

**Plug-in Signal Conditioners M-UNIT**

**PULSE ISOLATOR**

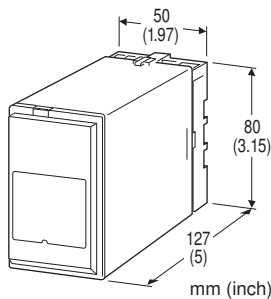
(built-in excitation)

**Functions & Features**

- Galvanically isolating pulse rate signals
- Input frequency = output frequency
- Various outputs (relay, open collector and voltage pulses)
- Excitation
- Isolation up to 2000 V AC
- High-density mounting

**Typical Applications**

- Isolating field pulse signals in order to reduce noises
- Changing e.g. dry contact signal to e.g. 5 V signals



**MODEL: PPD-[1][2][3][4][5]-[6][7]**

**ORDERING INFORMATION**

- Code number: PPD-[1][2][3][4][5]-[6][7]
- Specify a code from below for each [1] through [7]. (e.g. PPD-D4A3N-K/Q)
- Frequency range (e.g. 0 - 10 kHz)
- Output pulse width (e.g. 75 msec.)
- Use Ordering Information Sheet (No. ESU-1370). Default setting (table below) will be used if not otherwise specified.
- Specify the specification for option code /Q (e.g. /C01/S01)

**Factory setting**  
**■ PULSE INPUT SETTING**

**•Dry Contact**

|                    |                       |
|--------------------|-----------------------|
| Input              | Semiconductor contact |
| Filter             | W/O (without)         |
| Threshold 0 - 15 V | 2 V                   |
| Hysteresis 0 - 5 V | 0.5 V                 |

**•Voltage pulse**

|                    |               |
|--------------------|---------------|
| Input waveform     | Square        |
| Input coupling     | DC            |
| Input amplitude    | 0.5 - 50 Vp-p |
| Offset             | ≤ 50 V        |
| Filter             | W/O (without) |
| Threshold 0 - 15 V | 1/2 amplitude |
| Hysteresis 0 - 5 V | 0.5 V         |

**•5 V voltage pulse**

|        |               |
|--------|---------------|
| Filter | W/O (without) |
|--------|---------------|

**•12 V, 24 V voltage pulse**

|        |               |
|--------|---------------|
| Filter | W/O (without) |
|--------|---------------|

**•2- wire current pulse**

|                           |               |
|---------------------------|---------------|
| ON current (H) 0 - 25 mA  | 14.5 mA       |
| OFF current (L) 0 - 25 mA | 9.5 mA        |
| Filter                    | W/O (without) |

**■ SETTINGS FOR PULSE OUTPUT**

|                    |       |
|--------------------|-------|
| Output pulse width | 50 ms |
|--------------------|-------|

**[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] EXCITATION**

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

**[3] 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. frequency 50 kHz)
- H: High power photo MOSFET relay (max. 20 Hz)
- ( ) = Max. frequency

**[4] OUTPUT PULSE WIDTH**

- 1: Equal to the input
- 3: One-shot output (std. pulse width 50 ms)  
(Specify when optional pulse width is required.)



**[5] OUTPUT LOGIC**

N: The same as the input

R: Inverted

**[6] POWER INPUT****AC Power**

K: 85 - 132 V AC

(Operational voltage range 85 - 132 V, 47 - 66 Hz)

**DC Power**

S: 12 V DC

(Operational voltage range 12 V  $\pm$ 10 %, ripple 10 %p-p max.)

R: 24 V DC

(Operational voltage range 24 V  $\pm$ 10 %, ripple 10 %p-p max.)

V: 48 V DC

(Operational voltage range 48 V  $\pm$  10 % , ripple 10 % p-p max.)

P: 110 V DC

(Operational voltage range 85 - 150 V, ripple 10 %p-p max.)

**[7] 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 or sensor exc. to output to power

DIP SW1 &amp; SW2: Used for input spec. setting

Input monitor (PL1): Red LED blinks when pulse input

Input monitor (PL2): Not used

Excitation adjustment: 5 - 24 V DC

Input pulse sensing: DC coupled standard or AC coupled

Input filter: None, 10 ms (for chattering), 0.1 ms (for noise), selectable with DIP switch

**INPUT SPECIFICATIONS**

Excitation: Shortcircuit protection; approx. 440 mA at shortcircuit

Pulse width time requirement:  $\geq 5 \mu$  sec.

The detecting levels shown below are default value. Refer to

the manual for adjustment.

**■ Dry Contact**

Max. frequency: 100 kHz

**Detecting Conditions**

Exc. code: 1

Sensing: 5 V DC / 0.5 mA

**Detecting level:**OFF:  $\geq 2.25$  V /  $\geq 8.2$  k $\Omega$ ON:  $\leq 1.75$  V /  $\leq 5.3$  k $\Omega$ 

Exc. code: 4

Sensing: 12 V DC/ 1.2 mA

**Detecting level:**OFF:  $\geq 2.25$  V /  $\geq 2.3$  k $\Omega$ ON:  $\leq 1.75$  V /  $\leq 1.7$  k $\Omega$ 

Exc. code: 7

Sensing: 24 V DC/ 2.4 mA

**Detecting level:**OFF:  $\geq 2.25$  V /  $\geq 1$  k $\Omega$ ON:  $\leq 1.75$  V /  $\leq 0.8$  k $\Omega$ 

Sensing voltage means the excitation supply to the sensor and the current value indicates that at shortcircuit.

Detecting level means the threshold used to determine ON or OFF status of the pulses and the resistance values indicated that of the sensor.

**■ Voltage Pulse**

Maximum frequency: 100 kHz

• Customised pulse: Specify DC offset and amplitude.

Waveform: Square or sine

Input impedance:  $\geq 10$  k $\Omega$ 

Input amplitude: 0.5 - 50 Vp-p

Max. voltage between input terminals: 50 V

• 5 V, 12 V, 24 V Pulse

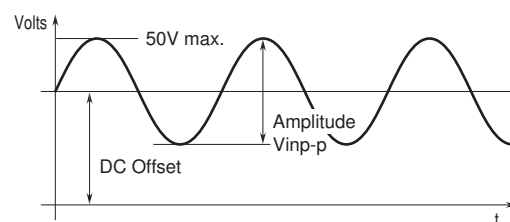
Waveform: Square or sine

Input impedance:  $\geq 10$  k $\Omega$ **Detecting level**5 V Pulse:  $V_H \geq 2.25$  V,  $V_L \leq 1.75$  V12 V / 24 V Pulse:  $V_H \geq 5.25$  V,  $V_L \leq 4.75$  V(  $V_H - V_L \geq 500$  mV)**■ Two-wire Current Pulse**

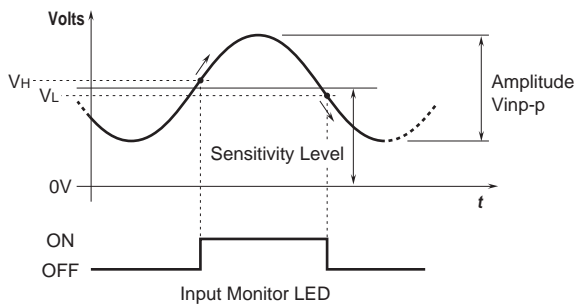
Max. frequency: 100 kHz

Input resistance: receiving resistor 100  $\Omega$ 

Input range: 0 - 25 mA

Hi/Lo level:  $\leq 9.5$  mA for Lo,  $\geq 14.5$  mA for Hi**Voltage pulse waveform**

## ■ Voltage pulse (example)



**High power photo MOSFET relay:** the output is delayed by 10 msec. at the rise, by 3 msec. at the fall.

**Insulation resistance:**  $\geq 100 \text{ M}\Omega$  with 500 V DC

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

## OUTPUT SPECIFICATIONS

### ■ High Power Photo MOSFET Relay

Maximum frequency: 20 Hz

• Rise time: 5 msec.

• Sink time: 3 msec.

Rating: 120 V AC or 120 V DC @ 200 mA (resistive load)

On resistance:  $3 \Omega$

### ■ Open Collector

Maximum frequency: 100 kHz

50 V DC @ 50 mA (resistive load)

Saturation voltage: 0.5 V DC

■ Voltage Pulse: Rating (5, 12 or 24 V)  $\pm 10 \%$

Maximum frequency: 100 kHz (50 kHz for 24 V)

Load resistance:  $\geq 1.2 \text{ k}\Omega$

Low level:  $\leq 0.5 \text{ V}$

## OUTPUT PULSE WIDTH

### ■ One-shot Output

The PPD detects a pulse sink and outputs [input pulse width  $\pm 20 \%$ ]; 50 msec. standard

Note: 2 types of one-shot detection are available: pulse rise or sink. Refer to the table on the "Output Logic" section and specify when ordering.

Optional pulse width: 30  $\mu\text{sec.}$  - 300 msec.

## INSTALLATION

### Power consumption

• AC: Approx. 6 VA

• DC: Approx. 6 W (230 mA at 24 V)

Operating temperature:  $-5$  to  $+60^\circ\text{C}$  (23 to  $140^\circ\text{F}$ )

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

Mounting: Surface or DIN rail

Weight: 200 g (0.44 lb)

## PERFORMANCE

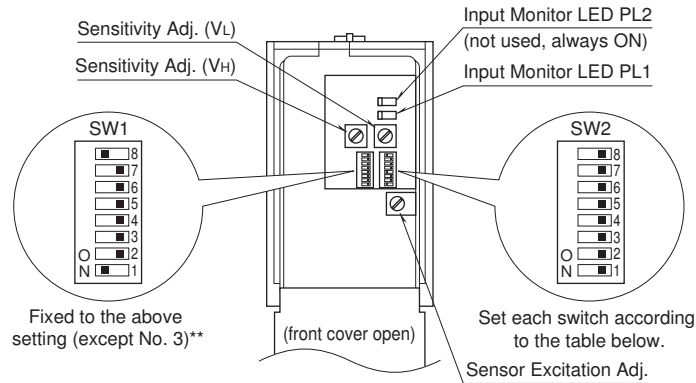
### Response time

**Open collector or voltage pulse:** the output is delayed at both pulse rise and fall by 3  $\mu\text{sec.}$  each. The delay could be much longer for certain types of load for open collector.



## EXTERNAL VIEW

Note: This unit is factory calibrated according to the Ordering Information. If you need to change hardware & software setting, refer to the instruction manuals of the transmitter.



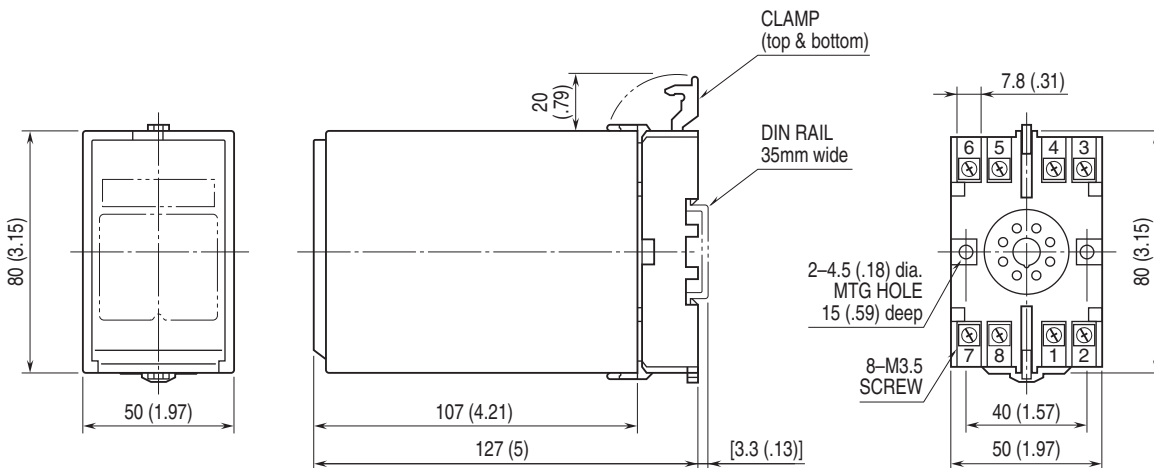
## OUTPUT LOGIC

| OUTPUT WAVEFORM                      |              | INPUT WAVEFORM                       | VOLTAGE PULSE or 2-WIRE CURRENT PULSE |   | DRY CONTACT |    |
|--------------------------------------|--------------|--------------------------------------|---------------------------------------|---|-------------|----|
|                                      |              |                                      | H                                     | L | OFF         | ON |
| VOLTAGE PULSE                        | Non Inverted | No pulse width conversion            | H                                     |   | H           |    |
|                                      |              | One-shot, detecting input pulse rise | H                                     |   | H           |    |
|                                      |              | One-shot, detecting input pulse drop | H                                     |   | H           |    |
|                                      | Inverted     | No pulse width conversion            | H                                     |   | H           |    |
|                                      |              | One-shot, detecting input pulse rise | H                                     |   | H           |    |
|                                      |              | One-shot, detecting input pulse drop | H                                     |   | H           |    |
| OPEN COLLECTOR or PHOTO MOSFET RELAY | Non Inverted | No pulse width conversion            | OFF                                   |   | OFF         |    |
|                                      |              | One-shot, detecting input pulse rise | OFF                                   |   | OFF         |    |
|                                      |              | One-shot, detecting input pulse drop | OFF                                   |   | OFF         |    |
|                                      | Inverted     | No pulse width conversion            | OFF                                   |   | OFF         |    |
|                                      |              | One-shot, detecting input pulse rise | OFF                                   |   | OFF         |    |
|                                      |              | One-shot, detecting input pulse drop | OFF                                   |   | OFF         |    |

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

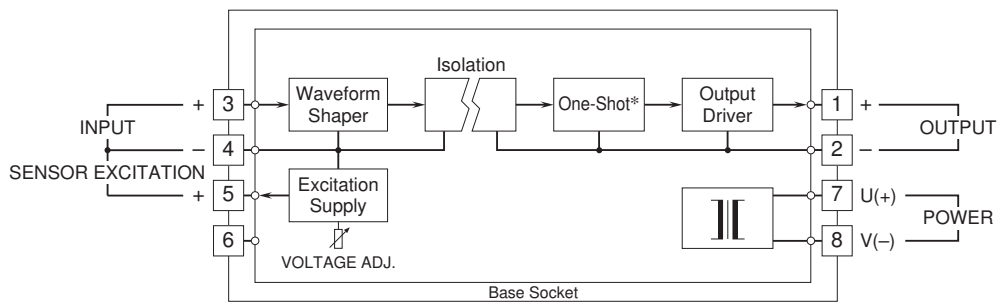


## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



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

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

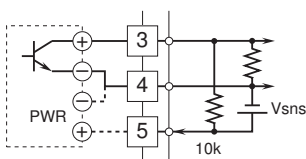


\*Provided only when the one-shot output is specified.

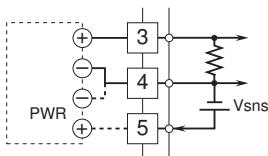
Remark: With 24V excitation and dry contact input, the voltage across the terminals 3 – 4, divided in the waveform shaper, is of approx. 16V.

### Input Connection Examples

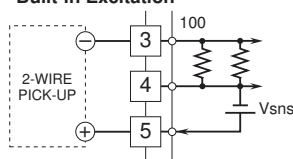
#### Dry Contact



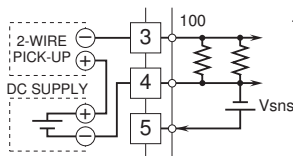
#### Voltage Pulse



#### 2-Wire Current Pulse •Built-in Excitation

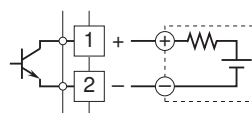


#### •External DC Supply

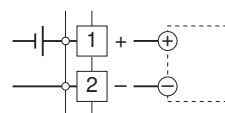


### Output Connection Examples

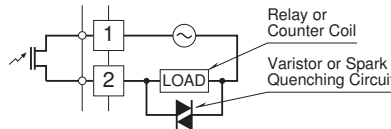
#### Open Collector



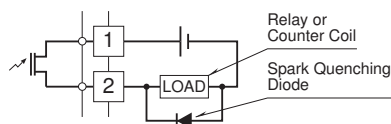
#### Voltage Pulse



#### Photo MOSFET Relay •AC Powered



#### •DC Powered



Specifications are subject to change without notice.