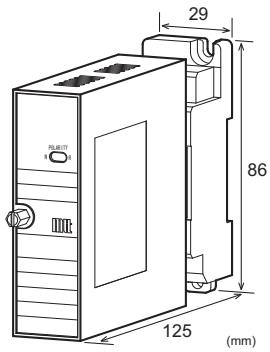
Slim Plug-In High Frequency Pulse Shaper (Pulse Isolator) with Isolated Single/Dual Output

DESCRIPTION

The MS3749 is a slim, plug-in high frequency pulse shaper (pulse isolator) that accepts pulse train signals from sensors or other devices, shapes these pulses or converts signal levels, and provides isolated single or dual output. This model accepts line driver signals and features high frequency up to 200kHz with voltage pulse output.



ORDERING CODE

MS3749 - □ - □ □ □

Model

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

Input
- **O**: Dry contact or open collector (Pull-up: Approx. 12V, 3.3kΩ)
- **A**: AC voltage pulse (Threshold voltage: Approx. 0.06Vp-p)
- **D**: DC voltage pulse (Threshold voltage: Approx. 2V)
- **I** : 4-20mA DC pulse (Threshold current: Approx. 8mA)
- **L**: Line driver pulse (Receiving IC: Receiver equivalent to RS-422)
- **Y**: Other input signal and/or threshold voltage

Output 1
- **1**: TTL level
- **2**: Open collector
- **3**: Voltage pulse 10V±10%
- **4**: Voltage pulse 12V±10%

Output 2
- **No code**: None
- **Codes 1-4 are the same as for Output 1.**
- **5**: Line driver pulse (RS-422 driver output)

Note 1: Code 5 is applicalbe only to Output 2.
Note 2: When a combination of TTL level or voltage pulse is selected for Outputs 1 and 2, the voltage levels for both outputs should be the same.

Options
- **No code**: None
- **/A**: Sensor power supply: 24V DC (±10%), 2-wire type
- **/B**: Sensor power supply: 12V DC (±10%), 2-wire type
- **/C**: Sensor power supply: 24V DC (±10%), 3-wire type
- **/D**: Sensor power supply: 12V DC (±10%), 3-wire type
- **/E**: Sensor power supply: 5V DC (±10%), 2-wire type
- **/F**: Sensor power supply: 5V DC (±10%), 3-wire type
- **/T**: Pulse Hold Function provided.
- **/X**: Others (Special order)

Note: When the code L (line driver pulse) is selected for input, an optional sensor power supply cannot be selected.
* For non-standard options, ask MTT for availability.

ORDERING INFORMATION

To place an order, please use the ordering code format as shown on the left.
(e.g.) MS3749-A-D11/AT

Other Ordering Examples:
For an input code of "Y": MS3749-A-Y11 (Input DC voltage pulse: 0 to 12V / SH = 8V, SL = 3V)
For an input code of "Y": MS3749-A-Y11 (Input AC voltage pulse: 200Vp-p / S = 2Vp-p)
* SH = Threshold level HI, SL = Threshold level LO, S = Threshold level
For an option code of "T": MS3749-A-D11/AT (Pulse hold time: 200ms, rising edge detection)
Note 1: Specify a pulse width between 200μs and 500ms and also choose whether to detect a rising edge or falling edge of an input signal.
Note 2: For DC current pulse input, current values must be specified between 0-100μA and 0-100mA.
Note 3: If you wish to include multiple options in your order, specify the option codes in series (e.g. /AX).

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	7.0VA max	3.0W max	9.0W max
Dual Output	9.0VA max	3.2W max	9.6W max

●INPUT SECTION

Input Resistance	
Voltage Input Model	With power: 1MΩ min. (Standard, 5V input) Without power: 10kΩ min.
Line Driver Pulse Model	Termination resistance: 120Ω
Current Input Model	250Ω (Standard for 4 to 20mA)

Note: When a 2-wire type sensor power supply is specified, a shunt resistor of 100Ω is used.

Allowable Input Voltage	
DC Voltage Input Model	50V DC max., continuous.
DC Current Input Model	40mA DC max., continuous.
AC Voltage Input Model	200Vp-p AC (±100V with reference to 0V) max., continuous.
Input Pulse Width	2.5μs min. (for both ON and OFF)
Maximum Sensor Supply Current	24V: 30mA, 12V: 60mA, 5V: 120mA

Ranges Available

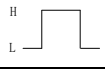
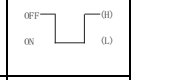
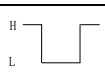
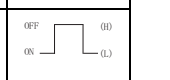
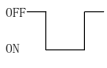
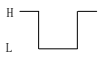
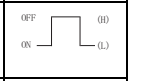
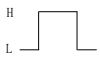
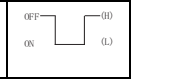
	AC Voltage Pulse	DC Voltage Pulse
Input Range	-300 to 300V	0 to 300V
Input Voltage Span	0.1 to 600Vp-p	1 to 300V
Input Bias	N/A	0 to +300%
Threshold Voltage	50mVp-p min.	Hi-Lo range: 0.2V min.

Example: For 10 to 15V DC voltage pulse input, the input voltage span is 5V and the bias +200%.

●OUTPUT SECTION

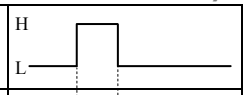
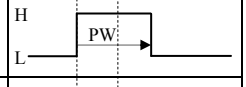
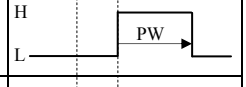
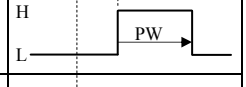
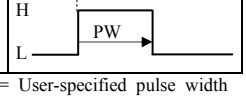
Maximum Output Load	
TTL Level	(Maximum output 10mA @ 3.5V)
Voltage Pulse 10V	(Maximum output 7mA @ ±10%)
Voltage Pulse 12V	(Maximum output 7mA @ ±10%)
Line Driver Pulse	(Per TIA/EIA-422-B)
Maximum Rating	Open collector (Maximum rating: 30V, 100mA)
Maximum Output Frequency without Pulse Hold Function	Voltage Pulse Output: 200kHz Line Driver Pulse Output: 200kHz Open Collector Output: 100kHz with a load resistance of up to 2KΩ (For all of the above, the conditions are as follows: input pulse duty ratio 50% and standard threshold voltage.)
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 × 1.2 + 2.5μs*) *2.5μs: Polarity reversing switch set to NORMAL and output pulse Lo level (rising edge) for TTL and voltage pulse outputs, output pulse ON for open collector output, or output pulse Hi level for line driver pulse output. (Example) When a pulse hold time of 200ms is set, the maximum output frequency is: 1 / (0.2×1.2+0.0000025) = 4.166Hz
Duty Ratio	50% typical (Input pulse duty ratio 50%, standard threshold voltage) DC voltage pulse: 0-5V/1kHz input AC voltage pulse: 5Vp-p/1kHz input Open collector: 1kHz input Line driver pulse: 1kHz input
Polarity Reversing Function	See the Output Logic Table below.

●OUTPUT LOGIC

Input Signal	Input Waveform	Polarity Reversing Switch	Voltage Pulse Output	Open Collector Output *
Voltage/ Current Pulse or between Line Driver A and GND		NORMAL		
		REVERSE		
Open Collector or Dry Contact		NORMAL		
		REVERSE		

*(Between Line Driver Y and GND)

●OUTPUT LOGIC (w/ PULSE HOLD FUNCTION)

Input Waveform		
Output Waveform	Rising edge detection Polarity reversing switch: NORMAL	
	Falling edge detection Polarity reversing switch: NORMAL	
	Rising edge detection Polarity reversing switch: REVERSE	
	Falling edge detection Polarity reversing switch: REVERSE	

PW = User-specified pulse width

●PERFORMANCE

Output Pulse Hold Time Accuracy	Better than ±20% of a user-specified value.
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)
Operating Environment	Ambient temperature: -5 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	-10 to 60°C

●PHYSICAL

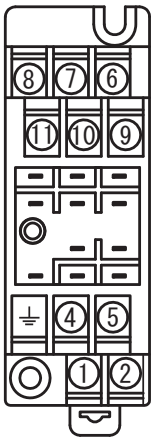
Installation	Wall/DIN rail mounting
Wiring	M3.5 screw terminal connection (with a power terminal block cover & drop-out prevention screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W29 × H86 × D125mm (including the mounting screw and socket)
Weight	Main unit: 120g max. Socket: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

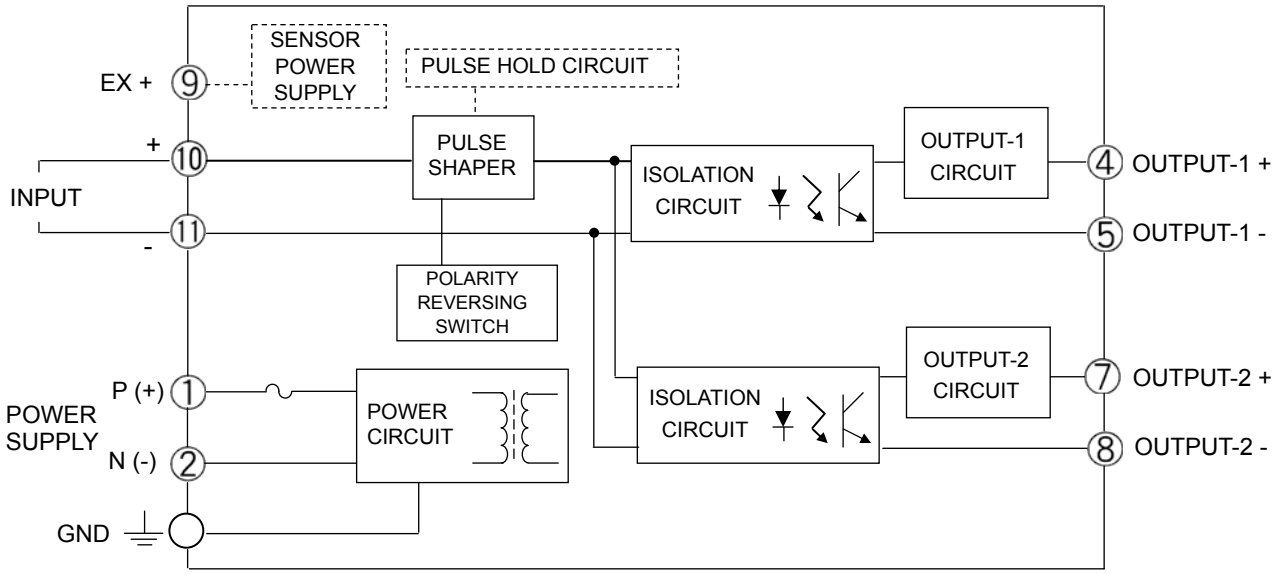


①	P (+) / N (-) POWER	
②		
⏚	GND	
④	+ OUTPUT 1	
⑤	- OUTPUT 1	
⑥	N.C.	OUTPUT 2 Y
⑦	+ OUTPUT 2	OUTPUT 2 Z
⑧	- OUTPUT 2	OUTPUT 2 COM
⑨	EX (*1)	INPUT A
⑩	+ INPUT	INPUT B
⑪	INPUT COM	INPUT COM

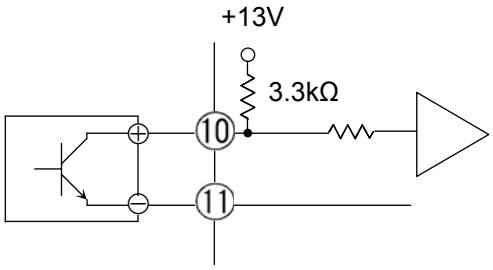
*1: Substituted by N.C. if no external power supply is specified.

Note: The terminal assignment in the dotted frame is as follows:
Terminals #9 - #11: Signal assignment for line driver pulse input
Terminals #6 - #8: Signal assignment for line driver pulse output

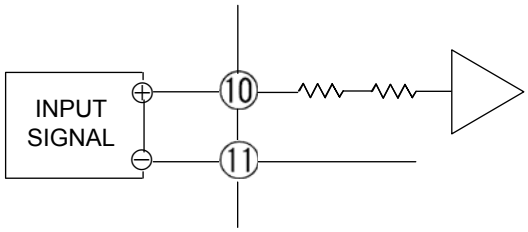
BLOCK DIAGRAM



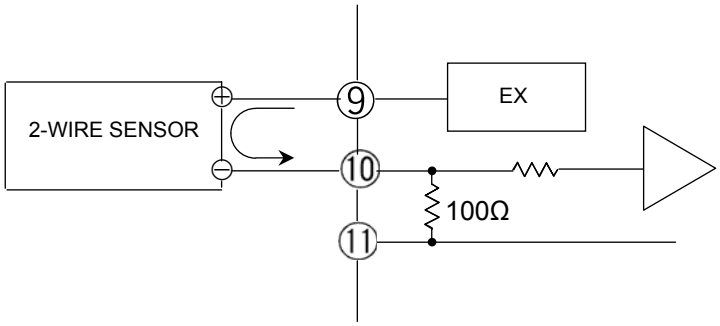
For dry contact or open collector input:



For voltage pulse input:



When a 2-wire sensor is used:
Note: The connections may vary depending on the type of the sensor used.



Block diagram for the following configurations:
Input: Line driver pulse
Output 2: Line driver pulse