MODEL: M5XPA

Super-mini Terminal Block Signal Conditioners M5X-UNIT
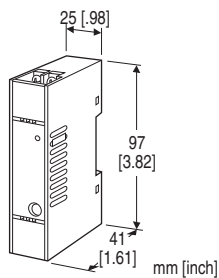
FREQUENCY TRANSMITTER
(PC programmable)

Functions & Features
• A super-mini terminal block signal conditioner that converts pulse input • I/O settings are configurable with DIP switches or PC configurator software • PC programmable • High-density mounting • Power LED $C \epsilon$ 25 [.98] 97 [3.82] 41 [1.61] mm [inch]

MODEL: M5XPA-1-R[1]

ORDERING INFORMATION
• Code number: M5XPA-1-R[1]
Specify a code from below for [1].
 (e.g. M5XPA-1-R/Q)
• Specify the specification for option code /Q
 (e.g. /C01/S01/SET)

INPUT – Field-selectable
Open collector
Mechanical contact
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 ±10 %, ripple 10 %p-p max.)

[1] OPTIONS
Other Options
blank: none
/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q
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-2772)

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
Chattering protection: Filter provided for mechanical contact input
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
• user's linearization table
• 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
Frequency range: Select from below.
0 - 10 mHz, 0 - 100 mHz, 0 - 1 Hz, 0 - 10 Hz, 0 - 100 Hz, 0 - 1 kHz, 0 - 10 kHz, 0 - 100 kHz
(Mechanical contact 0 - 10 mHz, 0 - 100 mHz, 0 - 1 Hz, 0 - 10 Hz

■ **Open Collector**
Pulse width time requirement: ≥ 4 μsec. for both ON and OFF
Sensing voltage/current: 3.3 V DC @ 3 mA
Detecting levels: ≤ 0.3 V / 100 Ω for ON; ≥ 2 V / 10 kΩ for OFF

■ **Mechanical Contact**
Pulse width time requirement: ≥ 50 msec. for both ON and OFF
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**
Pulse width time requirement: ≥ 4 μsec. for both H and L levels
Waveform: Square or sine
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

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: 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 range ÷ 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 range 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:
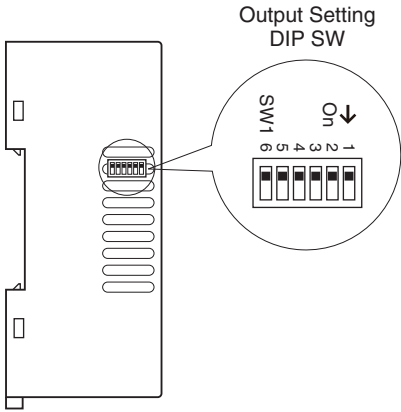EMC Directive
 EMI EN 61000-6-4
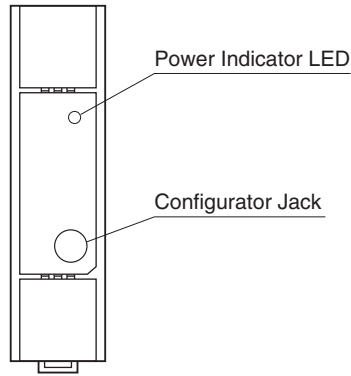 EMS EN 61000-6-2
RoHS Directive

EXTERNAL VIEW
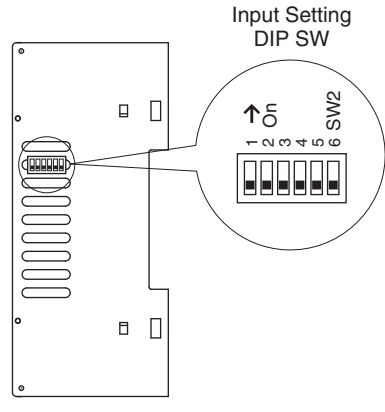
Refer to the instruction manual for the setting procedure.

■ **LEFT VIEW**   ■ **FRONT VIEW**   ■ **RIGHT VIEW**

Output Setting
DIP SW

Power Indicator LED

Configurator Jack

Input Setting
DIP SW
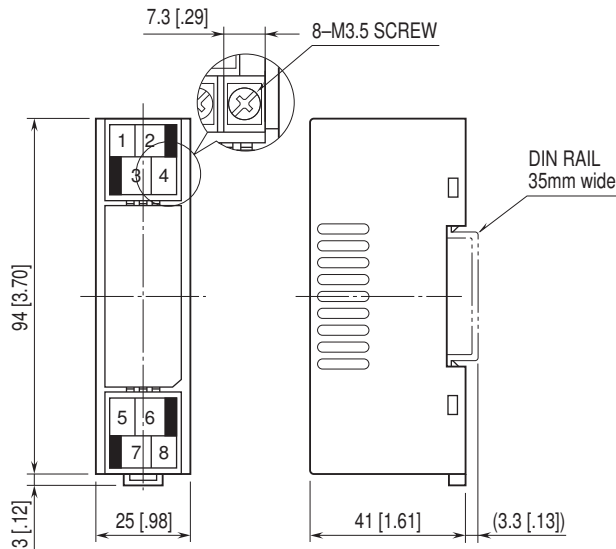
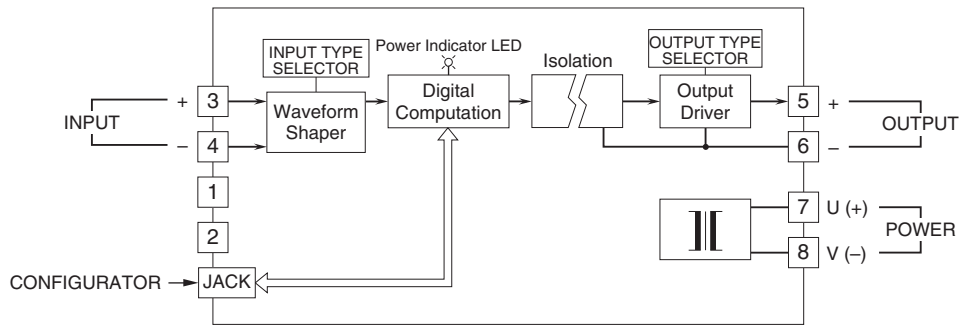## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]

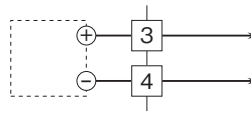• When mounting, no extra space is needed between units.

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SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

INPUT TYPE SELECTOR

Power Indicator LED

Isolation

OUTPUT TYPE SELECTOR

INPUT + 3 → Waveform Shaper → Digital Computation → Output Driver → 5 + OUTPUT

INPUT − 4 → 6 −

1

2

CONFIGURATOR → JACK

7 U (+) POWER
8 V (−)

Input Connection Examples

■ **Open Collector or Mechanical Contact**

+3.3V
1.1kΩ

⊕ 3
⊖ 4

■ **Voltage Pulse**

⊕ 3
⊖ 4
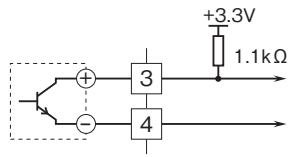
⚠ Specifications are subject to change without notice.