

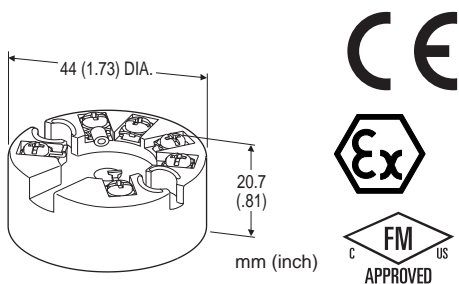
## Head-mounted Two-wire Signal Conditioners 27-UNIT

### 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

**Isolation:** Input to output

**Housing material:** Flame-resistant resin (black)

**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 (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 ( $\Omega$ ) = (Supply Voltage (V) - 9 (V))  $\div$  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,  $\pm$  0.075 % of span or  $\pm$ 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°C ( $\pm$ 0.9°F)**Temp. coefficient:** 0.0075 % /°C (0.004 % /°F) of max. range**Response time:**  $\leq$  1 sec. (0 - 90 %) with damping time set to 0**Burnout response time:**  $\leq$  2 sec.**Supply voltage effect:**  $\pm$ 0.01 % of span/V**Insulation resistance:**  $\geq$  100 M $\Omega$  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: 2007

EMC Directive (2004/108/EC)

EMI EN 61000-6-4: 2007/A1: 2011

EMS EN 61000-6-2: 2005

**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: 2002,

CAN/CSA-C22.2 No. 157: 2006,

CAN/CSA-C22.2 No. 60079-11: 2006)

CENELEC: Intrinsic safety (ATEX)

Ⓔ 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

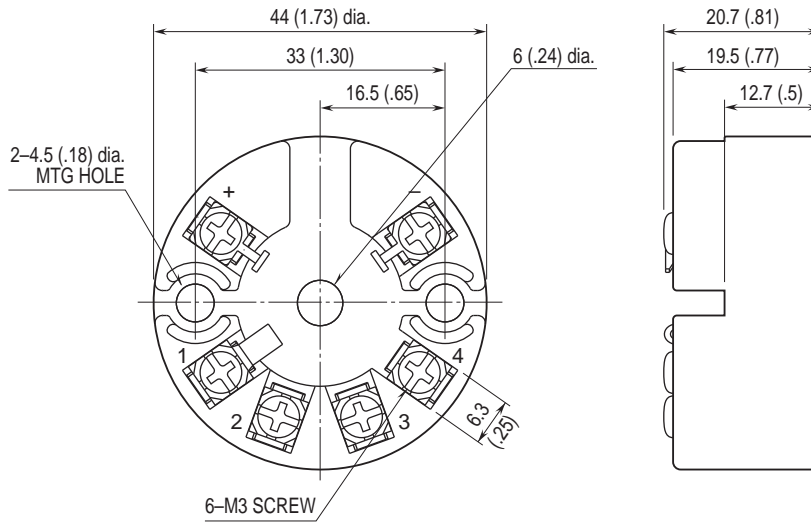
T6: -40 to +45°C

**Ex-data:**

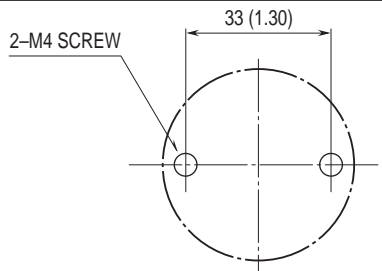
- Output circuit
  - Ui (Vmax): 30 V DC
  - Ii (Imax): 96 mA DC
  - Pi (Pmax): 720 mW
  - Ci: 1 nF
  - Li: 0 mH
- Sensor circuit
  - Uo (Voc): 30 V DC
  - Io (Isc): 24 mA DC
  - Po: 180 mW
  - Co (Ca): 50 nF
  - Lo (La): 40 mH



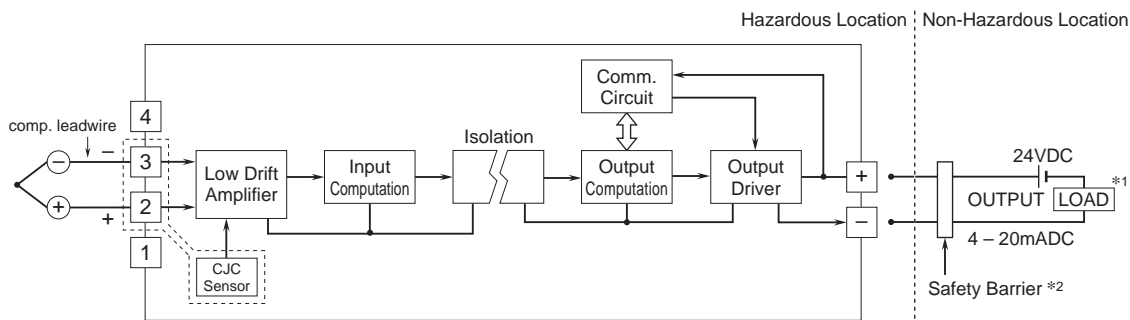
## DIMENSIONS unit: mm (inch)



## 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.