

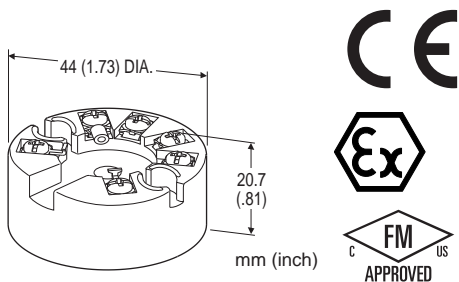
## Head-mounted Two-wire Signal Conditioners 27-UNIT

### RTD TRANSMITTER

(PC programmable; non-isolated)

#### Functions & Features

- Accepts direct input from an RTD and provides a standard 4 - 20 mA 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



## MODEL: 27R-[1][2]

### ORDERING INFORMATION

- Code number: 27R-[1][2]
- Specify a code from below for each of [1] and [2].  
(e.g. 27R-0/M)
- Use Ordering Information Sheet (No. ESU-7653). 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  
(Option code /M is not selectable)
- 2: ATEX intrinsic safety  
(Option code /M is not selectable)

### [2] OPTIONS

#### Function Monitor LED

- Blank: Without
- /M: With

### 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)
- Function monitor LED:** Input status and error status are displayed by blinking mode.
- User-configurable items:** PC and the transmitter are connected with the COP-HU.
  - Input sensor type
  - Number of wires
  - 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 Pt 100 (JIS '97, IEC), 0 to 100°C.

#### ■ RTD (2-wire, 3-wire or 4-wire)

**Input resistance:** ≥ 1 MΩ

**Excitation:** 0.2 mA

**Allowable leadwire resistance:** Max. 10 Ω per wire

#### Temperature Range

RTD		MIN. SPAN	USABLE RANGE
Pt 100 (JIS '97, IEC)	°C	10	-200 to +850
	°F	18	-328 to +1562
Pt 500	°C	10	-200 to +850
	°F	18	-328 to +1562
Pt 1000	°C	10	-200 to +850
	°F	18	-328 to +1562
JPt 100 (JIS '89)	°C	10	-200 to +510
	°F	18	-328 to +950

### 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.

ATEX: Intrinsic safety

⊕ II 1G, Ex ia IIC; T4, T5 and T6

(EN 60079-0)

(EN 60079-11)

## 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:**  $\pm 0.15^\circ\text{C}$  ( $\pm 0.27^\circ\text{F}$ ),  $\pm 0.075\%$  of span or

$\pm 0.075\%$  of max. range, whichever is greater

(max. range = 0 % or 100 % value, absolute value of whichever is greater.)

**Temp. coefficient:**  $0.0075\%/^\circ\text{C}$  ( $0.004\%/^\circ\text{F}$ ) of max. range

(max. range = 0 % or 100 % value, absolute value of whichever is greater.)

**Response time:**  $\leq 1$  sec. (2- or 3-wire; 0 - 90 %) or

$\leq 2$  sec. (4-wire; 0 - 90 %) with damping time set to 0

**Burnout response time:**  $\leq 2$  sec.

**Supply voltage effect:**  $\pm 0.01\%$  of span/V

**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)

## 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

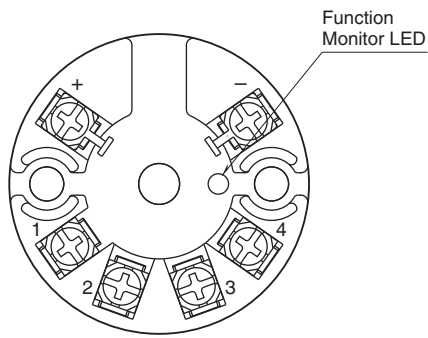
Io (Isc): 24 mA DC

Po: 180 mW

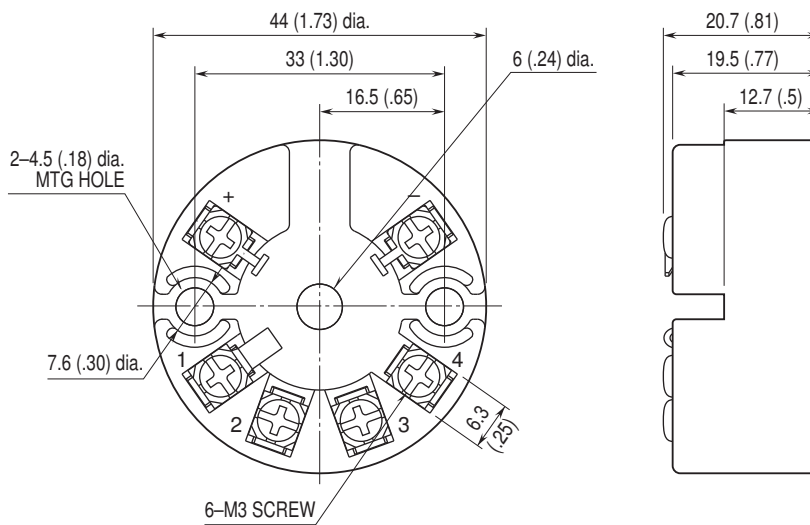
Co (Ca): 50 nF

Lo (La): 40 mH

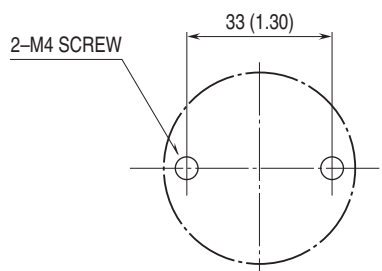
**FUNCTION MONITOR LED (option /M)**



**EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)**

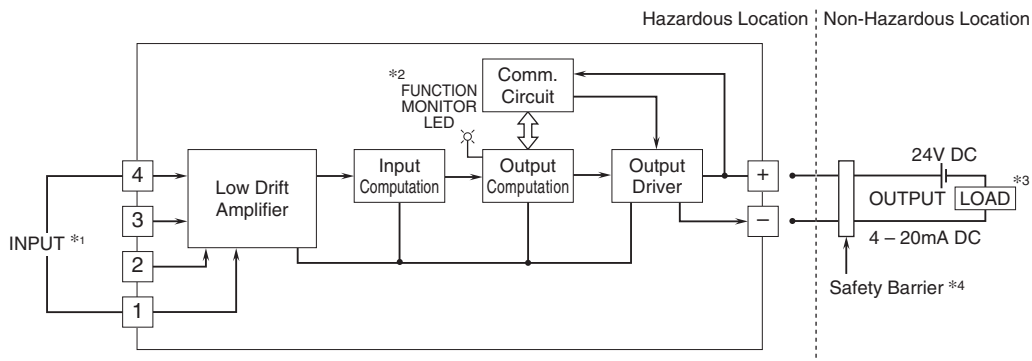


**MOUNTING REQUIREMENTS unit: mm (inch)**



The screws are to be provided by the customer.

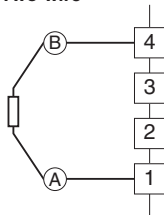
## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



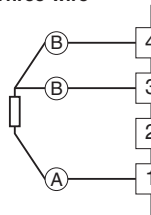
\*1. Input Connection Examples

■ **RTD & RESISTANCE**

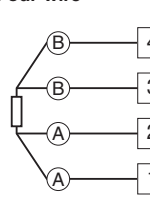
• **Two-wire**



• **Three-wire**



• **Four-wire**



\*2. Option /M

\*3. Limited to 250 – 500Ω when using the communication to configure the module.

\*4. 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.