

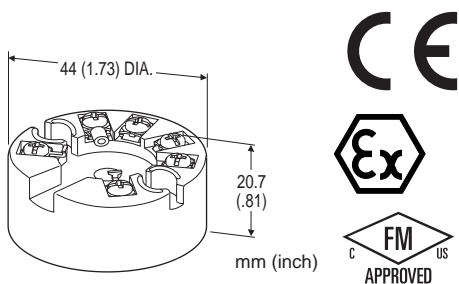
Head-mounted Two-wire Signal Conditioners 27-UNIT

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: CENELEC intrinsic safety (ATEX)

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 is factory set for use with K thermocouple, 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 (762 – 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: $\pm 0.5^\circ\text{C}$ ($\pm 0.9^\circ\text{F}$)**Temp. coefficient:** 0.0075 % /°C (0.0004 % /°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 M Ω 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****CE conformity:**

ATEX Directive (94/9/EC)

Ex ia EN 60079-11

EMC Directive (2004/108/EC)

EMI EN 61000-6-4

EMS EN 61000-6-2

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)

CENELEC: Intrinsic safety (ATEX)

 Ex II 1G, Ex ia IIC; T4, T5 and T6

(EN 60079-11: 2007)

SAFETY PARAMETERS**Operating temperature****For CENELEC (ATEX) / FM:**

T4: -40 to +80°C

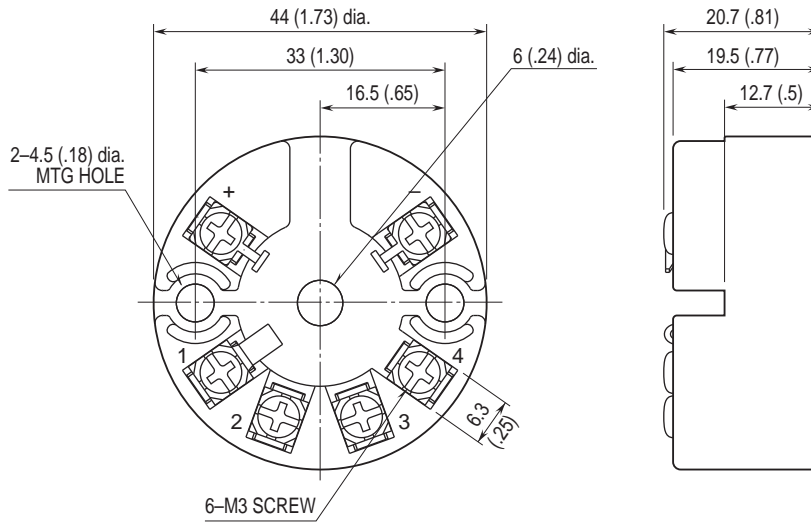
T5: -40 to +60°C

T6: -40 to +45°C

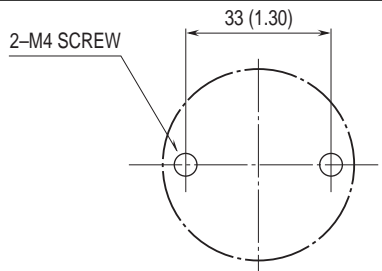
Ex-data:

- 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

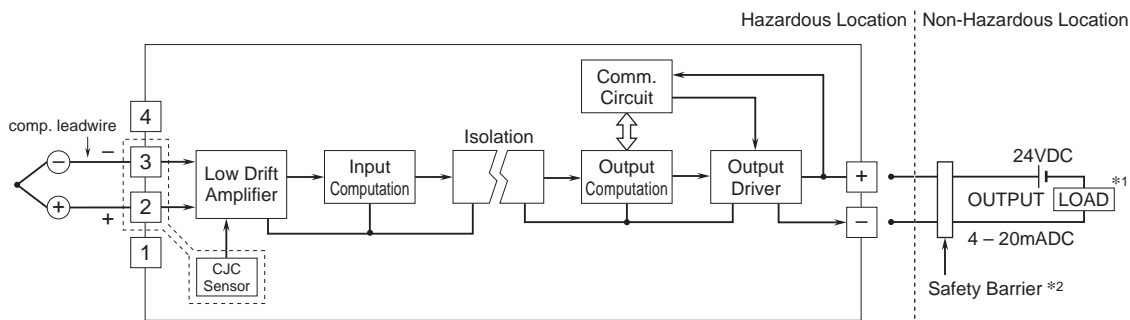
DIMENSIONS unit: mm (inch)



MOUNTING REQUIREMENTS unit: mm (inch)



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.