

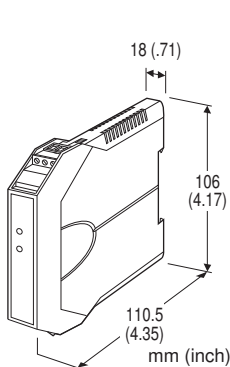
## Space-saving Two-wire Signal Conditioners B3-UNIT

### 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 mm<sup>2</sup>, 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.)

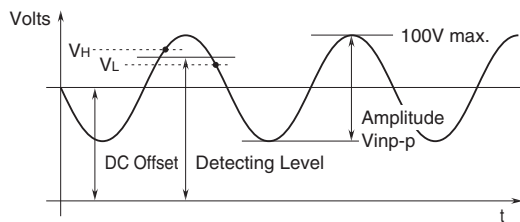
DETECTING LEVEL	PULSE AMPLITUDE		
	0.1 – 2 Vp-p	2 – 10 Vp-p	10 – 200 Vp-p
Zero-cross	0V	0V	0V
Low level	45mV	60mV	300mV
Middle level	200mV	400mV	2V
High level	1V	2V	10V

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**



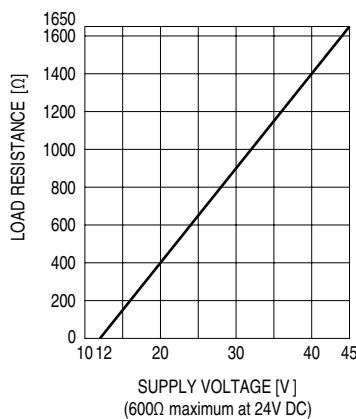
## OUTPUT SPECIFICATIONS

**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

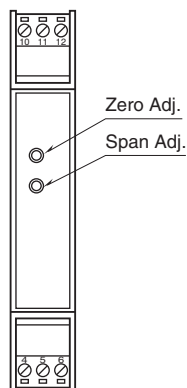
**Approval:**

UL/C-UL general safety requirements

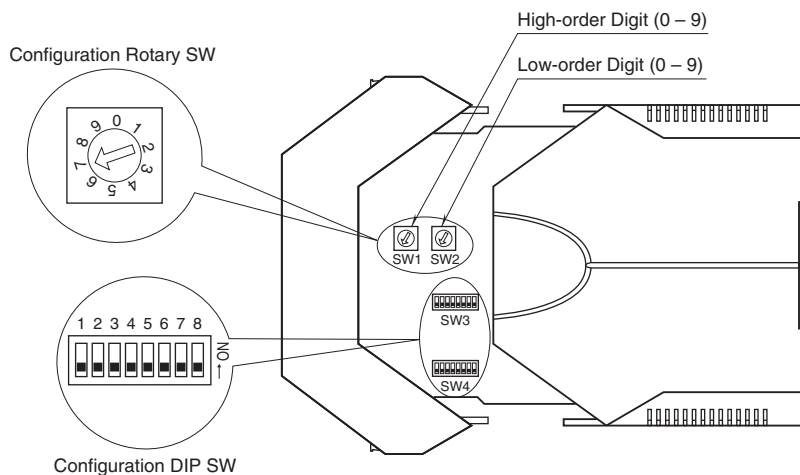
(UL 61010-1, CAN/CSA-C22.2 No.1010-1)

## EXTERNAL VIEW

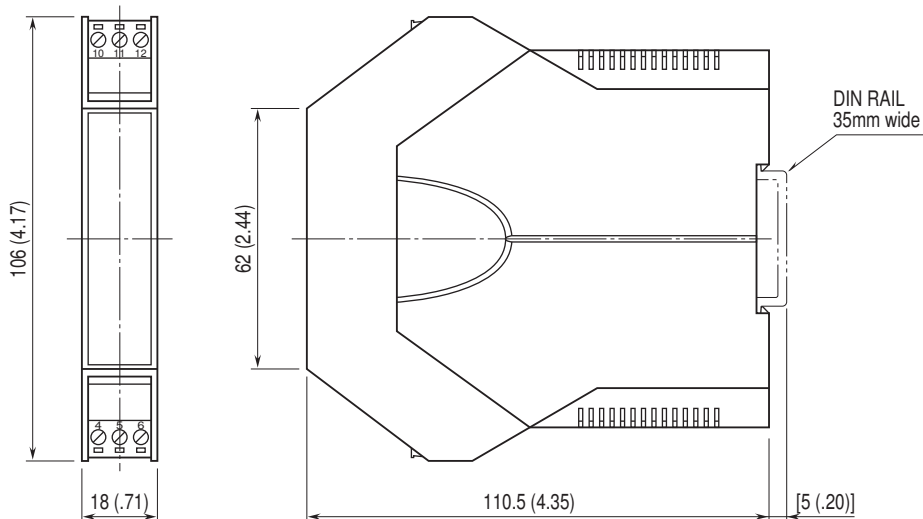
■ FRONT VIEW



■ SIDE VIEW

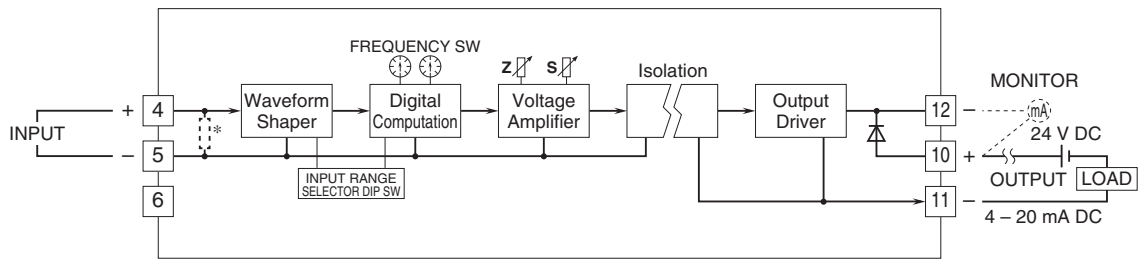


## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



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

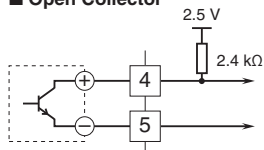
**SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM**



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

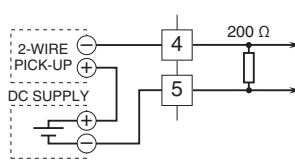
**Input Connection Examples**

■ **Open Collector**

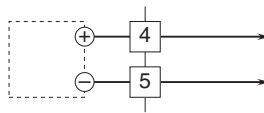


■ **Two-wire Current Pulse**

• **External DC Supply**



■ **Voltage Pulse**



Specifications are subject to change without notice.