Plug-in Signal Conditioners M-UNIT

ENCODER SPEED TRANSMITTER

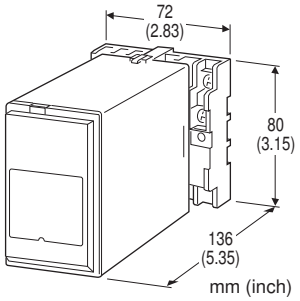
(field-programmable; built-in excitation)

Functions & Features

•Converts a two-phase forward and reverse rotation pulse signal with 90 degree phase difference into a forward and reverse speed signal
•Built-in excitation
•Field-selectable input type and range
•Isolation up to 2000 V AC
•High-density mounting

Typical Applications

•Measuring moving speed of a machine with a rotary encoder



MODEL: JRP2-[1][2]-[3][4]

ORDERING INFORMATION

• Code number: JRP2-[1][2]-[3][4]
Specify a code from below for each [1] through [4].
(e.g. JRP2-76-K/Q)
• Specify the specification for option code /Q
(e.g. /C01/S01)
• Special output range (For codes Z & 0)
• Use Ordering Information Sheet (No. ESU-1577). Factory setting (indicated below) will be used if not otherwise specified.

Factory Setting

Input type	Open collector
Pulse amplitude	----
Pulse sensing	DC coupled
Noise filter	Low
Detecting level	1V*1 (5V excitation) 2V*1 (12/24V excitation)
Frequency range	0 – 1 kHz
Input zero frequency	0 Hz
Input span frequency	1 kHz
Low-end cutout	0 Hz
Low-end cutout deadband	0.01kHz
Alarm setpoint	100%
Alarm deadband	1.00%
Alarm mode	High alarm
Linearization	Without

*1. Detecting voltage in the internal circuit

INPUT – Field-selectable

Open collector
Voltage pulse
RS-422 line driver pulse
Two inputs (phase A and B) are required for adequate operation of the this unit.

[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 %

Input monitor (PL1): Red LED blinks according to the input phase A.

Input monitor (PL2): Red LED blinks according to the input phase B.

Excitation adjustment: 5 – 24 V DC

Software programming: Programming unit (model: PU-2x) used to set the input frequency range, zero and span, low-end cutout, alarm, fine output adj., linearrization, etc. (Refer to the users manual of JXCON for the adjustments configurable with JXCON.)

Adjustments: With DIP and Rotary switches.

- Input Type
- Noise Filter
- Pulse amplitude

(Refer to the instruction manual for details)

Modular jack: Connecting the PU-2x

Low-end cutout: Specify frequency (When the low-end cutout is set to 0 Hz, the deadband is not valid.)

INPUT SPECIFICATIONS

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

Maximum frequency: 200 kHz

Frequency ranges: 0 – 0.01 Hz through 100 kHz

Note: Choose 100 kHz range to set the zero/span frequencies greater than 100 kHz.

Minimum span: 10 % of the selected frequency range

Minimum pulse width time requirement: 2.5 µsec. for both ON and OFF

■ **Open Collector**

Input requirements (Excitation: Sensing)

5 V: Approx. 4 V / 1.0 mA

12 V: Approx. 9 V / 2.3 mA

24 V: Approx. 16 V / 4.7 mA

ON resistance: ≤ 200 Ω

OFF resistance: ≥ 200 kΩ

Detecting level:

1 V (5 V excitation)

2 V (12/24 V excitation)

(Detecting voltage in the internal circuit. For open collector input, be sure to re-adjust the voltage back to 1 V (5 V excitation) or 2 V (12/24 V excitation) if it has been changed for other input types.)

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

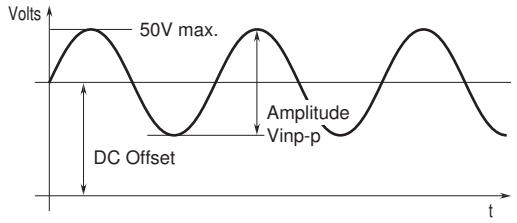
(Detecting voltage in the internal circuit.)

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 (LED OFF).

■ **RS-422 Line Driver Pulse**

Receiver: Conforms to RS-422

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. 7 VA
•**DC**: Operational voltage range: Rating ±10 %, or 85 – 150 V for 110 V rating; ripple 10 %p-p max.; Approx. 4 W (140 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
Output accuracy: ±0.05 % of the output range
Input accuracy: ±0.05 % of the selected freq. range
The input accuracy is inversely proportional to the input span, except fixed to ±0.05 % with [Freq. Range ÷ Span] ≤ 1.
[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 %

Alarm setpoint accuracy: ±0.1 %
Temp. coefficient: ±0.015 %/°C (±0.008 %/°F)
Response time (0 – 90 %)
≤1 Hz range: two pulse cycles
≥10 Hz range: 0.5 sec. + one pulse cycle
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 DC output to power)
1500 V AC @ 1 minute (input or DC output or power to alarm output)
2000 V AC @ 1 minute (circuit to ground)

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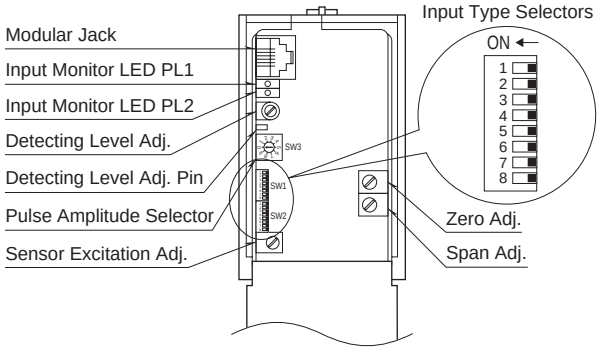
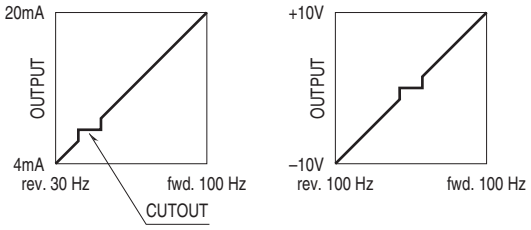
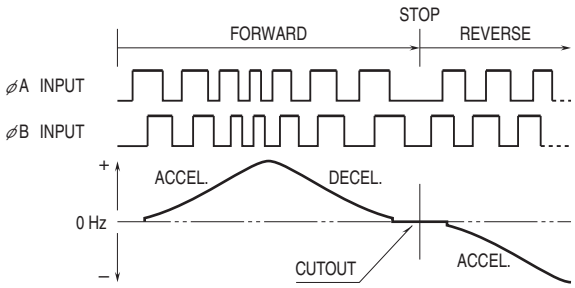
EXTERNAL VIEW

Refer to the instruction manual for the setting procedure.



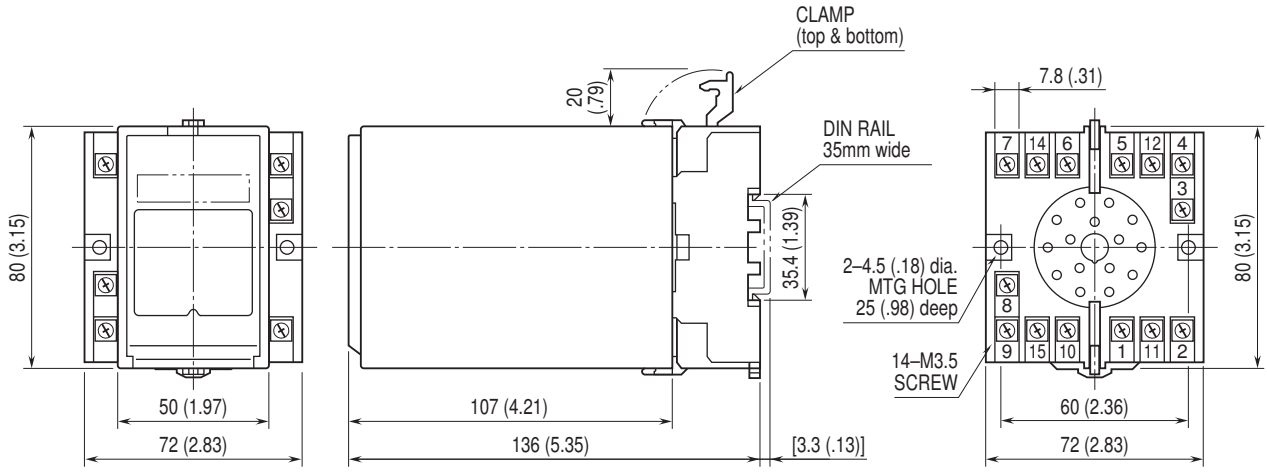
OPERATION





Forward Rotation: Phase A leads the Phase B by 90 degrees.
Reverse Rotation: Phase A lags behind Phase B by 90 degrees.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



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

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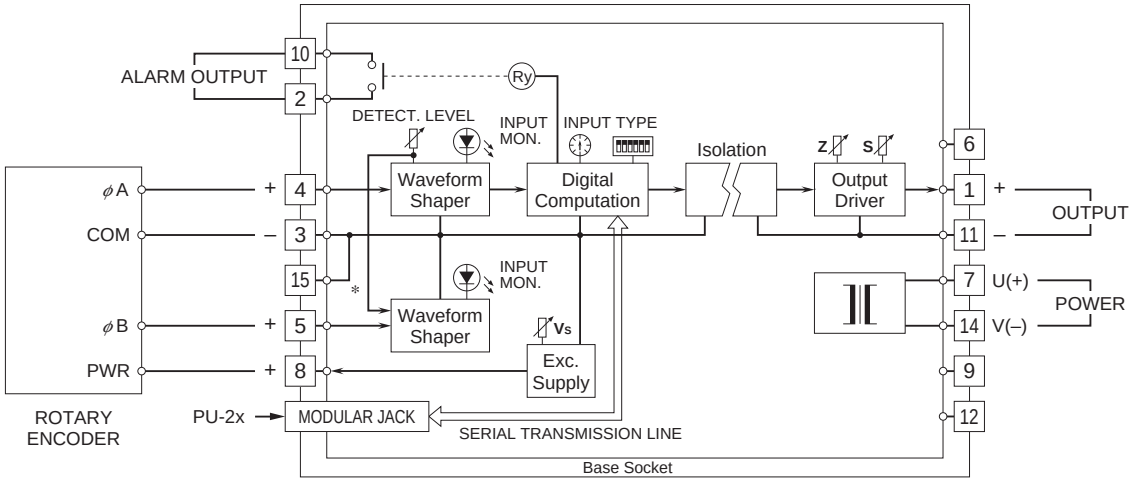
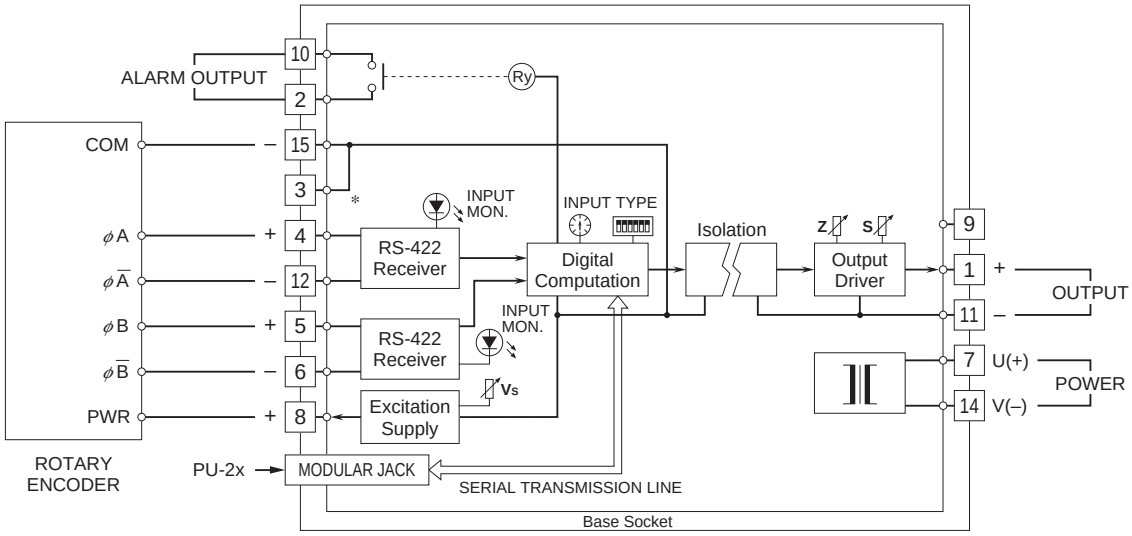
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

■OPEN COLLECTOR or VOLTAGE PULSE INPUT



■RS-422 LINE DRIVER INPUT



*Terminals 3 and 15 are internally connected.
The rotary encoder's COM terminal can be connected to either one.

⚠ Specifications are subject to change without notice.

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