

Plug-in Signal Conditioners K-UNIT

FREQUENCY TRANSMITTER

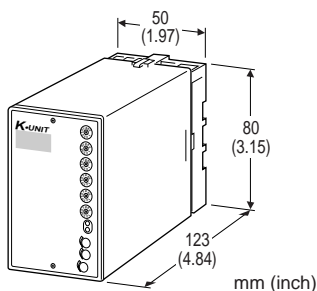
(field-configurable)

Functions & Features

- Converting the output from a pulse-type transducer into a standard process signal
- Open collector, mechanical contact, proximity sensor, voltage pulse and 2-wire current pulse inputs
- Output decreases gradually with no input
- Excitation
- Isolation up to 2000 V AC
- High-density mounting

Typical Applications

- Averaging non-uniform pulses from positive displacement flowmeter to provide a stable output
- Positive displacement flowmeters, turbine flowmeters and vortex flowmeters
- Measuring rotation speed of a machine generating dry contact signals



MODEL: KPAU-[1][2][3]-[4][5]

ORDERING INFORMATION

- Code number: KPAU-[1][2][3]-[4][5]
- Specify a code from below for each [1] through [5].
(e.g. KPAU-A1LA-B/Q)
- Special output range (For codes Z & 0)
- Specify the specification for option code /Q
(e.g. /C01/S01/SET)

[1] INPUT

- A1: Open collector
- A2: Mechanical contact
- B1: Proximity sensor
- B2: Voltage pulse
- H: Two-wire current pulse

[2] EXCITATION

- L: 12 V DC / 40 mA
- M: 24 V DC / 25 mA

[3] 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)

[4] 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

[5] 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

EX-FACTORY SETTING



/SET: Preset according to the Ordering Information Sheet
(No. ESU-3590)

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
Overrange output: 0 to 120 % (approx.) at 1 - 5 V
Zero adjustment: -5 to +5 % (front)
Span adjustment: 95 to 105 % (front)
Chattering protection: Filter provided for mechanical contact input (time constant: 1 msec.)
Input monitor LED: Red LED blinks according to the input.
Status indicator: Green LED turns ON in normal operating conditions.
Input pulse sensing: DC coupled
Frequency adjustments: Rotary switches (front)
Non-uniform pulse compensation: Input pulses divided and then multiplied for stabilizing the output; dividing factor adjustable with the front rotary switches (1/1 - 1/ 16, factory default 1/1)
Damper: Time constant adjustable within 0 to 5 sec. (factory default 0 sec.) to provide a first order lag output

INPUT SPECIFICATIONS

Excitation: Shortcircuit protection;
12 V DC @ 40 mA (approx. 43 mA at shortcircuit)
or 24 V DC @ 25 mA (approx. 33 mA at shortcircuit)
■ Open Collector
Frequency range: 0 - 0.001 Hz through 99.99 kHz
(If not specified the default value is used: 0 - 9.999 kHz)
Pulse width time requirement: 4 μ sec. min.
Detecting level:
Excitation 12 V
Sensing: 12 V / 1.5 mA
ON/OFF level
ON: $\leq 0.8 \text{ k}\Omega / 1.0 \text{ V}$
OFF: $\geq 1.7 \text{ k}\Omega / 2.5 \text{ V}$
Excitation 24 V
Sensing: 24 V / 3 mA
ON/OFF level
ON: $\leq 0.35 \text{ k}\Omega / 1.0 \text{ V}$
OFF: $\geq 0.8 \text{ k}\Omega / 2.5 \text{ V}$
■ Mechanical Contact
Frequency range: 0 - 0.001 Hz through 9.999 Hz
(If not specified the default value is used: 0 - 9.999 Hz)
Pulse width time requirement: 10 msec. min.
Detecting level:

Excitation 12 V
Sensing: 12 V / 1.5 mA
ON/OFF level
ON: $\leq 0.8 \text{ k}\Omega / 1.0 \text{ V}$
OFF: $\geq 1.7 \text{ k}\Omega / 2.5 \text{ V}$

Excitation 24 V
Sensing: 24 V / 3 mA
ON/OFF level
ON: $\leq 0.35 \text{ k}\Omega / 1.0 \text{ V}$
OFF: $\geq 0.8 \text{ k}\Omega / 2.5 \text{ V}$

■ Proximity Sensor
Frequency range: 0 - 0.001 Hz through 9.999 kHz
(If not specified the default value is used: 0 - 9.999 kHz)
Pulse width time requirement: $\geq 20 \mu$ sec.
Waveform: Square or sinusoidal
Detecting level: Input voltage $\pm 50 \text{ V}$ ($\pm 30 \text{ V}$ with CE)
 $\leq 0 \text{ mV}$ for Lo, $\geq 150 \text{ mV}$ for Hi
Input impedance: $\geq 20 \text{ k}\Omega$

■ Voltage Pulse
Frequency range: 0 - 0.001 Hz through 99.99 kHz
(If not specified the default value is used: 0 - 9.999 kHz)
Pulse width time requirement: $\geq 4 \mu$ sec.
Waveform: Square or sinusoidal
Detecting level: Input voltage $\pm 50 \text{ V}$ ($\pm 30 \text{ V}$ with CE)
 $\leq 1 \text{ V DC}$ for Lo, $\geq 2 \text{ V DC}$ for Hi
Input impedance: $\geq 20 \text{ k}\Omega$

■ Two-wire Current Pulse
Frequency range: 0 - 0.001 Hz through 99.99 Hz
(If not specified the default value is used: 0 - 99.99 Hz)
Pulse width time requirement: $\geq 10 \text{ msec.}$
Input resistance: 200 Ω
Input range: 0 - 30 mA
Detecting level: $\leq 5 \text{ mA}$ for Lo, $\geq 10 \text{ mA}$ for Hi

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 $\geq 0.5 \text{ V}$

INSTALLATION

Power input
•AC: Operational voltage range: rating $\pm 10 \%$,
50/60 $\pm 2 \text{ Hz}$, approx. 4 VA
•DC: Operational voltage range: rating $\pm 10 \%$,
ripple 10% p-p max.; approx. 2.5 W (100 mA at 24 V)



Operating temperature: -5 to +55°C (23 to 131°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Mounting: Surface or DIN rail
Weight: 350 g (0.77 lb)

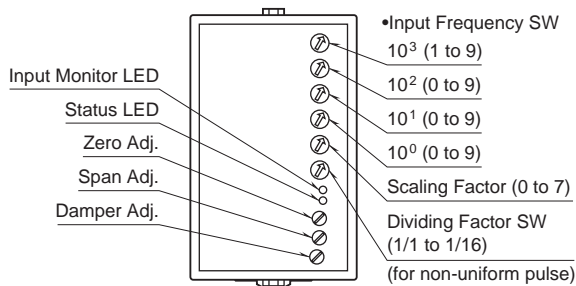
PERFORMANCE in percentage of span

Accuracy: $\pm 0.1\%$
Temp. coefficient: $\pm 0.015\%/^{\circ}\text{C}$ ($\pm 0.008\%/^{\circ}\text{F}$)
Response time: ≤ 0.5 sec. + one pulse cycle (0 - 90 %; with damper set to 0 sec.)
Line voltage effect: $\pm 0.1\%$ over voltage range
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)

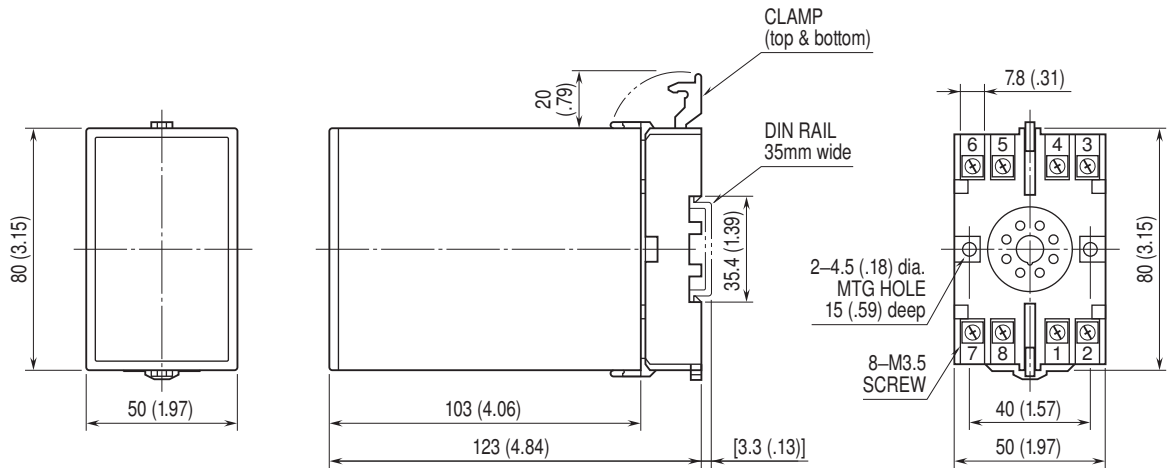
STANDARDS & APPROVALS

CE conformity:
EMC Directive (2004/108/EC)
EMI EN 61000-6-4: 2007
EMS EN 61000-6-2: 2005
Low Voltage Directive (2006/95/EC)
EN 61010-1: 2001
Measurement Category II (input, output)
Pollution Degree 2
Input or output to power: Reinforced insulation (300 V)
Input to output: Basic insulation (300 V)

EXTERNAL VIEW

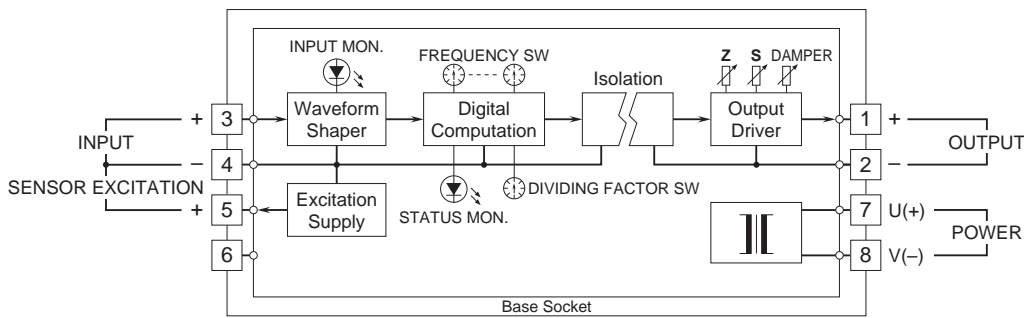


DIMENSIONS unit: mm (inch)



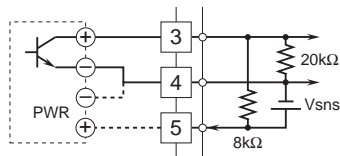
• When mounting, no extra space is needed between units.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

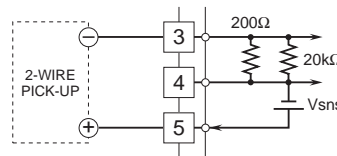


Input Connection Examples

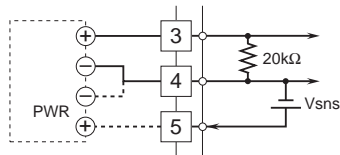
■ Open Collector or Mechanical Contact



■ 2-Wire Current Pulse



■ Voltage Pulse



Specifications are subject to change without notice.