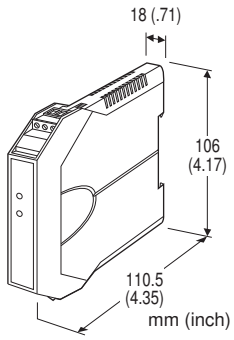
Space-saving Two-wire Signal Conditioners B3-UNIT

THERMOCOUPLE TRANSMITTER

(field-configurable)

Functions & Features

• Converts a thermocouple input into an isolated, linearized 4 – 20 mA DC signal
• DIP switch configurable input range
• Cold junction compensation, linearization and burnout
• Monitor terminals
• High-density mounting



MODEL: B3FT–[1][2]

ORDERING INFORMATION

• Code number: B3FT-[1][2]
Specify a code from below for each of [1] and [2].
(e.g. B3FT-1/UL/Q)
• Temperature range (e.g. J 0 – 400°C)
• If you need the transmitter to be calibrated to a specific range, please specify when ordering.
Non-specified orders will be shipped at default factory setting (K 0 – 300°C or E 0 – 250°C).
• Specify the specification for option code /Q
(e.g. /C01)

[1] INPUT THERMOCOUPLE

1: K (CA), J (IC), T (CC)
2: E (CRC), R, N

[2] OPTIONS (multiple selections)

Standards & Approvals
blank: CE marking
/UL: UL approval, CE marking
Other Options
blank: none
/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to M-System's web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating (UL not available)

GENERAL SPECIFICATIONS

Construction: Small-sized front terminal structure
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
Burnout: Upscale (default), downscale or no burnout selectable
Linearization: Standard
Cold junction compensation: CJC sensor attached to the input terminals
Configuration: DIP switch
Setting:
• Input Type
• Input Range
• Burnout
• Others
Refer to the instruction manual for details.

INPUT SPECIFICATIONS

Input resistance: 20 kΩ min.

Burnout sensing: 0.1 μA

K, J, T thermocouple, Celsius

T/C	UPPER RANGE (usable range)	LOWER RANGE	MIN. SPAN
K(CA)	-18 to +300°C	-18 to +190°C	75°C
	-18 to +1370°C	-18 to +850°C	300°C
J (IC)	-18 to +300°C	-18 to +190°C	70°C
	-18 to +1200°C	-18 to +750°C	300°C
T(CC)	-18 to +150°C	-18 to +75°C	75°C
	-18 to +400°C	-18 to +250°C	150°C

K, J, T thermocouple, Fahrenheit

T/C	UPPER RANGE (usable range)	LOWER RANGE	MIN. SPAN
K(CA)	0 to 572°F	0 to 374°F	135°F
	0 to 2498°F	0 to 1562°F	540°F
J (IC)	0 to 572°F	0 to 374°F	126°F
	0 to 2192°F	0 to 1382°F	540°F
T(CC)	0 to 302°F	0 to 167°F	135°F
	0 to 752°F	0 to 482°F	270°F

E, R, N thermocouple, Celsius

T/C	UPPER RANGE (usable range)	LOWER RANGE	MIN. SPAN
E(CRC)	-18 to +250°C	-18 to +120°C	60°C
	-18 to +1000°C	-18 to +600°C	250°C
R	-18 to +700°C	-18 to +340°C	360°C
	-18 to +1760°C	-18 to +1060°C	700°C
N	-18 to +400°C	-18 to +250°C	110°C
	-18 to +1300°C	-18 to +800°C	400°C

E, R, N thermocouple, Fahrenheit

T/C	UPPER RANGE (usable range)	LOWER RANGE	MIN. SPAN
E(CRC)	0 to 482°F	0 to 248°F	108°F
	0 to 1832°F	0 to 1112°F	450°F
R	0 to 1292°F	0 to 644°F	648°F
	0 to 3200°F	0 to 1940°F	1260°F
N	0 to 752°F	0 to 482°F	198°F
	0 to 2372°F	0 to 1472°F	720°F

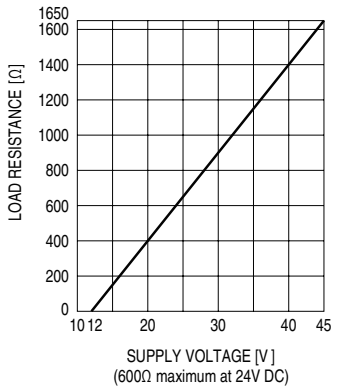
OUTPUT SPECIFICATIONS

Output: 4 – 20 mA DC

Load resistance vs. supply voltage:

Load Resistance (Ω) = (Supply Voltage (V) – 12 (V)) ÷ 0.02

(A) (including leadwire resistance)



INSTALLATION

Supply voltage: 12 – 45 V DC

Operating temperature:

-40 to +85°C (-40 to +185°F)

Max. 55°C (131°F) for UL approval

Operating humidity: 0 to 95 %RH (non-condensing)

Mounting: DIN rail

Weight: 80 g (2.8 oz)

PERFORMANCE in percentage of span

Accuracy

K, J: ±0.2 % of FS or ±0.3°C (±0.54°F), whichever is greater.

T, E, N: ±0.3 % of FS or ±0.4°C (±0.72°F), whichever is greater.

R: ±0.4 % of FS at ≥ 400°C or 752°F

Cold junction compensation error: ±0.5°C or ±0.9°F maximum for 0 – 55°C (32 – 131°F);

±2°C or ±3.6°F maximum for -40 – +85°C (-40 – +185°F)

Temp. coefficient: ±0.02 %/°C (±0.01 %/°F)

Response time: ≤ 0.5 sec. (0 – 90 %)

Burnout response: ≤ 10 sec.

Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength: 2000 V AC @1 minute (input to output to ground)

STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

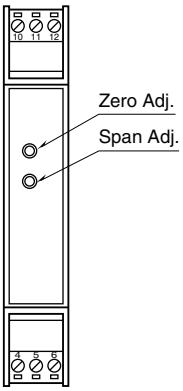
Approval:

UL/C-UL general safety requirements

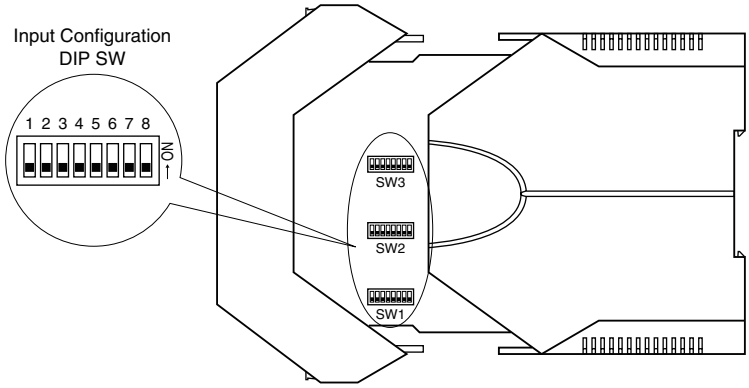
(UL 61010-1, CAN/CSA-C22.2 No.1010-1)

EXTERNAL VIEW

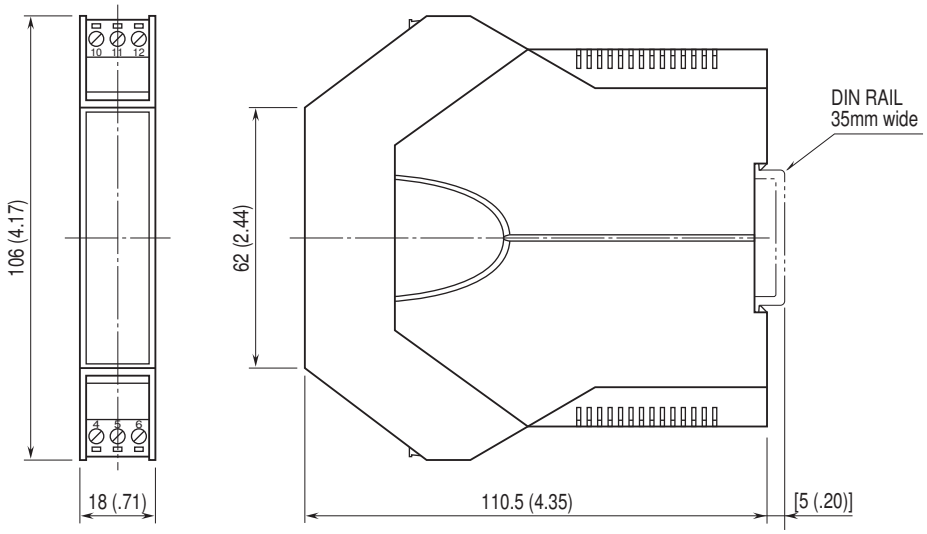
■ **FRONT VIEW**



■ **SIDE VIEW**

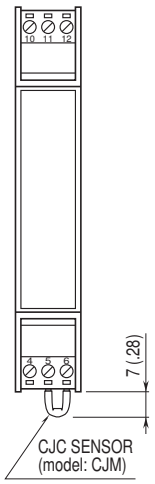


EXTERNAL DIMENSIONS unit: mm [inch]

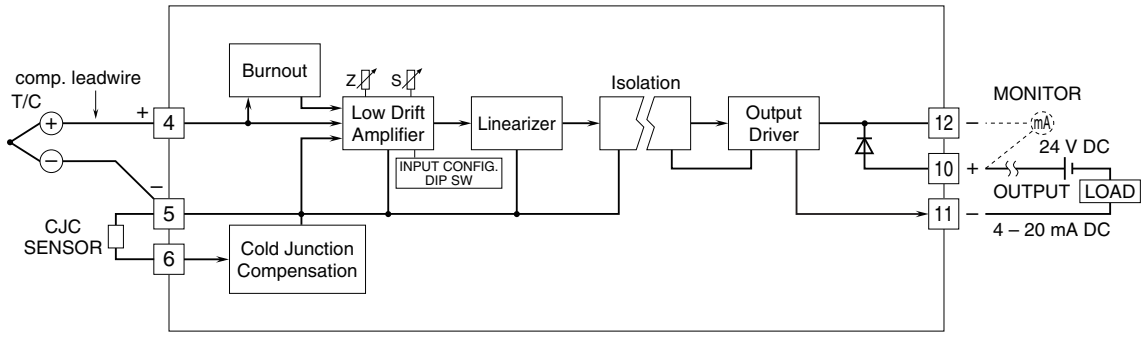


• When mounting, no extra space is needed between units.

TERMINAL ASSIGNMENTS unit: mm [inch]



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



⚠ Specifications are subject to change without notice.