

## Plug-in Signal Conditioners M-UNIT

### RAMP BUFFER

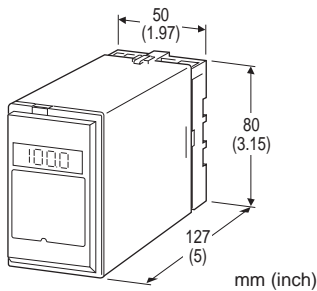
(non-isolated)

#### Functions & Features

- Limiting the rate of change of the output once the rate of the input exceeds the preset value
- Rate-of-change adjustable up to 40 seconds
- LCD meter (engineering unit display selectable)
- Simple loop test output (0 % and 100 %)
- High-density mounting

#### Typical Applications

- Reducing the rate of change caused by a step change or spikes on the input signal
- Protecting equipment that cannot withstand rapidly changing process variables



### MODEL: CR-[1][2]-[3][4]

#### ORDERING INFORMATION

- Code number: CR-[1][2]-[3][4]
- Specify a code from below for each [1] through [4]. (e.g. CR-6A-B/E2)
- Special input and output ranges (For codes Z & O)
- Specify the specification for option code /Q (e.g. /C01/S01)

#### [1] INPUT

##### Current

- A: 4 - 20 mA DC (Input resistance 250  $\Omega$ )
- A1: 4 - 20 mA DC (Input resistance 50  $\Omega$ )
- B: 2 - 10 mA DC (Input resistance 500  $\Omega$ )
- C: 1 - 5 mA DC (Input resistance 1000  $\Omega$ )
- D: 0 - 20 mA DC (Input resistance 50  $\Omega$ )
- E: 0 - 16 mA DC (Input resistance 62.5  $\Omega$ )
- F: 0 - 10 mA DC (Input resistance 100  $\Omega$ )
- G: 0 - 1 mA DC (Input resistance 1000  $\Omega$ )
- H: 10 - 50 mA DC (Input resistance 100  $\Omega$ )
- J: 0 - 10  $\mu$ A DC (Input resistance 1000  $\Omega$ )
- K: 0 - 100  $\mu$ A DC (Input resistance 1000  $\Omega$ )

- GW: -1 - +1 mA DC (Input resistance 1000  $\Omega$ )
- FW: -10 - +10 mA DC (Input resistance 100  $\Omega$ )
- Z: Specify current (See INPUT SPECIFICATIONS)

##### Voltage

- 1: 0 - 10 mV DC (Input resistance 10 k $\Omega$  min.)
- 15: 0 - 50 mV DC (Input resistance 10 k $\Omega$  min.)
- 16: 0 - 60 mV DC (Input resistance 10 k $\Omega$  min.)
- 2: 0 - 100 mV DC (Input resistance 100 k $\Omega$  min.)
- 3: 0 - 1 V DC (Input resistance 1 M $\Omega$  min.)
- 4: 0 - 10 V DC (Input resistance 1 M $\Omega$  min.)
- 5: 0 - 5 V DC (Input resistance 1 M $\Omega$  min.)
- 6: 1 - 5 V DC (Input resistance 1 M $\Omega$  min.)
- 4W: -10 - +10 V DC (Input resistance 1 M $\Omega$  min.)
- 5W: -5 - +5 V DC (Input resistance 1 M $\Omega$  min.)
- 0: Specify voltage (See INPUT SPECIFICATIONS)

#### [2] OUTPUT

##### Current

- A: 4 - 20 mA DC (Load resistance 750  $\Omega$  max.)
- B: 2 - 10 mA DC (Load resistance 1500  $\Omega$  max.)
- C: 1 - 5 mA DC (Load resistance 3000  $\Omega$  max.)
- D: 0 - 20 mA DC (Load resistance 750  $\Omega$  max.)
- E: 0 - 16 mA DC (Load resistance 900  $\Omega$  max.)
- F: 0 - 10 mA DC (Load resistance 1500  $\Omega$  max.)
- G: 0 - 1 mA DC (Load resistance 15 k $\Omega$  max.)
- Z: Specify current (See OUTPUT SPECIFICATIONS)

##### Voltage

- 1: 0 - 10 mV DC (Load resistance 10 k $\Omega$  min.)
- 2: 0 - 100 mV DC (Load resistance 100 k $\Omega$  min.)
- 3: 0 - 1 V DC (Load resistance 100  $\Omega$  min.)
- 4: 0 - 10 V DC (Load resistance 1000  $\Omega$  min.)
- 5: 0 - 5 V DC (Load resistance 500  $\Omega$  min.)
- 6: 1 - 5 V DC (Load resistance 500  $\Omega$  min.)
- 4W: -10 - +10 V DC (Load resistance 2000  $\Omega$  min.)
- 5W: -5 - +5 V DC (Load resistance 1000  $\Omega$  min.)
- 0: Specify voltage (See OUTPUT SPECIFICATIONS)

#### [3] 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

- S: 12 V DC
- R: 24 V DC
- V: 48 V DC
- P: 110 V DC (Not selectable with Option /E2)



## [4] OPTIONS (multiple selections)

### Input Signal Indicator (after the ramp filtering)

blank: Without

/E: With (0.0 - 100.0 % display)

/E2: With (in engineering unit with backlight and the simple loop test output)

### Other Options

blank: none

/Q: Option other than the above (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 to power

Overrange output: Approx. -10 to +120 % at 1 - 5 V

Rate-of-change adjustment: 270°-turn screwdriver adjustment (front)

Rate-of-change adjustment range: Approx. 0.5 to 40 sec. (0 - 100 %)

Zero adjustment: -5 to +5 % (front)

Span adjustment: 95 to 105 % (front)

Display scaling: -10000 - +10000; ex-factory set to 0.00 - 100.00 (%)

Engineering unit: %,  $\mu$ V, mV, V, mA, A, °C, °F,  $\Omega$ , DEG K, mHz, Hz, kHz, VAC, AAC, mg, g, kg, t, rpm or rps selectable

Simple loop test output: 0 % and 100 % signal simulated by selecting the front switch positions.

## INPUT SPECIFICATIONS

### DC Current:

Shunt resistor attached to the input terminals (0.5 W)

Specify input resistance value for code Z.

### DC Voltage: -300 - +300 V DC

Minimum span: 3 mV

Offset: Max. 1.5 times span

### Input resistance

Span 3 - 10 mV :  $\geq 10 \text{ k}\Omega$

Span 10 - 100 mV :  $\geq 10 \text{ k}\Omega$

Span 0.1 - 1 V :  $\geq 100 \text{ k}\Omega$

Span  $\geq 1 \text{ V}$  :  $\geq 1 \text{ M}\Omega$

## OUTPUT SPECIFICATIONS

### DC Current: 0 - 20 mA DC

Minimum span: 1 mA

Offset: Max. 1.5 times span

Load resistance: Output drive 15 V max.

### DC Voltage: -10 - +12 V DC

Minimum span: 5 mV

Offset: Max. 1.5 times span

Load resistance: Output drive 10 mA max.; 5 mA for negative voltage output; at  $\geq 0.5 \text{ V}$

## INSTALLATION

### Power input

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

(approx. 3 VA with Option /E2)

•DC: Operational voltage range: rating  $\pm 10 \%$ , or 85 - 150 V for 110 V rating (ripple 10 % p-p max.) approx. 2 W (90 mA at 24 V; approx. 3 W with Option /E2)

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:  $\pm 0.2 \%$

Display accuracy:  $\pm (0.2 \%$  of FS + 1 digit)

Simple loop test output setting accuracy:  $\pm 0.5 \%$

Temp. coefficient:  $\pm 0.015 \%$ /°C ( $\pm 0.008 \%$ /°F)

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

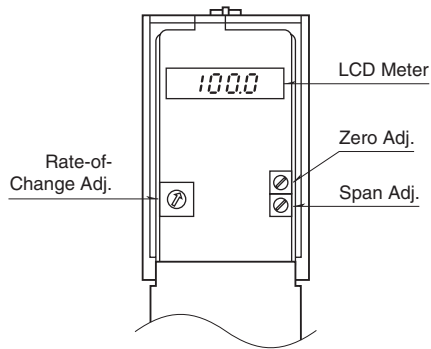
Insulation resistance:  $\geq 100 \text{ M}\Omega$  with 500 V DC

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

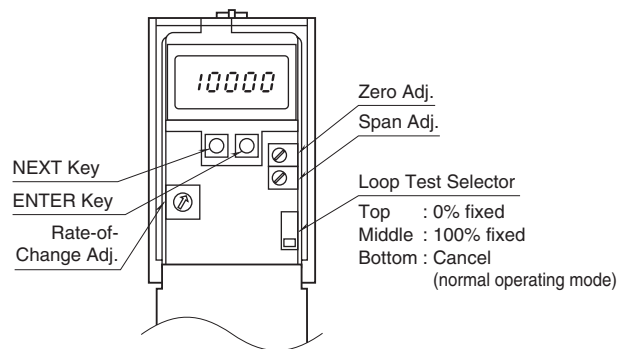


## EXTERNAL VIEW

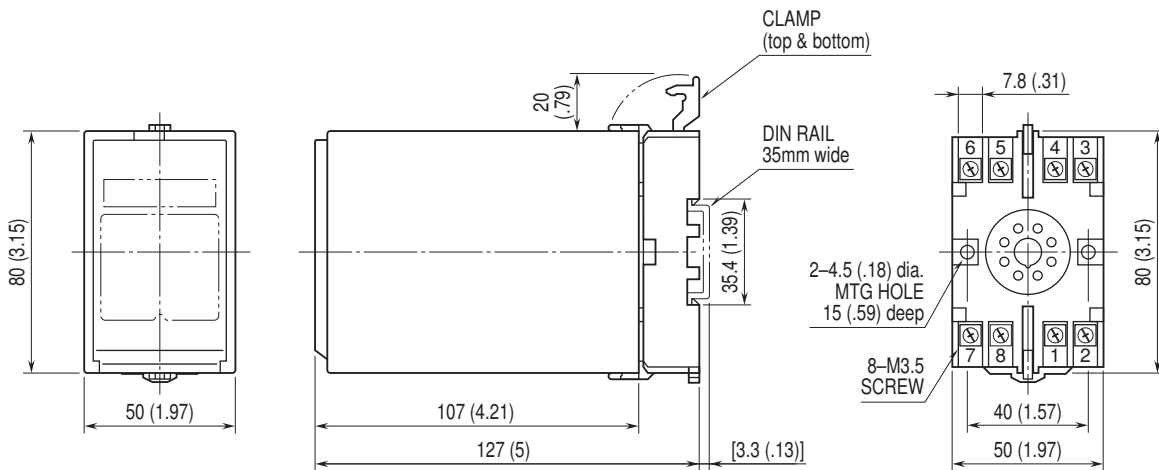
### ■ OPTION /E



### ■ OPTION /E2

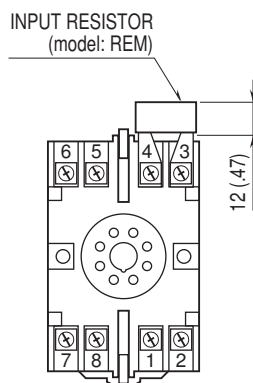


## DIMENSIONS unit: mm (inch)



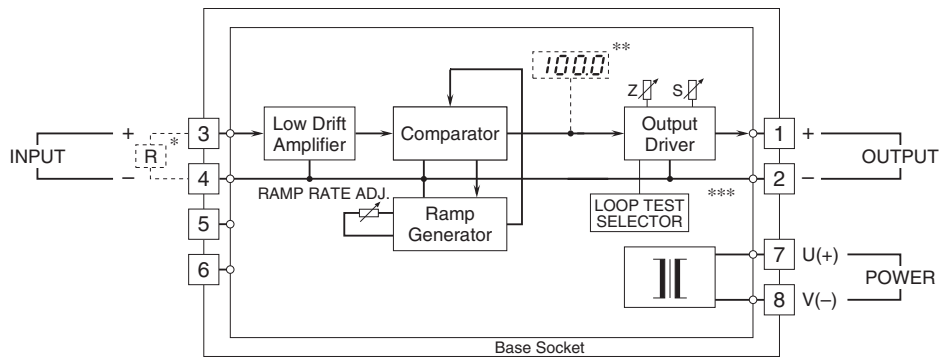
• When mounting, no extra space is needed between units.

## TERMINAL ASSIGNMENTS unit: mm (inch)



Input shunt resistor attached for current input.

**SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM**



- \* Input shunt resistor attached for current input.
- \*\* Option /E, E2
- \*\*\* Option /E2



Specifications are subject to change without notice.

