

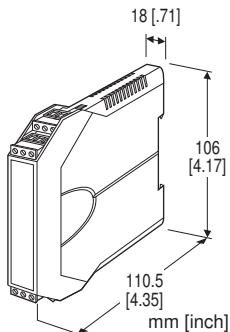
## Space-saving Two-wire Signal Conditioners B3-UNIT

### 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 our web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet  
(No. ESU-7501)

### 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:  $\geq 1 \text{ M}\Omega$

■ **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.  $10 \Omega$  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.  $10 \Omega$  per wire

## STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

## 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. range

Response 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/V

Insulation 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

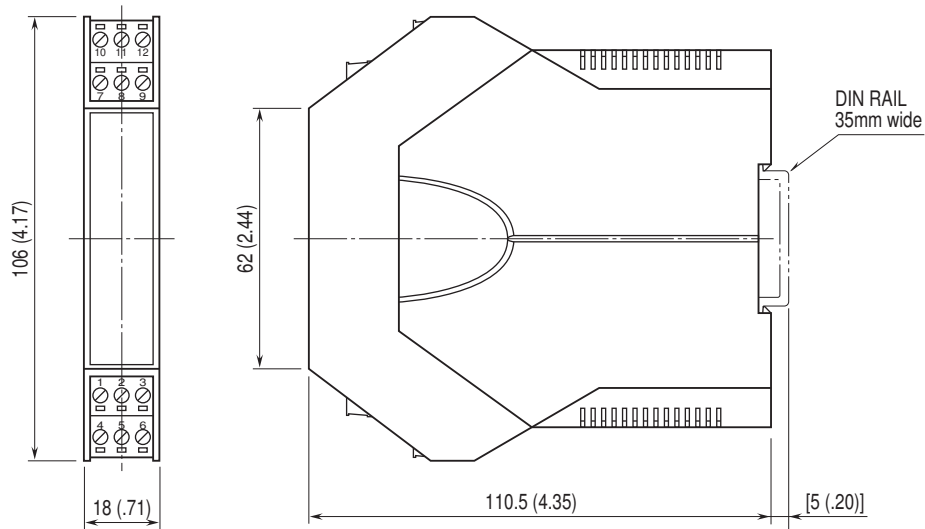
Table 1

| 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    |

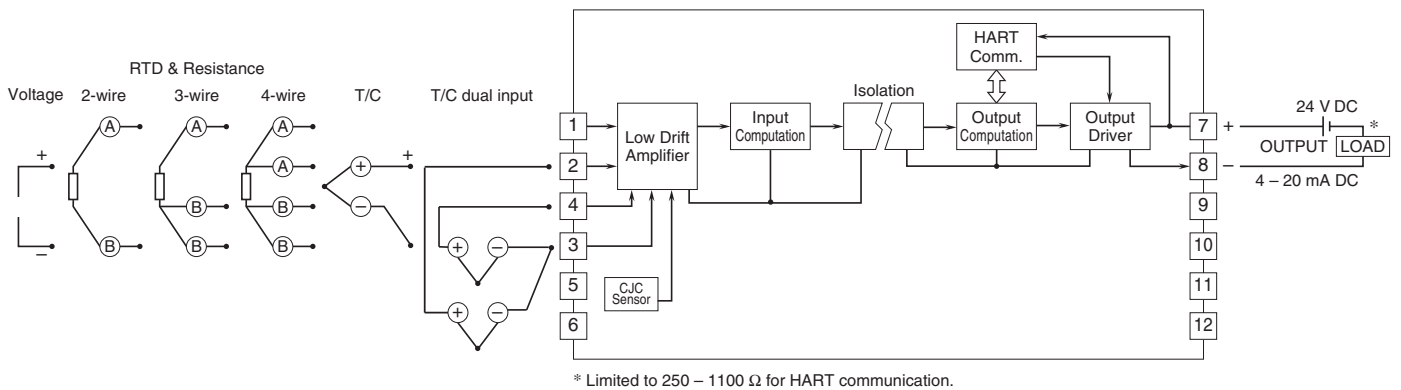
\*1. 2°C for 400 to 850°C range, 3.6°F for 752 to 1562°F range.

\*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.