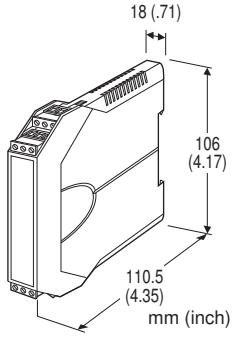
# Space-saving Two-wire Signal Conditioners B3-UNIT

**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




CE

## 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 (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 $mm^2$, 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 mAp-p 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:** ≥ 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:**
Average or Differential selectable

## INSTALLATION

**Supply voltage**
•**DC**: 9 – 35 V DC
**Operating temperature:** -40 to +85°C (-40 to +185°F)
**Operating humidity**: 0 to 95 %RH (non-condensing)
**Mounting**: DIN rail
**Weight**: 80 g (2.8 oz)

## PERFORMANCE

**Accuracy**: As indicated in Table 1[*1], ±0.075 % of span or ±0.075 % of max. range[*2], whichever is the greatest.
Add the CJC error for T/C input.
*1: max. range = 0 % or 100 % input setting value, absolute value of whichever is greater.
(e.g. 100℃ for -10 to +100℃, 200℃ for -200 to +50℃)
**Cold junction compensation error (thermocouple input)**: ±1.0°C (±1.8°F)
**Temp. coefficient:** 0.0075 %/°C (0.004 %/°F) of max. range
**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)

## STANDARDS & APPROVALS

**EU conformity**:
EMC Directive
EMI EN 61000-6-4
EMS EN 61000-6-2
RoHS Directive

## INPUT TYPE, RANGE & ACCURACY

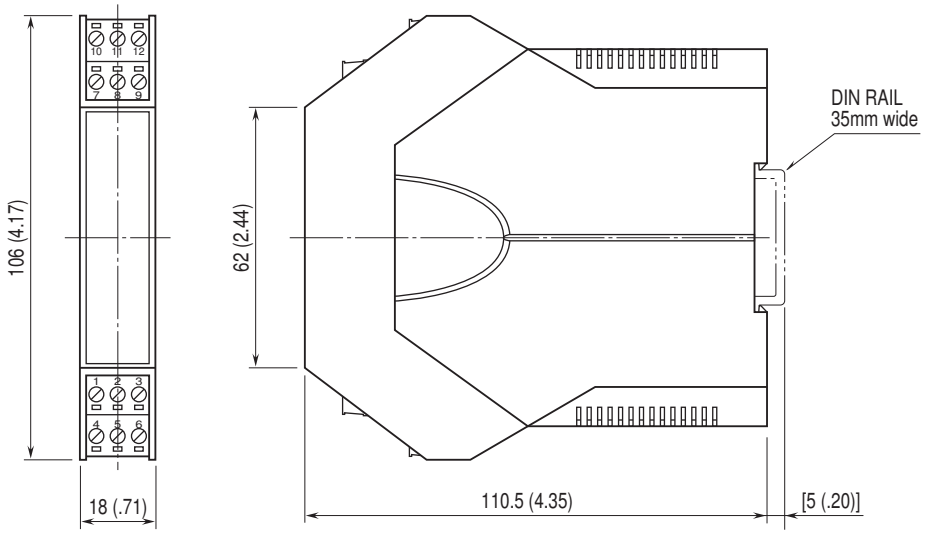
■ **INPUT TYPE, RANGE & ACCURACY** **Table 1**

| 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 |

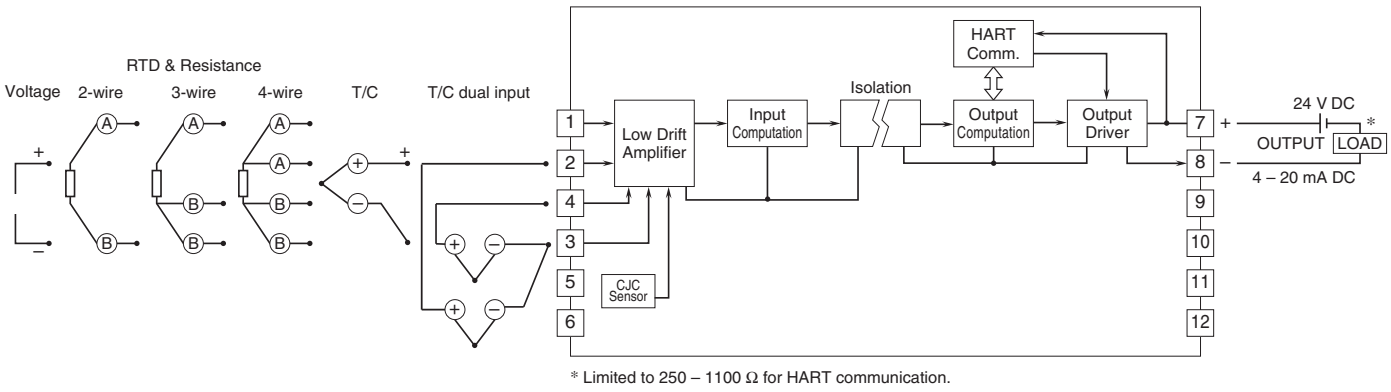
*1. 2°C for 400 to 850°C range, 3.6°F for 752 to 1562°F range.

*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.