

Plug-in Signal Conditioners M-UNIT

PULSE SCALER

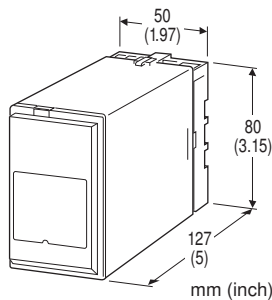
(pulse dividing; selectable range)

Functions & Features

- Galvanically isolating pulse rate signals and converting them into convenient engineering unit
- Excitation
- Scaling factor adjustable with the front switches
- Uniform output pulse
- Various outputs (relay, open collector and voltage pulses)
- Isolation up to 2000 V AC
- High-density mounting

Typical Applications

- Positive displacement flowmeters and turbine meters
- Dry contact signal produced at rotating machine



MODEL: PDU-[1][2][3][4]-[5][6]

ORDERING INFORMATION

- Code number: PDU-[1][2][3][4]-[5][6]
- Specify a code from below for each of [1] through [6]. (e.g. PDU-CM1N-B/Q)
- Use Ordering Information Sheet (No. ESU-1368). Default setting (table below) will be used if not otherwise specified.
- Specify the specification for option code /Q (e.g. /C01/S01)

Factory default setting

| ITEM | DEFAULT |
|--------------------|---|
| Scaling factor | 1 / (1x10 ⁰) |
| Output pulse width | Approx. 50% duty ratio at the max. input frequency (400 msec. max.); Limited to the range indicated in Output Pulse Width code 3 for relay output |
| Filter | Without; For dry contact input with frequency ≤10 Hz, the filter is automatically provided. |

[1] INPUT

- A: Dry contact
- B: Voltage pulse (Specify sensitivity)
- C: 5 V pulse (sensitivity 2 V)
- D: 12 V/24 V pulse (sensitivity 5 V)
- H: Two-wire current pulse

[2] OUTPUT

- A: Open collector (max. 100 kHz)
- M: 5 V pulse (max. 100 kHz)
- N: 12 V pulse (max. 100 kHz)
- P: 24 V pulse (max. 100 kHz)
- H: Relay contact (max. 5 Hz)
- () = Max. frequency

[3] OUTPUT PULSE WIDTH

- 1: One-shot output (5 - 200 μsec.) (Not selectable with relay contact.)
- 2: One-shot output (0.18 - 9 msec.) (Not selectable with relay contact.)
- 3: One-shot output (9 - 400 msec.)

[4] OUTPUT LOGIC

- N: The same as the input
- R: Inverted

[5] POWER INPUT

- AC Power**
- B: 100 V AC
- C: 110 V AC
- D: 115 V AC
- F: 120 V AC
- G: 200 V AC
- H: 220 V AC
- J: 240 V AC
- DC Power**
- S: 12 V DC
- R: 24 V DC
- V: 48 V DC

[6] 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

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 output to power

Input pulse sensing: DC coupled

Sensitivity adjustment: Single-turn screwdriver adjustment (front); 0 - ± 7 V

Hysteresis (deadband): Approx. 0.5 V

Input filter: Provided for 10 Hz or lower output frequency (time constant approx. 1 msec.)

Scaling factor adjustment: 10-position rotary switches (front);

$1 / (m \times 10^n)$ $m = 1 - 9999$, $n = 0 - 6$

Output pulse width adjustment: Multi-turn screwdriver adjustment (front); 5 μ sec. - 400 msec.

INPUT SPECIFICATIONS

Frequency range: 0 - 100 kHz (10 Hz max. with filter)

Excitation: 12 V DC @ 30 mA; shortcircuit protection

Pulse width time requirement: 5 μ sec. min. (10 ms with filter)

■ Dry Contact

Sensing: 7.5V DC @ 1mA

ON/OFF level: ≥ 30 k Ω /5 V for OFF; ≤ 1 k Ω /1 V for ON

■ **Voltage Pulse:** Specify DC offset and amplitude.

Waveform: Square or sine

Input impedance: 10 k Ω min.

Input amplitude: 2 - 50 Vp-p

Offset: 0 - ± 7 V

Max. voltage between input terminals: ± 32 V

• 5V, 12V, 24V Pulse

Waveform: Square or sine

Input impedance: 10 k Ω min.

Detecting level

(Input: 5 V pulse: 12 V/24 V pulse)

V_H : ≥ 3 V: ≥ 6 V

V_L : ≤ 1 V: ≤ 4 V

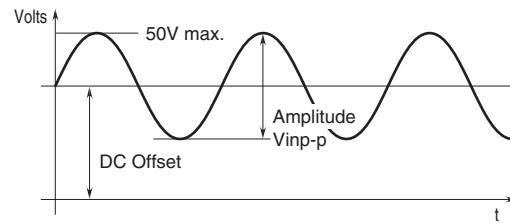
■ Two-wire Current Pulse

Input resistance: Receiving resistor 220 Ω

Maximum current: ± 50 mA

Hi/Lo level: ≤ 5 mA for Lo, ≥ 15 mA for Hi

■ Voltage pulse waveform



OUTPUT SPECIFICATIONS

■ **Open Collector:** 50 V DC @ 50 mA (resistive load)

Maximum frequency: 100 kHz with load resistance ≤ 1 k Ω

Saturation voltage: 1.0 V DC

■ Voltage Pulse:

High level: Rating (5, 12 or 24 V) ± 10 %

Low level: ≤ 0.5 V

Maximum frequency: 100 kHz

Load resistance:

1 k Ω min. for 5 V

2.4 k Ω min. for 12 V,

4.8 k Ω min. for 24 V

■ Relay Contact:

120 V AC @ 200 mA ($\cos \theta = 1$)

30 V DC @ 200 mA (resistive load)

Electrical life 3×10^5 cycles (rate 30/min.)

Maximum switching voltage: 250 V AC or 30 V DC

Maximum switching power: 24 VA or 6 W

Minimum load: 5 V DC @ 10 mA

Mechanical life: 2×10^7 cycles

For maximum relay life with inductive loads, external protection is recommended.

Maximum frequency: 5 Hz

OUTPUT PULSE WIDTH

• **One-shot Output:** Preset pulse width ± 20 %;

The pulse width is factory set to approx. 50 % duty ratio at the maximum frequency. For relay output, it is limited within the range indicated in Code 3 specification.

Adjustable pulse width: 5 μ sec. - 400 msec.

INSTALLATION

Power input

• **AC:** Operational voltage range: rating ± 10 %, 50/60 ± 2 Hz, approx. 2 VA

• **DC:** Operational voltage range: rating ± 10 %, ripple 10 %p-p max., approx. 2 W (80 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

Response time:

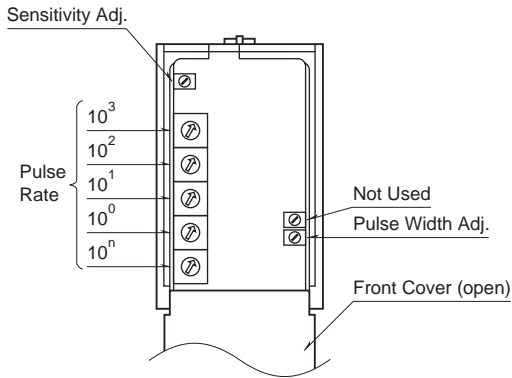
- ≤ 25 μsec. without filter
- ≤ 2 msec. with filter
- ≤ 20 msec. with relay contact pulse

Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength: 2000 V AC @1 minute (input to output to power to ground)

EXTERNAL VIEW

Note: This unit is factory calibrated according to the Ordering Information Sheet.

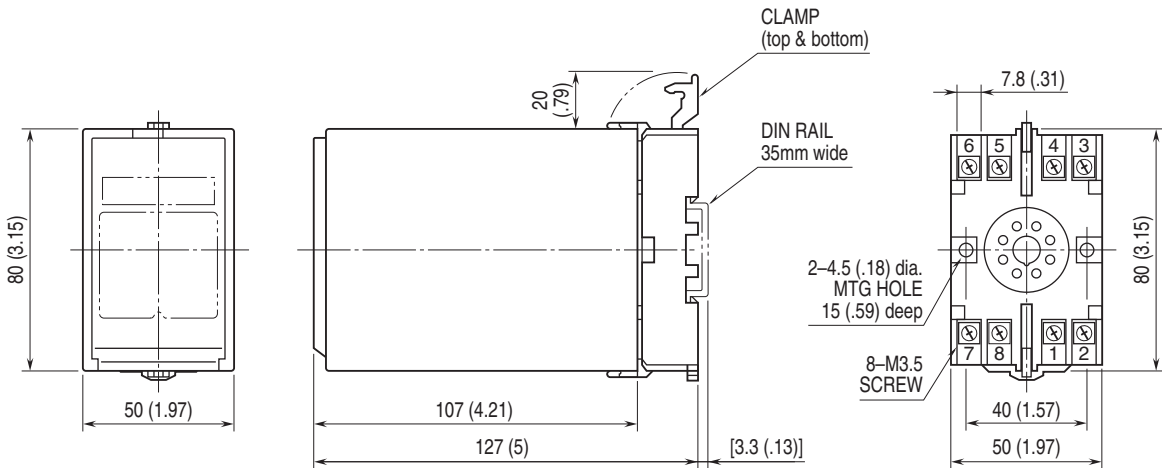


OUTPUT LOGIC

| INPUT TYPE | PULSE LOGIC | INPUT | VOLTAGE PULSE OUTPUT | OPEN COLLECTOR or RELAY CONTACT |
|--|--------------|-----------|----------------------|---------------------------------|
| Voltage Pulse Input 2-wire Current Pulse Input [ON current (H) OFF current (L)] | Non Inverted | H | H | OFF ON |
| | Inverted | H | H | OFF ON |
| Dry Contact Input | Non Inverted | OFF ON | H | OFF ON |
| | Inverted | OFF ON | H | OFF ON |

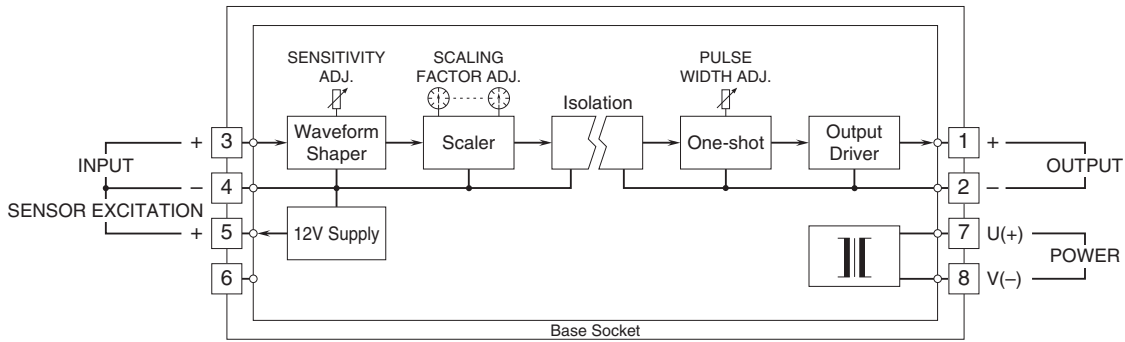
The pulse width in one-shot means the bold lined section of a pulse waveform.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



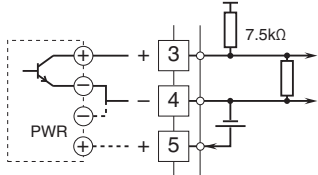
• When mounting, no extra space is needed between units.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

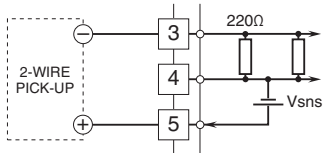


Input Connection Examples

■ Dry Contact

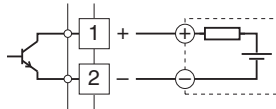


■ 2-Wire Current Pulse • Built-in Excitation

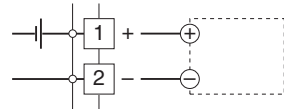


Output Connection Examples

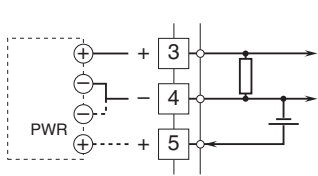
■ Open Collector



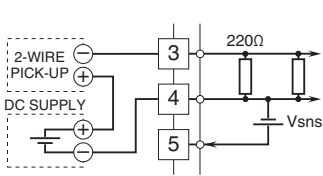
■ Voltage Pulse



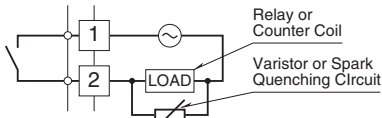
■ Voltage Pulse



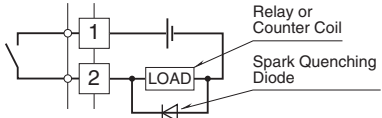
• External DC Supply



■ Relay Contact • AC Powered



• DC Powered



Specifications are subject to change without notice.