

Plug-in Signal Conditioners M-UNIT

PULSE ISOLATOR

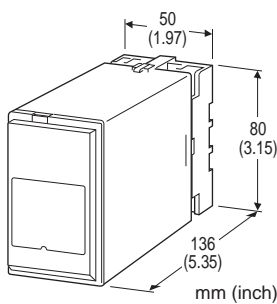
(built-in excitation; rotary encoder use)

Functions & Features

- Galvanically isolating two pulse rate signals from a rotary encoder
- Various outputs (relay, open collector, voltage pulses and RS-422 line driver)
- Different I/O specs can be specified
- Converting RS-422 line driver input into an open collector pulse
- Excitation
- Isolation up to 2000 V AC
- High-density mounting
- CE marking

Typical Applications

- Isolating field pulse signals in order to reduce noises



MODEL: RPPD-[1][2][3][4][5][6][7] -[8][9]

ORDERING INFORMATION

- Code number: RPPD-[1][2][3][4][5][6][7]-[8][9]
- Specify a code from below for each [1] through [9].
- Code number (e.g. RPPD-DD4AA1N-R/CE)
- Output pulse width (e.g. 75 msec.)
- Use Ordering Information Sheet (No. ESU-1693). Default setting will be used if not otherwise specified.

[1] INPUT 1

- 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
- J: RS-422 line driver pulse

[2] INPUT 2

Must be the same code as the one chosen for Input 1.

[3] EXCITATION

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

Excitation is not provided with input code J, but select code 1.

[4] OUTPUT 1

- 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) (Option /CE Not available)
- J: RS-422 line driver pulse (max. 100 kHz)

[5] OUTPUT 2

- A: Open collector (max. frequency 100 kHz)
 - M: 5 V pulse (max. frequency 100 kHz)
 - N: 12 V pulse (max. frequency 100 kHz)
 - P: 24 V pulse (max. frequency 50 kHz)
 - J: RS-422 line driver pulse (max. 100 kHz)
- The max. frequency is in parentheses.

OUTPUT COMBINATIONS

The table below shows the selectable type of Output 1 for each Output 2 type.

With the Output 2 other than code A, the Output 1 must be the same type.

| OUTPUT2 | OUTPUT1 |
|---------|---------------|
| A | A, M, N, P, H |
| M | M |
| N | N |
| P | P |
| J | J |

[6] OUTPUT PULSE WIDTH

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

[7] OUTPUT LOGIC (both Output 1 & 2)

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

[8] POWER INPUT

- AC Power
- K: 85 - 132 V AC

(Operational voltage range 85 - 132 V, 47 - 66 Hz)
(CE not available)

DC Power

S: 12 V DC

(Operational voltage range 12 V \pm 10 %, ripple 10 %p-p max.)
(Option /CE Not available)

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.)
(CE not available)

P: 110 V DC

(Operational voltage range 85 - 150 V, ripple 10 %p-p max.)
(CE not available)

[9] OPTIONS

STANDARDS & APPROVALS

blank: Without CE

/CE: CE marking

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection: M3.5 screw terminals

Housing material: Flame-resistant resin (black)

Isolation: Input 1 or input 2 or sensor exc. to output 1 or output 2 to power

DIP SW1 & SW2: Used for input spec. setting

Input monitor LED

PL1: Red LED blinks according to input 1.

PL2: Red LED blinks according to input 2.

Excitation adjustment: 5 - 24 V DC

Input pulse sensing: DC coupled standard

Sensitivity adjustments: V_H pot. for Hi level; V_L pot. for Lo level

INPUT SPECIFICATIONS

Excitation: Shortcircuit protection; approx. 440 mA at shortcircuit

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

■ Dry Contact

Max. frequency: 100 kHz

Detecting Conditions

Exc. code: 1

Sensing: 5 V DC / 0.5 mA

Detecting level:

OFF: ≥ 2.25 V / ≥ 8.2 k Ω

ON: ≤ 1.75 V / ≤ 5.3 k Ω

Exc. code: 4

Sensing: 12 V DC / 1.2 mA

Detecting level:

OFF: ≥ 2.25 V / ≥ 2.3 k Ω

ON: ≤ 1.75 V / ≤ 1.7 k Ω

Exc. code: 7

Sensing: 24 V DC / 2.4 mA

Detecting level:

OFF: ≥ 2.25 V / ≥ 1 k Ω

ON: ≤ 1.75 V / ≤ 0.8 k Ω

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: ≥ 10 k Ω

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: ≥ 10 k Ω

Detecting level

5 V Pulse: $V_H \geq 2.25$ V, $V_L \leq 1.75$ V

12 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 Ω

Input range: 0 - 25 mA

Hi/Lo level: ≤ 9.5 mA for Lo, ≥ 14.5 mA for Hi

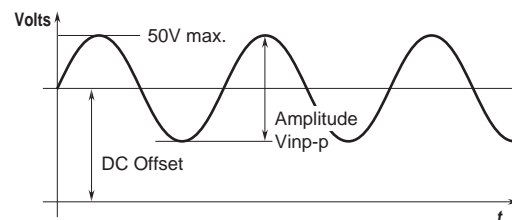
• **RS-422 LINE DRIVER PULSE**

Maximum frequency: 100 kHz

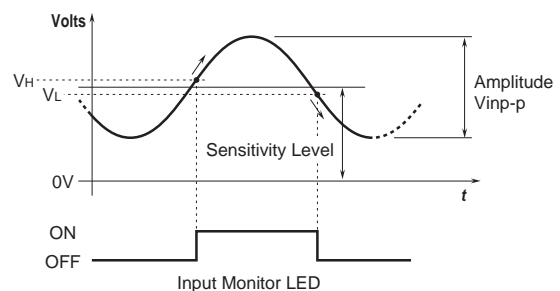
Receiver: Conforms to RS-422

(No receiving resistor incorporated)

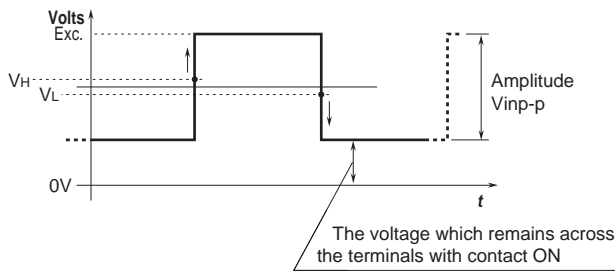
■ Voltage pulse waveform



■ Voltage pulse (example)



■ Dry contact (example)



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 Ω

■ 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) ±10 %

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

Load resistance: ≥ 1.2 kΩ

• RS-422 Line Driver Pulse: Conforms to RS-422

Output current: ±20 mA

OUTPUT PULSE WIDTH

• Equal to the Input: no pulse width conversion; difference by the length of response time

■ One-shot Output

This unit detects a pulse sink and outputs [input pulse width ±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 μsec. - 300 msec.

INSTALLATION

Power Consumption

• AC: Approx. 5.5 VA

• DC: Approx. 3.3 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: 200 g (0.44 lbs)

PERFORMANCE

Response time

1 - 4 μsec. delay occurs when the pulse rises and falls.

• Open collector: The delay could be much longer for certain types of load.

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

Insulation resistance: ≥ 100 MΩ with 500 V DC

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

STANDARDS & APPROVALS

CE conformity:

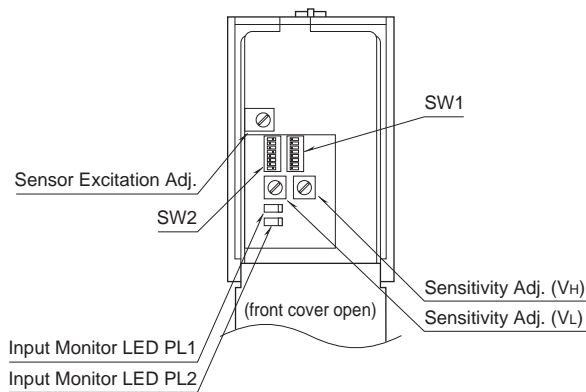
EMC Directive (2004/108/EC)

EMI EN 61000-6-4

EMS EN 61000-6-2

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.



There is no need of hardware adjustment for RS-422 line driver pulse input. Unnecessary switches or LEDs are not provided.

OUTPUT LOGIC

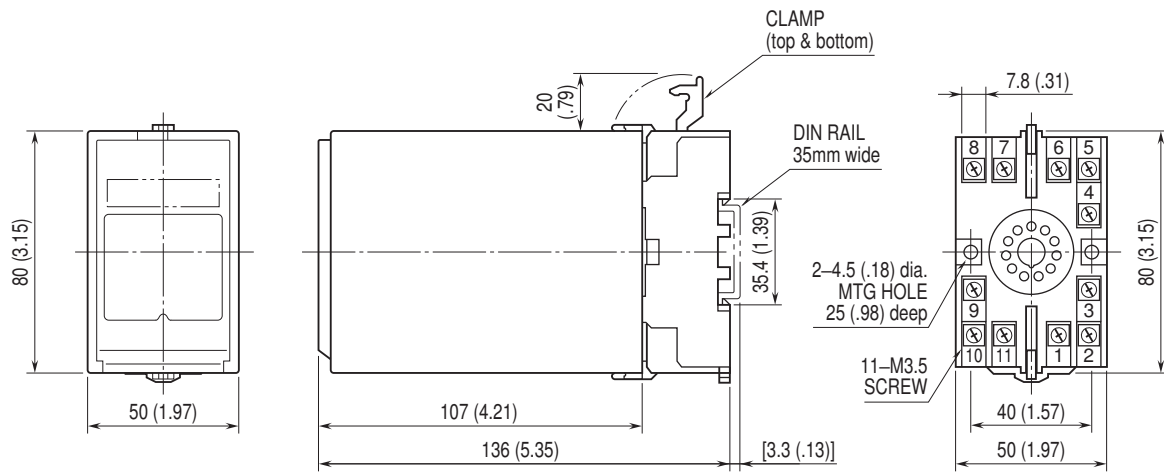
Applicable for both Output 1 and 2.

| OUTPUT WAVEFORM | | INPUT WAVEFORM | VOLTAGE PULSE, 2-WIRE CURRENT PULSE or RS-422 LINE DRIVER PULSE | DRY CONTACT |
|---|--------------|--------------------------------------|---|-------------|
| | | | H L | OFF ON |
| VOLTAGE PULSE or RS-422 LINE DRIVER PULSE | Non Inverted | No pulse width conversion | H L | OFF ON |
| | | One-shot, detecting input pulse rise | H L | H L |
| | | One-shot, detecting input pulse drop | H L | H L |
| | Inverted | No pulse width conversion | H L | H L |
| | | One-shot, detecting input pulse rise | H L | H L |
| | | One-shot, detecting input pulse drop | H L | H L |
| OPEN COLLECTOR or PHOTO MOSFET RELAY | Non Inverted | No pulse width conversion | OFF ON | OFF ON |
| | | One-shot, detecting input pulse rise | OFF ON | OFF ON |
| | | One-shot, detecting input pulse drop | OFF ON | OFF ON |
| | Inverted | No pulse width conversion | OFF ON | OFF ON |
| | | One-shot, detecting input pulse rise | OFF ON | OFF ON |
| | | One-shot, detecting input pulse drop | OFF ON | OFF ON |

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

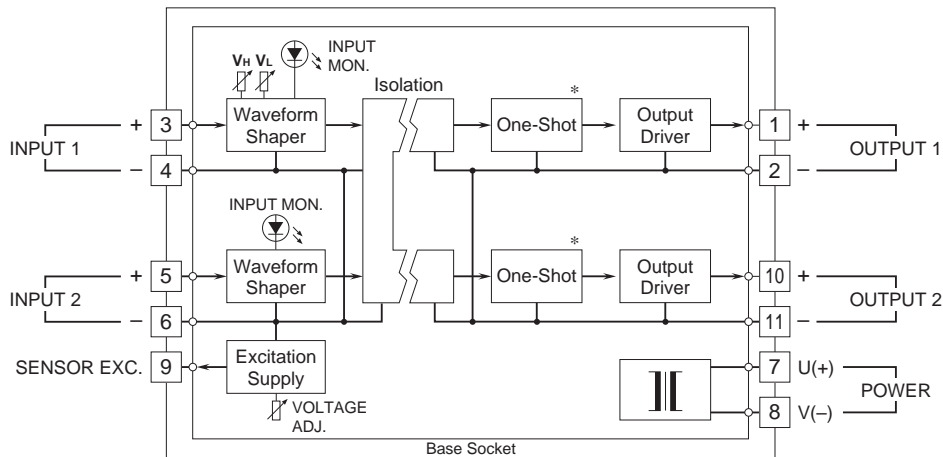
*Pulse rise for RS-422 line driver pulse can not be detected.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



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

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

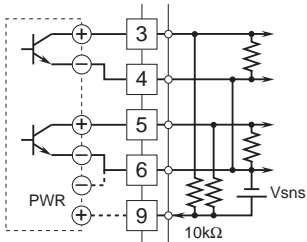


*Deleted with no pulse width conversion type.

Remark: With 24V excitation and dry contact input, the voltage across the terminals 3 - 4, 5 - 6, divided in the waveform shaper, is of approx. 16V.

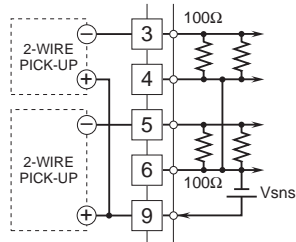
Input Connection Examples

■ Dry Contact



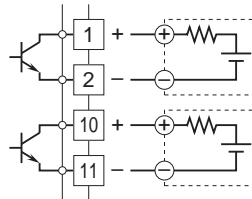
■ 2-Wire Current Pulse

• Built-in Excitation

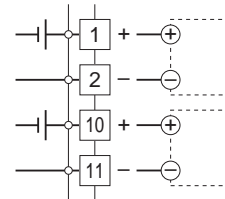


Output Connection Examples

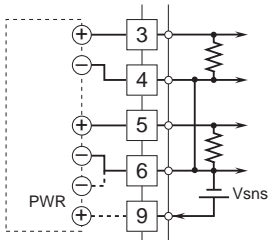
■ Open Collector



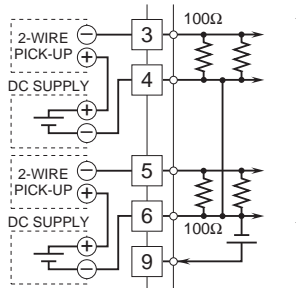
■ Voltage Pulse



■ Voltage Pulse

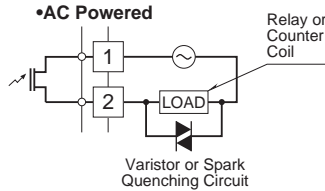


• External DC Supply

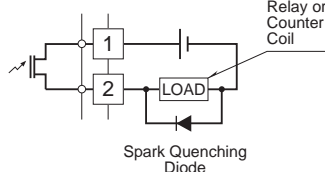


■ Power Photo MOSFET Relay

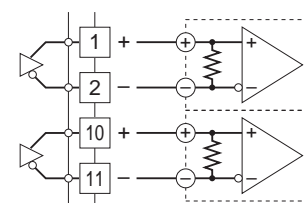
• AC Powered



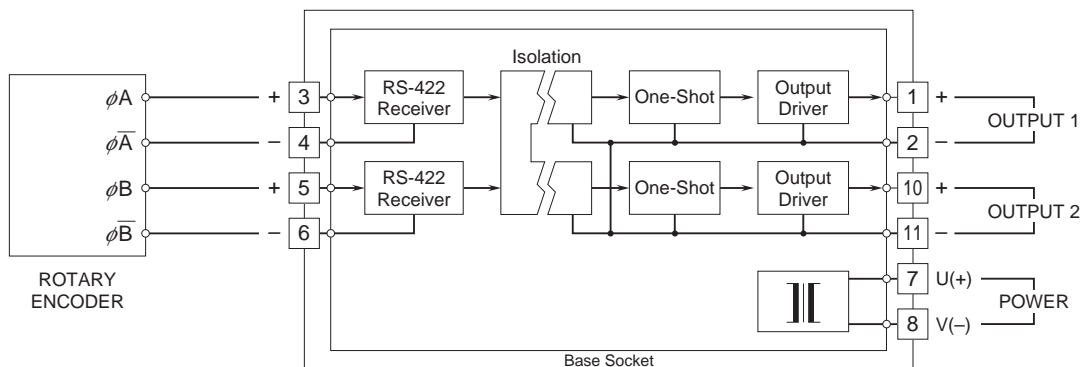
• DC Powered



■ RS-422 Line Driver Pulse



■ RS-422 LINE DRIVER INPUT



Sensor excitation not provided for RS-422 line driver input.



Specifications are subject to change without notice.