General Specifications

Model MP4
Pulse Rate Converter

JUXTA

GS 77J04P04-01E

■ General

The MP4 is a plug-in type pulse rate converter receives pulse signals from the field and converts them into various isolated pulse outputs at a set pulse rate. It can also operate as a pulse repeater (input frequency = output frequency) by setting the pulse rate and pulse width type.

- Input signals can be non-voltage contact (open collector), ON/OFF contact, voltage pulse, or current pulse.
- Pulse output signals can be selected from open collector, contactless AC switch, and voltage pulse.
- The transmitter power supply can be specified as 12 V DC or 24 V DC.
- The internal input filter (10 ms) can be turned ON/OFF to receive a signal with a lot of chattering.
- You can set the internal load resistance with a switch on the front panel (use for current pulse input).
- VJ77 PC-based Parameters Setting Tool (sold separately) can be used to change pulse rate and other parameters.
- The pulse rate can be set between 0.0001 and 2.0000.
- Provided with power indicator lamp (RDY).

Application examples

- Convert pulse signals of a positive displacement flow meter to a unit pulse.
- Convert non-contact pulse signals from a rotating machine into unit pulses.

■ Model and Suffix Codes

MP4-□□-□/□

Model

Transmitter power supply
- 1: 12 V DC ±10%
- 2: 24 V DC ±10%

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

Power supply
- 3: 24V DC ±10%
- 4: 100-130V AC/DC (Operating range: 85 to 150 V)
- 5: 200-240V AC (Operating range: 170 to 264 V)

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

(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, input frequency, output frequency and pulse width type.

- Model and Suffix Code: e.g. MP1-11-3
- Input frequency: e.g. 0 to 2000 Hz
- Output frequency: e.g. 0 to 5 Hz
- Pulse width type: Fixed on-state pulse

The input filter and pulse width time will be configured per your specifications prior to shipping. Items that you do not specify will remain at the factory default values.

- Input filter: e.g. ON (input frequency when ON is below 100Hz)
- Pulse width time: e.g. 30 ms (can be specified when the pulse width type is "Fixed on-state pulse")

■ 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.

- Input filter: OFF
- Pulse width time: 30 ms (when the pulse width type is through, the setting is invalid)
- Pulse logic (D/R): Direct
- Internal load resistance: none

■ Input Specifications

Input signal:
- 2-wire: Non-voltage contact (open collector), ON/OFF contacts, voltage pulse or current pulse (transmitter power supply available)
- 3-wire: Voltage pulses (transmitter power supply available)

Input frequency: 0 to F_{100} (F_{100} is 100 kHz or less)

Input filter: Has an approx. 10 ms time constant, which can be turned on or off at the front switch (turned off at factory shipment). When the input filter is turned on, the upper limit of the input frequency range reduces to 100 Hz (requiring a pulse width of at least 3 ms).

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Minimum input pulse width:
When input frequency is below 10 kHz: 30 µs
When input frequency is 10 kHz or more:
30% of pulse interval
Input pulse width: 40 µs minimum for both ON-state and OFF-state durations
Input display unit: Either Hz or kHz is selectable.
Input signal type:

Input signal	Detection level	
Non-voltage contact	ON-state	200 Ω maximum
	OFF-state	100 kΩ minimum
Open collector	ON-state	600 Ω maximum / 1.8 V maximum
	OFF-state	100 kΩ minimum / 3.5 V minimum
Voltage pulse	High level	2 to 50 V DC
	Low level	-1 to +8 V DC
	Pulse amplitude	2 to 50 V DC
Current pulse	High level	(2V/RL) to (50V/RL)mA
	Low level	(-1V/RL) to (+8V/RL)mA
	Pulse amplitude	(2V/RL) to (50V/RL)mA

RL: Internal load resistor (kΩ)

Maximum allowable input voltage: 58 V DC or less
Input resistance: 15 kΩ minimum for non-voltage contact (open collector), ON/OFF contact, and voltage pulse.
Value of the load resistor for current pulse.
Internal load resistor (RL):

Load resistance setting switch	Resistance values
0	OPEN
1	200 Ω
2	500 Ω
3	143 Ω
4	1 kΩ
5	167 Ω
6	500 Ω
7	143 Ω

Power rating: For a 1 W current pulse input, set a resistance value by using the switch on the front panel (factory default setting is OPEN).
Set to OPEN for voltage pulse, ON/OFF contact, and non-voltage contact pulse.
Contact input signal rated supply:
Contact voltage: 24 V DC
Contact current: 1 mA
Input contact capacity: 30 V DC/10 mA minimum
Transmitter power supply (at 4 to 30mA output):
12 V DC ±10% or 24 V DC ±10%
(with current limit circuit: limit at 50mA)
Pulse count point:
Turning point from OFF input to ON input (non-voltage contact (open collector), ON/OFF contact)
Turning point from HIGH to LOW input (voltage pulse, current pulse)

■ Output Specifications

Output signal : Open collector, contactless AC switch or voltage pulse
* An electromagnetic counter can be driven by an open collector output
Output pulse: Number of input pulse × pulse rate
Pulse rate = output frequency / input frequency
Output frequency: 0 to F_{100}
F_{100} is 100 kHz or less (1 kHz or less for contactless AC switch)

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 rate setting range: 0.0001 to 2.0000 (settable to four decimal places)
When pulse width type is “through”, effective range is 0.0001 to 1.0000.
Pulse width type: Either through (no change) or fixed on-state pulse width is selectable.
Pulse width time: Either 12.5 µs, 50 µs, 100 µs, 12.5 ms, 30 ms, 50 ms, or 100 ms is selectable.
Pulse logic (D/R): Select between DIRECT (forward) and REVERSE (backward)
Input/output logic:

Input signal		Output signal: Open collector / Contactless AC switch	Output signal: Voltage pulse
Open collector / Non-voltage contact	OFF / ON	OFF / ON	High / Low
Voltage pulse / Current pulse	High / Low	OFF / ON	High / Low

* For REVERSE, the ON/OFF or High/Low output becomes the opposite of DIRECT.

Input frequency limitation for fixed pulse width:
When the following conditions are not satisfied, number of output pulse is not guaranteed.

$$\text{Input frequency (Hz)} \leq \frac{1}{\text{Pulse width(s)} \times 2} \times n$$

“n” varies with the pulse rate applied.
When pulse rate is 0.0001 to 1.0000,

$$n = \frac{1}{\text{Pulse rate}}$$

(integer after omitting the figures below the decimal place)
When pulse rate is 1.0001 to 2.0000, n=0.5.

(Note) When pulse rate except for “1” is set, the scaler does not always deliver the same speed of output pulses as the number of input pulses multiplied by the given pulse rate. Be fully aware of this fact when using the scaler.

■ Items Available to Be Set

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

Input filter, input range unit, pulse rate, pulse width type, pulse width time, pulse logic

■ Standard Performance

Accuracy rating: ±0.1% of absolute value (however, an indicated value when monitoring)
Pulse width time accuracy: ±10%
However, 25 to 30 ms for 30 ms.
For contactless AC switches, 12.5, 50, and 100 µs accuracies are not guaranteed.
Effect of power supply voltage fluctuation: No malfunctions for allowable fluctuations in each supply voltage (note that if the input frequency is monitored via communication, the displayed value is within the accuracy range)
Effect of ambient temperature change: No malfunction within the operating temperature range. (Note, when monitoring the input frequency via communication, the displayed value is ±0.2% per 10°C of change.)

■ Power Supply and Isolation

Supply rated voltage range: 24 V DC ⎓ ±10%
100-130 V AC/DC ≂ 50/60 Hz
200-240 V AC ~ 50/60 Hz
Supply input voltage range: 24 V DC ±10%
100-130 V AC/DC (±15%) 50/60 Hz
200-240 V AC (−15, +10%) 50/60 Hz
Power consumption:
For voltage pulse output:
2.6 W at 24 V DC; 2.6 W at 110 V DC;
5.4 VA at 100 V AC, 6.9 VA at 200 V AC
For other than voltage pulse output:
2.2 W at 24 V DC; 2.4 W at 110 V DC;
4.7 VA at 100 V AC; 6.0 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/s^2 or less, 11 msec, 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

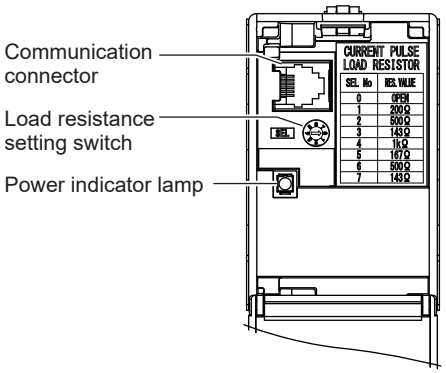
Construction: Plug-in type
Material: PC resin (black), UL94 V-0 (case)
Modified PPO resin, glass fiber filled (black), UL94 V-1 (socket)
Mounting method: Wall or DIN rail mounting
More than 5 mm interval is required for side-by-side close mounting.
Connection method: M3.5 screw terminals
External dimensions: 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.)

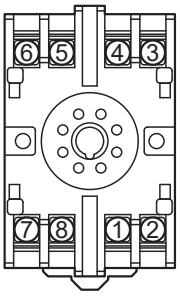
■ Front Panel

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



Communication connector: Connect the PC-based Parameter Setting Tool (VJ77).
Load resistance setting switch: Sets the resistance value for current pulse input.
Power indicator lamp: Turns on at power on.

■ Terminal Assignments



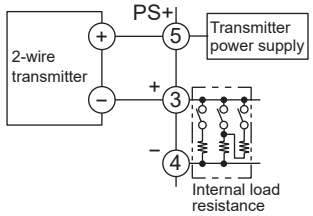
1	Output	(+)
2	Output	(−)
3	Input	(+)
4	Input	(−)
5	Input	(PS+)
6	GND	
7	Supply	(L+)
8	Supply	(N−)

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.”

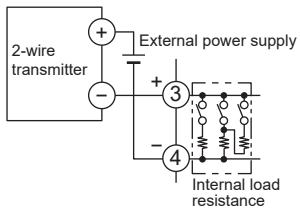
■ Block Diagrams

Input connection example

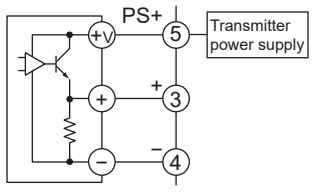
When receiving a current pulse
(using the transmitter power supply)



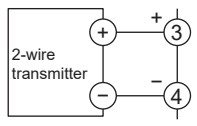
When receiving a current pulse
(using an external power supply)



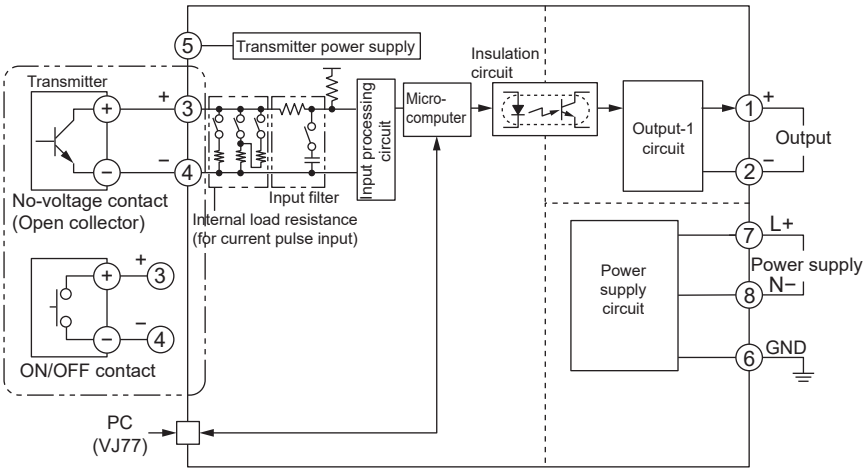
When receiving a voltage pulse
(using the transmitter power supply)



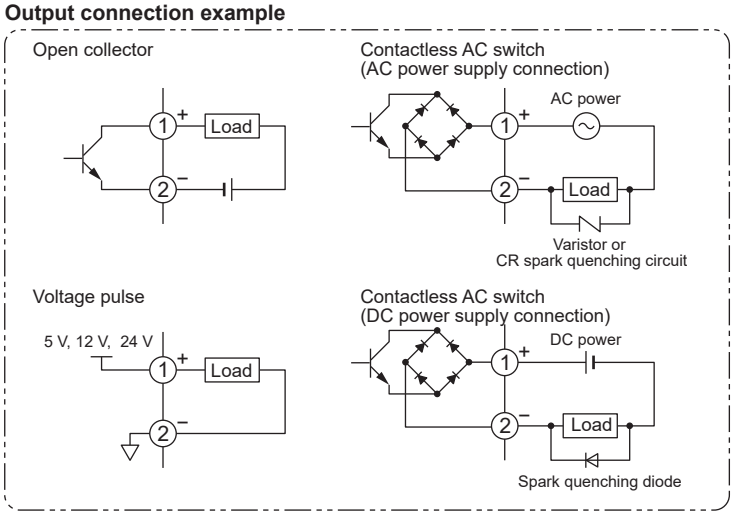
When receiving a voltage pulse
(not using the transmitter power supply)



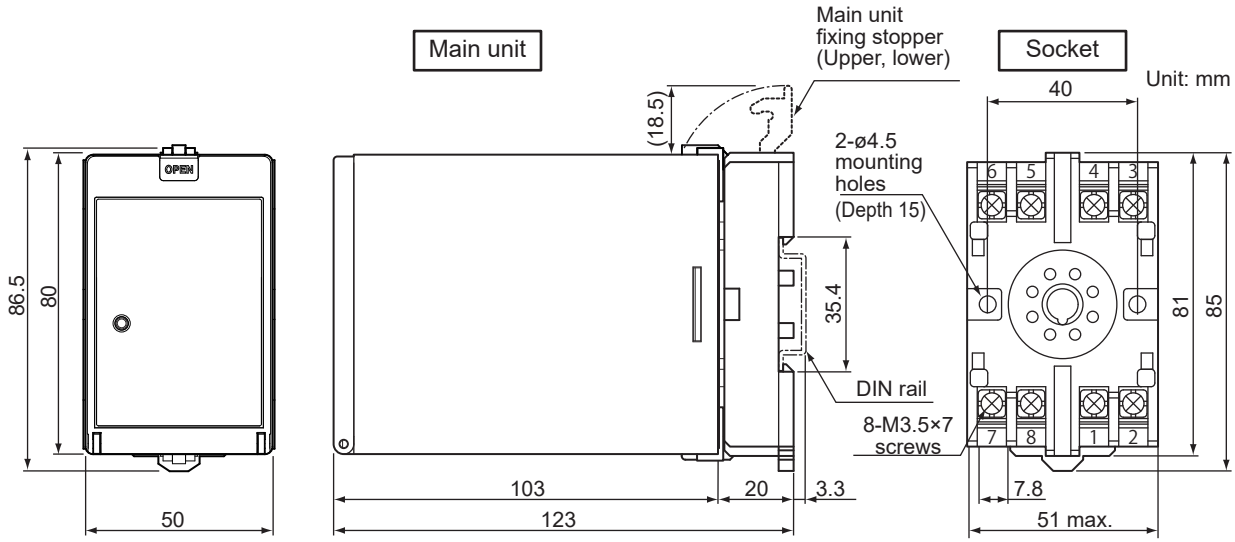
When receiving non-voltage contact signals (open collector) or ON/OFF contact



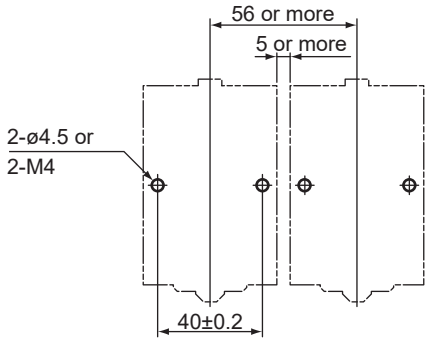
Output connection example



■ External Dimensions



<Mounting Dimensions>



Unit: mm

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