General Specifications

Model MQ0
Analog to Pulse Converter

JUXTA

GS 77J04Q10-01E

■ General

The MQ0 is a plug-in type analog-to-pulse converter converts DC current or DC voltage signals into various isolated pulse outputs.

- Pulse output signals can be selected from open collector, contactless AC switch, and voltage pulse.
- VJ77 PC-based Parameters Setting Tool (sold separately) enables input adjustments and setting of various other parameters.
- Provided with power indicator lamp (RDY).

Application examples

- Calculates integrated flow in combination with a counter.

  Note: When converting a DC input signal in which the steady input and the input in the vicinity of 0% are repeated to a pulse and using it for the integrating counter, order the M series computing unit MXD-Q.

■ Model and Suffix Codes

MQ0-□□-□ *C /□

Model

Input signal
A: 4 to 20 mA DC
B: 2 to 10 mA DC
C: 1 to 5 mA DC
D: 0 to 20 mA DC
E: 0 to 16 mA DC
F: 0 to 10 mA DC
G: 0 to 1 mA DC
H: 10 to 50 mA DC
Z: Custom order (DC current/voltage signal)
1: 0 to 10 mV DC
2: 0 to 100 mV DC
3: 0 to 1 V DC
4: 0 to 10 V DC
5: 0 to 5 V DC
6: 1 to 5 V DC
7: -10 to +10 V DC

Output signal
1: Open collector (*1)
3: Contactless AC switch
5: Voltage pulse (5 V ±10%)
6: Voltage pulse (12 V ±10%)
7: Voltage pulse (24 V ±10%)

Power supply
1: 15-40 V DC (Operating range: 12 to 48 V)
2: 100-240 V AC (Operating range: 85 to 264 V)

Option
/SN: No socket (with socket if not specified)
/C0: Coating
/FB: Fuse bypass

*1 When driving an electromagnetic counter (YOKOGAWA SICD, etc.), please use the open collector output of this unit in combination with an external power supply, or contact our sales department.

(Note 1) "/C0" option: Polyurethane coating. The "/C0" option does not guaranteed the coating effect though it is expected that the corrosion resistance for electric circuit is reinforced. And it is not able to submit coating test data.

(Note 2) "/FB" option: The primary power supply fuse is deleted, short circuit and ship it.

■ Ordering Information

Specify the model and suffix code, output frequency, and pulse width type.

- Model and Suffix Code: e.g. MQ0-61-2*C
- Output frequency: e.g. 0 to 50 Hz
- Pulse width type: e.g. Duty of 50%

The low cut point and pulse width time will be configured per your specification prior to shipping.

Items that you do not specify will remain at the factory default settings.

- Low cut point: e.g. 0.01 Hz
- Pulse width time: e.g. 3 ms (can be specified if the pulse width type is "fixed on-state pulse width" or "fixed off-state pulse width").

■ Initial Values (Factory-set Values)

Factory settings are as follows:

To change the setting value, it is necessary to use a personal computer (VJ77) or the front panel switch.

- Software filter: OFF
- Low cut point: 0.0001 Hz
- Pulse width time: 30 ms (when the pulse width type is through, the setting is invalid)

■ Input Specifications

Input signal: DC voltage or DC current signal
Input resistance: Attach an external resistor for current input.

Input Range	Input Resistance	Input Range	Input Resistance
4 to 20 mA DC	250 Ω	0 to 10 mV DC	1 MΩ during power on 10 kΩ or more during power off
2 to 10 mA DC	500 Ω	0 to 100 mV DC	
1 to 5 mA DC	1 kΩ	0 to 1 V DC	
0 to 20 mA DC	250 Ω	0 to 10 V DC	1 MΩ during power on 800 kΩ or more during power off
0 to 16 mA DC	250 Ω	0 to 5 V DC	
0 to 10 mA DC	500 Ω	1 to 5 V DC	
0 to 1 mA DC	1 kΩ	−10 to +10 V DC	
10 to 50 mA DC	100 Ω		

Allowable input level:
Current input: Any level that satisfies the following condition,
$(\text{Input current})^2 \times \text{Input resistance} \leq 0.5\ \text{W}$
Voltage input: Within ±30 V DC
Input adjustment range:
Zero adjustment range: ±1% of span
Span adjustment range: ±5% of span

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Software filter: OFF, Low, Middle, High (default value: OFF)
When LOW, MIDDLE, or HIGH is selected, a first-order filter equivalent to 100 ms, 300 ms, or 1 s is inserted in the input.

■ Output Specifications

Output signal : Open collector, contactless AC switch or Voltage Pulse

Output frequency: 0.001 Hz ≤ F_{100} ≤ 4 kHz
However, 1 kHz or less for contactless AC switch.
0 Hz ≤ F_0 < F_{100}
F_0 is 0% of output frequency.
F_{100} is 100% of output frequency.
Frequency can be set in increments of 0.00001 (Hz or kHz) within 4 significant digits.

Output range unit: Either Hz or kHz is selectable.

Low cut point: 0.0001Hz to 100% of output frequency
If the output is less than or equal to the low cut point, the output is 0Hz.

Maximum allowable load:

Output signal	Maximum allowable load	Output saturation voltage
Open collector	30 V DC/200 mA	0.2 V maximum
Contactless AC switch	100 V AC/200 mA	3 V maximum
	100 V DC/200 mA	
Voltage pulse	5 V DC/15 mA	---
	12 V DC/15 mA	
	24 V DC/15 mA	

Output voltage:

Output signal	High level	Low level
Voltage pulse 5 V	5 V ±10%	0.5 V maximum
Voltage pulse 12 V	12 V ±10%	
Voltage pulse 24 V	24 V ±10%	

Output leakage current

Output signal	Leakage current
Open collector	2 μA
Contactless AC switch	20 μA
Voltage pulse	---

Pulse width type: Either 50% duty, fixed on-state pulse width, or fixed off-state pulse width is selectable.

Pulse width time: 0.1 to 500 ms, settable by 0.1 ms

Output frequency available for fixed pulse width:
The frequency over the following is limited.

$$\frac{1}{\text{Set value of pulse width (ms)} \times 2} \times 1000\ [\text{Hz}]$$

Output variable range: −6 to 106%
(Note) 0 Hz output below 0.0001 Hz

■ Items Available to Be Set

The following items can be set via a PC (VJ77 PC-based Parameters Setting Tool).

Software filter, output frequency, output range unit, low cut point, pulse width type, pulse width time

■ Standard Performance

Accuracy rating: ±0.1% of span
However, accuracy is limited in the following case according to the input and output ranges.
When both input and output have accuracy limitation, total accuracy is their sum.

Input accuracy limit: For current input, an external receiving resistor accuracy of ±0.1% is added.
Note: Accuracy is not guaranteed if the input range is changed.

Output accuracy limit:
When F_{100} ≤ 1 kHz, zero elevation is 50% or more;

$$\text{Accuracy (\%)} = \frac{F_{100}/2}{F_{100} - F_0} \times 0.1$$

When F100>1kHz, zero elevation;

$$\text{Accuracy (\%)} = \frac{F_{100}/2}{F_{100} - F_0} \times 0.2$$

F0 is 0% of output frequency, F100 is 100% output frequency

Response speed: One cycle of output pulse + 150 ms (for 50% duty), 63% response (10 to 90%)
If the software filter is on, add the following to the value above: LOW: 100 ms, MIDDLE: 300 ms, HIGH: 1 s.

Effect of power supply voltage fluctuation: Within the accuracy range of span for power supply voltage fluctuation.

Effect of ambient temperature change: ±0.15% of span for change of 10°C

■ Power Supply and Isolation

Supply rated voltage range: 100-240 V AC ~ 50/60 Hz or 15-40 V DC ⎓

Supply input voltage range: 100-240 V AC (–15, +10%) 50/60 Hz or 15-40 V DC (±20%)

Power consumption:
For voltage pulse output:
1.2 W at 24 V DC; 0.8 W at 110 V DC; 2.2 VA at 100 V AC, 2.9 VA at 200 V AC
For other than voltage pulse output:
0.6 W at 24 V DC; 0.7 W at 110 V DC; 1.7 VA at 100 V AC; 2.2 VA at 200 V AC

Insulation resistance: 100 MΩ minimum at 500 V DC between input, output, power supply and grounding terminals mutually

Withstanding voltage: 2000 V AC for one minute between input, output, power supply and grounding terminals mutually

■ Environmental Conditions

Temperature: 0 to 50°C (0 to 40°C for multiple mounting)

Humidity: 5 to 90% RH (no condensation)

Ambient condition: Avoid installation in such environments as corrosive gas like sulfide hydrogen, dust, sea breeze and direct sunlight.

Magnetic field: 400 A/m or less.

Continuous vibration (at 5 to 9 Hz) Half amplitude of 3 mm or less (at 9 to 150 Hz) 9.8 m/s^2 or less, 1 oct/min for 90 minutes each in the 3-axis directions.

Impact: 98 m/s² or less, 11 ms, 3-axis 3 times each in 6 directions.
Altitude: 2000 m or less.
Warm-up time: At least 30 minutes after power on.

■ Transport and Storage Conditions

Ambient temperature: −25 to 70°C
Temperature change rate: 20°C per hour or less
Ambient humidity: 5 to 95%RH (no condensation)

■ Mounting and Appearance

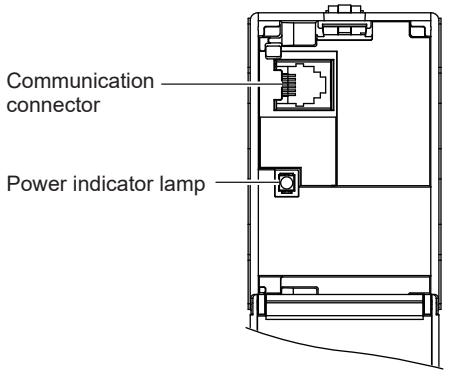
Construction: Plug-in type
Material: PC resin (black), UL94 V-0 (case)
Modified PPO resin, glass fiber filled (black), UL94 V-1 (socket)
Mounting method: Wall or DIN rail mounting
More than 5 mm interval is required for side-by-side close mounting.
Connection method: M3.5 screw terminals
External dimensions: 86.5 (H)× 51 (W)× 123 (D) mm (including a socket)
Weight: Main unit: 200 g or less
Socket: 60 g or less

■ Accessories

Spacer: 1 piece (used for DIN rail mounting)
Tag number label: 1 sheet
Range label: 1 sheet
Socket (A1653MR): 1 piece (when /SN option is not specified.)
Receiving resistor: 1 piece (when current input is specified.)

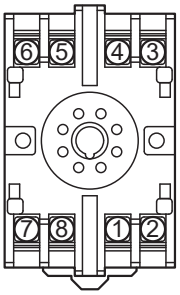
■ Front panel

The figure below shows the converter of which the front panel cover is open.



Communication connector: Connect the PC-based Parameter Setting Tool (VJ77).
Power indicator lamp: Turns on at power on.

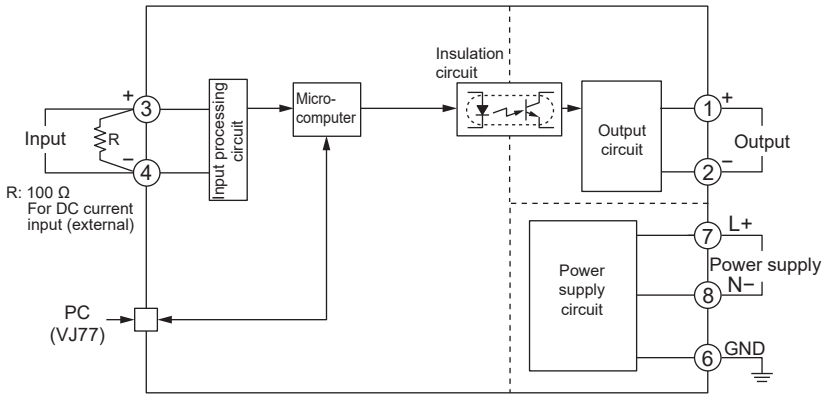
■ Terminal Assignments



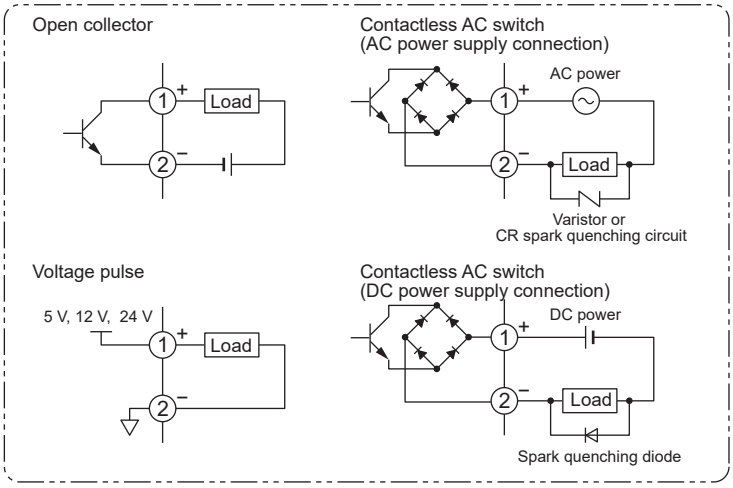
1	Output	(+)
2	Output	(−)
3	Input	(+)
4	Input	(−)
5	Do not use	
6	GND	
7	Supply	(L+)
8	Supply	(N−)

Note: This instrument may output a pulse when the power is turned on/off.
Depending on the connected devices, this pulse output is counted as “one pulse.”

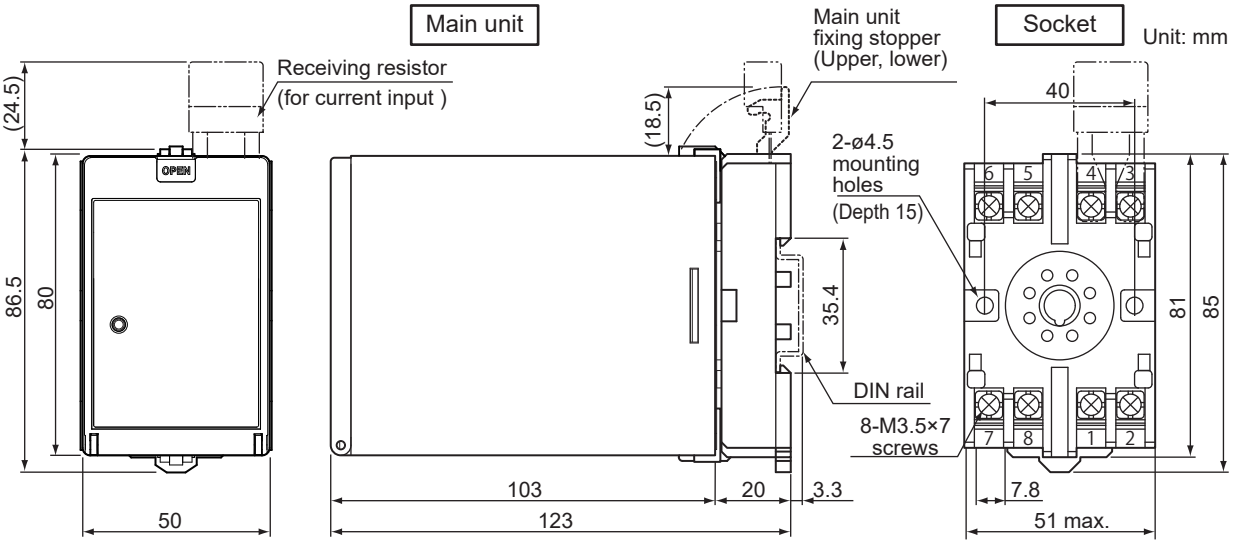
■ Block Diagrams



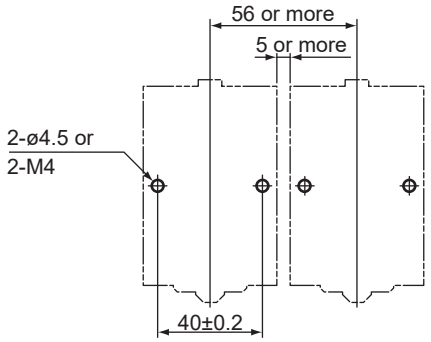
Output connection example



■ External Dimensions



<Mounting Dimensions>



Note:
- When mounting the units close together, leave a space of at least 5 mm between them.
- Use the supplied spacer to keep a space of 5 mm for DIN rail mounting.

Normal Allowable Deviation= ± (Value of JIS B 0401-2016 tolerance grade IT18) / 2