High-density Signal Conditioners 10-RACK

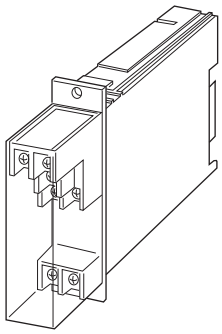
DC/FREQUENCY CONVERTER

Functions & Features

• Providing two pulse rate outputs in proportion to DC input signal

Typical Applications

• Totalizing applications in combination with a counter



MODEL: 10AP–[1][2][3]–R[4]

ORDERING INFORMATION

• Code number: 10AP-[1][2][3]-R[4]

Specify a code from below for each of [1] through [4].
(e.g. 10AP-621-R/Q)

• Special input range (For codes Z & 0)

• Output frequency range (e.g. 0 – 500 Hz)
Frequencies of Output 1 and 2 are the same.

• Specify the specification for option code /Q
(e.g. /C01)

[1] INPUT

Current

A: 4 – 20 mA DC (Input resistance 250 Ω)
D: 0 – 20 mA DC (Input resistance 50 Ω)
G: 0 – 1 mA DC (Input resistance 1000 Ω)
H: 10 – 50 mA DC (Input resistance 100 Ω)
Z: Specify current (See INPUT SPECIFICATIONS)
(0 % input must be 0 mA.)

Voltage

3: 0 – 1 V DC (Input resistance 1 MΩ min.)
4: 0 – 10 V DC (Input resistance 1 MΩ min.)
5: 0 – 5 V DC (Input resistance 1 MΩ min.)
6: 1 – 5 V DC (Input resistance 1 MΩ min.)
0: Specify voltage (See INPUT SPECIFICATIONS)
(0 % input must be 0 V.)

[2] OUTPUT 1

1: Open collector (max. 1 kHz)
2: 5 V pulse (max. 1 kHz)
5: Photo MOSFET relay pulse (max. 30 Hz)

[3] OUTPUT 2

0: None
1: Open collector

POWER INPUT

DC Power

R: 24 V DC
(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

[4] OPTIONS

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

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to M-System's web site.)

/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating

GENERAL SPECIFICATIONS

Construction: Rack-mounted; terminal access via screw terminals at the front and via card-edge connector at the rear; terminal cover provided

Connection

Input: M3.5 screw terminals (torque 0.8 N·m)

Output: Card-edge connector and M3.5 screw terminals (torque 0.8 N·m)

Power input: Supplied from card-edge connector

Screw terminal: Nickel-plated steel
Housing material: Flame-resistant resin (black)
Isolation: Input to output 1 to output 2 to power
Overrange output: Approx. 0 to 120 %
Zero adjustment: 0 – 5 % (front)
Span adjustment: 95 to 105 % (front)

INPUT SPECIFICATIONS

■ DC Current: Input resistor incorporated
Specify input resistance value for code Z.
($R \leq 2\ W \div [F.S.\ Current]^2$)

■ DC Voltage: 0 – 300V DC
Minimum span: 1V
Input resistance: 1 MΩ min.

OUTPUT SPECIFICATIONS

■ **Open Collector**: 30 V DC @ 100 mA (resistive load)
Frequency range: 0 – 10 pulses/hour through 1 kHz
Saturation voltage: 0.6 V DC
When output 1 is photo MOSFET relay pulse, a timer for output 2 is provided, which limits ON time within 75 ±25msec.

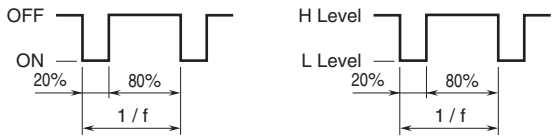
■ **5 V Pulse**
Frequency range: 0 – 10 pulses/hour through 1 kHz
Hi level: 3.0 – 5.5 V
Lo level: ≤ 0.5 V
Load resistance: 250 Ω min.

■ **Photo MOSFET Relay Pulse**
Frequency range: 0 – 10 pulses/hour through 30 Hz
Timer: Limits ON time within 75 ±25 msec.
Rating: 132 V AC @ 200 mA (cos ø = 1)
30 V DC @ 200 mA (resistive load)
ON resistance: ≤ 2 Ω

OUTPUT PULSE WIDTH

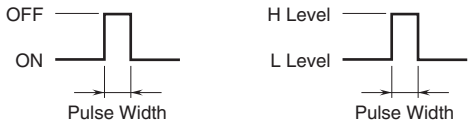
■ **Frequency less than 500 Hz at 100% input**
→ Duty ratio 20% (See the figure below)

• Open Collector **• Voltage Pulse**



■ **Frequency greater than 500 Hz at 100% input**
→ See the figure and equation below.

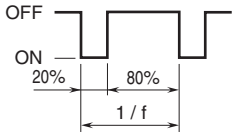
• Open Collector **• Voltage Pulse**



$$\text{Pulse Width [millisec.]} = \frac{1}{2.09 \times 100\% \text{ Frequency [kHz]}}$$

■ **When OUTPUT 1 is Photo MOSFET Relay Pulse**
→ See the figure below. ON pulse width is limited within 75 ±25 msec. when the output frequency gets low (below 2 to 4 Hz).

• OUTPUT 2's Open Collector and Photo MOSFET Relay Pulse



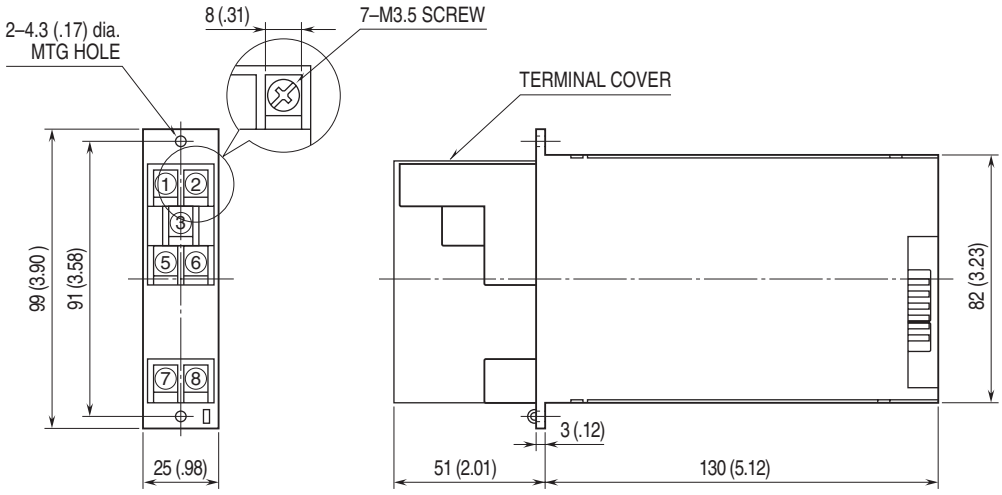
INSTALLATION

Current consumption: Approx. 60 mA
Operating temperature: -5 to +55°C (23 to 131°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Mounting: Standard Rack 10BXx
Weight: 200 g (0.44 lb)

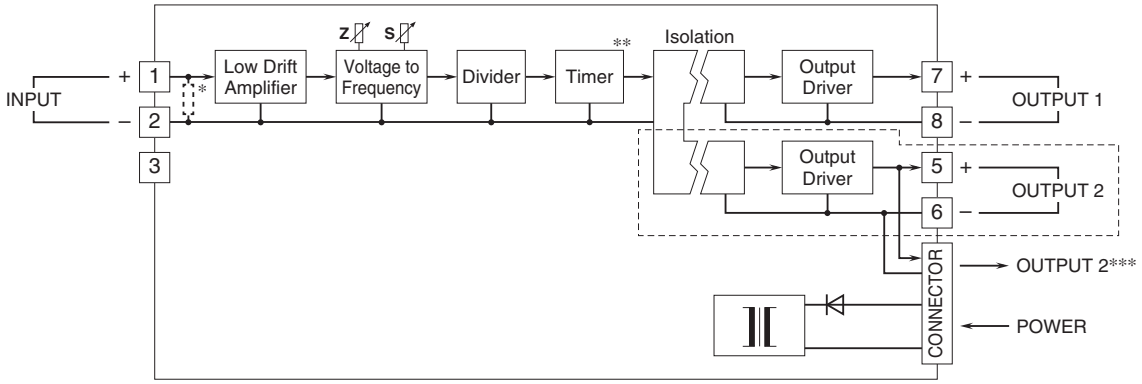
PERFORMANCE in percentage of span

Accuracy: ±0.1 %
Temp. coefficient: ±0.015 %/°C (±0.008 %/°F)
Response time: Approx. 3 sec. (0 – 90 %)
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 500 V AC @ 1 minute
(input to output 1 to output 2 to power)
1500 V AC @ 1 minute (input or output or power to ground)

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



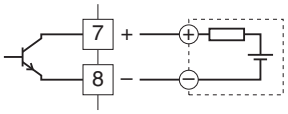
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



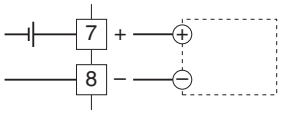
* Input shunt resistor incorporated for current input.
** Photo MOSFET relay pulse only.
*** For 1 output channel type, OUTPUT 1 is also connected to the card-edge connector inside.
Note: The section enclosed by broken line is only for 2nd output channel.

Output Connection Examples

■ Open Collector

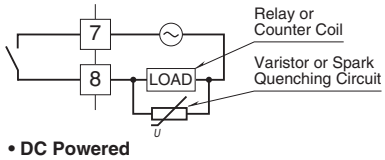


■ Voltage Pulse

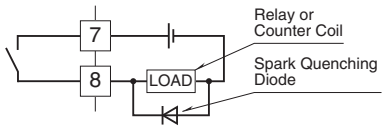


■ Photo MOSFET Relay Pulse

• AC Powered



• DC Powered



⚠ Specifications are subject to change without notice.