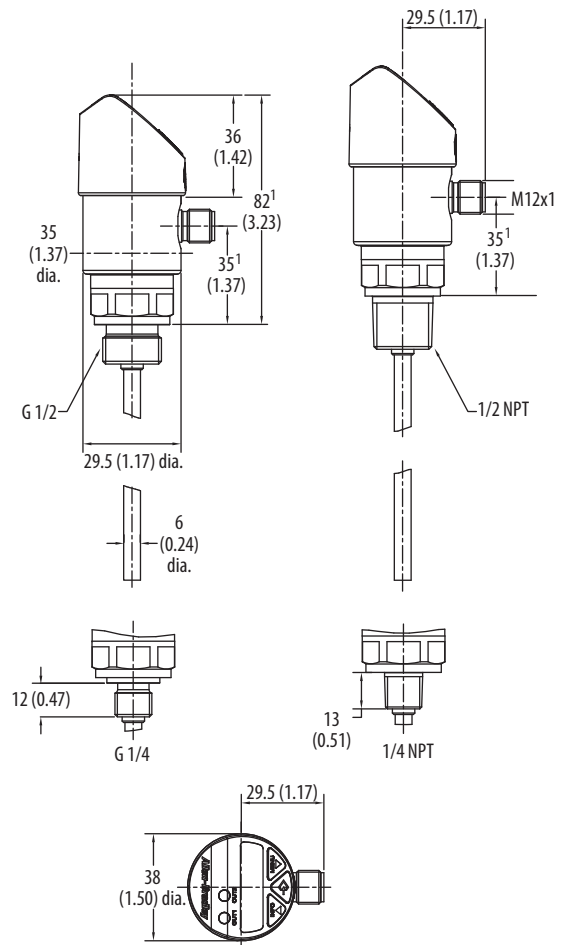
Electrical Safety	
Short-circuit protection	4...20 mA, Out 1/Out 2 vs. V-
Reverse polarity protection	V+ vs. V-
Insulation voltage	500V DC
Overvoltage protection	40V DC
Material	
<i>Wetted Parts</i>	
Temperature sensor	Stainless Steel 316Ti
<i>Non-wetted Parts</i>	
Housing	Stainless Steel 304
Keyboard	TPE-E
Display Window	Polycarbonate
Display Head	PC + ABS-blend

Measuring Ranges

Temperature	C	F
Standard	-20...+80°	-4...+176

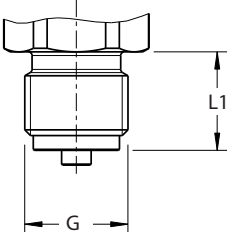
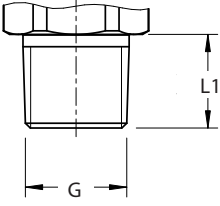
Dimensions [mm (in.)]

Attribute	Description
Measuring Element	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



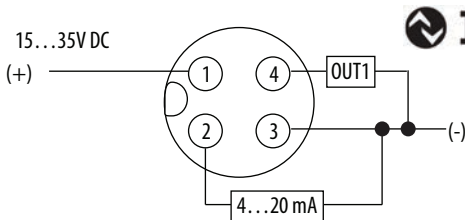
¹ Dimensions are for reference only and are variable depending on the process connection.

Process Connection [mm (in.)]

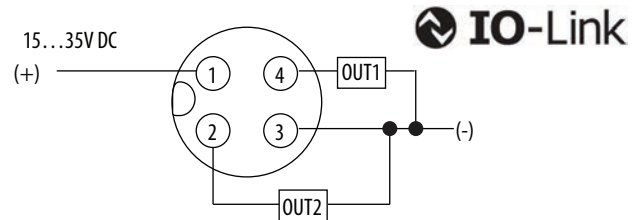
G Male		NPT Male	
			
G	L1 [mm (in.)]	G	L1 [mm (in.)]
G 1/4	12 (0.47)	1/4 in. NPT	13 (0.51)
G 1/2	14 (0.55)	1/2 in. NPT	19 (0.75)

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:

- Leaking fluid is indicative of damage.
- Since this 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

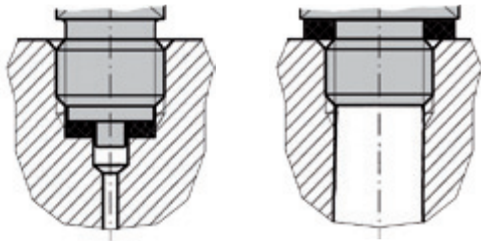
- While mounting, make sure that the sealing faces at the instrument are clean and undamaged.
- Only screw in or unscrew the instrument via the spanner flats. Never use the case as a working surface.
- The correct torque depends on the dimensions of the process connection and the gasket used (form/material).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

Types of Sealing

Figure 1 - Parallel Thread/Tapered Thread (NPT)

per EN 837

per DIN 3852-E



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

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

Making the Electrical Connection

- The instrument must be earthed 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 2,000 m (6,561.6 ft) should the temperature switch be used at this altitude.

- For cable outlets, make sure that no moisture enters at the cable end.

Dismantle and Disposal

Dismantle: 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.

Disposal: 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

Status switching output2 (optional)

Status switching output1

Display mode

- Short press
Display of the unit
- Long press
Display of the set parameters

Programming mode

- Short press
Menu up
Parameter value up (step-wise)
- Long press
Menu up
Parameter value up (fast)

Note: The temperature switch has two operating modes, the display mode and the programming mode. The function of the keys depends on the selected operating mode.

Enter key: In programming mode, press the enter key once to set the values for the selected parameters.

Four-digit status Indicator display

- Display temperature value
- Display menu item
- Display parameter

Display mode

- Short press
Display of the unit
- Long press
Enter the programming mode

Programming mode

- Short press (equals three seconds)
Menu up
Parameter value up (step-wise)
- Long press (equals five seconds)
Menu down
Parameter value down (fast)



Display mode

- Short press
Display of the unit

Programming mode

- Short press
Select menu item
Confirmation of the input

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

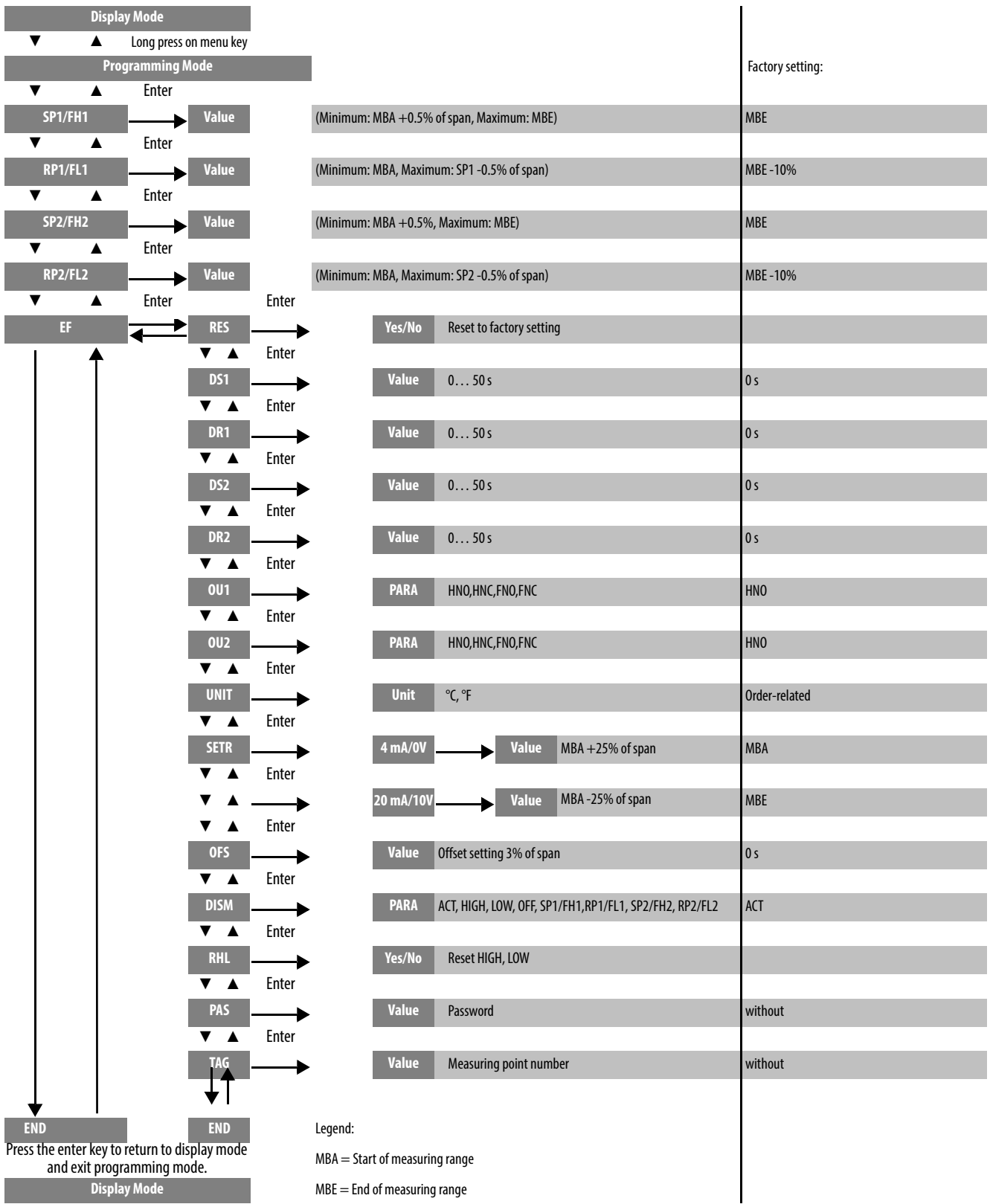
Keys (Simultaneously pressing the info and menu keys exits the programming mode and returns to display mode.)	Function		
	Display Mode	Programming Mode (Press the menu key for five seconds to enter programming mode.)	
	Short Press: • Display of the unit Long Press: • Display of set parameters	Short press: toggle parameter up (step-wise)	Short press: toggle parameter up (fast scroll)
	Short Press: • Display of the unit Long Press: • Enters programming 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	Switching function switching 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 (programming and factory setting)



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