

## Space-saving Plug-in Signal Conditioners F-UNIT

### FILTER/LAG TRANSMITTER

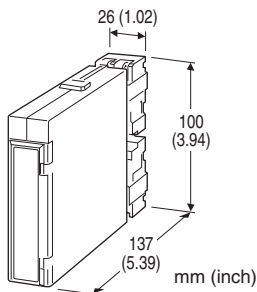
(field-programmable)

#### Functions & Features

- Providing various filter functions which eliminate unnecessary elements in the input signals
- Microprocessor based
- On-site calibration via hand-held programmer PU-2x
- Field-programmable input range
- High-density mounting

#### Typical Applications

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



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

### ORDERING INFORMATION

- Code number: FJFT[1]-[2][3]-[4]
- Specify a code from below for each [1] through [4] (e.g. FJFT1-6A-R)
- Use Ordering Information Sheet (No. ESU-1679) to specify parameters.
- Parameters (See "Functions" section)
  - Special input range (For codes U1, U2, U3)

### [1] FUNCTION

- 1: Moving average output
- 2: Dead-time computing
- 3: Delay buffer
- 4: Lead-time computing
- 5: Ramp buffer
- 6: Mean average output

### [2] INPUT

#### Current

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

H: 10 - 50 mA DC (Input resistance 100  $\Omega$ )

#### Voltage

6: 1 - 5 V DC (Input resistance 1 M $\Omega$  min.)

U1: Range  $\pm 100$  mV; minimum span 3 mV

U2: Range  $\pm 1000$  mV; minimum span 30 mV

U3: Range  $\pm 10$  V; minimum span 0.3 V

### [3] OUTPUT

#### Current

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

#### Voltage

6: 1 - 5 V DC (Load resistance 500  $\Omega$  min.)

### [4] POWER INPUT

#### AC Power

K: 85 - 132 V AC

(Operational voltage range 85 - 132 V, 47 - 66 Hz)

L: 170 - 264 V AC

(Operational voltage range 170 - 264 V, 47 - 66 Hz)

#### DC Power

R: 24 V DC

(Operational voltage range 24 V  $\pm 10$  %, ripple 10 %p-p max.)

P: 110 V DC

(Operational voltage range 85 - 150 V, ripple 10 %p-p max.)

### RELATED PRODUCTS

- JX configurator connection kit (model: JXCON)
- Programming Unit (model: PU-2x)

### GENERAL SPECIFICATIONS

**Construction:** Plug-in

**Connection:** M3.5 screw terminals (torque 0.8 N·m)

**Screw terminal:** Nickel-plated steel

**Housing material:** Flame-resistant resin (black)

**Isolation:** Input to output to power

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

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

(Input range can be changed with Codes U1, U2 or U3 and limited within ranges of each code type.)

(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)

#### ■ DC Voltage: -10 - +10 V DC

Minimum span: 3 mV

Offset: Max. 3 times span

Input resistance (Input Range: Input Resistance)



- U1:  $\pm 100$  mV: 20 k $\Omega$  min.
- U2:  $\pm 1000$  mV: 20 k $\Omega$  min.
- U3:  $\pm 10$  V: 1 M $\Omega$  min.

Default setting will be used if not otherwise specified.

- U1: 0 - 100 mV DC
- U2: 0 - 1 V DC
- U3: 0 - 10 V DC

## INSTALLATION

### Power input

- AC: Approx. 4.5 VA
- DC: 24 V approx. 70 mA
- 110 V approx. 20 mA

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

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

**Mounting:** Surface or DIN rail; Standard Rack Mounting

Frame BX-16H available

**Weight:** 220 g (0.49 lbs)

## PERFORMANCE in percentage of span

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

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

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

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

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

**Dielectric strength**

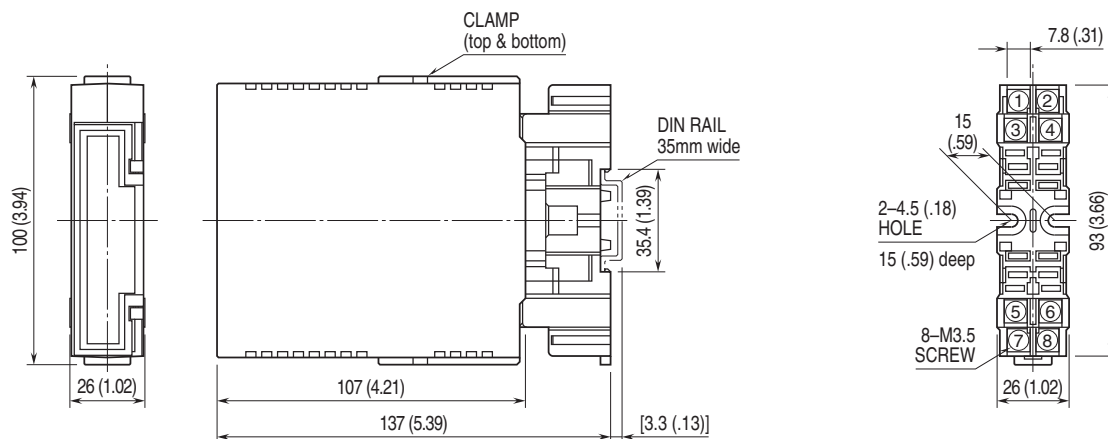
**Power input code R:**

- 1000 V AC @ 1 minute (input to output)
- 2000 V AC @ 1 minute (input or output or power to ground)
- 500 V AC @ 1 minute (I/O to power)

**Power input code K, L, P:**

- 1000 V AC @ 1 minute (input to output)
- 2000 V AC @ 1 minute (input or output or power to ground)
- 1500 V AC @ 1 minute (I/O to power)

## DIMENSIONS unit: mm (inch)



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

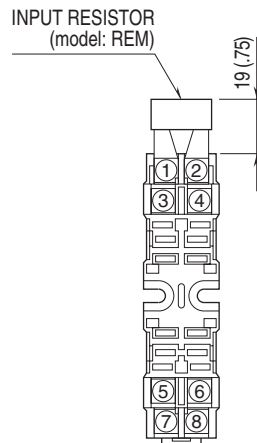


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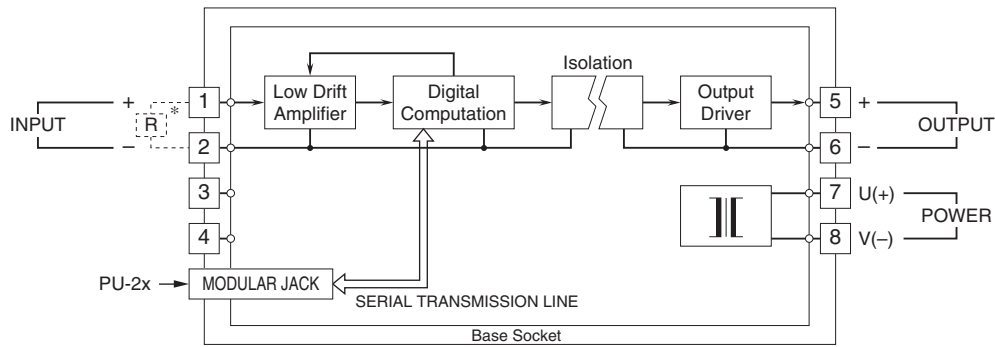
E-mail : info@xintop.com  
Website : www.xintop.com

## TERMINAL ASSIGNMENTS unit: mm (inch)



Input shunt resistor attached for current input.

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



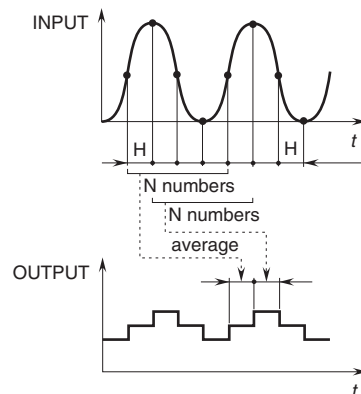
\*Input shunt resistor attached for current input.

## FUNCTIONS

### MOVING AVERAGE OUTPUT (model: FJFT1)

The FJFT1 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 8 adjustable)



## ■ DEAD-TIME COMPUTING (model: FJFT2)

The FJFT2 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 8 adjustable)

T : time constant

(0 to 100.0 seconds adjustable)

## ■ DELAY BUFFER (model: FJFT3)

The FJFT3 generates a first order lag output.

$$X_0(s) = \frac{1}{1 + Ts} X_1(s)$$

$X_0$  : output

$X_1$  : input

T : time constant

(0 to 100.0 second adjustable)

## ■ LEAD-TIME COMPUTING (model: FJFT4)

The FJFT4 operates a lead-time equation.

$$X_0(s) = (1 + Ts) X_1(s)$$

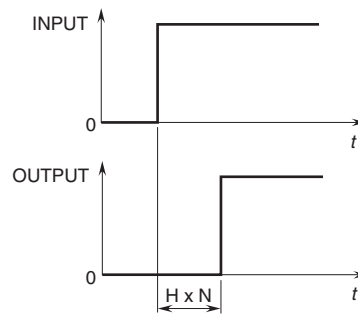
$X_0$  : output

$X_1$  : input

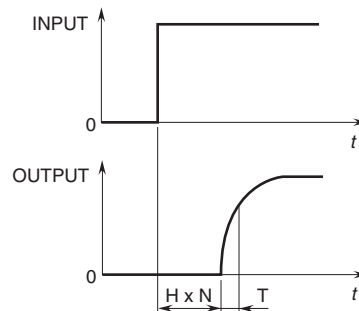
T : lead-time constant

(0 to 100.0 seconds adjustable)

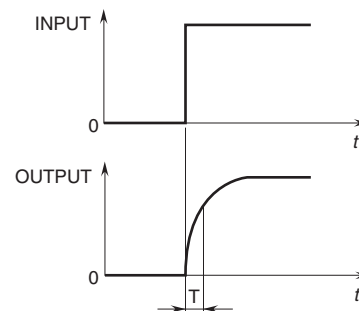
### •Step Input with Dead-Time



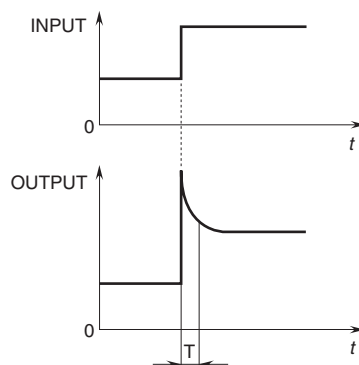
### •Step Input with Dead-Time Plus Time Constant



### •Step Input with Time Constant



### •Step Input with Time Constant (Lead)



## ■ RAMP BUFFER (model: FJFT5)

The FJFT5 output does not change faster than a preset maximum rate, positive CP and negative CN, no matter how fast its input changes.

CP: maximum rate of positive output change  
(0.00 to 200.00%/second adjustable)

CN: maximum rate of negative output change  
(0.00 to 200.00%/second adjustable)

## ■ MEAN AVERAGE OUTPUT (model: FJFT6)

The FJFT6 samples input signals every H seconds and, excluding U numbers of largest samples and L numbers of smallest samples, outputs proportionally to an average of the rest  $[N - (U + L)]$  of sampled data. When the number of samples to be calculated equals 0 or less, it outputs an error.

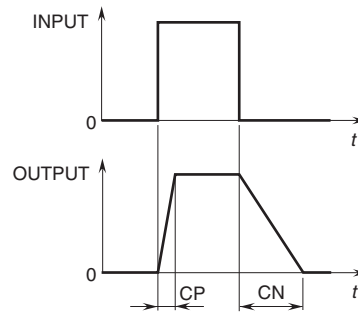
H : sampling cycle  
(0.1 to 100.0 seconds adjustable)

N : number of samples to be calculated  
(2 to 8 adjustable)

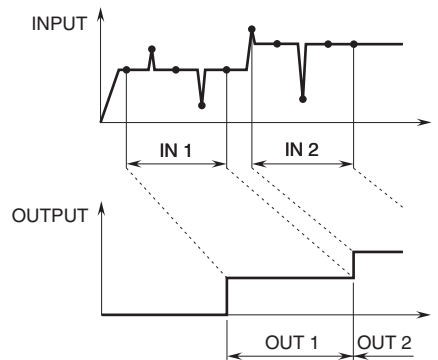
U : number of largest samples to be cut off  
(0 to 7 adjustable)

L : number of smallest samples to be cut off  
(0 to 7 adjustable)

## •Step Input with Rate-of-Change Limit



## •Example (N=5, U=1, L=1)



Specifications are subject to change without notice.