

## Plug-in Signal Conditioners M-UNIT

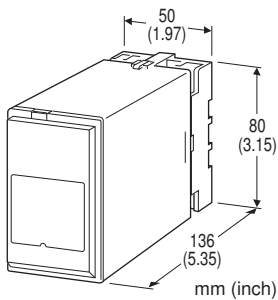
### SPLIT-RANGE TRANSMITTER

#### Functions & Features

- Generating two signals which control two final control elements
- High-density mounting

#### Typical Applications

- Balancing two final control elements in opposite actions used in heating-cooling or humidifying-dehumidifying processes



### MODEL: MFS-[1]-[2][3][4]-[5][6]

#### ORDERING INFORMATION

- Code number: MFS-[1]-[2][3][4]-[5][6]
- Specify a code from below for each of [1] through [6].  
(e.g. MFS-V-AAA-B/Q)
- Specify the specification for option code /Q  
(e.g. /C01/S01)

#### [1] OUTPUT CHARACTERISTICS

V: V-shape

P: Parallel

Output 2 is assigned to the reversed output in V-shape characteristics.

#### [2] INPUT

##### Current

A: 4 - 20 mA DC (Input resistance 250  $\Omega$ )

##### Voltage

4: 0 - 10 V DC (Input resistance 200 k $\Omega$  min.)

I/O code combination available AAA or 444 suffix codes only.

#### [3] OUTPUT 1

##### Current

A: 4 - 20 mA DC (Load resistance 600  $\Omega$  max.)

##### Voltage

4: 0 - 10 V DC (Load resistance 10 k $\Omega$  min.)

#### [4] OUTPUT 2

##### Current

A: 4 - 20 mA DC (Load resistance 600  $\Omega$  max.)

##### Voltage

4: 0 - 10 V DC (Load resistance 10 k $\Omega$  min.)

#### [5] POWER INPUT

##### AC Power

B: 100 V AC

C: 110 V AC

D: 115 V AC

F: 120 V AC

G: 200 V AC

H: 220 V AC

J: 240 V AC

##### DC Power

R: 24 V DC

#### [6] OPTIONS

blank: none

/Q: With options (specify the specification)

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

##### COATING (For the detail, refer to M-System's web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

##### TERMINAL SCREW MATERIAL

/S01: Stainless steel

#### GENERAL SPECIFICATIONS

Construction: Plug-in

Connection: M3.5 screw terminals

Screw terminal: Chromated steel (standard) or stainless steel

Housing material: Flame-resistant resin (black)

Isolation: Input or output 1 or output 2 to power

Input range: 0 - 23.2 mA DC or -1 - +12 V DC

Output range: 0 - 23.2 mA DC or -1 - +12 V DC

##### Output characteristics

- **V-shape:** two signals vary in opposite directions; used when both final control devices have the same action (direct-direct or reverse-reverse).

- **Parallel:** two signals vary in the same direction; used when one final control device is direct and another is reverse.

**Monitor jacks:** Direct monitoring of output signal; accessible at front

- **Ammeter requirement:** Input resistance 10 Ω max. (for current output)

**Monitor jack diameter:** 2 mm (.08")

## INPUT SPECIFICATIONS

- **DC Current:** Input resistor incorporated

## INSTALLATION

### Power input

• **AC:** Operational voltage range: rating  $\pm 10\%$ , 50/60  $\pm 2$  Hz, approx. 3 VA

• **DC:** Operational range: 24 V  $\pm 10\%$ , approx. 80 mA (ripple 10 %p-p max.)

**Operating temperature:** -5 to +60°C (23 to 140°F)

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

**Mounting:** Surface or DIN rail

**Weight:** 400 g (0.88 lb)

## PERFORMANCE in percentage of span

**Accuracy:**  $\pm 0.3\%$  (gain = 1 or -1)

**Temp. coefficient:**  $\pm 0.02\%/^{\circ}\text{C}$  ( $\pm 0.01\%/^{\circ}\text{F}$ )

**Response time:**  $\leq 0.5$  sec. (0 - 90 %)

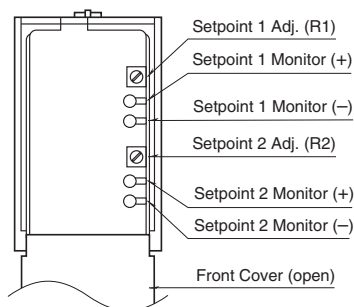
**Line voltage effect:**  $\pm 0.1\%$  over voltage range

**Insulation resistance:**  $\geq 100$  MΩ with 500 V DC

**Dielectric strength:** 2000 V AC @ 1 minute (input or output 1 or output 2 to power to ground)

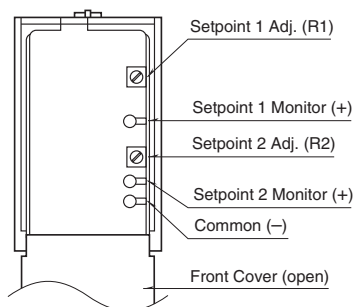
## EXTERNAL VIEW

### ■ FRONT VIEW (current output; with cover open)

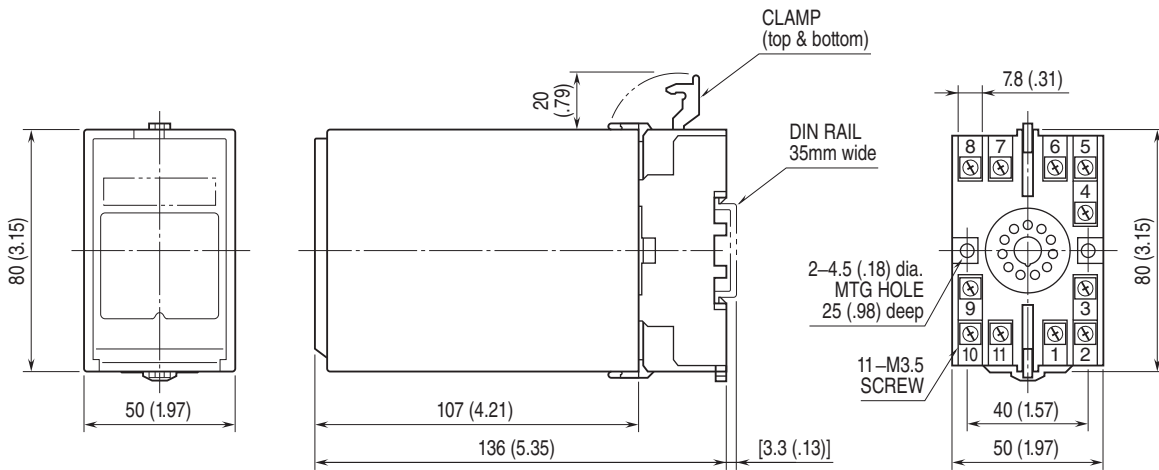


\* When monitor terminal is in use, connect a load to the output terminal or short across the output terminal.

### ■ FRONT VIEW (voltage output; with cover open)



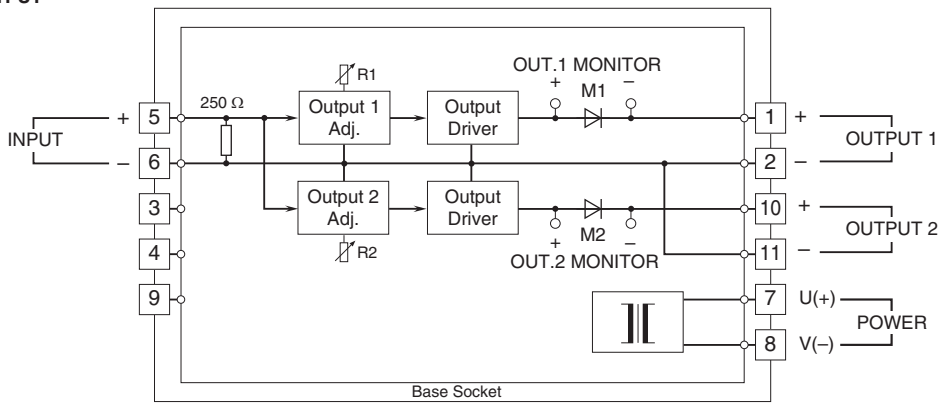
## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



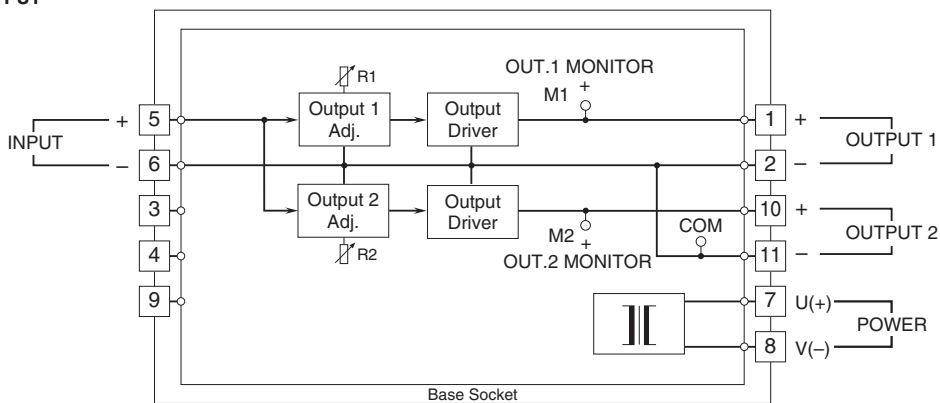
• When mounting, no extra space is needed between units.

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

### ■ CURRENT OUTPUT

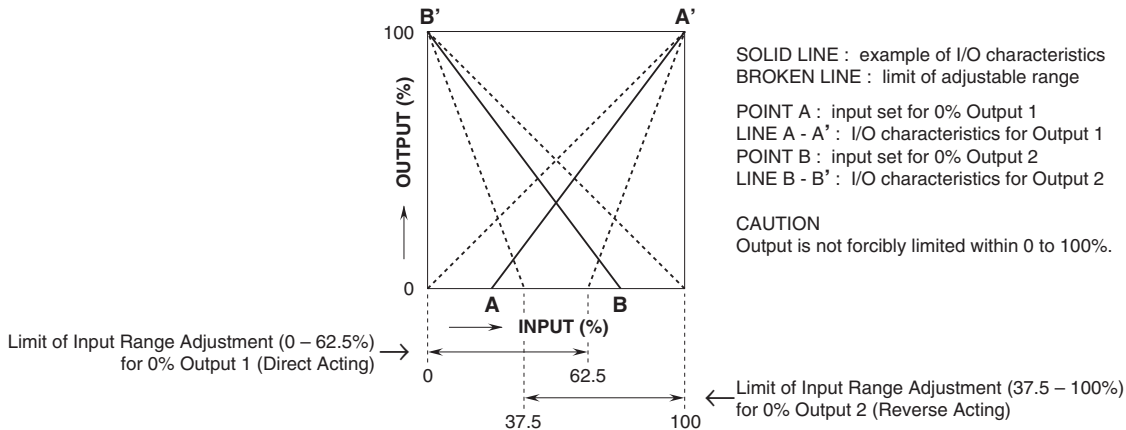


### ■ VOLTAGE OUTPUT



**OPERATION DIAGRAM**

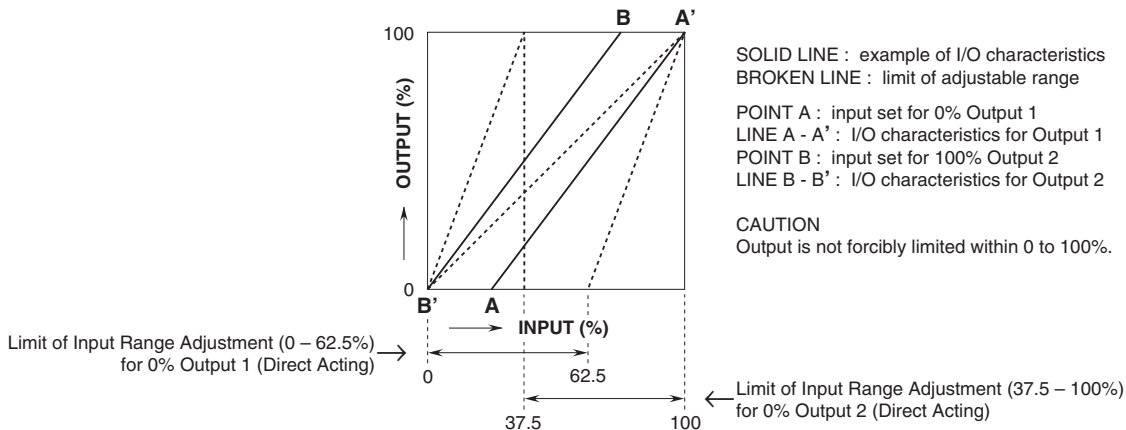
■ V-SHAPE CHARACTERISTICS (model: MFS-V)



•Input Range Adjustment

1. For current output, connect an ammeter to output 1 monitor terminals.  
 Current signal is measured at both ends of a diode inserted in series to the output 1 driver.  
 Input resistance of the ammeter must be 10Ω at the maximum to ensure accurate measurement.  
 For voltage output, connect a voltmeter across the common and output 1 monitor (+) terminals.
2. Apply an input signal desired for 0% output. (within 0 – 62.5%)
3. Turn output 1 adjustment until 0% output is monitored.
4. Adjust output 2 the same way as output 1. Allowable input range for 0% output is 37.5 – 100%.  
 Input signals for 100% output are fixed to 100% for output 1, 0% for output 2.

■ PARALLEL CHARACTERISTICS (model: MFS-P)

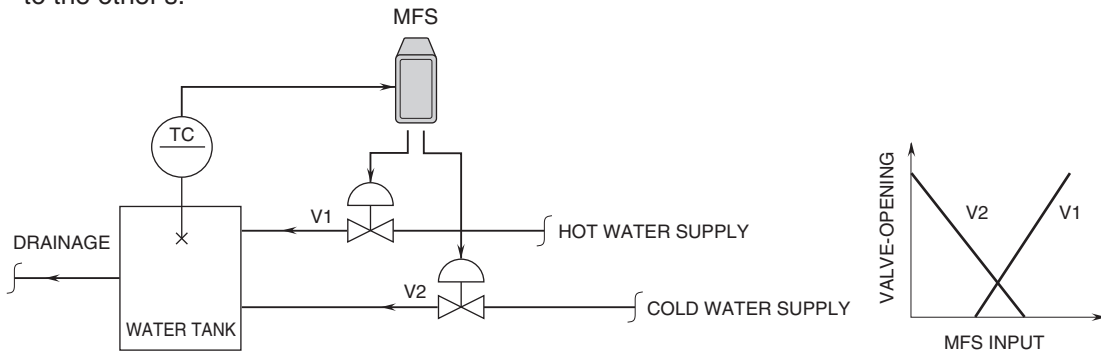


•Input Range Adjustment

1. For current output, connect an ammeter to output 1 monitor terminals.  
 Current signal is measured at both ends of a diode inserted in series to output 1 driver.  
 Input resistance of the ammeter must be 10Ω at the maximum to ensure accurate measurement.  
 For voltage output, connect a voltmeter across the common and output 1 monitor (+) terminals.
  2. Apply an input signal desired for 0% output. (within 0 – 62.5%)
  3. Turn output 1 adjustment until 0% output is monitored.
- Proceed to output 2 adjustment.
4. Connect an ammeter or voltmeter to output 2 monitor terminal.
  5. Apply input signal required for 100% output. (within 37.5 – 100%)
  6. Turn output 2 adjustment until 100% output is monitored.
- For output 1, input signal for 100% output is fixed to 100%, while for output 2, input signal for 0% output is fixed to 0%.

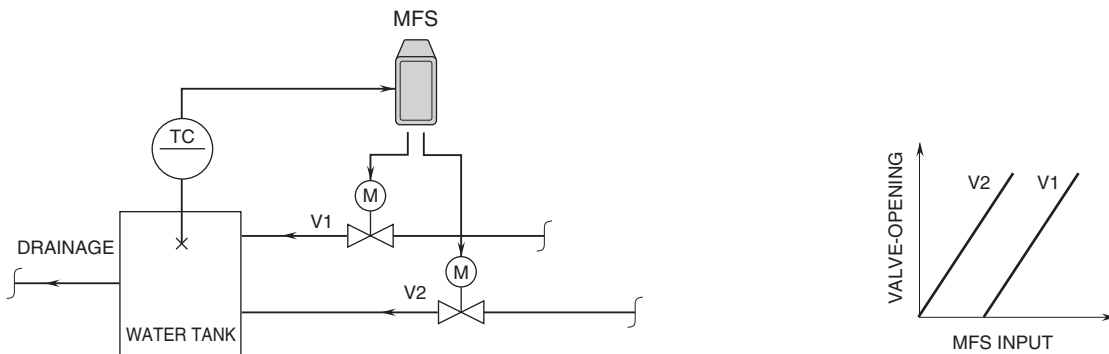
## ■ V-SHAPE CHARACTERISTICS (model: MFS-V)

- When the relation between control signal and valve-opening for one valve has the opposite characteristic to the other's:

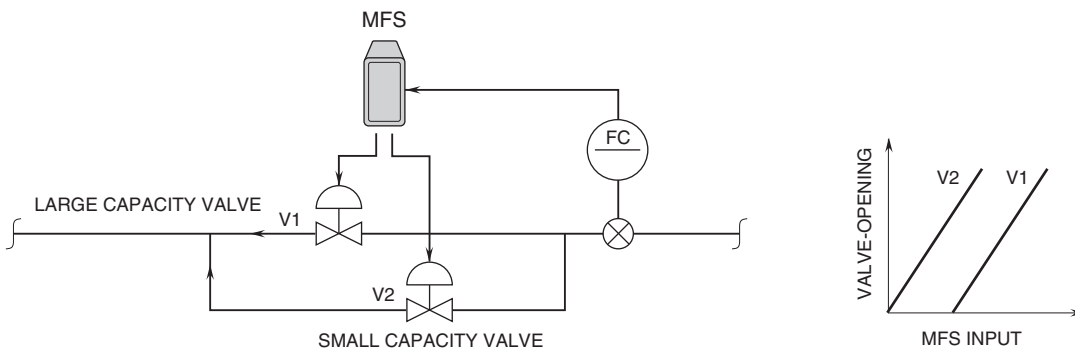


## ■ PARALLEL CHARACTERISTICS (model: MFS-P)

- When the relation between control signal and valve-opening for both valves has the same characteristic:



- To control wide flow range with two valves of different capacities:



Specifications are subject to change without notice.