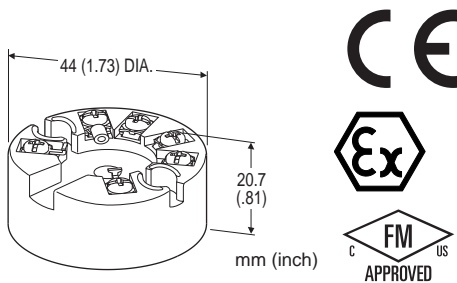


Head-mounted Two-wire Signal Conditioners 27-UNIT

2-WIRE UNIVERSAL TEMPERATURE TRANSMITTER (PC programmable)

Functions & Features

- Universal input: mV, T/C, RTD and resistance
- Suitable for Functional Safety applications up to SIL2
- Programming via PC Configurator
- A wide variety of T/C and RTD types
- User's temperature table can be used
- Self diagnostics
- Low temperature drift
- CE marking (conforms to ATEX and EMC)



MODEL: 27U-[1]

ORDERING INFORMATION

- Code number: 27U-[1]
- Specify a code from below for [1].
(e.g. 27U-0)
- Use Ordering Information Sheet (No. ESU-7656). 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, single input, 0 to 100°C, internal CJC sensor.
See Table 1 for the available input type, the minimum span and the maximum range.
- DC mV
Input resistance: $\geq 1 \text{ M}\Omega$
 - THERMOCOUPLE (dual input available)
Input resistance: $\geq 1 \text{ M}\Omega$
 - RTD (2-wire, 3-wire or 4-wire)
Input resistance: $\geq 1 \text{ M}\Omega$
Excitation: $\leq 0.25 \text{ mA}$
Allowable leadwire resistance: Max. 10 Ω per wire
 - RESISTANCE (2-wire, 3-wire or 4-wire)
Input resistance: $\geq 1 \text{ M}\Omega$
Excitation: 0.25 mA
Allowable leadwire resistance: Max. 10 Ω per wire

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. (660 msec. with dual input)
- Output characteristics for dual input:

Average or Differential selectable

CENELEC: Intrinsic safety (ATEX)
 II 1G, Ex ia IIC; T4, T5 and T6
(EN 60079-11: 2007)

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 the greatest. Add the CJC error for T/C input.

(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: $0.0075\ \%/^\circ\text{C}$ ($0.0004\ \%/^\circ\text{F}$) of max. range (max. range = 0 % or 100 % value, absolute value of whichever is greater.)

Response time: ≤ 1 sec. (0 – 90 %) or ≤ 2 sec. (4-wire RTD or dual input T/C; 0 – 90 %) with damping time set to 0

Supply voltage effect: ± 0.01 % of span/V

Insulation resistance: $\geq 100\ \text{M}\Omega$ 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

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)

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

INPUT TYPE, RANGE & ACCURACY

■ INPUT TYPE, RANGE & ACCURACY

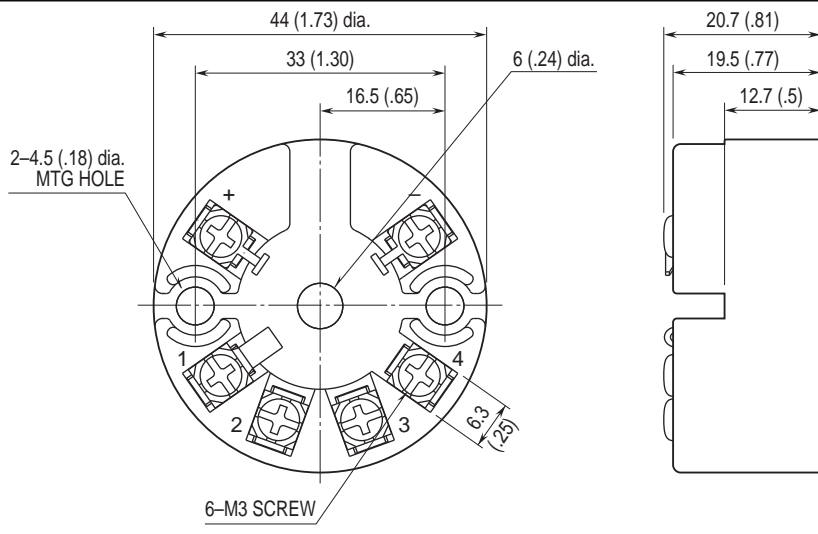
Table 1

INPUT TYPE	MIN. SPAN	MAXIMUM RANGE	ACCURACY			
DC mV	4 mV	-10 to 100 mV	±10 μV			
Resistance	25 Ω	0 to 4000 Ω	±0.1 Ω			
THERMOCOUPLE	°C			°F		
	MIN. SPAN	MAXIMUM RANGE	ACCURACY	MIN. SPAN	MAXIMUM RANGE	ACCURACY
K (CA)	50	-180 to +1372	±0.5	90	-292 to +2501	±0.9
E (CRC)	50	-100 to +1000	±0.5	90	-148 to +1832	±0.9
J (IC)	50	-100 to +1200	±0.5	90	-148 to +2192	±0.9
T (CC)	50	-200 to +400	±0.5	90	-328 to +752	±0.9
B (RH)	100	400 to 1820	±1 *1	180	752 to 3308	±1.8 *1
R	100	-50 to +1760	±1 *2	180	-58 to +3200	±1.8 *2
S	100	-50 to +1760	±1 *2	180	-58 to +3200	±1.8 *2
C (WRe 5-26)	100	0 to 2300	±1	180	32 to 4172	±1.8
D (WRe 3-25)	100	0 to 2300	±1	180	32 to 4172	±1.8
N	50	-180 to +1300	±0.5	90	-292 to +2372	±0.9
U	50	-200 to +600	±0.5	90	-328 to +1112	±0.9
L	50	-100 to +900	±0.5	90	-148 to +1652	±0.9
RTD	°C			°F		
	MIN. SPAN	MAXIMUM RANGE	ACCURACY	MIN. SPAN	MAXIMUM RANGE	ACCURACY
Pt 100 (JIS '97, IEC)	10	-200 to +850	±0.15	18	-328 to +1562	±0.27
Pt 500	10	-200 to +850	±0.15	18	-328 to +1562	±0.27
Pt 1000	10	-200 to +850	±0.15	18	-328 to +1562	±0.27
JPt 100 (JIS '89)	10	-200 to +510	±0.15	18	-328 to +950	±0.27

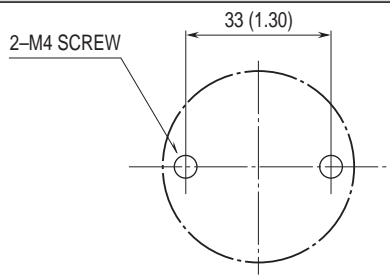
*1. 2°C for 400 to 850°C range, 3.6°F for 752 to 1562°F range.

*2. 2°C for -50 to +100°C range, 3.6°F for -58 to +212°F range.

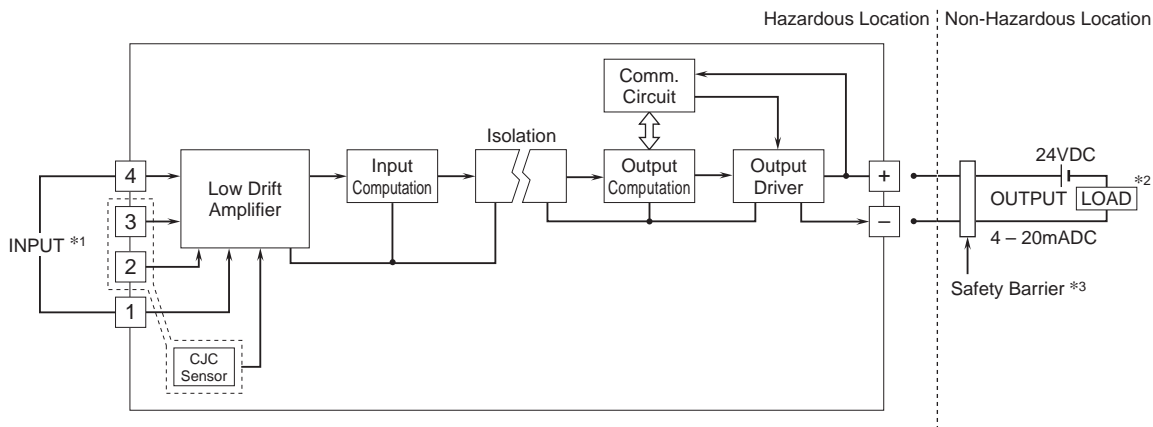
DIMENSIONS unit: mm (inch)



MOUNTING REQUIREMENTS unit: mm (inch)

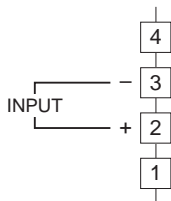


SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



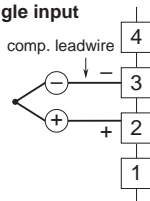
*1. Input Connection Examples

■ DC MILLIVOLT

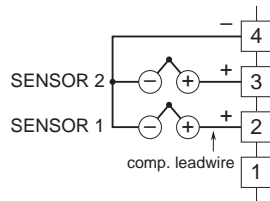


■ THERMOCOUPLE

• Single input

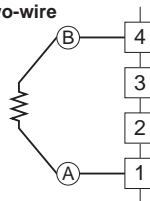


• Dual input

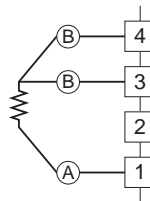


■ RTD & RESISTANCE

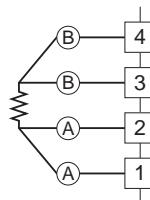
• Two-wire



• Three-wire



• Four-wire



*2. Limited to 250 – 500Ω when using the communication to configure the module.

*3. 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.