ETTN-YTTN Digital temperature switches

Two threshold outputs: PNP transistors or galvanic isolation

4…20 mA output signal, 0...10 V (configurable scale -200°C to 400°C) or Modbus

Accuracy ± 0.5°C

Totally stainless steel, rugged build for severe industrial environments

LCIE 03 ATEX 6300X/01

CE 0081

I M1
Ex ia I

II 1 G
Ex ia IIC T6 to T5

Hazardous areas: 0, 1 and 2

ETTN range digital temperature switches are intended for temperature control for industrial process management.

Based on microprocessor technology, the temperature switches can be programmed completely on site using code protected keys.
The output signal (4...20 mA or 0...10 V) is adjustable between -200°C and 400°C.
It is possible to reduce the errors due to thermal resistance of the pipe or thermowell by manually entering the process fluid temperature into the ETTN.

The ETTN range comprises three models: with the temperature measurement by a submerged probe, deported probe or by surface contact.

Specifications

Measurement range	Configurable in the range: -200...400°C/ -328…752°F Minimum measurement range: 30°C / 54°F
Display	-1999 to +9999 points. 4 digit red LEDs (8 mm high)
Power supply voltage	**ETTN6/ETTNM** : 10 …32 VDC, regulated. Protection against polarity reversals **ETTN5** : 18 …32 VDC regulated **YTTN** : 10...28 VDC regulated **ETTN7** : 12...32 VDC regulated
Consumption	**YTTN/ETTN6/ETTN7** < 22 mA. **ETTN5** : 50 mA max. **ETTNM** : Typ. 20 mA. Communicating : 100 mA
Load impedance	**YTTN/ETTN6:** $R_\Omega \leq (U_{supply}-10)/0.02$ **ETTN5** : RL ≤ 400 Ω **ETTN7 :** $R_C > 5$ kΩ
Output signal	**YTTN/ETTN6**: 4…20 mA (2 wires) **ETTN5** : 4…20 mA (3 wires) **ETTNM**: Modbus communication **ETTN7**: 0-10 V
Threshold outputs	**ETTN6/ETTN7-:** PNP transistors, 400 mA at 24 VDC **ETTN5/ETTNM**: static relays, 400 mA at 60 VDC or 40 VAC **YTTN** : PNP transistors, 40 mA at 28 VDC
Threshold adjustment range	2% to 98% of the measurement range
Typical response time of the threshold outputs	≤ 20 ms
Accuracy	± 0.5°C to 0°C
Drift	± 0.005°C/°C max
Repeatability	± 0.2°C
Sensing element	Pt1000 probe, class B according to DIN/EN/IEC 60751
Probe response time	T_{90} < 10 s (model with stem) (in water) T_{90} < 30 s (face mounted models)
Probe dimensions	Length: 50 to 400 mm. Diameter: 6 mm Other lengths to order
Probe immersion (models with stem)	Minimum length submerged in the fluid: 20 mm
Max. acceptable pressure	40 bar (models with stem) Higher pressures to order
Ambient temperature	**YTTN :** - 25 ... 70°C Ta = +40°C G: T6 Ta = +70°C G: T5 (G = Gas/Gaz) **Others :** -25 ... 85°C
Storage temperature	- 40 ... 85°C
Thermal drift (per 10°C)	± 0,1°C (in the housing T° range of: 25…85°C)
Materials in contact with the fluid	1.4404 (316L) stainless steel (models with stem)
Electrical connection	**YTTN/ETTN6/ETTN7:** M12-5 pin connector **ETTN5/ETTNM:** M12-8 pin connector
IP rating (EN 60 529)	IP 67
CE Conformity	EMC directive 2004/108/CE PED pressure directive 97/23/CE
Resistance to vibration	ETTN is fastened by sliding connection must be used in the absence of vibration
Resistance to shock (EN 60028-2-32)	25 drops from 1 meter onto a concrete floor
Weight	530 to 600 g depending on the version

Options

2 x 130 V 50 mA switching outputs (only ETTN5). ***Code 0597***

Mobile plugs and cables. See page 3

Baumer

ETTN range – Description

Digital temperature switch range

- **ETTN5** Galvanically isolated digital 2 threshold temperature switch, 4…20 mA output
- **ETTN6** Digital 2 threshold temperature switch, 4…20 mA output
- **ETTN7** Digital 2 threshold temperature switch, 0-10 V output
- **ETTNM** Galvanically insulated digital 2 threshold temperature switch, Modbus communication
- **YTTN** Digital 2 threshold temperature switch, 4…20 mA output.

ATEX Ex ia intrinsic safety approval (on request)

Version with galvanically insulated digital thresholds – ETTN5 and ETTNM

The current supply to the temperature switch is electrically isolated from the threshold outputs and the threshold outputs are isolated from each other.
It is possible to have a separate power supply between the ETTN5/ETTNM (32 VDC max.) and the threshold contacts (60 VDC max. or 40 VAC max.)

Modbus communication

The ETTNM has a RS485 serial port and uses the Modbus RTU communication protocol.
The Modbus protocol is a two-way exchange protocol based on a hierarchical data base structure between a master and multiple slaves (stations). It enables the user to read the temperature and the status of each threshold (open or closed).
Exchange between the master and one slave: the master sends an order and waits for a reply.
Exchange between the master and all slave stations: the master broadcasts a message to all the slaves in the network and they perform the order in the message without sending a reply.
Two slave stations cannot talk together.
The bus stations are identified by addresses given by the user.
These addresses range from 1 to 247.

Parameter configuration and consultation

Parameter configuration mode

The three keys on the front panel are used to configure the following operating parameters:

- Measurement scale: Temperature values for 0% and 100% of F.S. (YTTN/ETTN5/ETTN6/ETTN7)
- Switching point value for each threshold
- Bottom switching point value for each threshold
- Temporizations of switching of 0 in 25s by step of 0,1s
- Active status for each threshold (NO or NC)
- Self test and parameter protection by a 4 digit code
- Fluid temperature correction factor

Additional parameter for the ETTNM:

- Modbus slave address of the thermostat
- Parity selection

Parameter consultation mode

It is possible to consult the parameters entered without entering the access code:

- Measurement unit selected
- Configured parameters of each threshold
- Temperature range configured (ETTNM only)
- Modbus address and parity (ETTNM only)

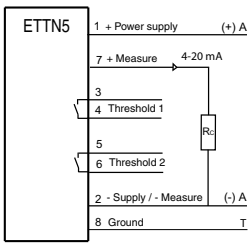
Max. and min. value consultation

When the temperature switch is in measurement mode it is possible to display or initialise the max. and min. temperature values saved at any time.

Dimensional drawing (mm) and connections

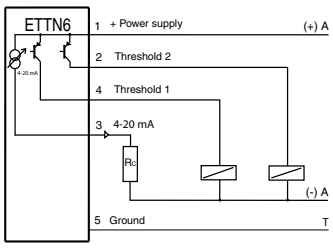
Connection diagrams

ETTN5



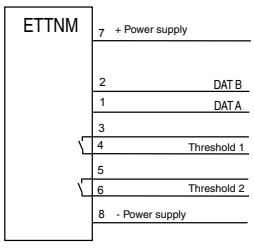
M12-8 connector

ETTN6/YTTN



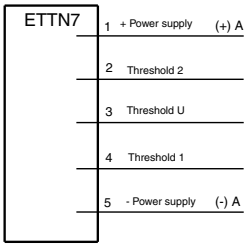
M12-5 connector

ETTNM



M12-8 connector

ETTN7

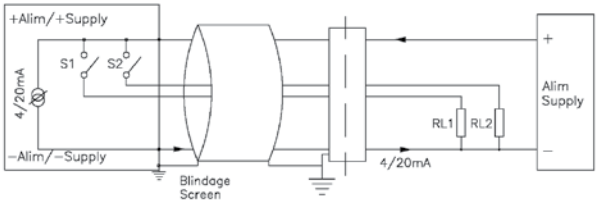


M12-5 connector

Installations YTED

Hazardous area
(0,1, 2)

Non hazardous area



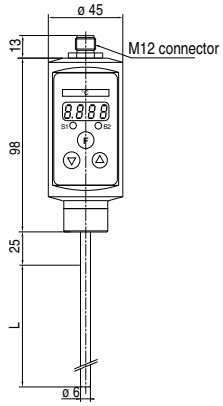
U_{max} = 28 VDC
I_{max} = 120 mA
P = 0,8 W

C_i = 13,2 nF
L_i = 0

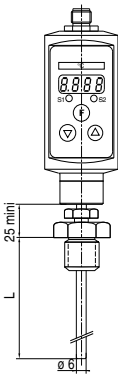
Important :
In area 0, the combination of the pressure switch and the safety barrier must be covered by a calculation checked by an approved body.
We offer a system of pressure switch + safety module + cable already certified by an approved body: see next page. : see data sheet A31.04 "YTED-YTTN ATEX Ex ia approved system".

Dimensions

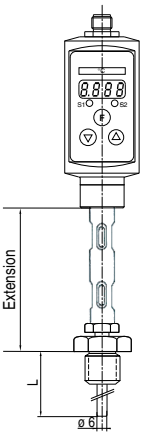
without sliding union



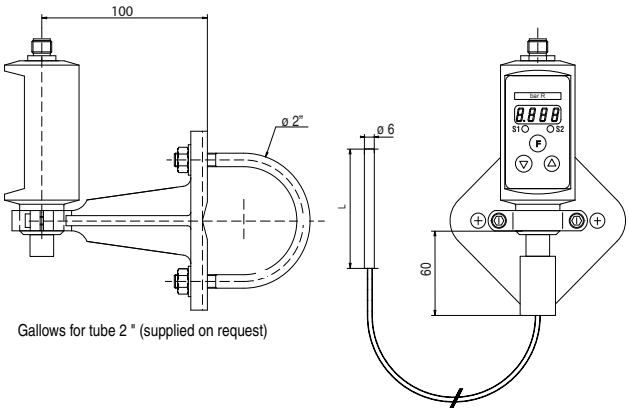
with sliding union
G 1/4, G1/2, 1/4 NPT or 1/2 NPT



with extension



To deported probe



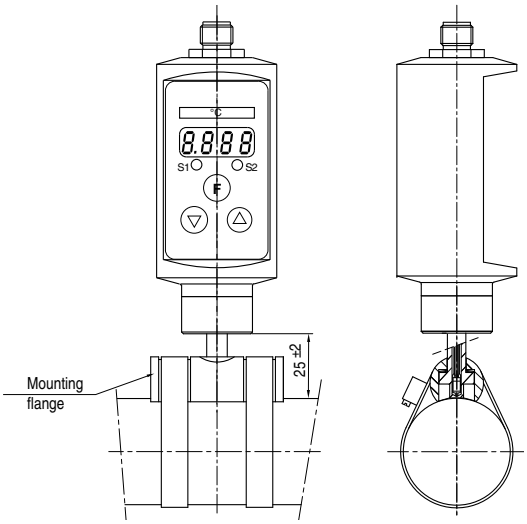
YTTN-ETTN model – temperature measurement by contact
Surface mounting

Temperature measurement is by thermal conduction as the sensing element is in contact with the pipe. There is compensation for the ambient temperature.

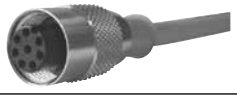
The YTTN/ETTN is held by two standard clips (not supplied). A spring washer ensures the contact between the sensing element and the pipe.

2 models of mounting flange are available for pipes with an outside diameter of 25 mm to 55 mm and 56 mm to 100 mm.

The operator can make an automatic correction by entering the exact temperature of the fluid (accessed via the configuration menu).



Accessories

Model	Description	*Code*
	M12-5 pin mobile plug, screw terminal connection	***2260***
	Shielded moulded M12-5 pin cable, length 2 m	***0604***
	Shielded moulded M12-5 pin cable, length 5 m	***0605***
	Shielded moulded M12-5 pin cable, length 10 m	***0606***
	Shielded moulded M12-8 pin cable, length 2 m	***0607***
	Shielded moulded M12-8 pin cable, length 5 m	***0608***
	Shielded moulded M12-8 pin cable, length 10 m	***0609***

Important: YTTN-ETTN series pressure switches have a immunity against high frequency interference. In environments with a high radiation (eg.GSM), **we recommend to use screened cable.**

Codification – YTTN-ETTN

xTTNxxxxxxxxxx

Type	1´...5´ digits
Digital 2 threshold thermostat, 4…20 mA output	ETTN6
Digital 2 threshold thermostat, Modbus communication	ETTNM
Digital 2 threshold thermostat, 4…20 mA output ATEX	YTTN6*
Digital 2 threshold thermostat, 0-10 V output	ETTN7
Digital 2 galvanically isolated threshold thermostat, 4…20 mA output	ETTN5

Measurement units	6´ digit
°C	1
°F	2

Stem length (L)	7´ digit
Flange for ø 25...55 mm pipe (face mounting)	A
Flange for ø 56...100 mm pipe (face mounting)	B
50 mm	C
100 mm	1
160 mm	2
250 mm	4
400 mm	5
Other lengths	x

Sliding union	8´ digit
Without union (1)	0
G 1/4	2
G 1/2	3
1/4 NPT	5
1/2 NPT	6

Extension	9´ digit
Without (measurement from -100 ... 150°C / -148 ... 302°F) (1)	A
65 mm (measurement from -200 ... 200°C / -328 ... 392°F) (2)	C
120 mm (measurement from -200 ... 400°C / -328 ... 752°F) (2)	D
To deported probe	E

Adjustment	10´ digit
Without adjustment	0
With factory setting	1

Probe cable length (3)	11´...14´ digit
Lengthes (cm)	xxxx

Example for a probe with 20 cms of cable : code 0020.
Beyond 10 m of cable, the precision is not any more guaranteed

(1) Obligatory for face mounting
(2) Available for a stem length ≤ 250 mm
(3) Only remote probe

* See data sheet A31.04 "YTED-YTTN ATEX Ex ia approved system".

Form to be filled in for factory adjustment

Parameter		To be filled in
Measurement units		
Units	°C °F	☐ ☐
Analogue output (except ETTNM)		
Configurable scale: -200…400°C / -328…752°F Min. measurement range: 30°C / 86°F		
Bottom of scale: temperature value for 0% of F.S. (4 mA)		...
Full scale: temperature value for 100% of F.S. (20 mA)		...
Threshold 1		
High switching point		...
Low switching point		...
Normally open contacts Normally closed contacts	NO NC	☐ ☐
Threshold 2		
High switching point		...
Low switching point		...
Normally open contacts Normally closed contacts	NO NC	☐ ☐

Curve showing change of threshold state