

## Plug-in Signal Conditioners M-UNIT

### FILTER/LAG TRANSMITTER

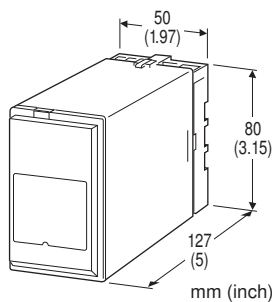
(field-programmable; 100-point samples)

#### Functions & Features

- Providing two filter functions which eliminate unnecessary elements in the input signals
- Isolation up to 2000 V AC
- High-density mounting

#### Typical Applications

- Level control; eliminating drifts in the input signal caused by pumps
- Averaging pulsating signals



## MODEL: JFTS[1]-[2][3]-[4][5]

### ORDERING INFORMATION

- Code number: JFTS[1]-[2][3]-[4][5]
  - Specify a code from below for each of [1] through [5]. (e.g. JFTS1-6A-B/Q)
  - Special input and output ranges (For codes Z & 0)
  - Parameters (See "Functions" section)
- Default setting will be used if not otherwise specified.  
Use Ordering Information Sheet (No. ESU-1685) to specify parameters.
- Specify the specification for option code /Q (e.g. /C01/S01)

### [1] FUNCTION

- 1: Moving average output
- 2: Dead-time computing

### [2] INPUT

#### Current

- A: 4 - 20 mA DC (Input resistance 250 Ω)
- A1: 4 - 20 mA DC (Input resistance 50 Ω)
- B: 2 - 10 mA DC (Input resistance 500 Ω)
- C: 1 - 5 mA DC (Input resistance 1000 Ω)
- D: 0 - 20 mA DC (Input resistance 50 Ω)

- E: 0 - 16 mA DC (Input resistance 62.5 Ω)
- F: 0 - 10 mA DC (Input resistance 100 Ω)
- G: 0 - 1 mA DC (Input resistance 1000 Ω)
- H: 10 - 50 mA DC (Input resistance 100 Ω)
- J: 0 - 10 μA DC (Input resistance 1000 Ω)
- K: 0 - 100 μA DC (Input resistance 1000 Ω)
- GW: -1 - +1 mA DC (Input resistance 1000 Ω)
- FW: -10 - +10 mA DC (Input resistance 100 Ω)
- Z: Specify current (See INPUT SPECIFICATIONS)

#### Voltage

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

### [3] OUTPUT

#### Current

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

#### Voltage

- 1: 0 - 10 mV DC (Load resistance 10 kΩ min.)
- 2: 0 - 100 mV DC (Load resistance 100 kΩ min.)
- 3: 0 - 1 V DC (Load resistance 1000 Ω min.)
- 4: 0 - 10 V DC (Load resistance 10 kΩ min.)
- 5: 0 - 5 V DC (Load resistance 5000 Ω min.)
- 6: 1 - 5 V DC (Load resistance 5000 Ω min.)
- 4W: -10 - +10 V DC (Load resistance 10 kΩ min.)
- 5W: -5 - +5 V DC (Load resistance 5000 Ω min.)
- 0: Specify voltage (See OUTPUT SPECIFICATIONS)

### [4] 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

## [5] 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

### RELATED PRODUCTS

- Programming Unit (model: PU-2x)
- PC configurator software (model: JXCON)

Downloadable at M-System's web site.

A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual for the PC configurator for applicable cable types.

### 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 to output to power

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

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

**Span adjustment:** 95 to 105 % (front)

**Adjustments:** Programming Unit (model: PU-2x); function and parameters, zero and span, etc.

(Refer to the users manual of JXCON for the adjustments configurable with JXCON.)

### 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 - +20 V DC

**Span:** Min. 5 mV, max. 20 V

**Offset:** Max. 1.5 times span

**Load resistance:** Output drive 1 mA max.; at  $\geq 0.5 \text{ V}$

### INSTALLATION

**Power input**

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

• **DC:** Operational voltage range: rating  $\pm 10 \%$   
ripple 10 %p-p max., approx. 3 W (125 mA at 24 V)

**Operating temperature:** -5 to +55°C (23 to 131°F)

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

**Mounting:** Surface or DIN rail

**Weight:** 350 g (0.77 lb)

### PERFORMANCE in percentage of span

**Accuracy:**  $\pm 0.1 \%$

**Temp. coefficient:**  $\pm 0.015 \%/^{\circ}\text{C}$  ( $\pm 0.008 \%/^{\circ}\text{F}$ )

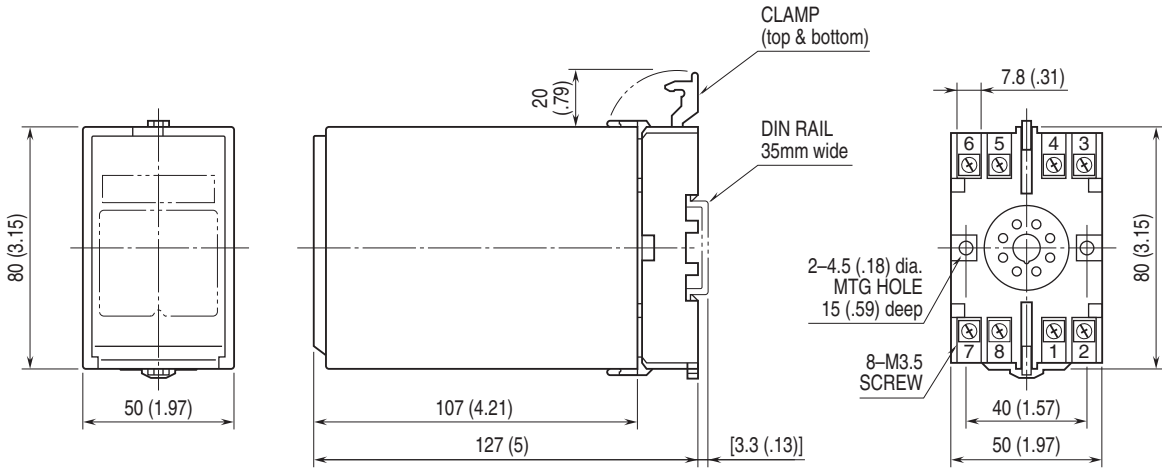
**Response time:**  $\leq 0.5 \text{ sec.}$  (0 - 90 %) without any function setting

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

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

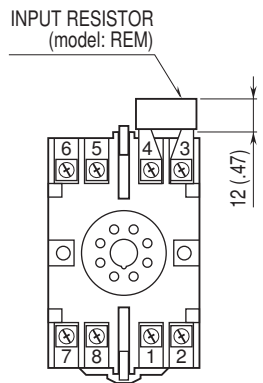
**Dielectric strength:** 2000 V AC @1 minute (input to output to power to ground)

## EXTERNAL DIMENSIONS unit: mm (inch)



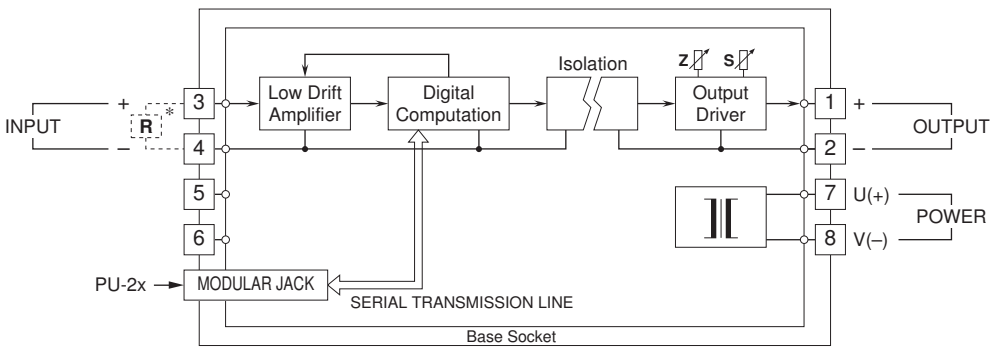
• When mounting, no extra space is needed between units.

## TERMINAL ASSIGNMENTS unit: mm (inch)



Input shunt resistor attached for current input.

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



\*Input shunt resistor attached for current input.

## FUNCTIONS

### ■ MOVING AVERAGE OUTPUT (model: JFTS1)

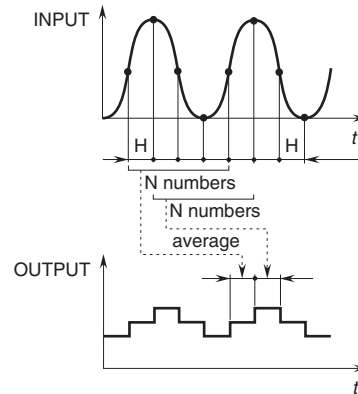
The JFTS1 samples input signals every H seconds and outputs proportionally to an average of N numbers of sampled data. When a new input is sampled after another H seconds, it gives up the oldest sample and calculates a new average including the latest sample and outputs proportionally.

H : sampling cycle

(0.1 to 100.0 seconds adjustable)

N : number of samples to be calculated

(1 to 100 adjustable)



### ■ DEAD-TIME COMPUTING (model: JFTS2)

The JFTS2 does not respond to an input signal for a preset dead-time duration. In addition, with adjusting a time constant T, it generates a first order lag output after the dead-time.

$$X_0(s) = \frac{e^{-Ls}}{1 + Ts} X_1(s) + H \times N(s)$$

$X_0$  : output

$X_1$  : input

Dead Time =  $H \times N$  (s) ( $H \leq T$ )

H : sampling cycle

(0.1 to 100.0 seconds adjustable)

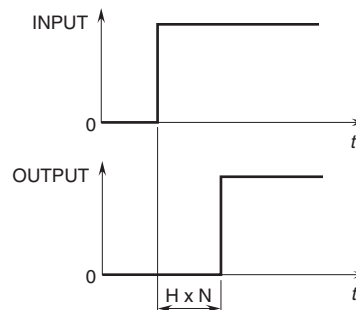
N : numbers of samples to be calculated

(1 to 100 adjustable)

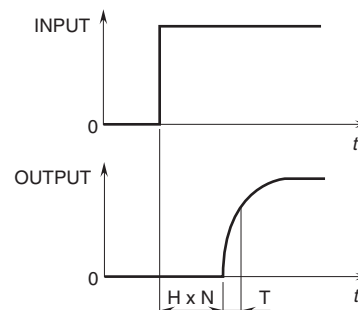
T : time constant

(0.1 to 100.0 seconds adjustable)

#### • Step Input with Dead-Time



#### • Step Input with Dead-Time Plus Time Constant



Specifications are subject to change without notice.