High-density Signal Conditioners 10-RACK

FILTER/LAG TRANSMITTER

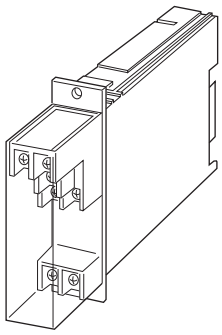
(field-programmable)

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
• Optional second channel output available at the front terminals and at the Standard Rack connector

Typical Applications

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



MODEL: 10JFT[1]-[2][3][4]-R[5]

ORDERING INFORMATION

• Code number: 10JFT[1]-[2][3][4]-R[5]
Specify a code from below for each [1] through [5].
(e.g. 10JFT1-6A6-R/Q)
• Special input range (For codes U1, U2, U3)
• Parameters (See "Functions" section)
Default setting will be used if not otherwise specified.
Use Ordering Information Sheet (No. ESU-1679) to specify parameters.
• Specify the specification for option code /Q
(e.g. /C01)

ITEM	DEFAULT
Sampling cycle: H	0.1
No. of samples to be calculated: N	1 (2 for mean average output filter)
Time constant: T	0.0
Max. rate of positive output change (CP)	200.00
Max. rate of negative output change (CN)	200.00
No. of smallest samples to be cut off (L)	0
No. of largest samples to be cut off (U)	0

[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 Ω)
H: 10 – 50 mA DC (Input resistance 100 Ω)
Voltage
6: 1 – 5 V DC (Input resistance 1 MΩ min.)
U1: Range ±100 mV;
(Minimum span 3 mV, Input resistance 20 kΩ min.)
U2: Range ±1000 mV;
(Minimum span 30 mV, Input resistance 20 kΩ min.)
U3: Range ±10 V;
(Minimum span 0.3 V,Input resistance 1 MΩ min.)

[3] OUTPUT 1

Current
A: 4 – 20 mA DC (Load resistance 600 Ω max.)
Voltage
6: 1 – 5 V DC (Load resistance 500 Ω min.)

[4] OUTPUT 2

0: None
Voltage
6: 1 – 5 V DC (Load resistance 5000 Ω min.)

POWER INPUT

DC Power
R: 24 V DC
(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

[5] OPTIONS

blank: none
/Q: With options (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to M-System's web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating

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RELATED PRODUCTS

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

GENERAL SPECIFICATIONS

Construction: Rack-mounted; terminal access via screw terminals at the front and via card-edge connector at the rear; terminal cover provided

Connection

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

Output: Card-edge connector and M3.5 screw terminals (torque 0.8 N·m)

Power input: Supplied from card-edge connector

Screw terminal: Nickel-plated steel

Housing material: Flame-resistant resin (black)

Isolation: Input to output 1 to output 2 to power

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**: Input resistor incorporated

■ **DC Voltage**: -10 – +10 V DC

Minimum span: 3 mV

Offset: Max. 3 times span

Default setting will be used if not otherwise specified.

U1: 0 – 100 mV DC

U2: 0 – 1 V DC

U3: 0 – 10 V DC

OUTPUT SPECIFICATIONS

With the input voltage code 6, U3 (0 % ≥ 0 V) and current, the output goes below 0 % when the input is open.

INSTALLATION

Current consumption: Approx. 60 mA with voltage output 1
Approx. 90 mA with current output 1

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

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

Mounting: Standard Rack 10BXx

Weight: 220 g (0.49 lb)

PERFORMANCE in percentage of span

Accuracy: ±0.1 %

Temp. coefficient: ±0.015 %/°C (±0.008 %/°F)

Response time: ≤ 0.5 sec. (0 – 90 %) without any function setting

Line voltage effect: ±0.1 % over voltage range

Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength: 500 V AC @ 1 minute
(input to output 1 to output 2 to power)
1500 V AC @ 1 minute (input or output or power to ground)

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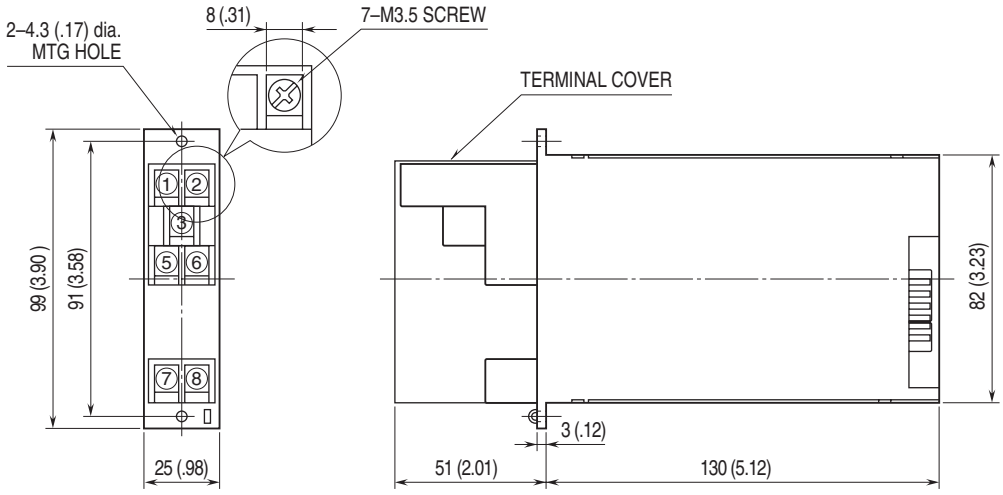
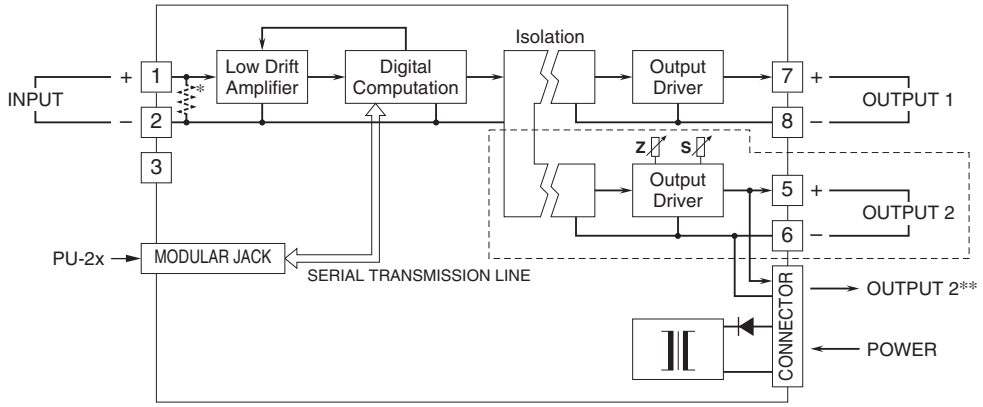
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



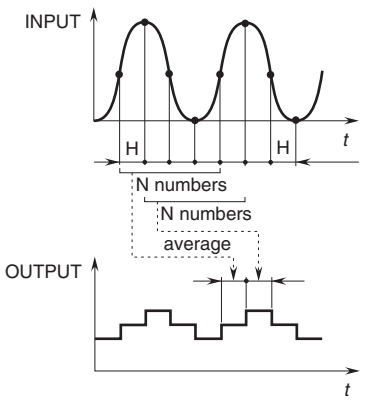
* Input shunt resistor incorporated for current input
**1 output type has the output 1 connected to the card-edge connector in parallel.
Remark 1) The section enclosed by broken line is only for 2nd output channel.

FUNCTIONS

■ MOVING AVERAGE OUTPUT

This unit 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)



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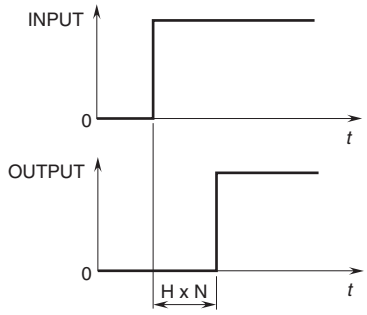
■DEAD-TIME COMPUTING

This unit 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.

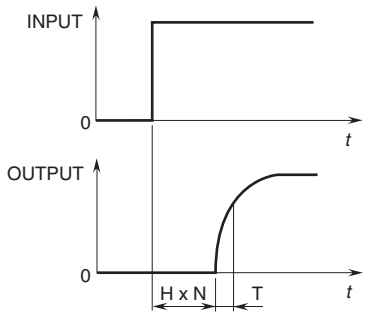
$$X_0(s) = \frac{e^{-Ls}}{1 + T\,s} X_1(s) + H \times N(s)$$

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)

•Step Input with Dead-Time



•Step Input with Dead-Time Plus Time Constant



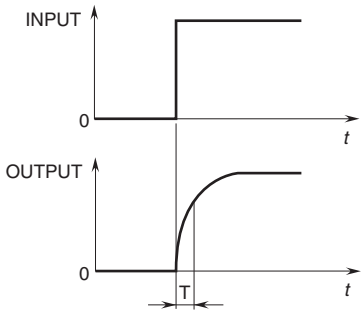
■DELAY BUFFER

This unit generates a first order lag output.

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

X_0 : output
X_1 : input
T : time constant
(0 to 100.0 second adjustable)

•Step Input with Time Constant



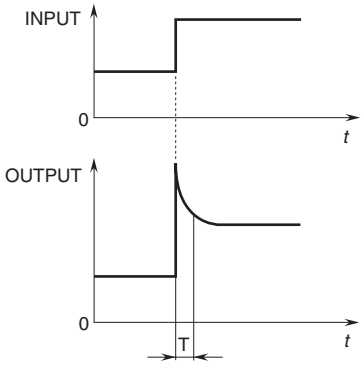
■ LEAD-TIME COMPUTING

This unit operates a lead-time equation.

$$X_0(s) = (1 + T\,s)\,X_1(s)$$

X_0 : output
X_1 : input
T : lead-time constant
(0 to 100.0 seconds adjustable)

•Step Input with Time Constant (Lead)



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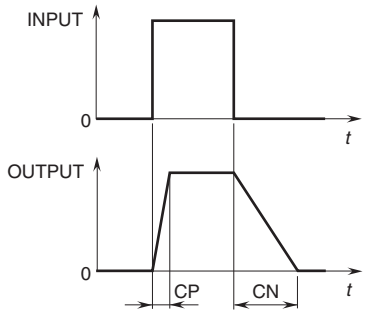
■ RAMP BUFFER

This unit's 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)

•Step Input with Rate-of-Change Limit

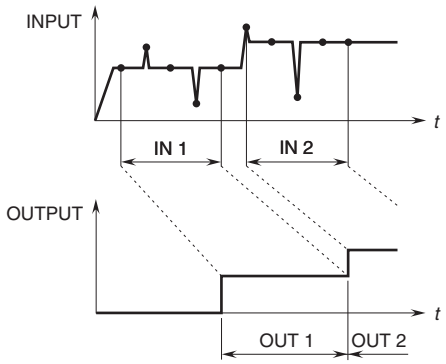


■ MEAN AVERAGE OUTPUT

This unit 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)

•Example (N=5, U=1, L=1)



⚠ Specifications are subject to change without notice.

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