Plug-in Signal Conditioners M-UNIT

FREQUENCY TRANSMITTER

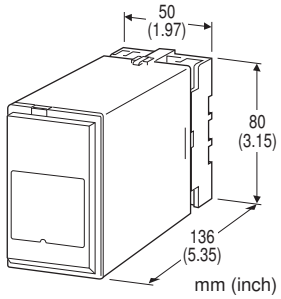
(field-programmable; built-in excitation)

Functions & Features

- Converts the output from a pulse-type transducer into a standard process signal
- Built-in excitation
- Field-selectable input type and range: Open collector, mechanical contact, voltage pulse or two-wire current pulse
- Isolation up to 2000 V AC
- High-density mounting

Typical Applications

- Positive displacement flowmeters, turbine flowmeters and vortex flowmeters
- Measuring rotation speed of a machine generating dry contact signals



MODEL: JPA2–[1][2]–[3][4]

ORDERING INFORMATION

- Code number: JPA2-[1][2]-[3][4]

Specify a code from below for each [1] through [4].
(e.g. JPA2-76-K/Q)

- Special output range (For codes Z & 0)
- Use Ordering Information Sheet (No. ESU-1572). Factory setting (indicated below) will be used if not otherwise specified.
- Specify the specification for option code /Q
(e.g. /C01/S01)

Factory Setting

Input type	Open collector
Pulse amplitude	----
Pulse sensing	DC coupled
Noise filter	Low
Detecting level	2V *1
Frequency range	0 – 1 kHz
Input zero frequency	0 Hz
Input span frequency	1 kHz
Low-end cutout	-15%
Low-end cutout deadband	1%
Alarm setpoint	100%
Alarm deadband	1.00%
Alarm mode	High alarm
Non-uniform pulse compensation	1 (no compensation)
Linearization	Without

*1. Detecting voltage in the internal circuit

INPUT – Field-selectable

Open collector
Mechanical contact
Voltage pulse
Two-wire current pulse

[1] EXCITATION

1: 5 V DC @ 120 mA
4: 12 V DC @ 60 mA
7: 24 V DC @ 25 mA

[2] 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 100 Ω min.)
4: 0 – 10 V DC (Load resistance 1000 Ω min.)
5: 0 – 5 V DC (Load resistance 500 Ω min.)
6: 1 – 5 V DC (Load resistance 500 Ω min.)
4W: -10 – +10 V DC (Load resistance 2000 Ω min.)
5W: -5 – +5 V DC (Load resistance 1000 Ω min.)
0: Specify voltage (See OUTPUT SPECIFICATIONS)

[3] POWER INPUT

AC Power

K: 85 – 132 V AC

DC Power

S: 12 V DC

R: 24 V DC

V: 48 V DC

P: 110 V DC

[4] 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

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

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 DC output to alarm output to power

Overrange output: Approx. -15 to +115 % at 1 – 5 V

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

Span adjustment: 95 to 105 % (front)

Alarm mode: High or Low

Alarm setpoint: -15 – +115 %

Alarm deadband: 0 – 20 %

Linearization: Max. 16 points

Input monitor LED: Red LED blinks according to the input.

Excitation adjustment: 5 – 24 V DC

Software programming: Programming Unit (model: PU-2x); (Refer to the users manual of JXCON for the adjustments configurable with JXCON.)

- Input frequency range
- Zero and span
- Low-end cutout
- Linearization
- Alarm setpoint
- Output fine adjustment
- Averaging non-uniform pulses
- Others

Adjustments: With DIP and Rotary switches.

- Input Type
- Pulse Sensing
- Noise Filter
- Detecting level

(Refer to the instruction manual for details)

Modular jack: Connecting the PU-2x

Low-end cutout: -15 – +115 % adjustable

(% of the input range determined by the input zero and span frequencies. This unit outputs 0 % for the input below the setting. When the input zero frequency is set to 0 Hz, the low-end cutout setting below 0 % is not valid.)

INPUT SPECIFICATIONS

Excitation: Shortcircuit protection; approx. 440 mA (max.) at shortcircuit

Frequency ranges: 0 – 0.01 Hz through 100 kHz (up to 10 Hz for mechanical contact)

Minimum pulse width time requirement: 5 µsec.; 50 msec. for mechanical contact (for both ON and OFF)

Minimum span: 10 % of the selected frequency range

■ Open Collector & Mechanical Contact

Input requirements

(Excitation: Sensing: OFF: ON)

5 V: Approx. 4 V / 1.0 mA: ≥ 200 kΩ: ≤ 200 Ω

12 V: Approx. 9 V / 2.3 mA: ≥ 200 kΩ: ≤ 200 Ω

24 V: Approx. 16 V / 4.7 mA: ≥ 200 kΩ: ≤ 200 Ω

Detecting level: 2 V (Detecting voltage in the internal circuit.)

Detecting pulse edge: OFF (input monitor LED ON) to ON (input monitor LED OFF)

■ Voltage Pulse

Waveform: Square or sine

Input impedance: 10 kΩ min.

Pulse amplitude: 0.1 – 100 Vp-p

Max. voltage between input terminals: 50 V

Detecting level: 0 – 5 V (factory setting: 2 V)

(Detecting voltage in the internal circuit.)

Detecting pulse state: A pulse rise detected when the input voltage goes above the detecting level (input monitor LED ON); a pulse sink detected when it goes below the level (input monitor LED OFF).

■ Two-wire Current Pulse

Input resistance: Receiving resistor 100 Ω

Input range: 0 – 25 mA

Minimum pulse amplitude: 10 mA

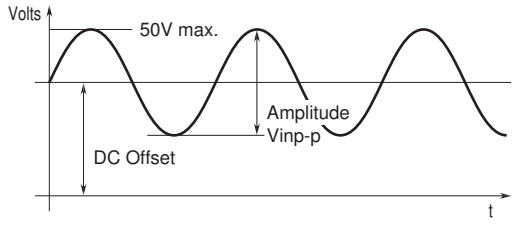
Detecting level: 0 – 5 V (factory setting: 2 V)

(Detecting voltage in the internal circuit.)

Detecting pulse state: The input resistor (100 Ω) converts the current signal (0 - 25 mA) into 0 – 2.5 V. A pulse rise

detected when the voltage goes above the detecting level (input monitor LED ON); a pulse sink detected when it goes below the level (input monitor LED OFF).

Voltage pulse waveform



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 ≥ 0.5 V
■ **Alarm Output**: Relay contact
Rated load: 125 V AC @ 0.5 A (cos ø = 1)
30 V DC @ 0.5 A (resistive load)
Maximum switching voltage: 250 V AC or 125 V DC
Maximum switching power: 62.5 VA or 60 W
Minimum load: 10 mV DC @ 1 mA
Mechanical life: 5 × 10^7 cycles (300 cycles/minute)
For maximum relay life with inductive loads, external protection is recommended.

INSTALLATION

Power input
•**AC**: Operational voltage range 85 – 132 V, 47 – 66 Hz, approx. 6 VA
•**DC**: Operational voltage range: Rating ±10 %, or 85 – 150 V for 110 V rating; ripple 10 %p-p max.; Approx. 3.3 W (130 mA at 24 V)
Operating temperature: -5 to +60°C (23 to 140°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: Input accuracy + output accuracy
Input accuracy: ±0.05% of the selected freq. range
Inversely proportional to the input span.
[Example] Open collector input, 0 – 50 kHz
Selected Freq. Range 100 kHz ÷ Input Span 50 kHz × Accuracy 0.05 % + Output Accuracy 0.05 % = ±0.15 %

Output accuracy: ±0.05 % of the output range
Alarm setpoint accuracy: ±0.1 %
Temp. coefficient: ±0.015 %/°C (±0.008 %/°F)
Response time: 0.5 sec. + 1 pulse cycle (0 – 90 %)
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength:
2000 V AC @ 1 minute (input to output to power)
1500 V AC @ 1 minute (input or output or power to alarm output)
2000 V AC @ 1 minute (circuit to ground)

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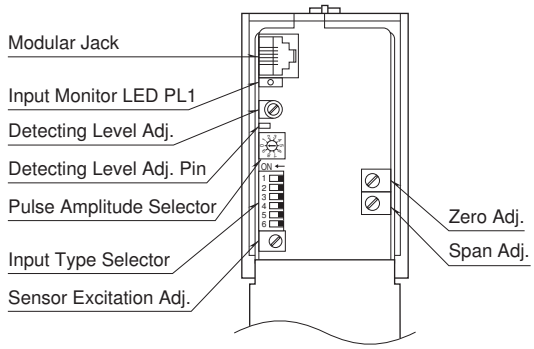
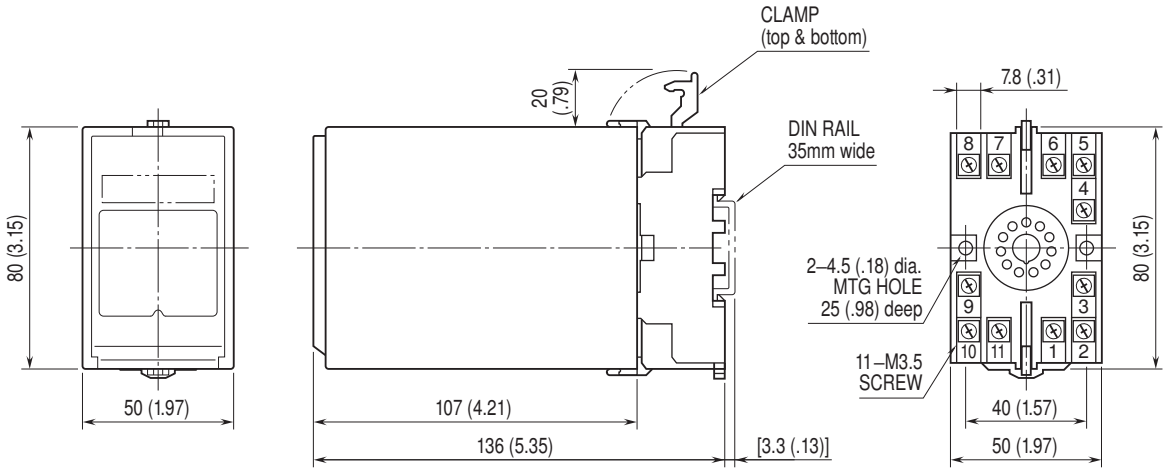
EXTERNAL VIEW



Refer to the instruction manual for detailed procedures.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



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

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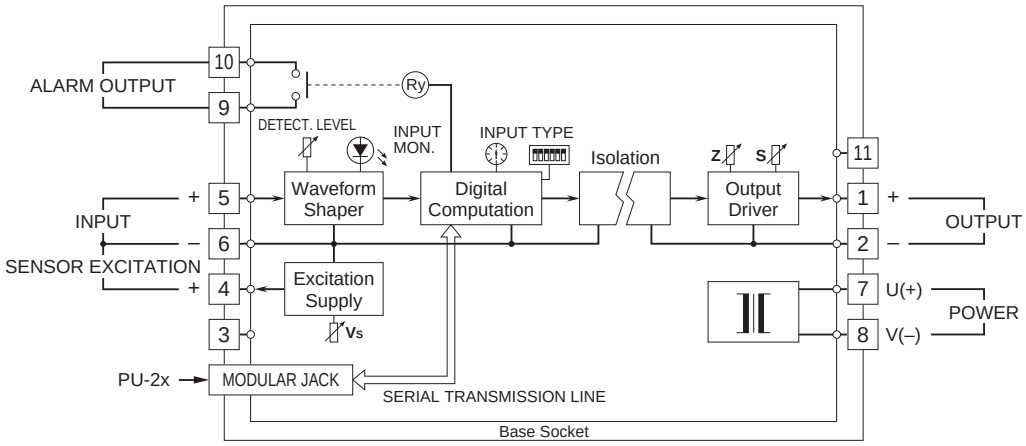
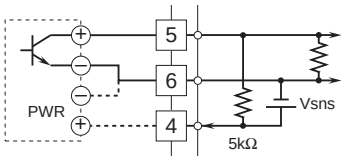
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

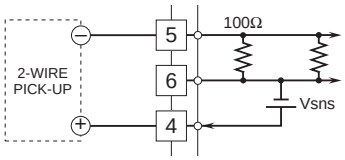


Input Connection Examples

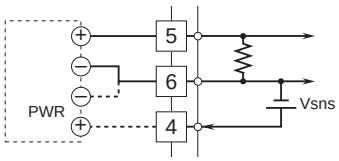
■Open Collector or Mechanical Contact



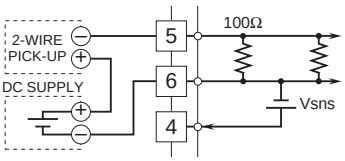
■2-Wire Current Pulse
•Built-in Excitation



■Voltage Pulse



•External DC Supply



⚠ Specifications are subject to change without notice.

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