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

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 mm², 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

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

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/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, ±0.075 % of span or ±0.075 % of max. range, 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°C for -10 to +100°C, 200°C for -200 to +50°C)
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)
### Input Type, Range & Accuracy

<table>
<thead>
<tr>
<th>INPUT TYPE</th>
<th>MIN. SPAN</th>
<th>INPUT RANGE</th>
<th>ACCURACY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>4 mV</td>
<td>-10 to +100 mV</td>
<td>±10 µV</td>
</tr>
<tr>
<td>Resistance</td>
<td>25 Ω</td>
<td>0 to 4000 Ω</td>
<td>±0.1 Ω</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>THERMOCOUPLE</th>
<th>MIN. SPAN</th>
<th>INPUT RANGE</th>
<th>ACCURACY</th>
<th>MIN. SPAN</th>
<th>MAXIMUM RANGE</th>
<th>ACCURACY</th>
</tr>
</thead>
<tbody>
<tr>
<td>K (CA)</td>
<td>50</td>
<td>-180 to +1372 °C</td>
<td>±0.5 °C</td>
<td>90</td>
<td>-292 to +2501 °F</td>
<td>±0.9 °F</td>
</tr>
<tr>
<td>E (CRC)</td>
<td>50</td>
<td>-100 to +1000 °C</td>
<td>±0.5 °C</td>
<td>90</td>
<td>-148 to +1832 °F</td>
<td>±0.9 °F</td>
</tr>
<tr>
<td>J (IC)</td>
<td>50</td>
<td>-100 to +1200 °C</td>
<td>±0.5 °C</td>
<td>90</td>
<td>-148 to +2192 °F</td>
<td>±0.9 °F</td>
</tr>
<tr>
<td>T (CC)</td>
<td>50</td>
<td>-200 to +400 °C</td>
<td>±0.5 °C</td>
<td>90</td>
<td>-328 to +752 °F</td>
<td>±0.9 °F</td>
</tr>
<tr>
<td>B (RH)</td>
<td>100</td>
<td>400 to +1820 °C</td>
<td>±1 °C</td>
<td>180</td>
<td>752 to 3308 °F</td>
<td>±1.8 °F</td>
</tr>
<tr>
<td>R</td>
<td>100</td>
<td>-50 to +1760 °C</td>
<td>±1.2 °C</td>
<td>180</td>
<td>-58 to +3200 °F</td>
<td>±1.8 °F</td>
</tr>
<tr>
<td>S</td>
<td>100</td>
<td>-50 to +1760 °C</td>
<td>±1 °C</td>
<td>180</td>
<td>-58 to +3200 °F</td>
<td>±1.8 °C</td>
</tr>
<tr>
<td>C (WRe 5-26)</td>
<td>100</td>
<td>0 to +2300 °C</td>
<td>±1 °C</td>
<td>180</td>
<td>32 to 4172 °F</td>
<td>±1 °C</td>
</tr>
<tr>
<td>D (WRe 3-25)</td>
<td>100</td>
<td>0 to +2300 °C</td>
<td>±1 °C</td>
<td>180</td>
<td>32 to 4172 °F</td>
<td>±1 °C</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
<td>-180 to +1300 °C</td>
<td>±0.5 °C</td>
<td>90</td>
<td>-292 to +2372 °F</td>
<td>±0.9 °F</td>
</tr>
<tr>
<td>U</td>
<td>50</td>
<td>-200 to +600 °C</td>
<td>±0.5 °C</td>
<td>90</td>
<td>-328 to +1112 °F</td>
<td>±0.9 °F</td>
</tr>
<tr>
<td>L</td>
<td>50</td>
<td>-100 to +900 °C</td>
<td>±0.5 °C</td>
<td>90</td>
<td>-148 to +1652 °F</td>
<td>±0.9 °F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RTD</th>
<th>MIN. SPAN</th>
<th>INPUT RANGE</th>
<th>ACCURACY</th>
<th>MIN. SPAN</th>
<th>MAXIMUM RANGE</th>
<th>ACCURACY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt 100 (JIS '97, IEC)</td>
<td>10</td>
<td>-200 to +850 °C</td>
<td>±0.15 °C</td>
<td>18</td>
<td>-328 to +1562 °F</td>
<td>±0.27 °F</td>
</tr>
<tr>
<td>Pt 500</td>
<td>10</td>
<td>-200 to +850 °C</td>
<td>±0.15 °C</td>
<td>18</td>
<td>-328 to +1562 °F</td>
<td>±0.27 °F</td>
</tr>
<tr>
<td>Pt 1000</td>
<td>10</td>
<td>-200 to +850 °C</td>
<td>±0.15 °C</td>
<td>18</td>
<td>-328 to +1562 °F</td>
<td>±0.27 °F</td>
</tr>
<tr>
<td>JPt 100 (JIS '89)</td>
<td>10</td>
<td>-200 to +510 °C</td>
<td>±0.15 °C</td>
<td>18</td>
<td>-328 to +950 °F</td>
<td>±0.27 °F</td>
</tr>
</tbody>
</table>

*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.