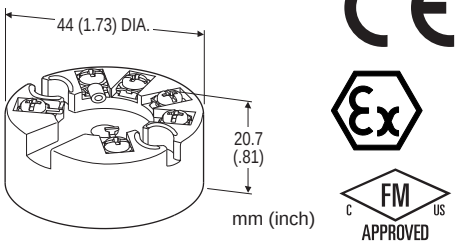
Head-mounted Two-wire Signal Conditioners
27-UNIT

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)



FM C US APPROVED

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.
See Table 1 for the available input type, the minimum span and the maximum range.

■ **DC mV**
Input resistance: ≥ 1 MΩ
■ **Thermocouple (dual input available)**
Input resistance: ≥ 1 MΩ
■ **RTD (2-wire, 3-wire or 4-wire)**
Input resistance: ≥ 1 MΩ
Excitation: ≤ 0.25 mA
Allowable leadwire resistance: Max. 10 Ω per wire
■ **Resistance (2-wire, 3-wire or 4-wire)**
Input resistance: ≥ 1 MΩ
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:

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France : Tél. 04 73 98 26 98 - Fax 04 73 98 26 99 - International : Tél. (33) 4 7398 2698 - Fax. (33) 4 7398 2699
E-mail : sales.dpt@fujielectric.fr – WEB : www.fujielectric.fr

Average or Differential selectable

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: ±0.5°C (±0.9°F)
Temp. coefficient: 0.0075 %/°C (0.004 %/°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, 4-wire resistance or dual input T/C; 0 – 90 %) with damping time set to 0
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)
CENELEC: Intrinsic safety (ATEX)
Ⓔx II 1G, Ex ia IIC; T4, T5 and T6
(EN 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

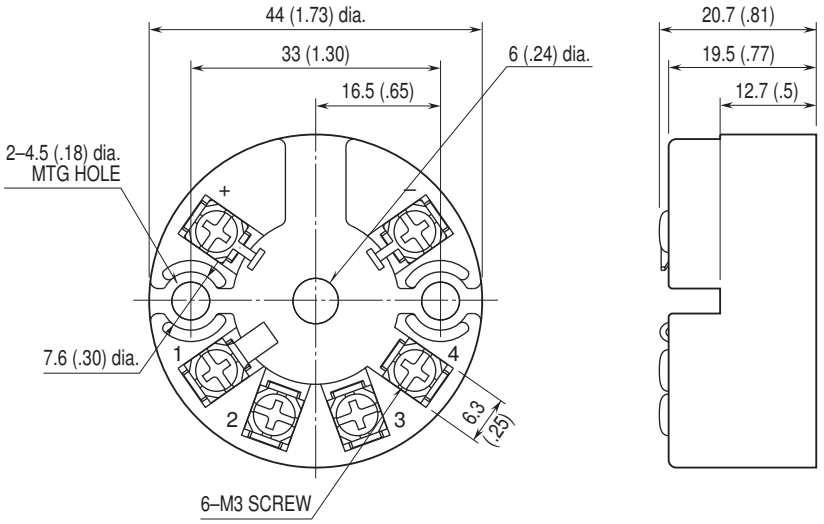
INPUT TYPE, RANGE & ACCURACY

■ **INPUT TYPE, RANGE & ACCURACY** Table 1

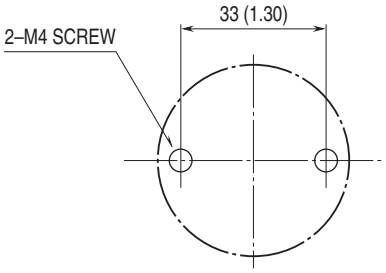
INPUT TYPE	MIN. SPAN	MAXIMUM RANGE	ACCURACY			
DC mV	4 mV	-10 to +100 mV	±10 μV			
Resistance	25 Ω	0 to 4000 Ω	±0.1 Ω			
THERMOCOUPLE	°C			°F		
	MIN. SPAN	MAXIMUM RANGE	ACCURACY	MIN. SPAN	MAXIMUM RANGE	ACCURACY
K (CA)	50	-180 to +1372	±0.5	90	-292 to +2501	±0.9
E (CRC)	50	-100 to +1000	±0.5	90	-148 to +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)

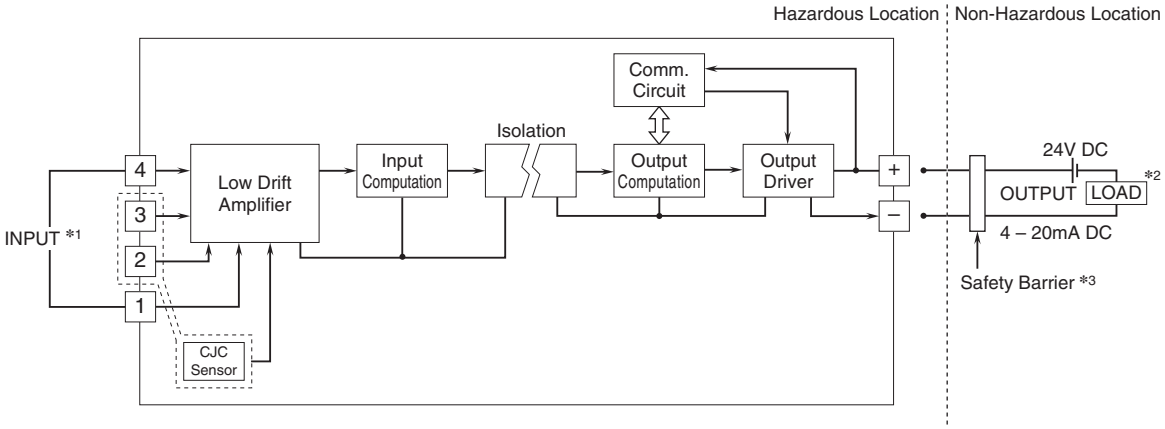


MOUNTING REQUIREMENTS unit: mm (inch)



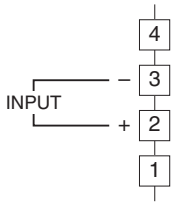
The screws are to be provided by the customer.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



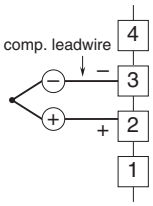
*1. Input Connection Examples

■ **DC MILLIVOLT**

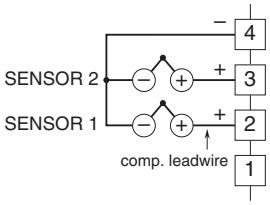


■ **THERMOCOUPLE**

• **Single input**

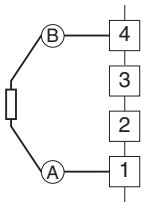


• **Dual input**

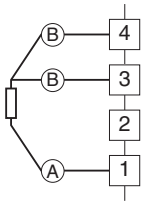


■ **RTD & RESISTANCE**

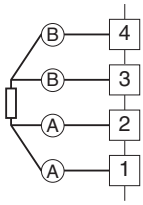
• **Two-wire**



• **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.

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