Plug-in Signal Conditioners M-UNIT

PULSE SCALER

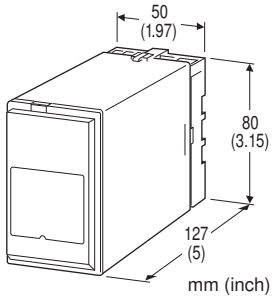
(field-configurable)

Functions & Features

• Converting pulse rate into convenient engineering unit for display on a totalizing counter or meter
• Excitation
• Digital scaling accuracy
• Scaling factor adjustable of 0.9999 × 10^{0} to 0.0001 × 10^{-6}
• High-density mounting

Typical Applications

• Positive displacement flowmeters and turbine flowmeters
• Magnetic tachometers



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

ORDERING INFORMATION

• Code number: PRU-[1][2]-[3][4]
Specify a code from below for each [1] through [4].
(e.g. PRU-11-B/Q)
•Input frequency range (e.g. 0 – 356.7 Hz)
•Output frequency range (e.g. 0 – 1.00 Hz)
• Specify the specification for option code /Q
(e.g. /C01/S01)

[1] INPUT

1: Dry contact (Excitation 12 V @30 mA)
2: DISCONTINUED, replaced with code 8
Voltage pulse; square wave (Exitation 12 V @30 mA)
7: Sine wave (Excitation 12 V @30 mA)
8: Voltage pulse; square wave (Excitation 12 V @30 mA)

[2] OUTPUT

1: Open collector (max. frequency 20 kHz)
2: 5 V pulse (max. frequency 20 kHz)
3: Relay contact (max. frequency 2 Hz)
4: 24 V pulse (max. frequency 20 Hz)

[3] 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

[4] OPTIONS

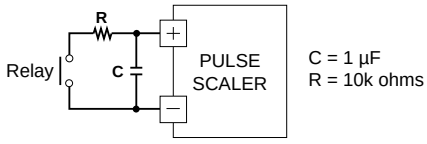
Other Options
blank: none
/Q: With options (specify the specification)

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

CAUTION

1) This unit's output waveform is not uniform due to its scaling method.
2) Use input relays which do not cause chattering (e.g. mercury relays). Other relays could be used only with a CR filter, for 10 Hz at maximum.
3) Use M-System's Model M2PRU instead of this unit in conjunction with the pulse output from M-System's power transducers.



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: Capacitor coupled; detecting pulse rise
Sensitivity adjustment: For voltage pulse input, sine wave

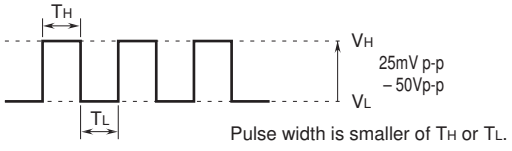
input, adjustable between 25 mVp-p – 5 Vp-p (front)
Scaling factor adjustment: 0.9999 × 10^{0} – 0.0001 × 10^{-6} (front 10-position rotary switch)
Output pulse width adjustment: (front)
• Open collector, 5 V pulse: 40 µsec. - 0.8 msec.
• Relay contact, 24 V pulse: 40 msec. - 0.8 sec.

INPUT SPECIFICATIONS

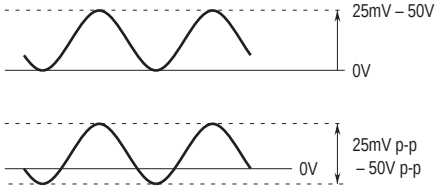
Excitation: 12 V DC @30 mA; shortcircuit protection
■ **Dry Contact**: Mechanical contact or open collector
Max. frequency: 100 kHz
Pulse width time requirement: 5 µsec. min. (20 msec. min. for frequencies ≤ 10 Hz)
Sensing: Approx. 7.5 V DC @ 1 mA
ON/OFF level: ≤ 20 kΩ for ON, ≥ 100 kΩ for OFF
■ **Voltage Pulse:** Square or similar waveform
Max. frequency: 100 kHz
Pulse width time requirement: 5 µsec. min. (20 msec. min. for frequencies ≤ 10 Hz)
Input amplitude: 25 mVp-p – 50 Vp-p
Minimum amplitude requirement:
[Pulse With (Fequency): Amplitude]
≥ 250 µsec. (0 – 2 kHz): 25 mVp-p
≥ 25 µsec. (0 – 20 kHz): 50 mVp-p
≥ 12.5 µsec. (0 – 40 kHz): 1 Vp-p
≥ 5 µsec. 0 – (100 kHz): 5 Vp-p
Input impedance: ≥ 50 kΩ
■ **Sine wave**: Sine or similar waveform
Frequency: 10 Hz - 100 kHz
Pulse width time requirement: 5 µsec. min. (20 msec. min. for frequencies ≤ 10 Hz)
Input amplitude: 25 mVp-p – 50 Vp-p (within 10 Hz - 100 kHz)
Minimum amplitude requirement: (Frequency: Amplitude)
0 – 2 kHz: 25 mVp-p
0 – 20 kHz: 50 mVp-p
0 – 40 kHz: 1 Vp-p
0 – 100 kHz: 5 Vp-p
Input impedance: ≥ 50 kΩ

Waveform examples

•Square Waveform



•Sine Waveform



OUTPUT SPECIFICATIONS

■ **Open Collector**: 50 V DC @ 50 mA (resistive load)
Frequency range: 0 – 20 kHz
ON pulse width: 40 µsec. – 0.8 msec. adjustable
Saturation voltage: 0.6 V DC
■ **Relay Contact:** 120 V AC @ 200 mA (cos ø = 1)
240 V AC @ 100 mA (cos ø = 1)
24 V DC @ 200 mA (resistive load)
Frequency range: 0 – 2 Hz
ON pulse width: 40 msec. – 0.8 sec. adjustable
Relay life:
≥ 5 × 10^{7} cycles (mechanical)
≥ 10^{5} cycles (electrical)
■ **5 V Pulse**
Frequency range: 0 – 20 kHz
Low pulse width: 40 µsec. – 0.8 msec. adjustable
Hi/Lo level: 5 V ± 10 % for Hi; ≤ 0.5 V for Lo
Load resistance: 600 Ω min.
■ **24 V Pulse**
Frequency range: 0 – 20 Hz
High pulse width: 40 msec. – 0.8 sec. adjustable
Hi/Lo level: 24 V ± 10 % for Hi; ≤ 0.5 V for Lo
Load current: 30 mA max.
Load resistance: 800 Ω min.

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

Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 2000 V AC @1 minute (input to output to power to ground)

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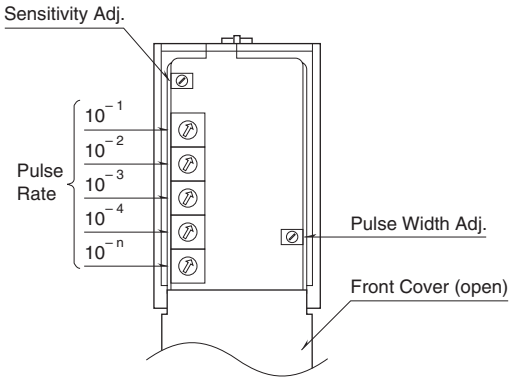
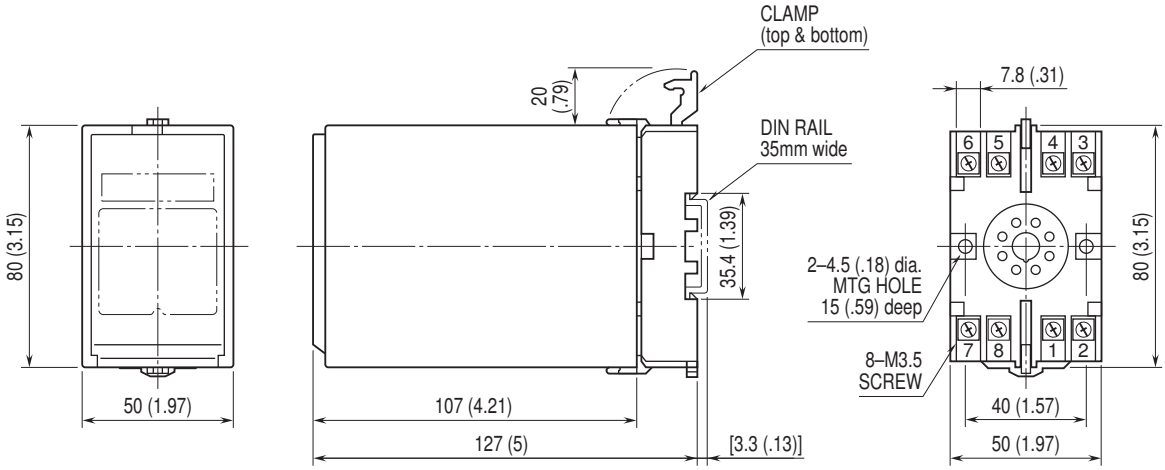
EXTERNAL VIEW



DIMENSIONS unit: mm (inch)



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

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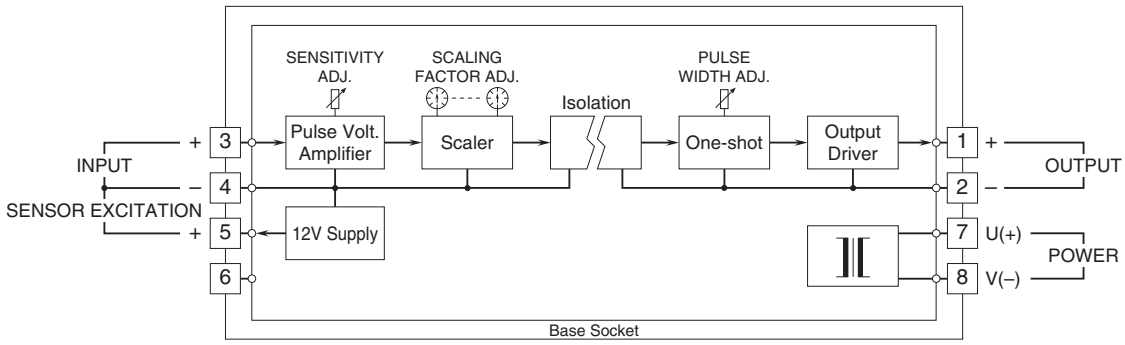
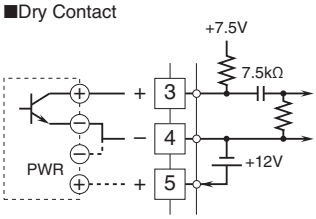
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

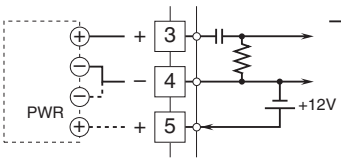


Input Connection Examples

■Dry Contact

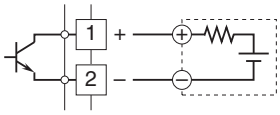


■Voltage Pulse, Sine Wave

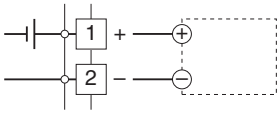


Output Connection Examples

■Open Collector

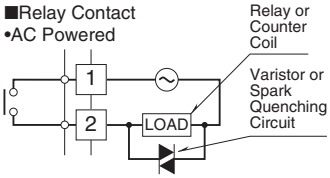


■Voltage Pulse

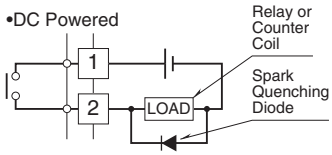


■Relay Contact

•AC Powered



•DC Powered



⚠ Specifications are subject to change without notice.

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