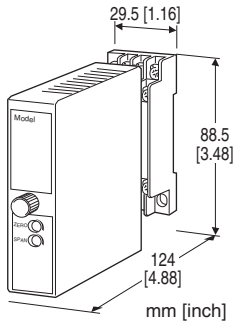
Space-saving Dual Output Signal Conditioners
Mini-MW Series

DC/FREQUENCY CONVERTER

Functions & Features
• Provides a pulse rate output in proportion to DC input signal

Typical Applications
• Totalizing applications in combination with a counter



MODEL: W2AP–[1][2][3]-[4][5]

ORDERING INFORMATION

• Code number: W2AP-[1][2][3]-[4][5]
Specify a code from below for each of [1] through [5].
(e.g. W2AP-612-M2/CE/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/S01)

[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. frequency 10 kHz)
(When the dry contact AC/DC switch is selected as one of the outputs, the frequency of the other output is limited to max. 30 Hz.)
2: 5 V pulse (max. frequency 10 kHz)
(When the dry contact AC/DC switch is selected as one of the outputs, the frequency of the other output is limited to max. 30 Hz.)
3: Dry contact AC/DC switch (max. frequency 30 Hz)

[3] OUTPUT 2

Same range availability as Output 1
Y: None

[4] POWER INPUT

AC Power
M2: 100 – 240 V AC (Operational voltage range 85 – 264 V, 47 – 66 Hz)
(90 – 264 V for UL)
DC Power
R: 24 V DC
(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)
R2: 11 – 27 V DC
(Operational voltage range 11 – 27 V, ripple 10 %p-p max.)
(Select '/N' for 'Standards & Approvals' code.)
P: 110 V DC
(Operational voltage range 85 – 150 V, ripple 10 %p-p max.)
(Select '/N' for 'Standards & Approvals' code.)

[5] OPTIONS (multiple selections)

Standards & Approvals (must be specified)
/N: Without CE or UL
/CE: CE marking
/UL: UL approval, CE marking
Other Options
blank: none
/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q (multiple selections)

COATING (For the detail, refer to our web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating (UL not available)
TERMINAL SCREW MATERIAL
/S01: Stainless steel (UL not available)

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GENERAL SPECIFICATIONS

Construction: Plug-in
Connection: M3 screw terminals (torque 0.8 N·m)
Screw terminal: Chromated steel (standard) or stainless steel
Housing material: Flame-resistant resin (black)
Isolation: Input to output 1 to output 2 to power
Zero adjustment: 0 – 5 % (front)
Span adjustment: 95 to 105 % (front)

INPUT SPECIFICATIONS

■ **DC Current**:
Shunt resistor attached to the input terminals (0.5 W)
Specify input resistance value for code Z.
■ **DC Voltage**: 0 – 300V DC
Minimum span: 1V
Input resistance: 1 MΩ min.

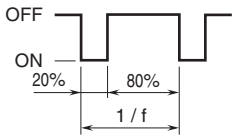
OUTPUT SPECIFICATIONS

■ **Open Collector**: 30 V DC @100 mA (resistive load)
Frequency range: 0 – 10 pulses/hour through 10 kHz
Saturation voltage: 0.6 V DC
■ **5 V Pulse**
Frequency range: 0 – 10 pulses/hour through 10 kHz
Hi level: 3.0 – 5.5 V
Lo level: ≤ 0.5 V
Load resistance: 250 Ω min.
■ **Dry Contact AC/DC Switch**
Frequency range: 0 – 10 pulses/hour through 30 Hz
Timer: Limits within 75 ±25 msec.
for wider than 75 msec. pulses
Rated load: 132 V AC @200 mA (cos ø = 1)
30 V DC @200 mA (resistive load)
Saturation voltage: 3 V DC

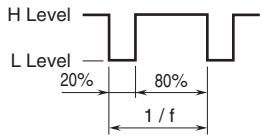
OUTPUT PULSE WIDTH

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

• **Open Collector**

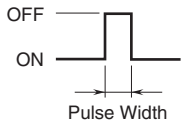


• **Voltage Pulse**

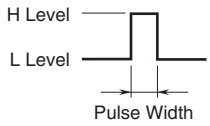


■ **Frequency greater than 500 Hz at 100% input**
→ See the figure and equation below.

• **Open Collector**



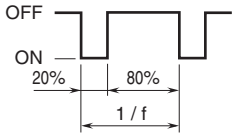
• **Voltage Pulse**



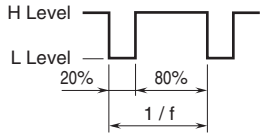
$$\text{Pulse Width [millisec.]} = \frac{1}{2.09 \times 100\% \text{ Frequency [kHz]}}$$

■ **When the dry contact AC/DC Switch is selected as either OUTPUT 1 or OUTPUT 2**
→ See the figure below. ON or L pulse width is limited within 75 ±25 msec. when the output frequency gets low (below 2 to 4 Hz).

• **Open Collector**
Dry Contact AC/DC Switch



• **Voltage Pulse**



INSTALLATION

Power Consumption
•**AC**:
Approx. 4 VA at 100 V
Approx. 5 VA at 200 V
Approx. 6 VA at 240 V
•**DC**: Approx. 3 W
Operating temperature: -5 to +55°C (23 to 131°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Mounting: Surface or DIN rail
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: 2000 V AC @1 minute (input to output 1 to output 2 to power to ground)

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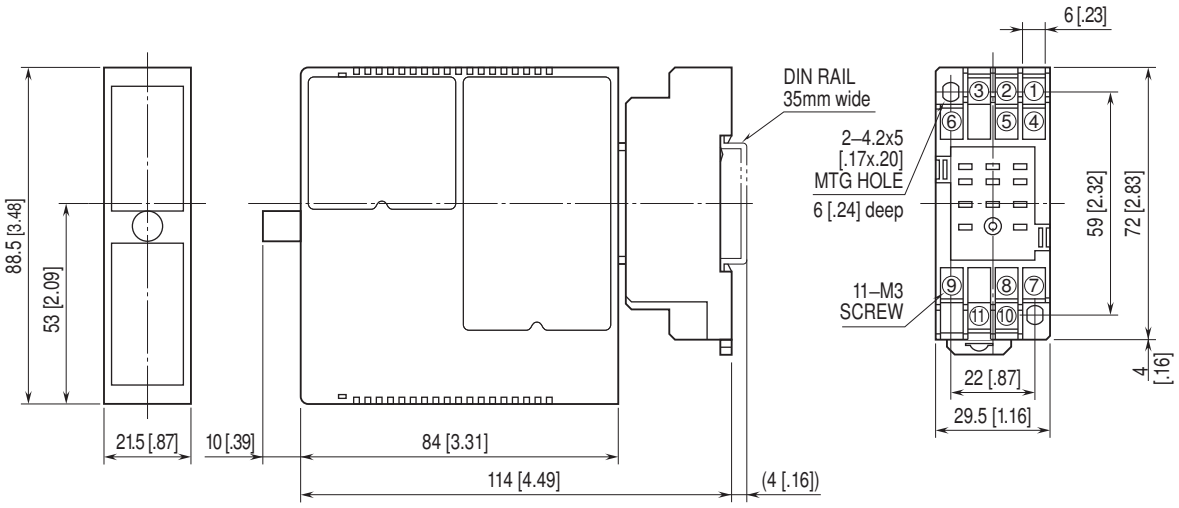
STANDARDS & APPROVALS

EU conformity:
EMC Directive
EMI EN 61000-6-4
EMS EN 61000-6-2
Low Voltage Directive
EN 61010-1
Measurement Category II (input, output)
Installation Category II (power)
Pollution Degree 2
Input or output 1 or output 2 to power input:
Reinforced insulation (300 V)
Input to output 1 to output 2: Basic insulation (300 V)
RoHS Directive
Approval:
UL/C-UL nonincendive Class I, Division 2,
Groups A, B, C, and D
(UL 121201, CAN/CSA-C22.2 No.213-17)
UL/C-UL general safety requirements
(UL 61010-1, CAN/CSA-C22.2 No.61010-1-12)

EXTERNAL DIMENSIONS unit: mm [inch]



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

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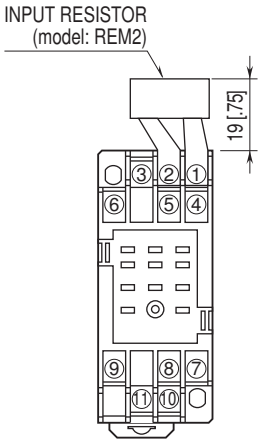
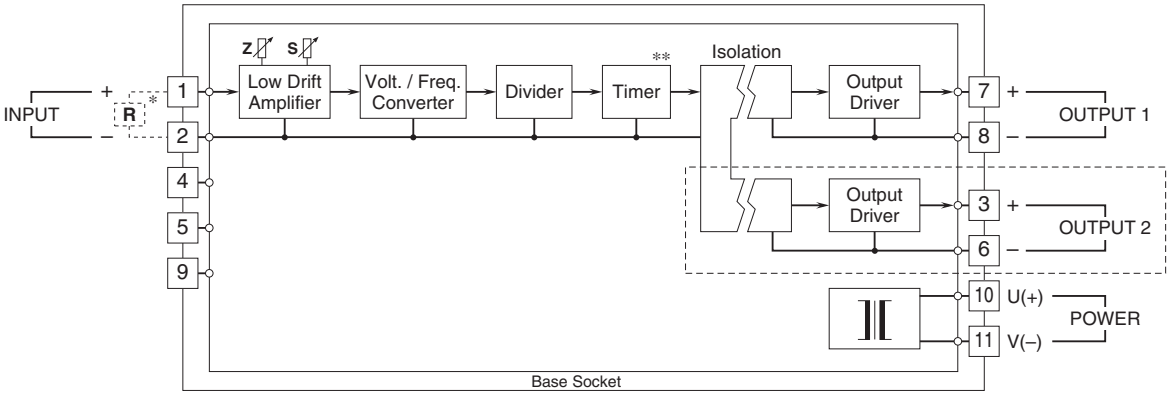
TERMINAL ASSIGNMENTS unit: mm [inch]



Input shunt resistor attached
for current input.

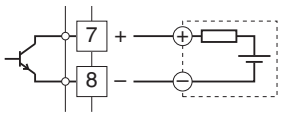
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



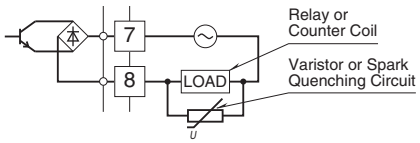
* Input shunt resistor attached for current input.
** Provided only when the dry contact AC/DC switch is selected as one of the outputs.
Note: The section enclosed by broken line is only with 2nd output option.

Output Connection Examples

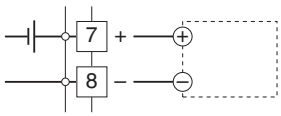
■ **Open Collector**



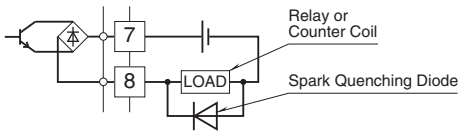
■ **Dry Contact AC/DC Switch**
• **AC Powered**



■ **Voltage Pulse**



• **DC Powered**



⚠ Specifications are subject to change without notice.

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