

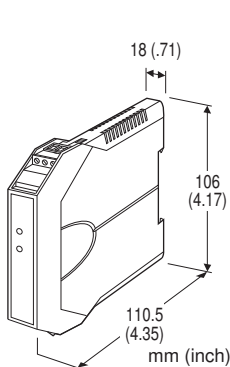
Space-saving Two-wire Signal Conditioners B3-UNIT

FREQUENCY TRANSMITTER

(field-configurable)

Functions & Features

- Converts the output from a pulse-type transducer into a 4 - 20 mA DC signal
- DIP switch configurable input range
- Monitor terminals
- High-density mounting



MODEL: B3FP[1]

ORDERING INFORMATION

- Code number: B3FP[1]

Specify a code from below for [1].

- (e.g. B3FP/UL/Q)
- Specify the specification for option code /Q (e.g. /C01)

• Orders will be shipped with default factory settings as shown below.

- Factory default setting:
Input type: Voltage pulse
Frequency range: 0 - 1000 Hz
Pulse amplitude: 5 Vp-p
DC offset: 2.5 V
Pulse sensing: DC coupled
Noise filter: None
Detecting level: High (2 V)

INPUT - Field-selectable

Open collector
Voltage pulse
Two-wire current pulse

[1] 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 mm², stripped length 8 mm)

Housing material: Flame-resistant resin (gray)

Isolation: Input to output

DIP/rotary switches: For input calibration
(Refer to the instruction manual)

Noise filter: Chattering protection filter selectable with DIP switches (time constant 1 msec.)

Pulse sensing: DC coupled or capacitor coupled selectable with DIP SW

INPUT SPECIFICATIONS

Measurable frequencies: 0 - 0.01 Hz through 100 kHz; Sine waves with frequencies lower than 0.1 Hz cannot be detected with capacitor coupling.

Pulse width time requirement: Min. 4 μsec. for both H and L levels

DC offset: Selectable within the maximum voltage for respective pulse amplitude setting.
(e.g. For the amplitude 2 Vp-p with the maximum voltage 10 V, DC offset can be as low as -9 V and as high as +9 V.)

Frequency offset: Selectable up to 50 % of the full-scale frequency.

■ Open Collector

Sensing voltage/current: Approx. 2.5 V DC @ 1mA

Detecting levels: ≤ 750 Ω / 0.7 V for ON;
≥ 3.0 kΩ / 1.3 V for OFF

■ Voltage Pulse

Waveform: Square or sine

Input impedance: 10 kΩ min.

Input amplitude: Min. 0.1 V p-p, max. 200 Vp-p

Max. voltage between input terminals: 100 V

(Max. voltage across the input terminals: 70 V for conform with EU Directive; 30 V rms, 42.4 V peak or 60 V DC for UL approval)

Detecting level: See the table below

■ **Two-wire Current Pulse**

Input resistance: Receiving resistor 200 Ω

Input range: 0 - 25 mA

Detecting level: See the table below

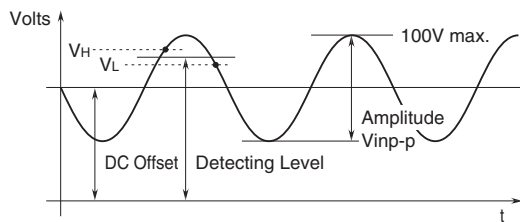
(Convert current into voltage using the receiving resistor value.)

DETECTING LEVEL	PULSE AMPLITUDE		
	0.1 – 2 Vp-p	2 – 10 Vp-p	10 – 200 Vp-p
Zero-cross	0V	0V	0V
Low level	45mV	60mV	300mV
Middle level	200mV	400mV	2V
High level	1V	2V	10V

DETECTING LEVEL	DEADBAND
Zero-cross	±15% of Amplitude, ≥45mV*
Low level	±15% of Amplitude, ≥40mV*
Middle level	±15% of Amplitude, ≥80mV*
High level	±40% of Detecting Level

* Minimum deadband required for the amplitude 0.1 – 2 Vp-p.

■ **VOLTAGE PULSE WAVEFORM**



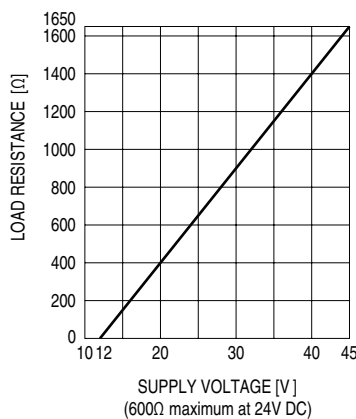
OUTPUT SPECIFICATIONS

Output: 4 - 20 mA DC

Load resistance vs. supply voltage:

$$\text{Load Resistance } (\Omega) = (\text{Supply Voltage (V)} - 12 \text{ (V)}) \div 0.02$$

(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: ±0.1 % (±0.3 % for frequencies below 10 Hz for sine waves detected with capacitor coupling)

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

Response time: Max. 0.5 sec. + 1 pulse cycle (0 - 90 %)

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

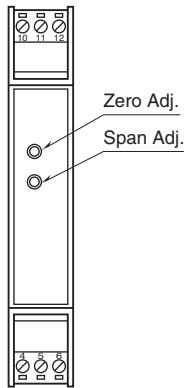
Approval:

UL/C-UL general safety requirements

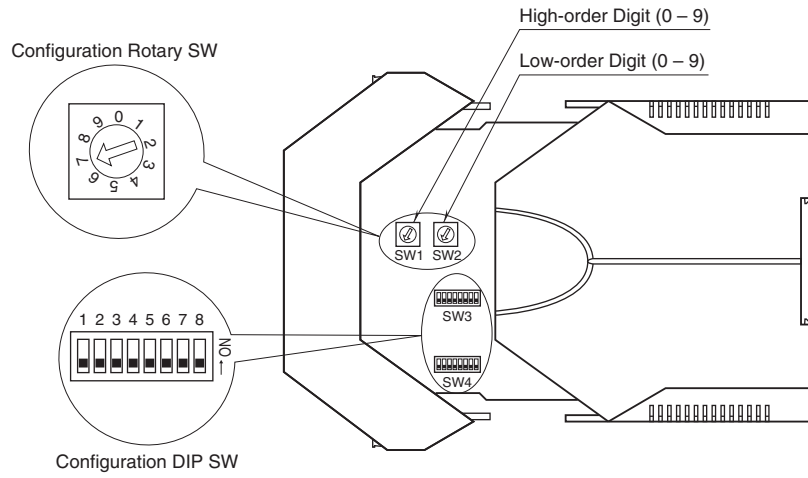
(UL 61010-1, CAN/CSA-C22.2 No.1010-1)

EXTERNAL VIEW

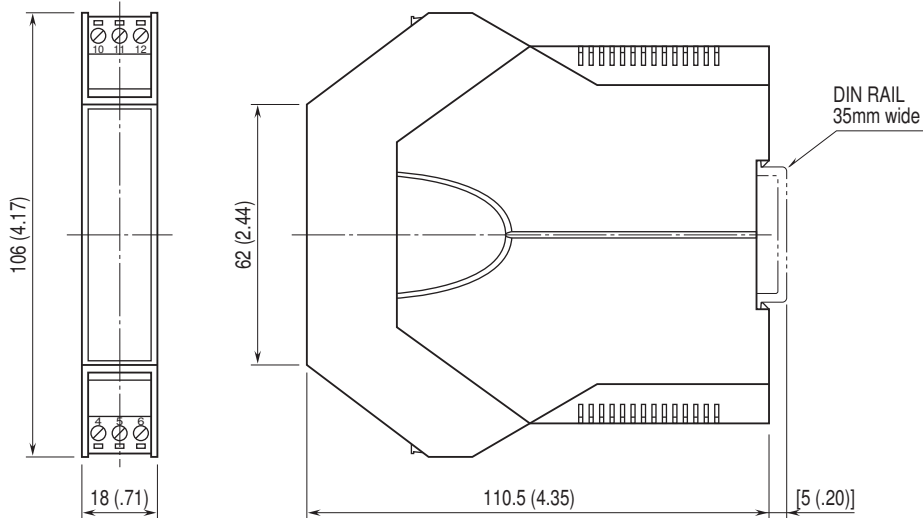
■ FRONT VIEW



■ SIDE VIEW

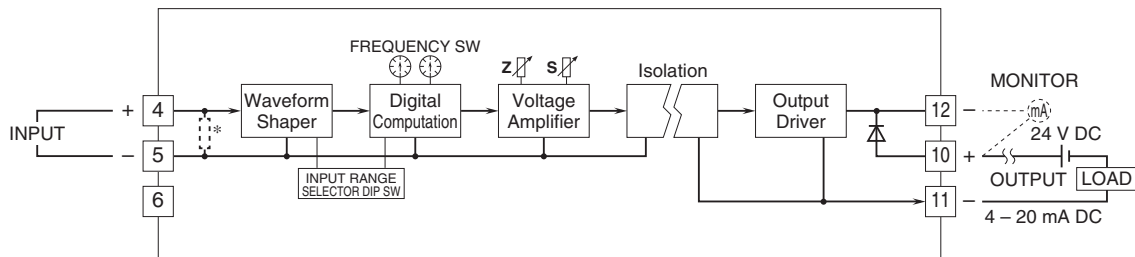


EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



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

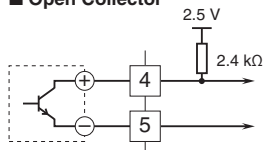
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



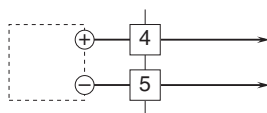
*Input shunt resistor incorporated for two-wire current pulse input.

Input Connection Examples

■ Open Collector

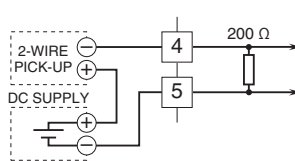


■ Voltage Pulse



■ Two-wire Current Pulse

• External DC Supply



Specifications are subject to change without notice.