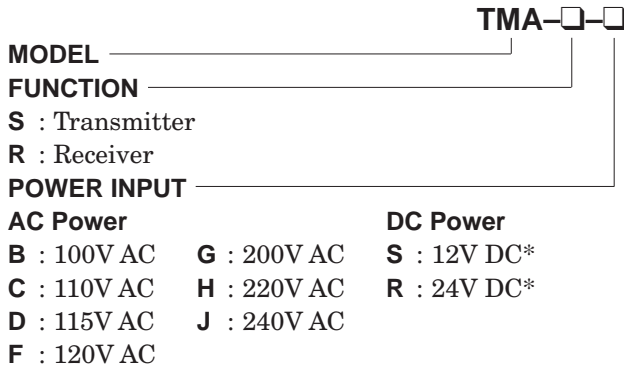


**Telemetry System**

**ANALOG TELEMETERING MODULE**

MODEL **TMA**

**MODEL & SUFFIX CODE SELECTION**



\*24V DC (Code R) and 12V DC (Code S) are not approved by Japan Approvals Institute for Telecommunications Equipment.

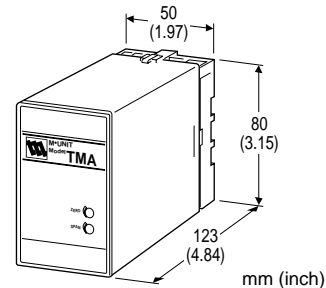
Therefore an individual application will be necessary for using the TMA on NTT telecom. line.

**ORDERING INFORMATION**

Specify code number. (e.g. TMA-S-B)

**GENERAL SPECIFICATIONS**

- Construction:** plug-in
- Connection:** M3.5 screw terminals
- Housing material:** flame-resistant resin (black)
- Isolation:** input to output to power
- Front adjustments:** zero and span;  $\pm 5\%$



**Functions & Features**

- Transmitting 1-point analog signal (water level, pressure, flow or ingredients analysis) through NTT (Nippon Telephone & Telegraph) personal telecommunication line of 50 b/s
- Both transmitter (TMA-S) and receiver (TMA-R) modules are approved of Technical Requirements Compliance Approval by Japan Approval Institute for Telecommunications Equipment
- Approval No. M90-N239-0 (TMA-S), M90-N240-1 (TMA-R)
- No interference by induction noise
- Output circuit isolated from input and power circuits
- Compact plug-in construction easy to install and maintain

**INPUT & OUTPUT**

**TRANSMITTER (model: TMA-S)**

- **Input:** 1 – 5V DC  
For a current input, specify a resistance value to convert it into 1 – 5V when ordering.
- Input resistance:** 1M $\Omega$  minimum

- **Output:** 1 – 5mA DC
- Load resistance:** 3k $\Omega$  maximum

**RECEIVER (model: TMA-R)**

- **Input:** 1 – 5mA DC  
Shunt resistor attached to input terminals (included in the product package)
- Input resistance:** 10 $\Omega$

- **Output:** 4 – 20mA DC
- Load resistance:** 750 $\Omega$  maximum

**INSTALLATION****Power input**

**AC:** operational voltage range: rating  $\pm 10\%$ ,  
50/60  $\pm 2$  Hz, approx. 2VA

**DC:** operational voltage range: rating  $\pm 10\%$   
(ripple 10% p-p max.)  
approx. 80mA at 24V  
approx. 160mA at 12V

**Operating temperature:** -5 to +60°C (23 to 140°F)

**Operating humidity:** 30 to 90% RH (non-condensing)

**Mounting:** surface or DIN rail

**Dimensions:** W50×H80×D123 mm (1.97"×3.15"×4.84")

**Weight:** 400 g (0.88 lbs)

**PERFORMANCE in percentage of span**

**Accuracy:**  $\pm 0.1\%$

**Temp. coefficient:**  $\pm 0.015\%/^{\circ}\text{C}$  ( $\pm 0.008\%/^{\circ}\text{F}$ )

**Response time:**  $\leq 0.5$  seconds (0 – 90%)

**Line voltage effect:**  $\pm 0.1\%$  over voltage range

**Insulation resistance:**  $\geq 100\text{M}\Omega$  with 500V DC

**Dielectric strength:** 1000V AC @1 minute  
(input to output to power)

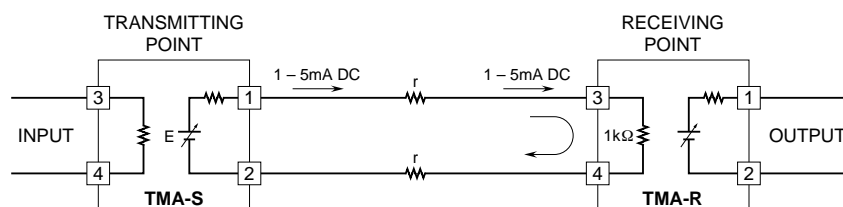
2000V AC @1 minute (input to ground)

2000V AC @1 minute (output to ground)

**EXPLANATIONS**

■ The TMA Telemetering Module provides 1 to 5mA DC current signal. The current signal has a high impedance of  $5\text{M}\Omega$  and thus the signal level is not affected by leadwire resistance of cable connected to the receiving instrument, the receiving resistor receives a current signal proportional to the input signal 1 to 5V DC.

The current varies only by 0.02% ( $=1\text{k}\Omega / 5\text{M}\Omega$ ) when the leadwire resistance value changes from  $0\Omega$  to  $1\text{k}\Omega$ .

**■ AVAILABLE NTT LINE**

Among the several circuit lines opened by NTT (Nippon Telephone & Telegraph), the TMA utilizes the "special DC line" of 50 b/s.

The following shows the conditions to use this line.

ITEM	DATA
Transmission speed	50 b/s max.
Technical configuration	2-wire (metallic return) 4-wire (metallic return)
Communication	Uni-directional, full-duplex
Intersection	Not allowed
Circuit protection	Required
Electrical characteristics	Current 45mA max. Voltage between lines 100V max. Voltage to ground 50V max.

**■ LEADWIRE RESISTANCE**

Most popular wire size among the cables for city telecommunication lines is that of 0.65 mm diameter. This wire has about  $100\Omega$  of leadwire resistance for 1 kilometer with return, thus  $3\text{k}\Omega$  is for about 30 kilometers.

Cable size	mm	0.65	0.90		
	mm <sup>2</sup>			1.25	2.00
Approx. Resistance ( $\Omega/\text{km}$ ; including return)		100	55	35	20

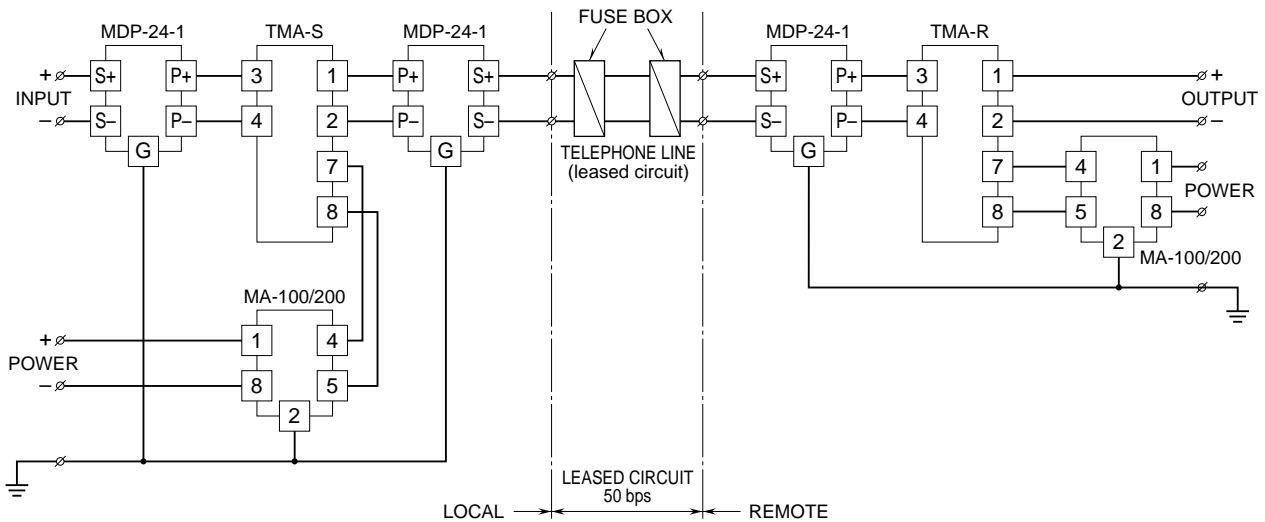
## INSTALLATION INSTRUCTIONS

### ■ LIGHTNING PROTECTION

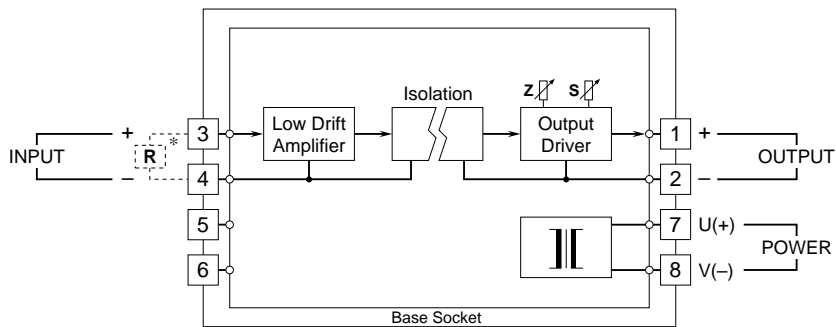
Long distance transmission system via cables are often destroyed by inductive surge of lightning. In order to prevent lightning surges entering through power supply line and signal line, proper procedure will be required. Specify M-System's special lightning arrester M-RESTER for this purpose. Fuses provided by NTT do not meet to the protecting purpose of transmission cable.

### ■ CABLE RESISTANCE OF NTT SPECIAL LINE

Check that cable resistance (including return) of the NTT special line is within  $3k\Omega$ . In general, it is around  $1k\Omega$  and does not cause any problem.

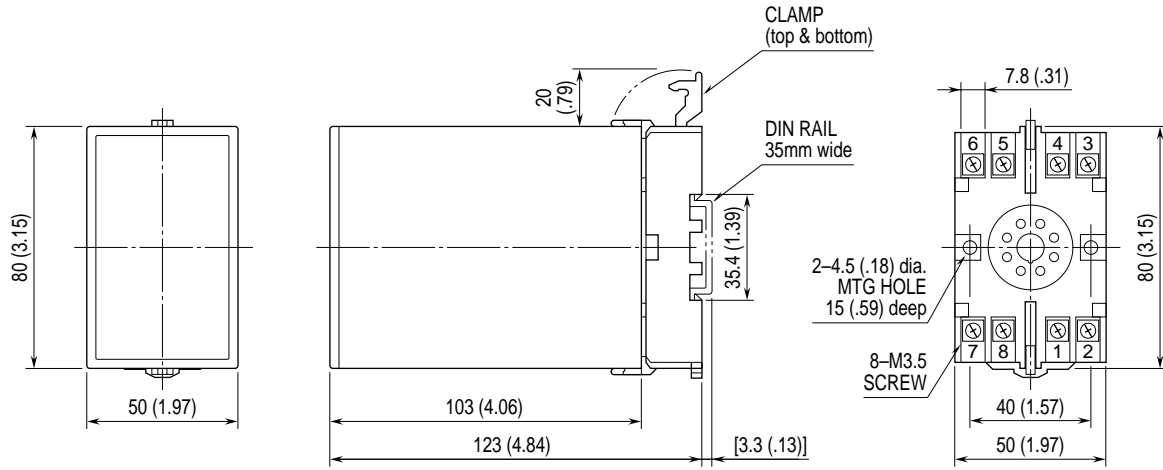


## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



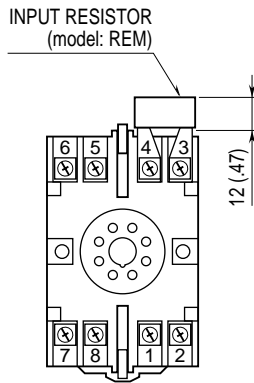
\*Input shunt resistor attached for current input.

**EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENT mm (inch)**



•When mounting, no extra space is needed between units.

**TERMINAL ASSIGNMENT mm (inch)**



Input shunt resistor attached for current input.