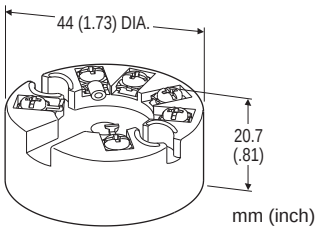
Head-mounted Two-wire Signal Conditioners
27-UNIT

THERMOCOUPLE TRANSMITTER

(PC programmable)

Functions & Features

- Accepts direct input from a thermocouple and provides a standard 4 – 20mA DC signal
- Suitable for Functional Safety applications up to SIL2
- I/O range programming via PC Configurator
- User's temperature table can be used
- Self diagnostics
- Low temperature drift
- CE marking (conforms to ATEX and EMC)



MODEL: 27TS-[1]

ORDERING INFORMATION

- Code number: 27TS-[1]

Specify a code from below for [1].
(e.g. 27TS-0)

Use Ordering Information Sheet (No. ESU-7655). Factory standard setting will be used if not otherwise specified. Specify the country in which the product is to be used with the Safety Approval code 2.

[1] SAFETY APPROVAL

0: None
1: FM intrinsically safe
2: ATEX intrinsic safety

RELATED PRODUCTS

- USB interface Bell202 modem (model: COP-HU)

Usable in 'non-hazardous' area only.

- PC configurator software (model: 27MCFG)

Downloadable at M-System's web site.

GENERAL SPECIFICATIONS

Construction: Sensor head-mounting
Connection: M3 screw terminals (torque 0.5 N·m)
Screw terminal: Nickel-plated brass
Housing material: Flame-resistant resin (black)
Isolation: Input to output
Cold Junction Compensation: CJC sensor incorporated
Self diagnostics: Detects internal error, burnout
User-configurable items: PC and the transmitter are connected with the COP-HU.

- Input sensor type
- Input range
- Burnout
- Output limits (Upper / Lower)
- Damping time (factory set to 0)
- Linearization
- Output calibration
- Loop test output

INPUT SPECIFICATIONS

The input type is factory-set to K thermocouple, and the input range to 0 to 100°C.
See Table 1 for the available input type, the minimum span, and the maximum range.
Input resistance: 1 MΩ min.

■ **THERMOCOUPLE**
Input resistance: ≥ 1 MΩ
Temperature range **Table 1**

THERMOCOUPLE		MIN. SPAN	USABLE RANGE	ACCURACY
K (CA)	°C	50	-180 to +1372	±0.5
	°F	90	-292 to +2501	±0.9
E (CRC)	°C	50	-100 to +1000	±0.5
	°F	90	-148 to +1832	±0.9
J (IC)	°C	50	-100 to +1200	±0.5
	°F	90	-148 to +2192	±0.9
T (CC)	°C	50	-200 to +400	±0.5
	°F	90	-328 to +752	±0.9
B (RH)	°C	100	400 to 1820	±1 *1
	°F	180	752 to 3308	±1.8 *1
R	°C	100	-50 to +1760	±1 *2
	°F	180	-58 to +3200	±1.8 *2
S	°C	100	-50 to +1760	±1 *2
	°F	180	-58 to +3200	±1.8 *2
C (WRe 5-26)	°C	100	0 to 2300	±1
	°F	180	32 to 4172	±1.8
D (WRe 3-25)	°C	100	0 to 2300	±1
	°F	180	32 to 4172	±1.8
N	°C	50	-180 to +1300	±0.5
	°F	90	-292 to +2372	±0.9
U	°C	50	-200 to +600	±0.5
	°F	90	-328 to +1112	±0.9
L	°C	50	-100 to +900	±0.5
	°F	90	-148 to +1652	±0.9

*1. ±2°C (3.6°F) for the range 400 – 850°C (752 – 1562°F)
*2. ±2°C (3.6°F) for the range -50 – +100°C (-58 – +212°F)

OUTPUT SPECIFICATIONS

Output range: 4 – 20 mA DC
Operational range: 3.75 – 23 mA
Load resistance vs. supply voltage:
Load Resistance (Ω) = (Supply Voltage (V) – 9 (V)) ÷ 0.023 (A) (including leadwire resistance)
Burnout: 3.75 – 3.8 mA or 21.5 – 23 mA (factory set to 23 mA)
Upper output limit proportional to the input:
20 – 21.5 mA (factory set to 21.5 mA)
Lower output limit proportional to the input:
3.8 – 4 mA (factory set to 3.8 mA)
Update time: 440 msec.

INSTALLATION

Supply voltage
- 9 – 35 V DC (non-approved)
- 9 – 28 V DC (approved)

Operating temperature: -40 to +85°C (-40 to +185°F)
(See Safety Parameters for use in a hazardous location.)
Operating humidity: 0 to 95 %RH (non-condensing)
Mounting: Head-mounting (DIN type B head)
Weight: 50 g (1.76 oz)

PERFORMANCE

Accuracy: As indicated in Table 1, ± 0.075 % of span or ±0.075 % of max. range, whichever is greater.
Add the CJC error. (max. range = 0 % or 100 % value, absolute value of whichever is greater.)
Cold junction compensation error: ±0.5°C (±0.9°F)
Temp. coefficient: 0.0075 % /°C (0.004 % /°F) of max. range
Response time: ≤ 1 sec. (0 – 90 %) with damping time set to 0
Burnout response time: ≤ 2 sec.
Supply voltage effect: ±0.01 % of span/V
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @1 minute (input to output)
Safety integrity level according to IEC 61508: Suitable for use in a safety instrumented system up to SIL2 (together with sensor) if appropriate safety instructions are observed. Consult M-System.

STANDARDS & APPROVALS

EU conformity:
ATEX Directive
Ex ia EN 60079-11
EMC Directive
EMI EN 61000-6-4
EMS EN 61000-6-2
RoHS Directive
EN 50581

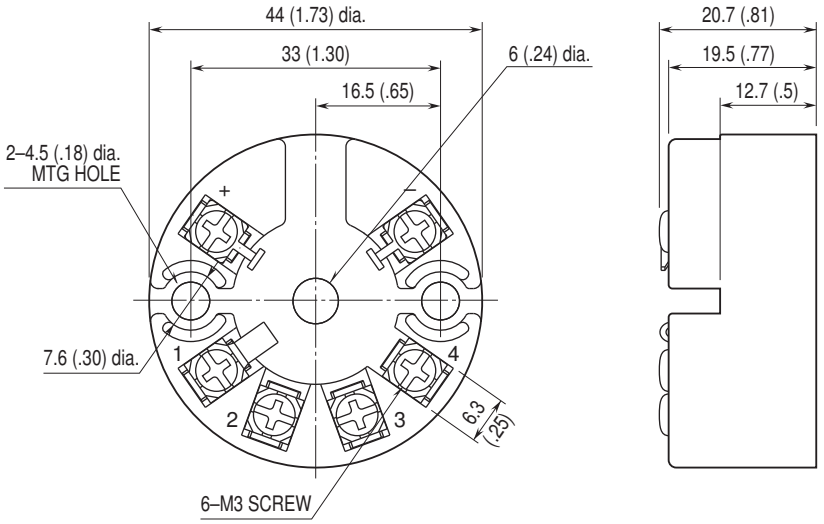
Safety approval:
FM: Intrinsically safe
Class I, Division 1, Groups A, B, C and D
Class I, Zone 0, AEx ia IIC (US)
Class I, Zone 0, Ex ia IIC (Canada)
T4, T5 and T6
(Class 3610, ANSI/ISA 60079-11,
CAN/CSA-C22.2 No. 157,
CAN/CSA-C22.2 No. 60079-11)
ATEX: Intrinsic safety
⟨Ex⟩ II 1G, Ex ia IIC; T4, T5 and T6
(EN 60079-0)
(EN 60079-11)

SAFETY PARAMETERS

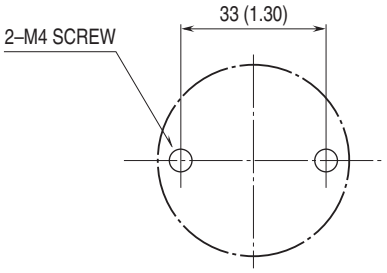
Operating temperature
For ATEX / FM:
T4: -40 to +80°C
T5: -40 to +60°C
T6: -40 to +45°C

Ex-data:
- Output circuit
  Ui (Vmax): 30 V DC
  Ii (Imax): 96 mA DC
  Pi (Pmax): 720 mW
  Ci: 1 nF
  Li: 0 mH
- Sensor circuit
  Uo (Voc): 30 V DC
  Io (Isc): 24 mA DC
  Po: 180 mW
  Co (Ca): 50 nF
  Lo (La): 40 mH

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)

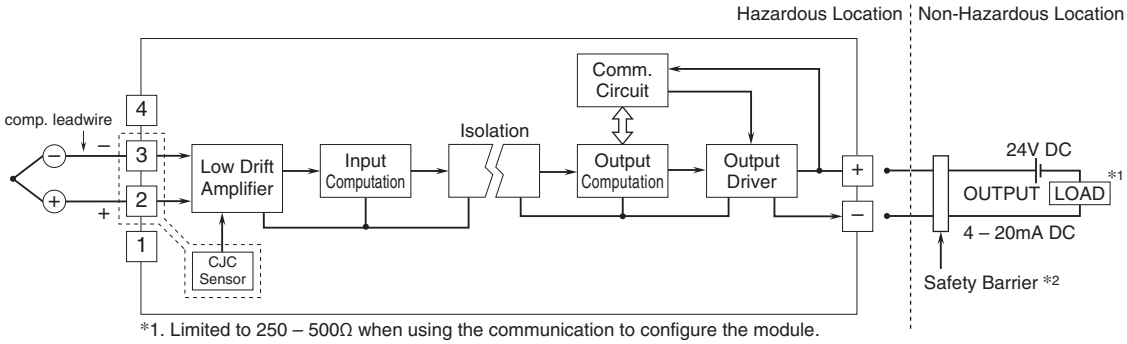


MOUNTING REQUIREMENTS unit: mm (inch)



The screws are to be provided by the customer.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



*1. Limited to 250 – 500Ω when using the communication to configure the module.
*2. A safety barrier must be installed for the intrinsic safety.
The safety barrier must meet the Ex-data of this unit and must be approved for the hazardous location.

⚠ Specifications are subject to change without notice.