

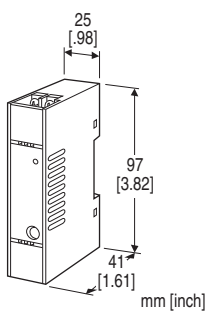
## Super-mini Terminal Block Signal Conditioners M5X-UNIT

### ENCODER SPEED TRANSMITTER

(PC programmable)

#### Functions & Features

- Converts a two-phase forward and reverse rotation pulse signal with 90 degree phase difference into a forward and reverse speed signal
- I/O range programming via DIP switch or PC Configurator
- High-density mounting
- Power LED



### MODEL: M5XRP-1-R[1]

#### ORDERING INFORMATION

- Code number: M5XRP-1-R[1]
- Specify a code from below for [1].  
(e.g. M5XRP-1-R/Q)
- Specify the specification for option code /Q  
(e.g. /C01/S01/SET)

#### INPUT - Field-selectable

Open collector  
5 V pulse  
12 V pulse  
24 V pulse

#### EXTERNAL INTERFACE

##### ◆ OUTPUT SIGNAL

- 1: DC output (field-selectable)
- Current output: 0 - 20 mA DC
  - Voltage output: -5 - +5 V DC
  - Voltage output: -10 - +10 V DC

#### POWER INPUT

##### DC Power

R: 24 V DC  
(Operational voltage range 24 V  $\pm$ 10 %, ripple 10 %p-p max.)

#### [1] OPTIONS

blank: none  
/Q: With options (specify the specification)

#### SPECIFICATIONS OF OPTION: Q (multiple selections)

##### COATING (For the detail, refer to our web site.)

/C01: Silicone coating  
/C02: Polyurethane coating  
/C03: Rubber coating

##### TERMINAL SCREW MATERIAL

/S01: Stainless steel

##### EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet  
(No. ESU-2773)

#### RELATED PRODUCTS

- PC Configurator cable (model: COP-US)
  - PC configurator software (model: M5CFG)
- Downloadable at our web site.

#### GENERAL SPECIFICATIONS

**Construction:** Terminal block  
**Connection:** M3.5 screw terminals (torque 0.8 N·m)  
**Screw terminal:** Nickel-plated steel (standard) or stainless steel  
**Housing material:** Flame-resistant resin (black)  
**Isolation:** Input to output to power  
**Power indicator LED:** Green LED; Blinking patterns indicate different operating status of the transmitter.  
**Setting and configurable items**  
Following items are configurable via PC.  
COP-US is required.

- input type
- input range
- output range
- Output limit
- zero and span
- loop test
- Others

For detailed information, refer to the users manual for the PC configurator  
**Configurator connection:** 2.5 dia. miniature jack;  
RS-232-C level

#### INPUT SPECIFICATIONS

Default setting  
Open collector: 0 - 100 kHz  
**Maximum frequency:** 125 kHz  
**Frequency ranges:** Select from below.  
-10 - 10 mHz, -100 - 100 mHz, -1 - 1 Hz, -10 - 10 Hz,

-100 - 100 Hz, -1 - 1 kHz, -10 - 10 kHz, -100 - 100 kHz  
(Choose 100 kHz range to set the zero/span frequencies lower than -100 kHz (higher than 100 kHz in the reverse direction) or higher than 100 kHz (higher than 100 kHz in the forward direction.))

**Minimum pulse width time requirement:** 4 µsec.

**Waveform:** Square or sine

**Minimum span:** 10 % of the selected frequency range (absolute value)

#### ■ Open Collector

**Sensing voltage/current:** 3.3 V DC @ 3 mA

**Detecting levels:** ≤ 0.3 V / 100 Ω for ON; ≥ 2 V / 10 kΩ for OFF

#### ■ Voltage Pulse

**Input impedance:** ≥ 10 kΩ

**Max. voltage between input terminals:** ±50 V

**Detecting H level**

5 V pulse: ≥ 2 V

12 V pulse: ≥ 5 V

24 V pulse: ≥ 10 V

**Detecting L level**

5 V pulse: ≤ 0.5 V

12 V pulse: ≤ 1.5 V

24 V pulse: ≤ 3 V

**Detecting pulse state:** A pulse rise detected when the input voltage goes above the detecting level;  
a pulse sink detected when it goes below the level.

## OUTPUT SPECIFICATIONS

Standard default setting: DC current output 4 - 20 mA

#### Output type

- DC current output: 0 - 20 mA DC
- DC voltage output: -10 - +10 V DC
- DC voltage output: -5 - +5 V DC

(3 types can be switched by DIP switch and PC)

■ **DC Current:** 0 - 20 mA DC

**Output range:** 0 - 23 mA DC

**Minimum span:** 1 mA

**Load resistance:** 550 Ω

#### ■ DC Voltage

- **Output range -10 - +10 V DC**

**Voltage range:** -11.5 - +11.5 V DC

**Minimum span:** 1 V

**Load resistance:** Output drive 1 mA max.

(ex. 0 - 10 V DC: 10 V ÷ 1 mA = 10 kΩ)

- **Output range -5 - +5 V DC**

**Voltage range:** -5.75 - +5.75 V DC

**Minimum span:** 500 mV

**Load resistance:** Output drive 1 mA max.

(ex. 1 - 5 V DC: 5 V ÷ 1 mA = 5000 Ω)

## INSTALLATION

**Power consumption:** ≤ 1W

**Operating temperature:** -20 to +65°C (-4 to +149°F)

**Operating humidity:** 30 to 90 %RH (non-condensing)

**Atmosphere:** No corrosive gas or heavy dust

**Mounting:** DIN rail

**Weight:** 80 g (2.8 oz)

## PERFORMANCE in percentage of span

**Input accuracy (% of max. input range):** ±0.1 %

**Output accuracy (% of max. output range):** ±0.02 %  
(±0.04 % for current output)

**Temp. coefficient:** ±0.0075 %/°C (±0.004 %/°F) of max. span

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

**Line voltage effect:** ±0.1 % over voltage range

**Insulation resistance:** ≥ 100 MΩ with 500 V DC

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

## ACCURACY AND CALCULATION EXAMPLES

#### ■ Overall Accuracy

The accuracy includes input accuracy, which converts the sensor input into a digital value, and output accuracy, which converts the digital value into an analog signal.

The accuracy of the device is the total of the input accuracy and the output accuracy.

#### Input accuracy

Input accuracy for the setting value span is shown as following formula.

Input accuracy = (input frequency range (absolute value) ÷ input setting value span) × 0.1 %

#### Output accuracy

Output accuracy for the setting value span is shown as following formula.

Output accuracy = (output range ÷ output setting value span) × 0.02 %

For current output,

Output accuracy = (output range ÷ output setting value span) × 0.04 %

#### Calculation examples

Input: input frequency range (absolute value) 0 - 100 kHz, input setting value span 50 - 100 kHz

Output: output range 0 - 20 mA, output setting value span 4 - 20 mA

Input accuracy = (100 kHz ÷ 50 kHz) × 0.1 % = 0.2 %

Output accuracy = (20 mA ÷ 16 mA) × 0.04 % = 0.05 %

Accuracy = input accuracy 0.2 % + output accuracy 0.05 % = 0.25 %

## STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

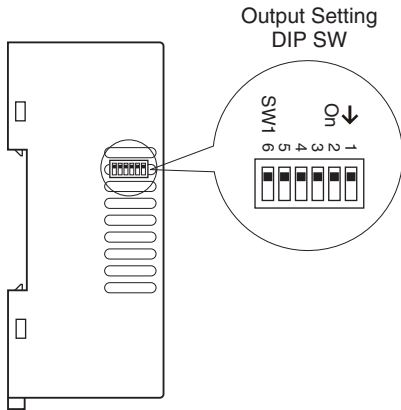
EMS EN 61000-6-2

RoHS Directive

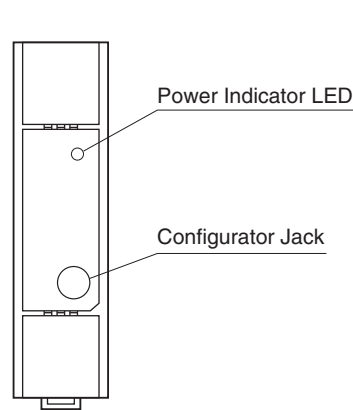
## EXTERNAL VIEW

Refer to the instruction manual for the setting procedure.

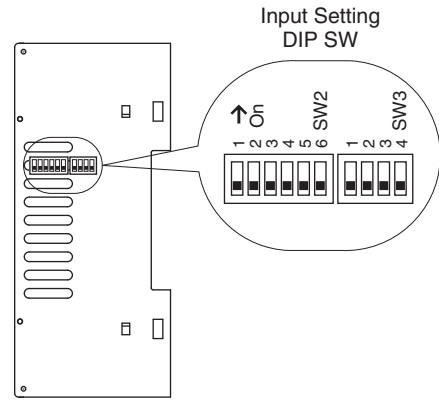
### LEFT VIEW



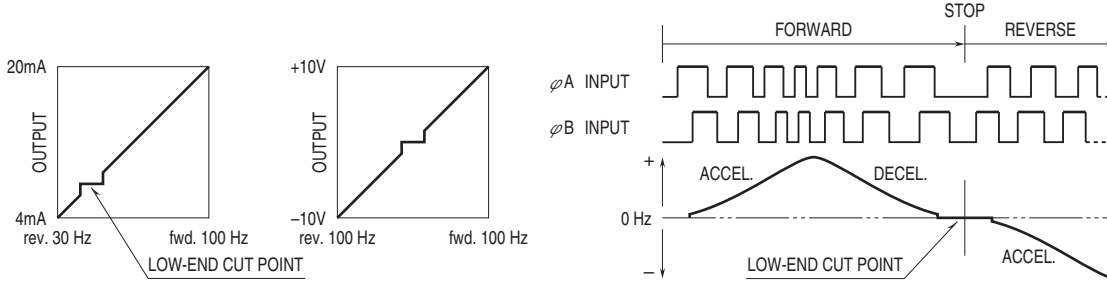
### FRONT VIEW



### RIGHT VIEW

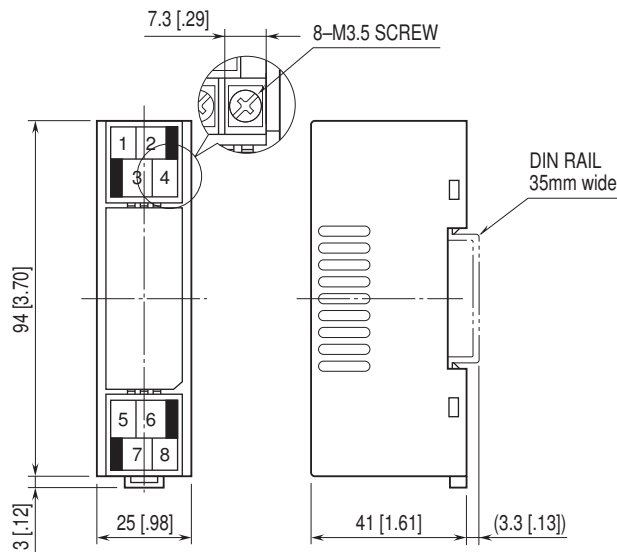


## OPERATION



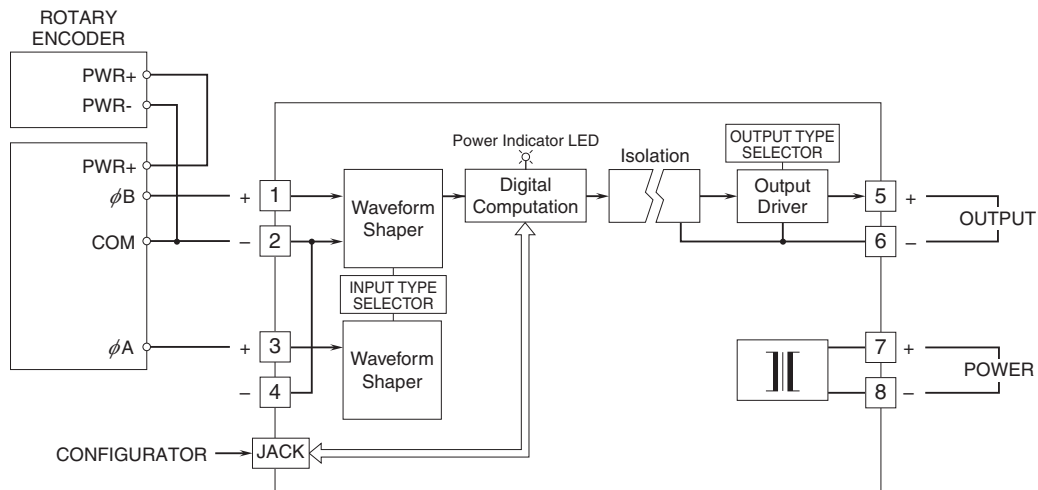
Forward Rotation: Phase A leads the Phase B by 90 degrees.  
Reverse Rotation: Phase A lags behind Phase B by 90 degrees.

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



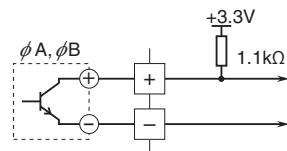
• When mounting, no extra space is needed between units.

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

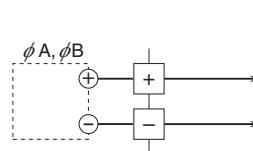


### Input Connection Examples

■ Open Collector



■ Voltage Pulse



Specifications are subject to change without notice.