

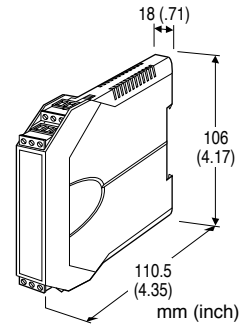
Space-saving Two-wire Signal Conditioners *B3-UNIT*

**2-WIRE UNIVERSAL TEMPERATURE TRANSMITTER
(PROFIBUS-PA)**

MODEL **B3PU**

MODEL & SUFFIX CODE SELECTION

MODEL _____ **B3PU**-□
 SAFETY APPROVAL _____
0 : None



Functions & Features

- Universal input: mV, V, T/C, RTD, resistance and potentiometer
- High accuracy
- PROFIBUS-PA communication
- A wide variety of T/C and RTD types
- Self diagnostics
- Input-output isolated

ORDERING INFORMATION

Specify code number. (e.g. B3PU-0)

RELATED PRODUCTS

- GSD (General Station Description) file
- EDDL (Electronic Device Description Language) file
 GSD and EDDL files are downloadable at M-System's web site: <http://www.m-system.co.jp>

GENERAL SPECIFICATIONS

Connection: Removable terminal block
Housing material: Flame-resistant resin (grey)
Isolation: Input to output
Data transmission: MBP (Manchester-coded Bus Powered) Mode
Device profile: PROFIBUS-PA Profile V3.0, Compact Class B
Device address: 0 to 126 (factory set to 126)
Cold junction compensation (T/C): CJC sensor incorporated

INPUT

The input is factory set for use with K thermocouple. See Table 1 for the available input type and the maximum range.

■ **DC mV & V**

Input resistance: 1MΩ minimum

■ **THERMOCOUPLE**

Input resistance: 1MΩ minimum

Burnout sensing: 130nA ±10%

■ **RTD (2-wire, 3-wire or 4-wire)**

Excitation: 0.2mA ±10%

Allowable leadwire resistance: Max. 20Ω per wire

■ **POTENTIOMETER**

Excitation: 0.2mA ±10%

Allowable leadwire resistance: Max. 20Ω per wire

■ **RESISTANCE (2-wire, 3-wire or 4-wire)**

Excitation: 0.2mA ±10%

Allowable leadwire resistance: Max. 20Ω per wire

OUTPUT

Output signal: Digital signals (refer to 'Communications')
Static current consumption: 12 ±1mA

COMMUNICATIONS

Digital signal: Manchester-coded signal
(conforms to IEC 61158-2)
Baud rate: 31.25 kbps
Protocol: PROFIBUS-DP-V1
Device profile: PROFIBUS-PA Profile V3.0,
Compact Class B

INSTALLATION

Supply voltage: 9 – 30V DC (automatic polarity detection)
Operating temperature: -40 to +85°C (-40 to +185°F)
Operating humidity: 0 to 95% RH (non-condensing)
Mounting: DIN rail
Dimensions: W18×H106×D110.5 mm (0.71"×4.17"×4.35")
Weight: 80 g (2.8 oz)

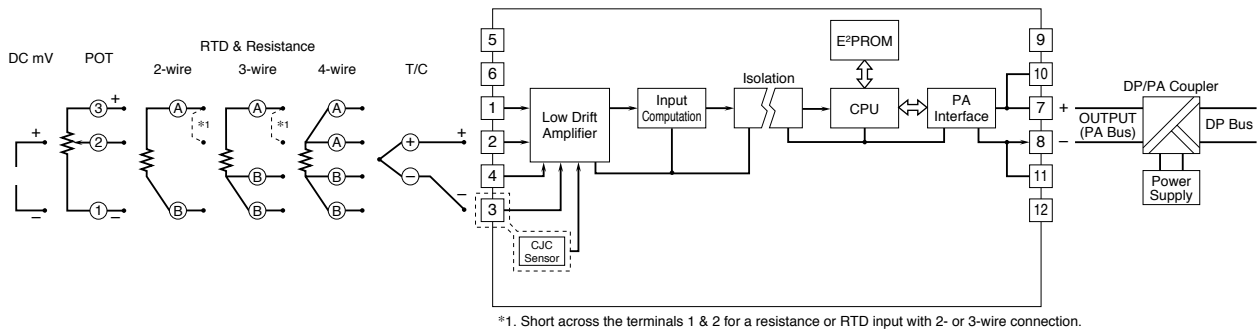
PERFORMANCE

Accuracy: See Table 1.
Cold junction compensation error: ±0.5°C (±0.9°F) maximum
Temp. coefficient: ±0.015%/°C (±0.008%/°F) at -5 to +55°C
Start-up time: Approx. 10 seconds
Response time: ≤2 seconds (0 – 90%) with damping time set to 0
Supply voltage effect: ±0.003% / 1V
Insulation resistance: ≥100MΩ with 500V DC (input to output)
Dielectric strength: 1500V AC @1 minute (input to output)

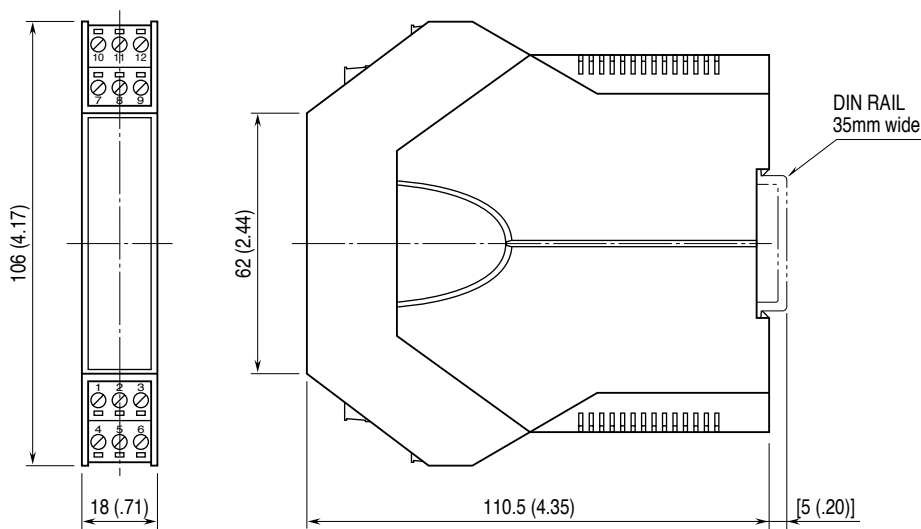
STANDARDS & APPROVALS

CE conformity: EMC Directive (2004/108/EC)
 EMI EN 61000-6-4
 EMS EN 61000-6-2

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



• When mounting, no extra space is needed between units.

INPUT TYPE, RANGE & ACCURACY

INPUT TYPE, RANGE & ACCURACY
Table 1

INPUT TYPE	MAXIMUM RANGE			ACCURACY		
DC mV & V	-16 to +16mV	-32 to +32mV	-50 to +64mV	$\pm 10\mu\text{V}$ or $\pm 0.04\%$ of reading, whichever is greater	$\pm 15\mu\text{V}$ or $\pm 0.04\%$ of reading, whichever is greater	$\pm 25\mu\text{V}$ or $\pm 0.04\%$ of reading, whichever is greater
	-50 to +128mV	-50 to +256mV	-50 to +500mV	$\pm 40\mu\text{V}$ or $\pm 0.04\%$ of reading, whichever is greater	$\pm 60\mu\text{V}$ or $\pm 0.04\%$ of reading, whichever is greater	$\pm 100\mu\text{V}$ or $\pm 0.04\%$ of reading, whichever is greater
	-50 to +1000mV			$\pm 120\mu\text{V}$ or $\pm 0.04\%$ of reading, whichever is greater		
Potentiometer	0 to 4000 Ω			$\pm 0.5\%$ (total resistance $\geq 10\Omega$) $\pm 0.2\%$ (total resistance $\geq 40\Omega$) $\pm 0.1\%$ (total resistance $\geq 80\Omega$)		
Resistance	0 to 200 Ω	0 to 500 Ω	0 to 1000 Ω	$\pm 0.06\Omega$ or $\pm 0.04\%$ of reading, whichever is greater ^{*1}		
	0 to 2000 Ω	0 to 4000 Ω		$\pm 0.1\Omega$ or $\pm 0.04\%$ of reading, whichever is greater ^{*1}		
				$\pm 0.2\Omega$ or $\pm 0.04\%$ of reading, whichever is greater ^{*1}		
				$\pm 0.4\Omega$ or $\pm 0.04\%$ of reading, whichever is greater ^{*1}		
				$\pm 0.6\Omega$ or $\pm 0.04\%$ of reading, whichever is greater ^{*1}		
Thermocouple	°C			°F		
	MAXIMUM RANGE	CONFORMANCE RANGE	ACCURACY ^{*2}	MAXIMUM RANGE	CONFORMANCE RANGE	ACCURACY ^{*2}
K (CA)	-270 to +1370	-150 to +1370	± 0.25	-454 to +2498	-238 to +2498	± 0.45
E (CRC)	-270 to +1000	-170 to +1000	± 0.20	-454 to +1832	-274 to +1832	± 0.36
J (IC)	-210 to +1200	-180 to +1200	± 0.25	-346 to +2192	-292 to +2192	± 0.45
T (CC)	-270 to +400	-170 to +400	± 0.25	-454 to +752	-274 to +752	± 0.45
B (RH)	100 to 1820	400 to 1760	± 0.75	212 to 3308	752 to 3200	± 1.35
R	-50 to +1760	200 to 1760	± 0.50	-58 to +3200	392 to 3200	± 0.90
S	-50 to +1760	200 to 1760	± 0.50	-58 to +3200	392 to 3200	± 0.90
C (WRe 5-26)	0 to 2315	0 to 2315	± 0.80	32 to 4199	32 to 4199	± 1.44
N	-270 to +1300	-130 to +1300	± 0.30	-454 to +2372	-202 to +2372	± 0.54
U	-200 to +600	-200 to +600	± 0.20	-328 to +1112	-328 to +1112	± 0.36
L	-200 to +900	-200 to +900	± 0.25	-328 to +1652	-328 to +1652	± 0.45
P (Platinel II)	0 to 1395	0 to 1395	± 0.25	32 to 2543	32 to 2543	± 0.45
RTD	°C			°F		
	MAXIMUM RANGE	ACCURACY ^{*3}		MAXIMUM RANGE	ACCURACY ^{*3}	
Pt 100 (JIS '97, IEC)	-200 to +850	± 0.15		-328 to +1562	± 0.27	
Pt 200 (JIS '97, IEC)	-200 to +850	± 0.15		-328 to +1562	± 0.27	
Pt 500 (JIS '97, IEC)	-200 to +850	± 0.15		-328 to +1562	± 0.27	
Pt 1000 (JIS '97, IEC)	-200 to +850	± 0.15		-328 to +1562	± 0.27	
Pt 50 (JIS '81)	-200 to +649	± 0.30		-328 to +1200	± 0.54	
Pt 100 (JIS '81)	-200 to +649	± 0.15		-328 to +1200	± 0.27	
Ni 120 (Edison curve No. 7)	-80 to +260	± 0.15		-112 to +500	± 0.27	
Cu 10 (@25°C)	-50 to +250	± 1.0		-58 to +482	± 1.8	

*1. For 2- or 3-wire resistance, the value is valid by the sensor calibration after the wiring.

*2. Or $\pm 0.04\%$ of reading, whichever is greater. Add Cold Junction Compensation Error 0.5°C (0.9°F).

*3. Or $\pm 0.04\%$ of reading, whichever is greater.

For 2- or 3-wire RTD, the value is valid by the sensor calibration after the wiring.