

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

### DIVIDER

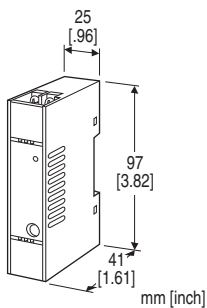
(PC programmable)

#### Functions & Features

- Receives two DC inputs and provides an output proportional to the division of the inputs
- PC programmable
- High-density mounting
- Power LED

#### Typical Applications

- Air-fuel ratio control
- Ratio control in mixing two kinds of liquid



## MODEL: M5XDIS-1-R[1]

### ORDERING INFORMATION

- Code number: M5XDIS-1-R[1]
- Specify a code from below for [1].
- (e.g. M5XDIS-1-R/Q)
  - Specify the specification for option code /Q (e.g. /C01/S01/SET)
  - ◆ DC Input
  - **Current input:** 0 - 50 mA DC
  - **Voltage input:** -1000 - +1000 mV DC
  - **Voltage input:** -10 - +10 V DC

### INPUT 2 - Field-selectable

- ◆ DC Input
- **Current input:** 0 - 50 mA DC
- **Voltage input:** -1000 - +1000 mV DC
- **Voltage input:** -10 - +10 V DC

### 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

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-2777)

### 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.  
**Parameters:** Stored in non-volatile memory; write/erase cycle endurance: less than 20 000  
**Programming:** Downloaded from PC;
 

- input type
- input range
- output type
- output range
- zero and span
- parameter

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

## Equation:

$$X_0 = \frac{K_0(K_1X_1 + A_1)}{(K_2X_2 + A_2)} + A_0$$

When  $(K_2X_2 + A_2) = 0$

$X_0 = +102\%$  with  $K_0(K_1X_1 + A_1) > 0$

$X_0 = A_0\%$  with  $K_0(K_1X_1 + A_1) = 0$

$X_0 = -2\%$  with  $K_0(K_1X_1 + A_1) < 0$

$X_1 - X_2$ : input signal (%) -2 - +102%

$K_0 - K_2$ : gain (no units)  $\pm 29.999$

$A_0 - A_2$ : bias (%)  $\pm 299.99\%$

Factory default setting

$K_0 = 1, K_1 = 1, K_2 = 1, A_0 = 0\%, A_1 = 0\%, A_2 = 0\%$

## INPUT SPECIFICATIONS

Standard default setting: DC current input 4 - 20 mA

### Output type

- DC current input: 0 - 50 mA DC
- DC voltage input: -1000 - +1000 mV DC
- DC voltage input: -10 - +10 V DC

(3 types can be switched for each input 1 and input 2 by DIP switch and PC)

### ■ DC Current

**Input resistance:** Incorporated (15.5  $\Omega$ )

**Input range:** 0 - 50 mA DC

**Measurable range:** 0 - 52.5 mA DC

**Minimum span:** 2 mA DC

**Offset:** Lower range can be any specific value within the input range provided that the minimum span is maintained.

### ■ DC Voltage

#### Input range

- S1: -1000 - +1000 mV DC
- S2: -10 - +10 V DC

#### Measurable range

- S1: -1100 - +1100 mV DC
- S2: -11 - +11 V DC

#### Minimum span:

- S1: 100 mV DC
- S2: 1 V DC

**Offset:** Lower range can be any specific value within the input range provided that the minimum span is maintained.

If not specified, the input range is shown below.

#### Input resistance

- S1:  $\geq 100 \text{ k}\Omega$
- S2:  $\geq 1 \text{ M}\Omega$

## 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  $\Omega$

### ■ 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  $\div$  1 mA = 10 k $\Omega$ )

• **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  $\div$  1 mA = 5000  $\Omega$ )

## INSTALLATION

**Power consumption:**  $\leq 1\text{W}$

**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):**  $\pm 0.01\%$

( $\pm 0.02$  for current input)

**Output accuracy (% of max. output range):**  $\pm 0.02\%$

( $\pm 0.04$  for current output)

**Temp. coefficient:**  $\pm 0.015\%/\text{°C}$  ( $\pm 0.008\%/\text{°F}$ ) of max. span

**Response time:**  $\leq 500$  msec. (0 - 90 %)

**Line voltage effect:**  $\pm 0.1\%$  over voltage range

**Insulation resistance:**  $\geq 100 \text{ M}\Omega$  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 is also affected by the input 2.

#### Input accuracy

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

Input accuracy = (input range  $\div$  input setting value span)  $\times$  0.01%

For current input,

Input accuracy = (input range ÷ input setting value span) × 0.02%

(Use the larger one when input 1 accuracy and input 2 accuracy are different.)

### **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**

The overall accuracy is ±0.1% when following setting.

$K_0 = K_1 = K_2 = 1, A_0 = A_1 = A_2 = 0$

Input 1: input range -10 - +10 V, input setting value span 0 - 5 V

Input 2: input range 0 - 50 mA, input setting value span 0 - 20 V

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

Input 1 accuracy =  $(20 \text{ V} \div 5 \text{ V}) \times 0.01\% = 0.04\%$

Input 2 accuracy =  $(50 \text{ mA} \div 20 \text{ mA}) \times 0.02\% = 0.05\%$

Output accuracy =  $(20 \text{ mA} \div 16 \text{ mA}) \times 0.04\% = 0.05\%$

Output 2 accuracy (0.05%) is larger than output 1 accuracy (0.04%), the overall accuracy is input accuracy 0.05% + output accuracy 0.05% = 0.1.

## **STANDARDS & APPROVALS**

### **EU conformity:**

EMC Directive

EMI EN 61000-6-4

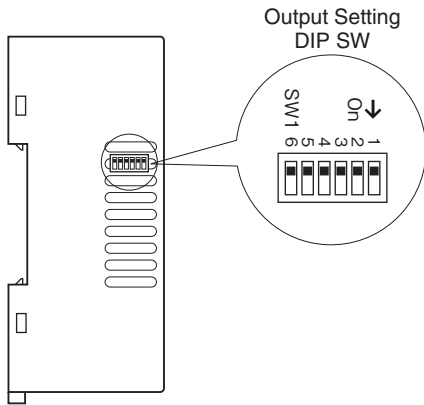
EMS EN 61000-6-2

RoHS Directive

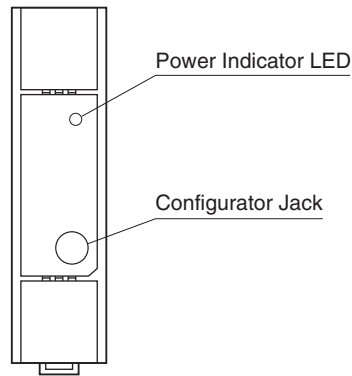
## EXTERNAL VIEW

Refer to the instruction manual for the setting procedure.

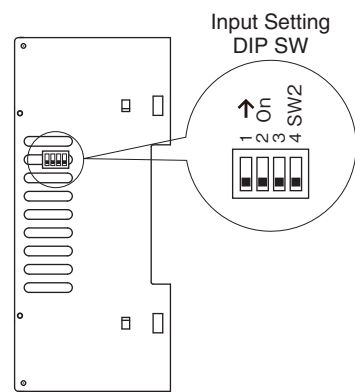
### LEFT VIEW



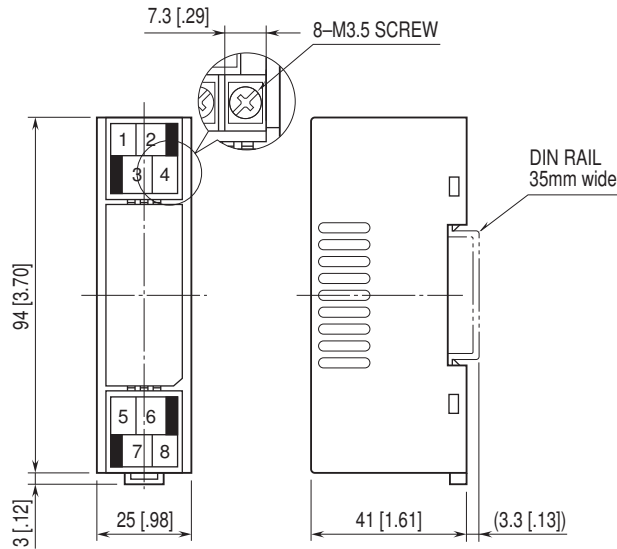
### FRONT VIEW



### RIGHT VIEW

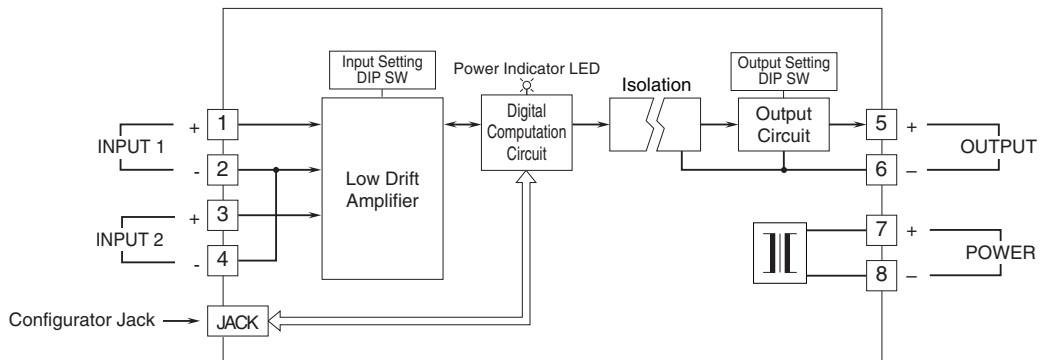


## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



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

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM





Specifications are subject to change without notice.