Slim Plug-In Analog/Frequency Converter with Isolated Single/Dual Output

DESCRIPTION

The MS3729 is a slim, plug-in analog to frequency converter that converts DC current or voltage signals into pulse train signals. The unit provides isolated single or dual output.

ORDERING CODE

MS3729 - ☐ - ☐☐☐

Model

Power Supply
A: 100 to 240V AC (50 to 60Hz)
D: 24V DC   **P**: 100 to 240V DC

Input
A: 4 to 20mA DC   **3**: 0 to 1V DC
B: 2 to 10mA DC   **4**: 0 to 10V DC
C: 1 to 5mA DC   **5**: 0 to 5V DC
D: 0 to 20mA DC   **6**: 1 to 5V DC
E: 4 to 20mA DC[*1]   **0**: Other DC voltage signal
H: 10 to 50mA DC
Z: Other DC current signal

*1: Shunt resistor 50Ω

Output 1
1: TTL level
2: Open collector
5: Photo MOS relay

Output 2
No code: None
The codes are the same as for Output 1.

Options
No code: None
/T: Pulse Hold Function provided.
/X: Others (Special order)
* For non-standard options, ask MTT for availability.

ORDERING INFORMATION

To place an order, please use the ordering code format as shown above. Also specify an output frequency range.
  (e.g.) MS3729-A-611 (0 to 4.3kHz)

* Note that the output frequency range should be specified between 0-0.001Hz and 0-5kHz (30Hz max. for the photo MOS relay).
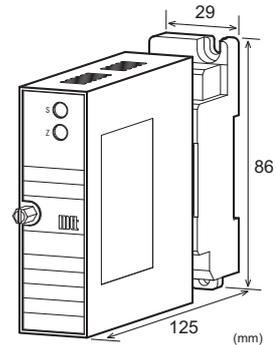
Other Ordering Examples:
For an input code of "0": MS3729-A-011 (0 to 4.3kHz / Input: 0.2 to 1V)
For an option code of "T": MS3729-A-611/T (0 to 2Hz / 200ms)
Note 1: For the option code "T", specify a pulse hold time between 200μs and 500ms.
Note 2: If you wish to include multiple options in your order, specify the option codes in series (e.g. /TX).

86
29
125
(mm)

SPECIFICATIONS

●POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 100 to 240V DC: 85 to 264V DC
Power Sensitivity	Better than ±0.1% of span for each power supply range.
Power Line Fuse	160mA fuse is installed (standard).

Power Consumption

Power	100-240V AC	24V DC	100-240V DC
Single Output	3.5VA max	1.0W max	3.6W max
Dual Output	4.0VA max	1.2W max	4.8W max

●INPUT SECTION

Input Resistance

Voltage Input (DC)	With or without power: 1MΩ min.	
Current Input (DC)	4 to 20mA (std.)	250Ω
	2 to 10mA	250Ω
	1 to 5mA	100Ω
	0 to 20mA	250Ω
	10 to 50mA	10Ω

Allowable Input Voltage

Voltage Input Model	30V DC max., continuous. (Standard for a span up to 10V)
Current Input Model	40mA DC max., continuous. (Standard for 4 to 20mA)

Ranges Available

	Current Signal	Voltage Signal
Input Range (DC)	-100 to 100V	-300 to 300V
Input Span (DC)	100μA[*1] to 200mA	200mV[*2] to 600V
Input Bias	-100 to 100%	-100 to 100%

Note: For any input range including negative input signals, the input spans for current and voltage signals range from [*1]200μA to 200mA and [*2]400mV to 600V, respectively.
Input Spec. Ex.1: For 3 to 8V input, the input span is 5V and the bias +60%.
Input Spec. Ex. 2: For -5 to 0V input, the input span is 5V and the bias -100%.

●OUTPUT SECTION

Zero Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)
Span Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)

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Ranges Available	Output frequency range between 0-0.001Hz and 0-5kHz
	Note: When the photo MOS relay is selected, the range should be between 0-0.001Hz and 0-30Hz.
Maximum Output Load	TTL level: Maximum output 10mA at 3.5V
Maximum Rating	
Open Collector	Maximum rating: 30V, 100mA (Resistive load)
Photo MOS Relay	Maximum load voltage: 400V (Peak AC)
	Maximum continuous load current: 0.15A (Peak AC)
	Peak load current: 0.5A @ 100ms (1 shot) DC
	Maximum output power dissipation: 360mW
	ON resistance: 16Ω max.
	Off-state leakage current: 1μA max.

Maximum Output Frequency

<With Pulse Hold Function>

When a pulse hold time is specified, the maximum possible output frequency is determined by the following equation:

$$Hz = 1 / (T \times 1.2 + 10\mu s^*)$$

   * 10μs: Output pulse Lo level for TTL or voltage pulse output, or output pulse ON for open collector output

(Example) When a pulse hold time of 200ms is set, the output frequency is:

$$1 / (0.2 \times 1.2 + 0.00001) = 4.166 \ Hz$$

Duty Ratio without Pulse Hold Function	40 to 60%

●**PERFORMANCE**

Accuracy Rating	Better than ±0.1% of span (at 25°C±5°C).
Pulse Hold Time Accuracy	Better than ±20% of a user-specified value.
Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.
Response Time	
Output Frequency	0 to 90% with a step input at 100%
0.5Hz	3.1s max.
5Hz	310ms max.
50Hz	65ms max.
500Hz ≤	35ms max.
Isolation	4-way isolation between input, output [Output 1/Output 2], power, and ground.
Insulation Resistance	100MΩ min. (@ 500V DC) between input, output [Output 1/Output 2], power, and ground.
Dielectric Strength	Input / Output [Output 1/Output 2] / [Power, Ground]: 2000V AC for 1 minute (Cutoff current: 0.5mA)
	Power / Ground: 2000V AC for 1 minute (Cutoff current: 5mA)
	Output 1 / Output 2: 500V AC for 1 minute (Cutoff current: 0.5mA)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: -5 to 55°C
	Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	-10 to 60°C

●**PHYSICAL**

Installation	Wall/DIN rail mounting
Wiring	M3.5 screw terminal connection (with a power terminal block cover & drop-out prevention screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W29 × H86 × D125mm (including the mounting screw and socket)
Weight	Main unit: 120g max.
	Socket: 80g max.

●**MATERIALS**

|	
Housing	ABS resin (UL 94V-0)
Terminal Block	PBT resin (UL 94V-0)
Terminal Block Cover	PC resin (UL 94V-2)
DIN Rail Stopper	PP resin (UL 94HB)
Screw Terminal	Nickel-plated steel
Contacts Material and Finish	Brass with 0.2μm gold plating
Printed Circuit Board	Glass fabric epoxy resin (FR-4: UL 94V-0)
Anti-Humidity Coating	HumiSeal® 1A27NS (Polyurethane)

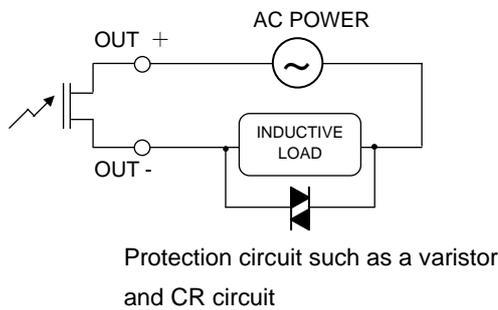* HumiSeal® is a registered trademark of Chase Corporation.

TERMINAL ASSIGNMENT
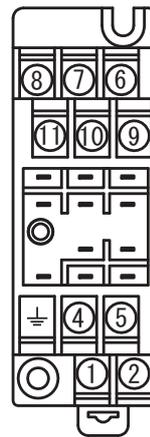
①	P (+)	POWER
②	N (-)	
⏚	GND	
④	+ OUTPUT 1	
⑤	- OUTPUT 1	
⑥	N.C.	
⑦	+ OUTPUT 2	
⑧	- OUTPUT 2	
⑨	+ INPUT	
⑩	- INPUT	
⑪	N.C.	

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BLOCK DIAGRAM
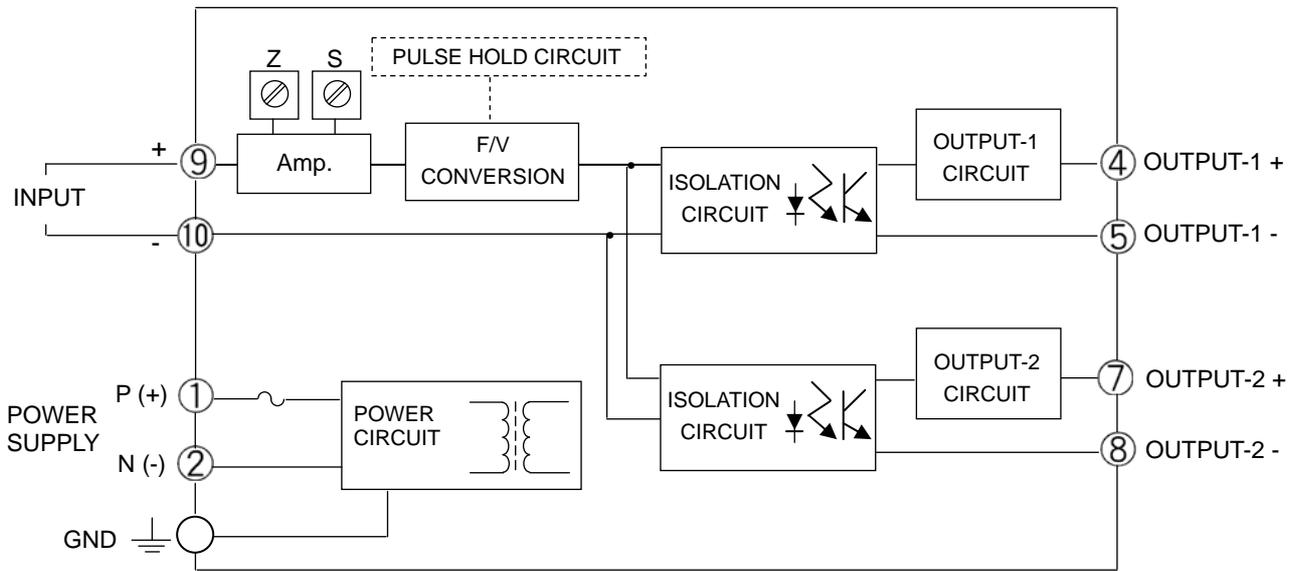
Note: When an inductive load, such as an electric motor, is connected to the photo MOS relay output, a relay contact protection circuit must be connected across the load.

Example of AC power connection:

Protection circuit such as a varistor
and CR circuit

Example of DC power connection:

Protection circuit such as a diode,
varistor and CR circuit

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