

Plug-in Signal Conditioners K-UNIT

FREQUENCY TRANSMITTER

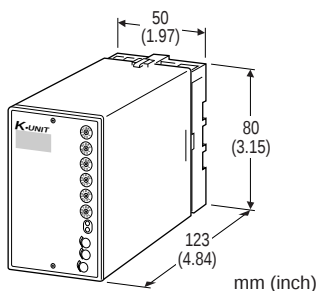
(field-configurable)

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 of [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 - 1 MHz through 99.99 kHz
 (If not specified the default value is used: 0 - 9.999 kHz)
Pulse width time requirement: 4 µsec. min.
Detecting level:
Excitation 12 V
 Sensing: 12 V / 1.5 mA
 ON/OFF level
 ON: $\leq 0.8 \text{ k}\Omega$ / 1.0 V
 OFF: $\geq 1.7 \text{ k}\Omega$ / 2.5 V
Excitation 24 V
 Sensing: 24 V / 3 mA
 ON/OFF level
 ON: $\leq 0.35 \text{ k}\Omega$ / 1.0 V
 OFF: $\geq 0.8 \text{ k}\Omega$ / 2.5 V
■ Mechanical Contact
Frequency range: 0 - 1 MHz 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 V
 OFF: $\geq 1.7 \text{ k}\Omega$ / 2.5 V

Excitation 24 V

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

■ Proximity Sensor

Frequency range: 0 - 1 MHz through 9.999 kHz
 (If not specified the default value is used: 0 - 9.999 kHz)
Pulse width time requirement: $\geq 20 \text{ }\mu\text{sec.}$
Waveform: Square or sinusoidal
Detecting level: Input voltage $\pm 50 \text{ V}$ ($\pm 30 \text{ V}$ to conform with EU Directive)
 $\leq 0 \text{ mV}$ for Lo, $\geq 150 \text{ mV}$ for Hi
Input impedance: $\geq 20 \text{ k}\Omega$

■ Voltage Pulse

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

■ Two-wire Current Pulse

Frequency range: 0 - 1 MHz 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: $200 \text{ }\Omega$
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)

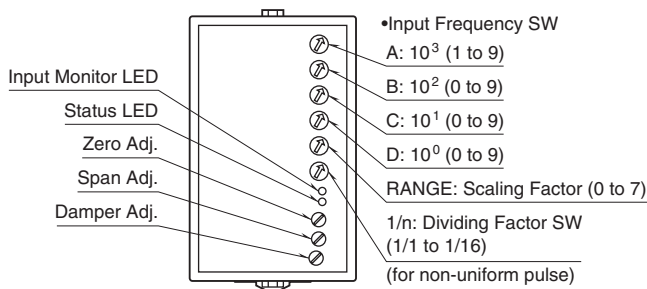
PERFORMANCE in percentage of span

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)

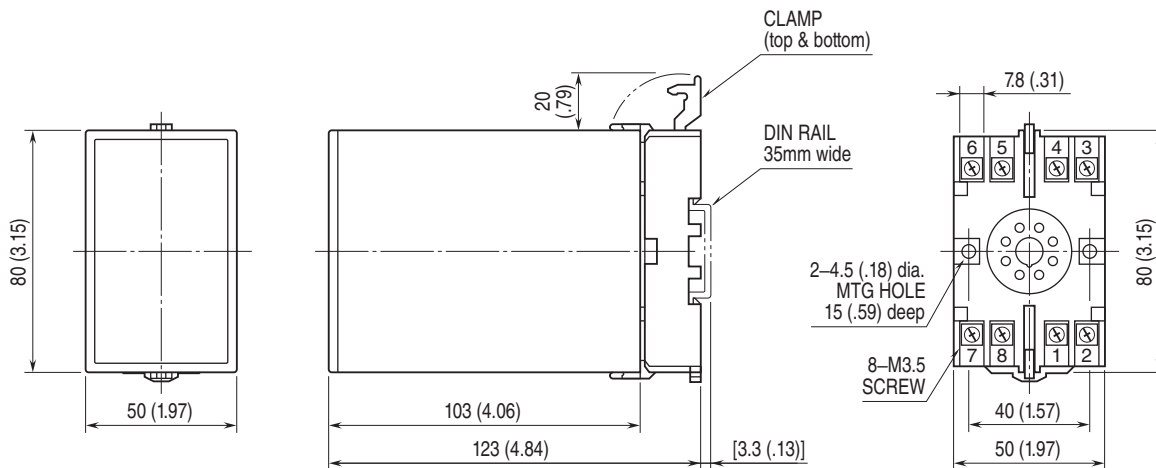
STANDARDS & APPROVALS

EU conformity:
 EMC Directive
 EMI EN 61000-6-4
 EMS EN 61000-6-2
 Low Voltage Directive
 EN 61010-1
 Installation Category II
 Pollution Degree 2
 Input or output to power: Reinforced insulation (300 V)
 Input to output: Basic insulation (300 V)
 RoHS Directive

EXTERNAL VIEW

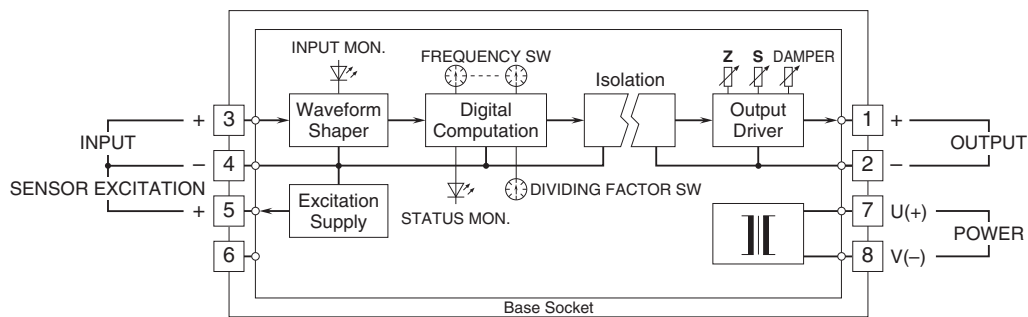


EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



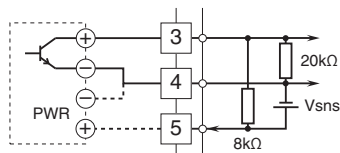
• When mounting, no extra space is needed between units.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

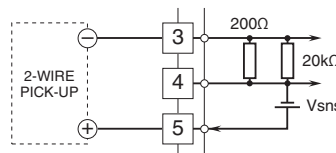


Input Connection Examples

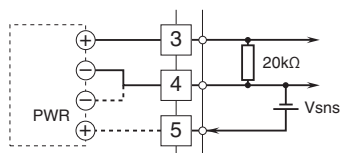
■ Open Collector or Mechanical Contact



■ 2-Wire Current Pulse



■ Voltage Pulse or Proximity Sensor



Specifications are subject to change without notice.