

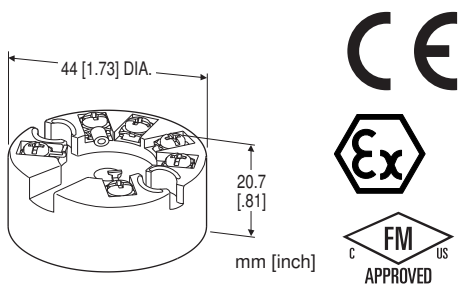
Head-mounted Two-wire Signal Conditioners 27-UNIT

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: $\pm 0.5^\circ\text{C}$ ($\pm 0.9^\circ\text{F}$)
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 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

EU conformity:
 ATEX Directive
 Ex ia EN 60079-11
 EMC Directive
 EMI EN 61000-6-4
 EMS EN 61000-6-2
 RoHS Directive
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
 Ⓔ II 1G, Ex ia IIC; T4, T5 and T6 Ga
 (EN 60079-0)
 (EN 60079-11)

SAFETY PARAMETERS

Operating temperature

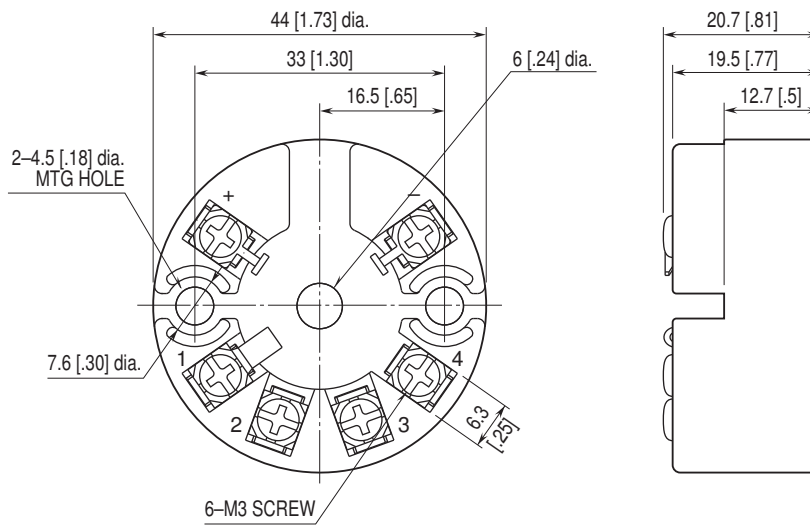
For ATEX / FM:

T4: -40 to +80°C
 T5: -40 to +60°C
 T6: -40 to +45°C

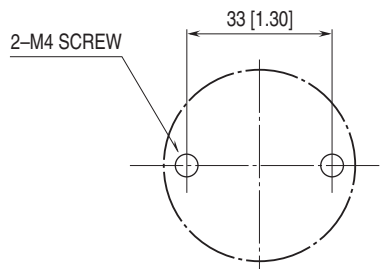
Ex-data:

- 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]

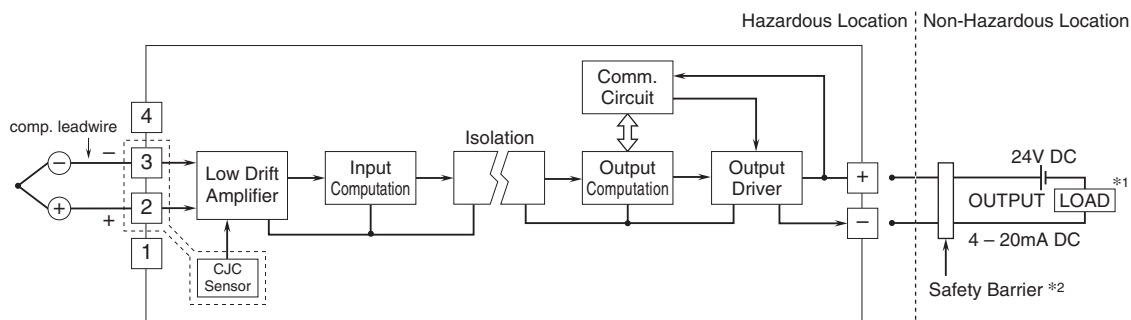


MOUNTING REQUIREMENTS unit: mm [inch]



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.