

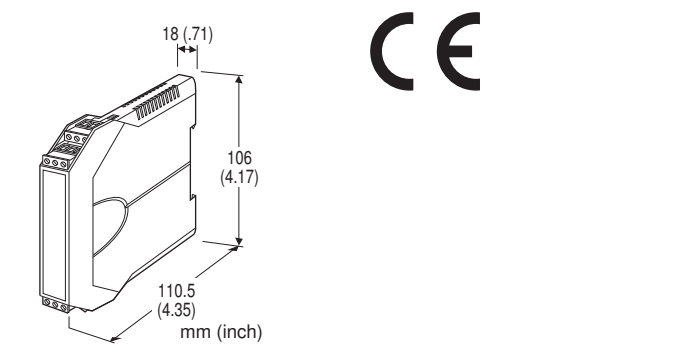
**Space-saving Two-wire Signal Conditioners B3-UNIT**

(No. ESU-7501)

**2-WIRE UNIVERSAL TEMPERATURE TRANSMITTER**  
(HART communication, low temp. drift)

**Functions & Features**

- Universal input: Voltage, T/C, RTD and resistance
- High accuracy
- HART communication
- Programming via hand-held communicator or via PC
- A wide variety of T/C and RTD types
- User's temperature table can be used
- Self diagnostics
- Input-output isolated



**MODEL: B3HU2-0[1]**

**ORDERING INFORMATION**

- Code number: B3HU2-0[1]
- Specify a code from below for [1].  
(e.g. B3HU2-0/Q)
- Specify the specification for option code /Q  
(e.g. /C01/SET)

**SAFETY APPROVAL**

0: None

**[1] OPTIONS**

blank: none

/Q: With options (specify the specification)

**SPECIFICATIONS OF OPTION: Q (multiple selections)**

**COATING (For the detail, refer to M-System's web site.)**

- /C01: Silicone coating
- /C02: Polyurethane coating
- /C03: Rubber coating

**EX-FACTORY SETTING**

/SET: Preset according to the Ordering Information Sheet

**RELATED PRODUCTS**

- USB interface Bell202 modem (model: COP-HU)
- PC configurator software (model: B3HU2CFG)

**GENERAL SPECIFICATIONS**

- Construction:** Stand-alone; terminal access at the front
- Degree of protection:** IP20
- Connection:** Euro type connector terminal  
(applicable wire size: 0.2 to 2.5 mm<sup>2</sup>, stripped length 8 mm)
- Housing material:** Flame-resistant resin (gray)
- 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

**HART COMMUNICATION**

- Protocol:** HART communication protocol
- HART version:** 7
- HART address range:** 0 - 63 (factory set to 0)
- Transmission speed:** 1200 bps
- Digital current:** Approx. 1 mA<sub>p-p</sub> when communicating
- Character format:** 1 Start Bit, 8 Data Bits, 1 Odd Parity Bit, 1 Stop Bit
- Distance:** 1.5 km (0.9 miles)
- HART communication mode:** Master-Slave Mode and Burst Mode (factory set to Master-Slave)
- HART network mode:** Point-to-Point Mode and Multi-drop Mode; automatically set to Multi-drop Mode when the address is set to other than 0.

**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.
- **Voltage**  
Input resistance: ≥ 1 MΩ
- **Thermocouple (dual input available)**  
Input resistance: ≥ 1 MΩ

**■ 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.  $10 \text{ }\Omega$  per wire**■ Resistance (2-wire, 3-wire or 4-wire)**Input resistance:  $\geq 1 \text{ M}\Omega$ Excitation:  $0.25 \text{ mA}$ Allowable leadwire resistance: Max.  $10 \text{ }\Omega$  per wire**STANDARDS & APPROVALS**

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

EN 50581

**OUTPUT SPECIFICATIONS**Output range:  $4 - 20 \text{ mA DC}$ Operational range:  $3.75 - 23 \text{ mA}$ 

Load resistance vs. supply voltage:

Load Resistance ( $\Omega$ ) = (Supply Voltage (V) - 9 (V))  $\div$  0.023  
(A) (including leadwire resistance)Burnout:  $3.75 - 3.8 \text{ mA}$  or  $21.5 - 23 \text{ mA}$ (factory set to  $23 \text{ mA}$ )

Upper output limit proportional to the input:

 $20 - 21.5 \text{ mA}$  (factory set to  $21.5 \text{ mA}$ )

Lower output limit proportional to the input:

 $3.8 - 4 \text{ mA}$  (factory set to  $3.8 \text{ mA}$ )Update time:  $440 \text{ msec.}$  ( $660 \text{ msec.}$  with dual input)

Output characteristics for dual input:

Average or Differential selectable

**INSTALLATION**

Supply voltage

• DC:  $9 - 35 \text{ V DC}$ Operating temperature:  $-40$  to  $+85^\circ\text{C}$  ( $-40$  to  $+185^\circ\text{F}$ )Operating humidity:  $0$  to  $95 \text{ \%RH}$  (non-condensing)

Mounting: DIN rail

Weight:  $80 \text{ g}$  ( $2.8 \text{ oz}$ )**PERFORMANCE**Accuracy: As indicated in Table 1<sup>1</sup>,  $\pm 0.075 \text{ \%}$  of span or  $\pm 0.075 \text{ \%}$  of max. range<sup>2</sup>, whichever is the greatest.

Add the CJC error for T/C input.

\*1: max. range =  $0 \text{ \%}$  or  $100 \text{ \%}$  input setting value, absolute value of whichever is greater.(e.g.  $100^\circ\text{C}$  for  $-10$  to  $+100^\circ\text{C}$ ,  $200^\circ\text{C}$  for  $-200$  to  $+50^\circ\text{C}$ )

Cold junction compensation error (thermocouple input):

 $\pm 1.0^\circ\text{C}$  ( $\pm 1.8^\circ\text{F}$ )Temp. coefficient:  $0.0075 \text{ \%}/^\circ\text{C}$  ( $0.004 \text{ \%}/^\circ\text{F}$ ) of max. rangeResponse time:  $\leq 1 \text{ sec.}$  ( $0 - 90 \text{ \%}$ ) or  $\leq 2 \text{ sec.}$  ( $4\text{-wire RTD}$ ,  $4\text{-wire resistance}$  or dual input T/C;  $0 - 90 \text{ \%}$ ) with damping time set to  $0$ Supply voltage effect:  $\pm 0.01 \text{ \%}$  of span/VInsulation resistance:  $\geq 100 \text{ M}\Omega$  with  $500 \text{ V DC}$ Dielectric strength:  $1500 \text{ V AC}$  @1 minute (input to output)

**INPUT TYPE, RANGE & ACCURACY**
**INPUT TYPE, RANGE & ACCURACY**

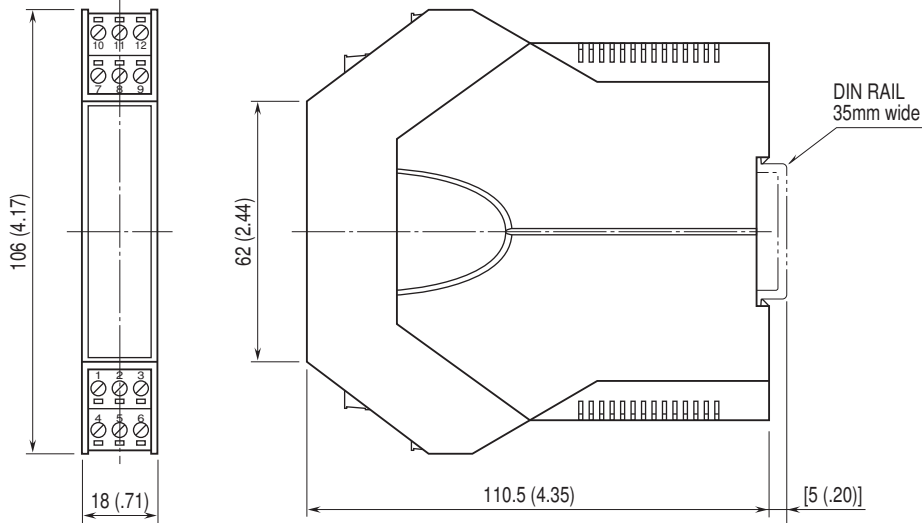
Table 1

INPUT TYPE	MIN. SPAN	INPUT RANGE	ACCURACY			
Voltage	4 mV	-10 to +100 mV	±10 μV			
Resistance	25 Ω	0 to 4000 Ω	±0.1 Ω			
THERMOCOUPLE	°C			°F		
	MIN. SPAN	INPUT 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	INPUT 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

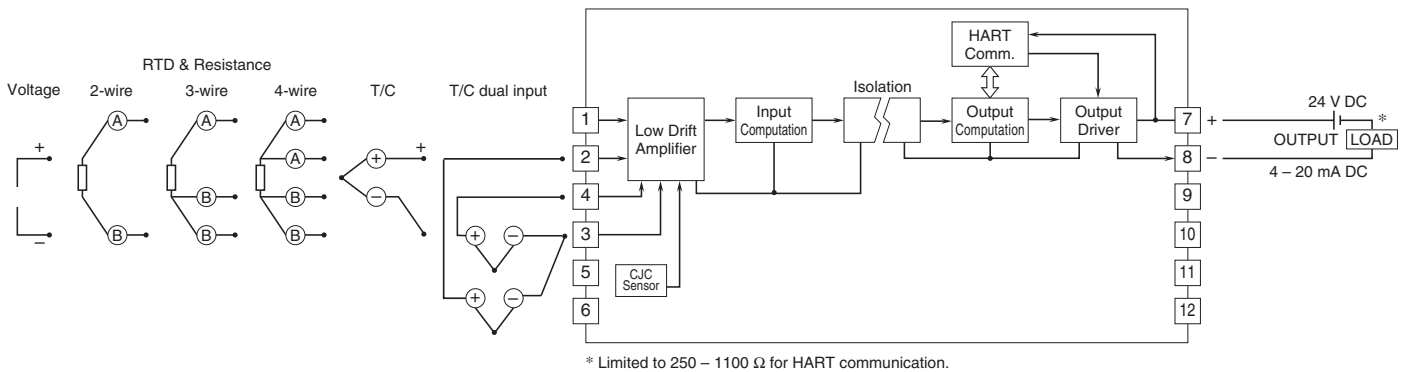
\*1. 2°C for 400 to 850°C range, 3.6°F for 752 to 1562°F range.

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

**DIMENSIONS unit: mm (inch)**



**SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM**



Specifications are subject to change without notice.