**Product Specification Sheet** **Model: MS3706** **MS3700**

# Slim Plug-In Strain Gauge Transmitter with Isolated Single/Dual Output

## DESCRIPTION

The MS3706 is a slim, plug-in strain gauge transmitter that supplies excitation voltage to strain-gauge type pressure sensors, load cells, and the like and converts their output signals into standard process signals. It provides isolated single or dual output.

## ORDERING CODE

**MS3706 - □ - □ □ □ □**

**Model**

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

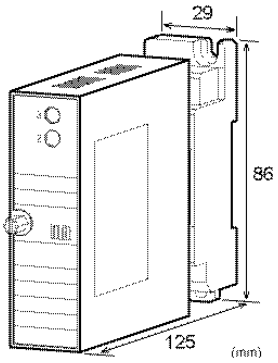
**Excitation Voltage**
**E2**: 5V DC **0**: Other DC voltage
**E3**: 10V DC

**Input**
**1**: 0 to 10mV DC **1W**: ±10mV DC
**2**: 0 to 100mV DC **2W**: ±100mV DC
**0**: Other DC voltage signal

**Output 1**
**A**: 4 to 20mA DC **1**: 0 to 10mV DC
**D**: 0 to 20mA DC **2**: 0 to 100mV DC
**Z**: Other DC current signal **3**: 0 to 1V DC
**4**: 0 to 10V DC
**5**: 0 to 5V DC
**6**: 1 to 5V DC
**3W**: ±1V DC
**4W**: ±10V DC
**5W**: ±5V DC
**0**: Other DC voltage signal

**Output 2**
**No code**: None
**The codes are the same as for Output 1.**
Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.
Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.

**Options**
**No code**: None
**/K**: Fast response (0 to 90% response time: 10ms max.)
**/L**: Dual current output with high output load (OUT-1: 750Ω / OUT-2: 550Ω)
**/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 on the left. Also specify a bridge resistance.
(e.g.) MS3706-A-E3144 (700Ω)

Other Ordering Examples:
For an excitation voltage code of "0": MS3706-A-01AA (700Ω / Excitation voltage: 4V)
For an input code of "0": MS3706-A-E20AA (700Ω / Input: 0 to 20mV)
For an output code of "Z": MS3706-A-E21Z6 (700Ω / Output: 8 to 20mA)
For an option code of "X": MS3706-A-E22A6/X (700Ω / Response frequency: 50Hz)
Note: If you wish to include multiple options in your order, specify the option codes in series (e.g. /KX).

## SPECIFICATIONS

### ●POWER SECTION

| | |
|---|---|
| Power Requirements | 100 to 240V AC: 85 to 264V AC (47 to 63Hz)<br>24V DC: 24V DC±10%<br>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 | 2.1W max | 7.2W max |
| Dual Output | 7.0VA max | 2.4W max | 8.4W max |

### ●INPUT SECTION

| | |
|---|---|
| Input Resistance | With power: 1MΩ min.<br>(Without power: 10kΩ min.) |
| Allowable Input Voltage | 30V DC max., continuous. |
| Excitation Voltage | 5V DC at 120Ω bridge resistance<br>10V DC at 350Ω bridge resistance<br>Other voltages |

| Ranges Available | |
|---|---|
| Input Range (DC) | -200mV to 200mV |
| Input Span (DC) | 5mV* to 400mV |
| Input Bias | -100 to 100% |
| Excitation Voltage | 3 to 10V |

Note: For any input range including negative input signals, the input span ranges from *10mV to 400mV.

Input Spec. Ex.1: For 50 to 150mV input, the input span is 100mV and the bias +50%.

Input Spec. Ex. 2: For -10 to 30mV input, the input span is 40mV and the bias -25%.

## ●OUTPUT SECTION

| Maximum Output Load | | |
|---|---|---|
| Voltage Output (DC) | 1V span and up | 2mA max. |
| | 10mV | 10kΩ min. |
| | 100mV | 100kΩ min. |
| Current Output (DC) | 4-20mA single output | 750Ω max. |
| | 4-20mA dual output | Output 1: 550Ω max. Output 2: 350Ω max. |

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

| Ranges Available | Current Signal | Voltage Signal |
|---|---|---|
| Output Range (DC) | 0 to 20mA | -10 to 10V |
| Output Span (DC) | 4 to 20mA | 10mV to 20V |
| Output Bias | 0 to 100% | -100 to 100% |

* For current output signals, the accuracy of any current output smaller than 0.1mA is not guaranteed.

Output Spec. Ex.1: For 4 to 20mA output, the output span is 16mA and the bias +25%.

Output Spec. Ex. 2: For -1 to 4V output, the output span is 5V and the bias -20%.

## ●PERFORMANCE

| | |
|---|---|
| Accuracy Rating | Better than ±0.1% of span (at 25°C±5°C). |
| Temperature Effect | Better than ±0.2% of span per 10°C change in ambient. |
| Response Time | 85ms max. (0 to 90%) with a step input at 100%. |
| CMRR | 100dB min. (500V AC, 50/60Hz) |
| Isolation | 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)<br>Power / Ground: 2000V AC for 1 minute (Cutoff current: 5mA)<br>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<br>Humidity: 5 to 90% RH (non-condensing) |
| Storage Temperature | -10 to 60°C |

## ●PHYSICAL

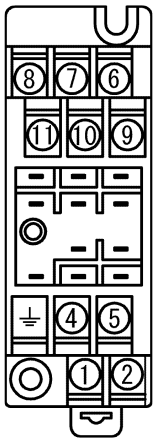
| | |
|---|---|
| Installation | Wall/DIN rail mounting |
| Wiring | M3.5 screw terminal connection (with a power terminal block cover & drop-proof screws) |
| Screwing Torque | 0.8 to 1.0 [Nm] * Recommended |
| External Dimensions | W29 × H86 × D125mm (including the mounting screw and socket) |
| Weight | Main unit: 120g max.<br>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) |
| Conformal Coating | HumiSeal® 1A27NSLU (Polyurethane) |

* HumiSeal® is a registered trademark of Chase Corporation.

## TERMINAL ASSIGNMENT




| | | |
|---|---|---|
| ① | P (+) | POWER |
| ② | N (-) | |
| ⏚ | GND | |
| ④ | + OUTPUT 1 | |
| ⑤ | - OUTPUT 1 | |
| ⑥ | - EX (Excitation voltage) | |
| ⑦ | + OUTPUT 2 | |
| ⑧ | - OUTPUT 2 | |
| ⑨ | + INPUT | |
| ⑩ | - INPUT | |
| ⑪ | + EX (Excitation voltage) | |

## BLOCK DIAGRAM