High-density Signal Conditioners 10-RACK

2-input MATH FUNCTION MODULE

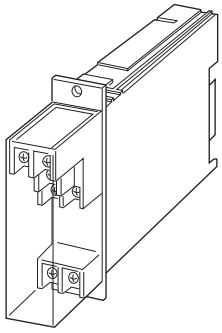
(field-programmable)

Functions & Features

• Providing temperature or pressure compensation for a gas flow, and other arithmetic operations
• Microprocessor based
• Equation and parameters selectable on site via hand-held programmer PU-2x
• Loop testing
• Optional second channel output available at the front terminals and at the Standard Rack connector

Typical Applications

• Various flowmeters
• Adding two flows
• Ratio calculation
• Calculating average temperature



MODEL: 10JF-[1][2][3]-R[4]

ORDERING INFORMATION

• Code number: 10JF-[1][2][3]-R[4]
Specify a code from below for each [1] through [4].
(e.g. 10JF-6A6-R/3/Q)
• Parameters
Use Ordering Information Sheet (No. ESU 1980). Default setting will be used if not otherwise specified.
(K_0 = 1, K_1 = 1, K_2 = 1, A_0 = 0 %, A_1 = 0 %, A_2 = 0 %)
• Specify the specification for option code /Q
(e.g. /C01)

[1] INPUT

Current

A: 4 – 20 mA DC (Input resistance 100 Ω)

Voltage

6: 1 – 5 V DC (Input resistance 1 MΩ min.)

[2] OUTPUT 1

Current

A: 4 – 20 mA DC (Load resistance 600 Ω max.)

Voltage

6: 1 – 5 V DC (Load resistance 500 Ω min.)

[3] 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.)

[4] OPTIONS (multiple selections)

Equation (Refer to the EQUATION table)

/1: Temperature compensation for DP flowmeter (ideal gas)
/2: Pressure compensation for DP flowmeter (ideal gas)
/3: Addition/subtraction
/4: Multiplication
/5: Division

Other Options

blank: none
/Q: Option other than the above (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

EQUATION

Equation parameters

X_0: output (%)
X_1 to X_2: input (%)
K_0 to K_2: gain ±29.999
A_0 to A_2: bias (%) ±299.99 %

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EQUATION

/1: Temperature compensation for DP flowmeter (ideal gas)

$$X_0 = \frac{K_1 X_1}{\sqrt{K_2 X_2 + A_2}}$$

where X_0 : compensated flow (linear characteristic)
X_1 : uncompensated flow (square root extraction available)
X_2 : temperature

/2: Pressure compensation for DP flowmeter (ideal gas)

$$X_0 = K_1 X_1 \sqrt{K_2 X_2 + A_2}$$

where X_0 : compensated flow (linear characteristic)
X_1 : uncompensated flow (square root extraction available)
X_2 : pressure

/3: Addition/subtraction

$$X_0 = K_0 \{K_1 (X_1 + A_1) + K_2 (X_2 + A_2)\} + A_0$$

/4: Multiplication

$$X_0 = K_0 (K_1 X_1 + A_1) (K_2 X_2 + A_2) + A_0$$

/5:Division

$$X_0 = \frac{K_0 (K_1 X_1 + A_1)}{(K_2 X_2 + A_2)} + A_0$$

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 (non-isolated between inputs)

Overrange input: Approx. -25 to +125 %

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

Adjustments: Programming Unit (model: PU-2x); equation and parameters, square root extraction, zero and span, etc. (Refer to the users manual of JXCON for the adjustments configurable with JXCON.)

INPUT SPECIFICATIONS

■ **DC Current**: Input resistor incorporated

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

Input accuracy: ±0.2 %

Output accuracy: ±0.2 %

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

Response time: ≤ 0.8 sec. (0 – 90 %)

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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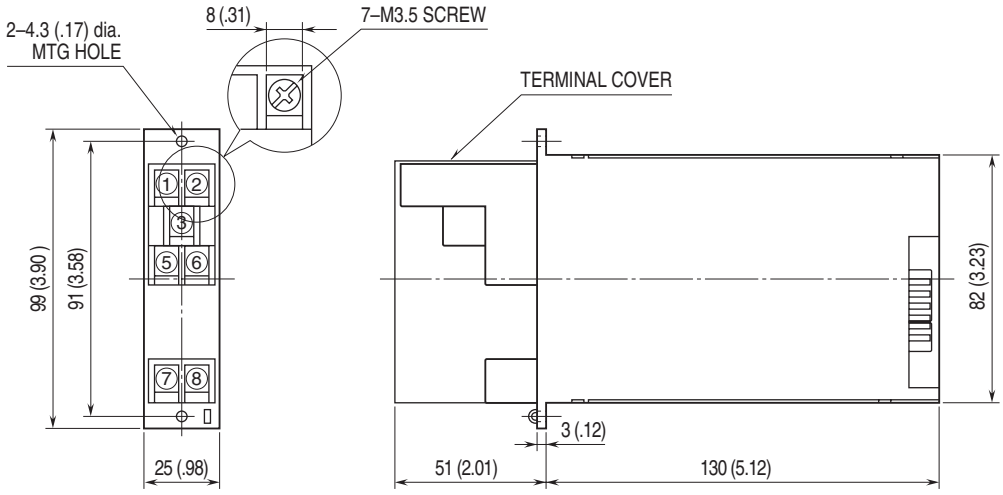
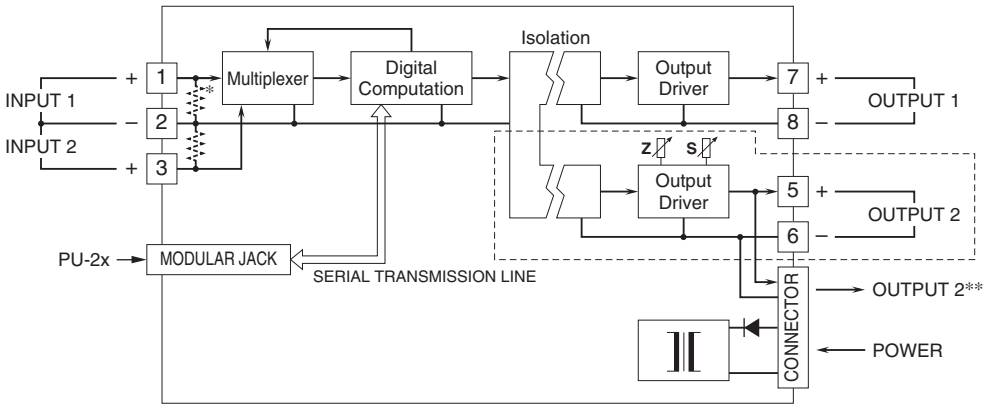
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



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.

⚠ Specifications are subject to change without notice.

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