

Super-mini Signal Conditioners *Mini-M Series*

DC/FREQUENCY CONVERTER

MODEL **M2AP**

MODEL & SUFFIX CODE SELECTION

MODEL _____ M2AP-□□-□□

INPUT _____

Current **Voltage**

A : 4 – 20mA DC **3** : 0 – 1V DC

D : 0 – 20mA DC **4** : 0 – 10V DC

G : 0 – 1mA DC **5** : 0 – 5V DC

H : 10 – 50mA DC **6** : 1 – 5V DC

Z : Specify current *¹ **0** : Specify voltage *¹

*¹ : 0% input must be 0mA or 0V.

OUTPUT _____

1 : Open collector (max. frequency 1 kHz)

2 : 5V pulse (max. frequency 1 kHz)

3 : Mercury relay contact (max. frequency 30 Hz) *², *³

POWER INPUT _____

AC Power **DC Power**

M : 85 – 264V AC *² **R** : 24V DC

M2: 100 – 240V AC **R2**: 11 – 27V DC *²

P : 110V DC *²

STANDARDS & APPROVALS

/N : Without CE or UL

/CE: CE marking

/UL: UL approval (CE marking)

*² : Select 'N' for 'Standards & Approvals' code.

*³ : Not conform to RoHS Directive

ORDERING INFORMATION

Specify code number and variables.

- **Code number** (e.g. M2AP-61-M2/CE)
- **Special input range** (For codes Z & 0)
- **Output frequency range** (e.g. 0 – 500 Hz)

GENERAL SPECIFICATIONS

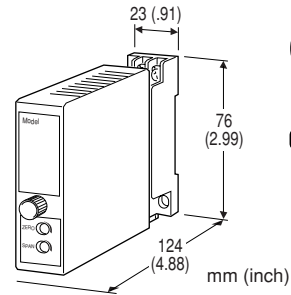
Construction: plug-in

Connection: M3 screw terminals (torque 0.8 N·m)

Housing material: flame-resistant resin (black)

Isolation: input to output to power

Front adjustments: 0 – 5% for zero; ±5% for span



Functions & Features

- Providing a pulse rate output in proportion to DC input signal
- Universal power input
- High-density mounting
- CE marking
- UL approval

Typical Applications

- Totalizing applications in combination with a counter

INPUT & OUTPUT

INPUT

- **DC Current:** shunt resistor attached to input terminals (0.5W)

Input resistance: For resistance values other than listed below, specify when ordering.

Input	Input Resistance
4 – 20mA	: 250 (Ω)
0 – 20mA	: 50
0 – 1mA	: 1000
10 – 50mA	: 100

- **DC Voltage:** 0 – 300V DC

Minimum span: 1V

Input resistance: 1MΩ minimum

OUTPUT

• **Open Collector:** 30V DC @100mA (resistive load)
Frequency range: 0 – 10 pulses/hour through 1 kHz
Saturation voltage: 0.6V DC

• **5V Pulse**

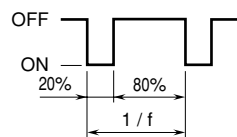
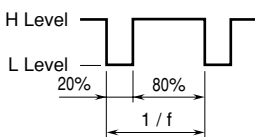
Frequency range: 0 – 10 pulses/hour through 1 kHz
Hi level: 3.0 – 5.5V
Lo level: ≤0.5V
Load resistance: 250Ω minimum

• **Mercury Relay Contact**

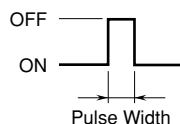
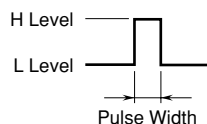
Frequency range: 0 – 10 pulses/hour through 30 Hz
Timer: limits ON time ≤75 ±25 millisecc.
Rated load: 132V AC @200mA (cosφ=1)
 30V DC @200mA (resistive load)
Maximum switching voltage: 350V AC or 500V DC
Maximum switching current: 200mA AC or 300mA DC
Maximum switching power: 26VA or 6W
Relay life: ≥5 × 10⁸ cycles (mechanical)
 ≥5 × 10⁷ cycles (electrical)

OUTPUT PULSE WIDTH TIME

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

• **Open Collector**• **Voltage Pulse**

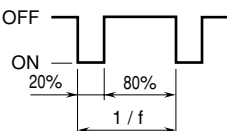
■ **Frequency greater than 500 Hz at 100% input**
 → See the figure and equation below.

• **Open Collector**• **Voltage Pulse**

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

■ **Mercury Relay Contact**

→ See the figure below. ON pulse width is limited within 75 ±25 ms when the output frequency is low.

• **Relay****INSTALLATION****Power input**

AC: operational voltage range 85 – 264V
 (90 – 264V for UL);
 47 – 66 Hz; approx. 3VA at 100V
 approx. 4VA at 200V
 approx. 5VA at 264V

DC: operational voltage range for R: 24V
 ±10%, R2: 11 – 27V, or P: 85 – 150V
 ripple 10% p-p max.; approx. 3W

Operating temperature: -5 to +55°C (23 to 131°F)

Operating humidity: 30 to 90% RH (non-condensing)

Mounting: surface or DIN rail

Dimensions: W23×H76×D124 mm (0.91"×2.99"×4.88")

See General Spec. Sheet Figure A-1.

Weight: 150 g (0.33 lbs)

Terminal assignment: See General Spec. Sheet Figure B-2.

PERFORMANCE in percentage of span

Accuracy: ±0.1%

Temp. coefficient: ±0.015%/°C (±0.008%/°F)

Response time: approx. 3 seconds (0 – 90%)

Line voltage effect: ±0.1% over voltage range

Insulation resistance: ≥100MΩ with 500V DC

Dielectric strength: 2000V AC @1 minute

(input to output to power to ground)

STANDARDS & APPROVALS

CE conformity: EMC Directive (89/336/EEC)

EMI EN61000-6-4

EMS EN61000-6-2

Low Voltage Directive (73/23/EEC)

EN61010-1

Installation category II

Pollution degree 2

Max. operating voltage 300V

Input or output to power – Reinforced insulation

Input to output – Basic insulation

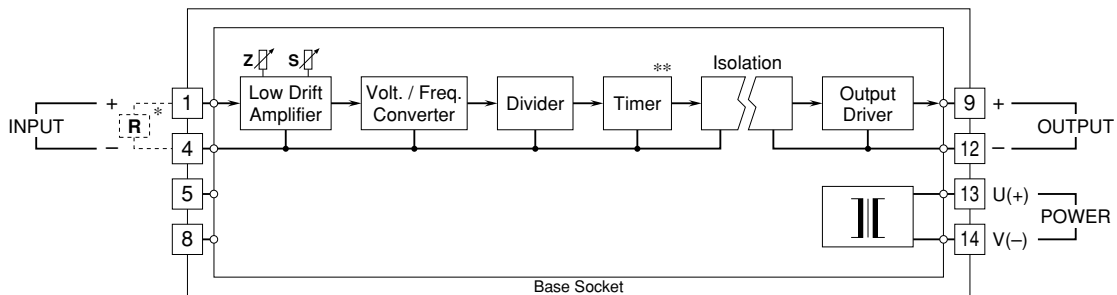
Approval: UL/C-UL nonincendive

Class I, Division 2, Groups A, B, C, and D
 (UL 1604, CAN/CSA-C22.2 No.213)

UL/C-UL general safety requirements

(UL 3111-1, CAN/CSA-C22.2 No.1010-1)

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

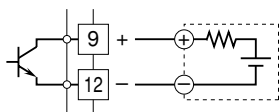


* Input shunt resistor attached for current input.

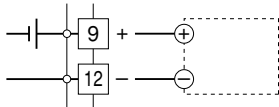
**Mercury relay contact only.

Output Connection Examples

■ Open Collector

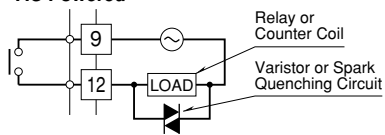


■ Voltage Pulse



■ Relay

•AC Powered



•DC Powered

