

# PULSE ISOLATOR

(built-in excitation; rotary encoder use)

MODEL

**RPPD**

## BEFORE USE ....

Thank you for choosing M-System. Before use, please check contents of the package you received as outlined below.

If you have any problems or questions with the product, please contact M-System's Sales Office or representatives.

### ■ PACKAGE INCLUDES:

Signal conditioner (body + base socket).....(1)

### ■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

### ■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection, hardware setting and basic maintenance procedures.

This unit is factory adjusted and calibrated according to the Ordering Information included in the product package. If you don't need to change the pre-adjusted setting, you can skip the sections on hardware setting and calibration in this manual.

## POINTS OF CAUTION

### ■ CONFORMITY WITH EU DIRECTIVES

- The equipment must be mounted inside a panel.
- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this unit when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures\* to ensure the CE conformity.

\* For example, installation of noise filters and clamp filters for the power source, input and output connected to the unit, etc.

- Install lightning surge protectors for those wires connected to remote locations. For 24V DC power supply line, choose a surge protector with its maximum surge voltage 40V or less between lines. Recommended M-System model: MDP-D24.

### ■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:  
85 – 132V AC rating: 85 – 132V, 47 – 66 Hz, approx. 5.5VA  
12V, 24V and 48V DC ratings: Rating  $\pm 10\%$ , approx. 3.3W  
110V DC rating: 85 – 150V DC, approx. 3.3W

### ■ GENERAL PRECAUTIONS

- Before you remove the unit from its base socket or mount it, turn off the power supply and input signal for safety.

### ■ ENVIRONMENT

- Indoor use.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within  $-5$  to  $+60^{\circ}\text{C}$  ( $23$  to  $140^{\circ}\text{F}$ ) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

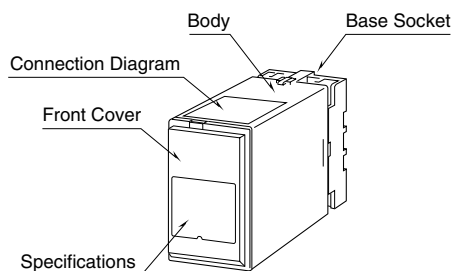
### ■ WIRING

- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

### ■ AND ....

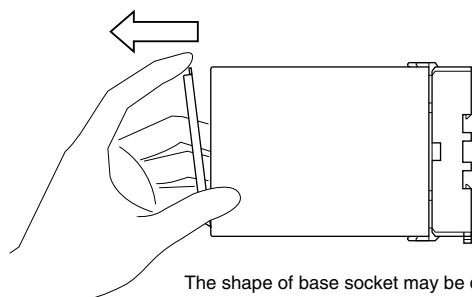
- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

## COMPONENT IDENTIFICATION



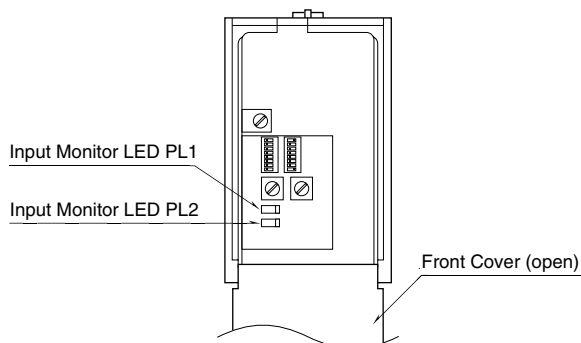
### ■ HOW TO OPEN THE FRONT COVER:

Hang your finger on the hook at the top of front cover and pull.



The shape of base socket may be different for some models.

### ■ FRONT PANEL CONFIGURATION

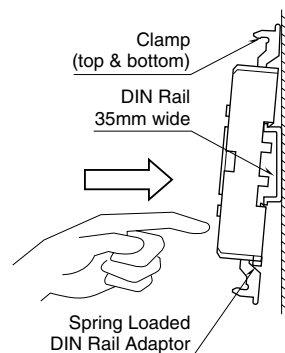


## INSTALLATION

Detach the yellow clamps located at the top and bottom of the unit for separate the body from the base socket.

### ■ DIN RAIL MOUNTING

Set the base socket so that its DIN rail adaptor is at the bottom. Hang the upper hook at the rear side of base socket on the DIN rail and push in the lower. When removing the socket, push down the DIN rail adaptor utilizing a minus screwdriver and pull.



### ■ WALL MOUNTING

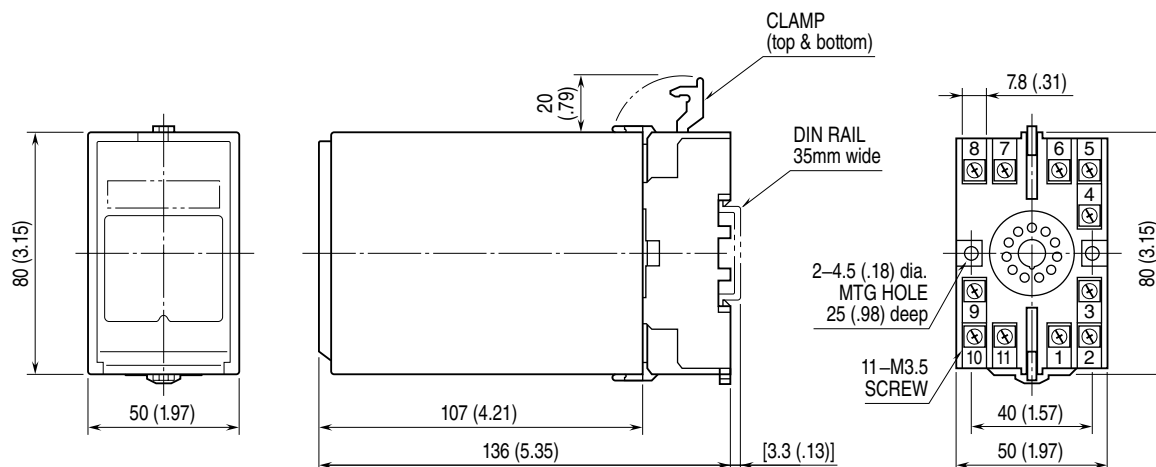
Refer to "EXTERNAL DIMENSIONS."

Shape and size of the base socket are slightly different with various socket types.

## TERMINAL CONNECTIONS

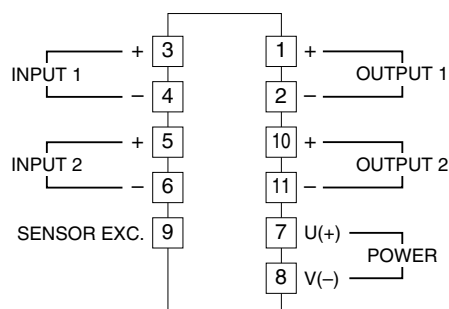
Connect the unit as in the diagram below or refer to the connection diagram on the top of the unit.

### EXTERNAL DIMENSIONS unit: mm (inch)

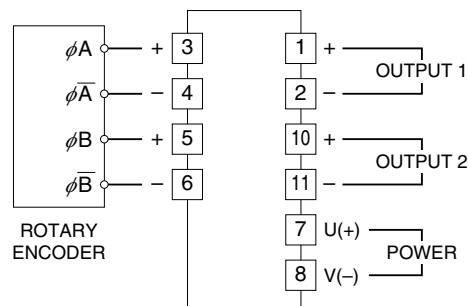


• When mounting, no extra space is needed between units.

### CONNECTION DIAGRAM



### RS-422 LINE DRIVER PULSE INPUT

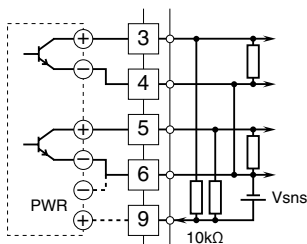


Note 1: Sensor excitation not provided for RS-422 line driver pulse input.

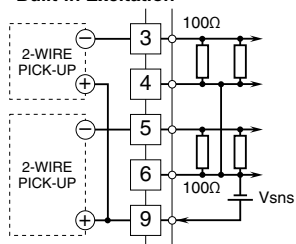
Note 2: Not negative common in case of RS-422 line driver pulse output or power photo MOSFET relay output.

### Input Connection Examples

#### ■Dry Contact

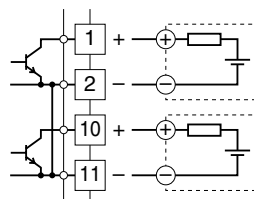


#### ■2-Wire Current Pulse •Built-in Excitation

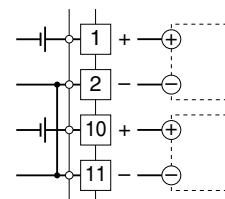


### Output Connection Examples

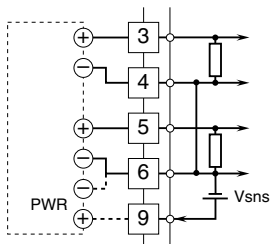
#### ■Open Collector



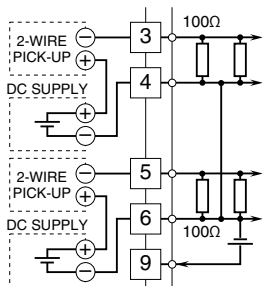
#### ■Voltage Pulse



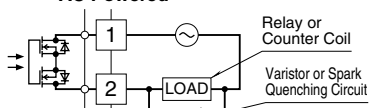
#### ■Voltage Pulse



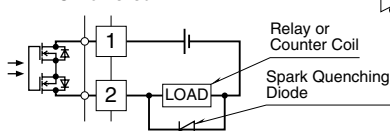
#### •External DC Supply



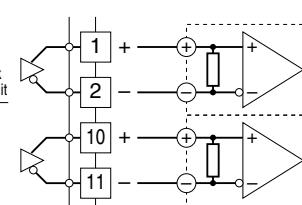
#### ■Power Photo MOSFET Relay • AC Powered



#### • DC Powered











#### ■RS-422 Line Driver Pulse



## FUNCTION & FEATURES

- Galvanically isolating pulse rate signals from a rotary encoder
- Maximum input/output frequencies: 100 kHz
- Minimum input pulse width: 5  $\mu$ sec. (dry contact, voltage/current pulse input)
- Monitor LED provided to check that input pulses are provided.
- Accepting a wide variety of input: 0.5 – 50V at the input terminals
- Pulse logic can be converted.
- RS-422 line driver pulse input acceptable; converted into open collector or voltage pulse output.
- For one-shot output, a pulse rise or drop can be selected for synchronization.
- Output 1 is available with power photo MOSFET relay.

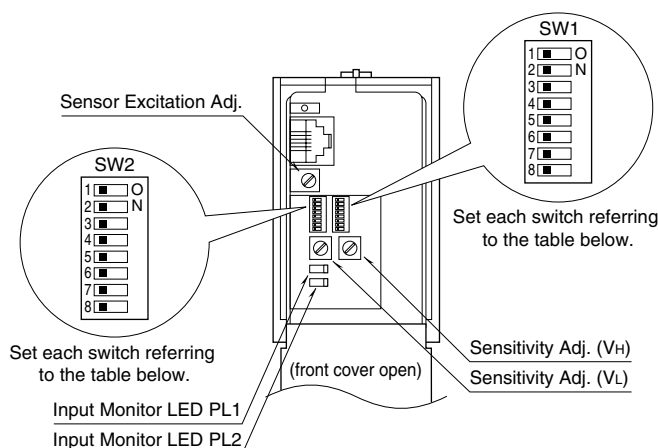
## I/O PULSE LOGIC

INPUT WAVEFORM			VOLTAGE PULSE, 2-WIRE CURRENT PULSE or RS-422 LINE DRIVER PULSE	DRY CONTACT
OUTPUT WAVEFORM			H L	OFF ON
VOLTAGE PULSE or RS-422 LINE DRIVER PULSE	Non Inverted	No pulse width conversion	H L	H L
		One-shot, detecting input pulse rise 	H L *	H L
		One-shot, detecting input pulse drop 	H L	H L
	Inverted	No pulse width conversion	H L	H L
		One-shot, detecting input pulse rise 	H L *	H L
		One-shot, detecting input pulse drop 	H L	H L
OPEN COLLECTOR or POWER PHOTO MOSFET RELAY	Non Inverted	No pulse width conversion	OFF ON	OFF ON
		One-shot, detecting input pulse rise 	OFF ON *	OFF ON
		One-shot, detecting input pulse drop 	OFF ON	OFF ON
	Inverted	No pulse width conversion	OFF ON	OFF ON
		One-shot, detecting input pulse rise 	OFF ON *	OFF ON
		One-shot, detecting input pulse drop 	OFF ON	OFF ON

The pulse width in one-shot means the bold lined section of a pulse waveform.

\*Pulse rise for RS-422 line driver pulse can not be detected.

## HARDWARE SETTING & CALIBRATION



There is no need of hardware adjustment for RS-422 line driver pulse input.  
Unnecessary switches or LEDs are not provided.

### SW1 & 2 FUNCTIONS (SW1: Input 2, SW2: Input 1, SW1-3 and SW2-3 are used commonly to both inputs.)

SWITCH NO.	SW FUNCTION	INPUT CODE	A	B	C	D	H
SW1,2 - 1	ON with dry contact input (model suffix: A)		ON	OFF	OFF	OFF	OFF
2	ON with 2-wire current pulse input (model suffix: H)		OFF	OFF	OFF	OFF	ON
3	SW1-3: Adjustable range of sensitivity level for $V_L$ (ON: 0 – 10 V, OFF: 0 – 5 V) SW2-3: Adjustable range of sensitivity level for $V_L$ (ON: 0 – 10 V, OFF: 0 – 5 V) Refer to the section “SENSITIVITY ADJUSTMENT”.		ON or OFF (required level)		OFF	ON or OFF (re- quired level)	OFF
4	Always ON		ON or OFF according to the adjustment				
5	Noise filter Type 1 (ON: with, OFF: without)		ON or OFF according to the noise level. Refer to the tables below for the max. frequency which can pass through the filter.				
6	Noise filter Type 2 (ON: with, OFF: without)						
7	Attenuator for input signal (ON: with, OFF: without) Input voltage is attenuated to half the original amplitude with this switch ON. (one-third for the model number suffix code A.)		OFF*	OFF*	OFF	OFF*	OFF
8	Input pulse sensing method (ON: DC coupled, OFF: AC coupled) Turn this switch off with a 10 V or greater offset.		ON				

\*Set to ON with excitation voltage  $\geq 24$  V.

### INPUT FILTER

The tables below show the maximum frequency which can pass through the filter when the sensitivity level is set to 2 V. The frequency may change according to the sensitivity level.

After turning the filter ON, check that the PL1 and PL2 blink according to the input signals. If they do not, readjust the sensitivity according to the instructions in the following section.

#### • Noise Filter Type 1 (SW1/2-5 = ON)

DC Coupling (SW1/2-8 = ON)		AC Coupling (SW1/2-8 = OFF)	
V p-p (V)	MAX. FREQ. (Hz)	V p-p (V)	MAX. FREQ. (Hz)
5	69	5	22
12	35	12	65
24	89	24	112

#### • Noise Filter Type 2 (SW1/2-6 = ON)

DC Coupling (SW1/2-8 = ON)		AC Coupling (SW1/2-8 = OFF)	
V p-p (V)	MAX. FREQ. (Hz)	V p-p (V)	MAX. FREQ. (Hz)
5	1220	5	256
12	329	12	664
24	851	24	1090

## ■ SENSITIVITY ADJUSTMENT

You can change the detection level with the sensitivity adj. located behind the front cover. The  $V_H$  determines the pulse rise and the  $V_L$  determines the pulse fall. With SW1/2-7 set to ON, the input signal is scaled down by 1/2 (1/3 for the model number suffix code A). Be sure that the sensitivity levels are also scaled down by 1/2 (1/3 for the model number suffix code A). See the Ordering Information Sheet included in the package for the factory settings.

For the RS-422 line driver pulse input, there is no need of adjustment because a line receiver conforming with the RS-422 standard is incorporated.

### • How to Change the Sensitivity

A voltmeter of class 0.5 or better accuracy with pointed probes is required.

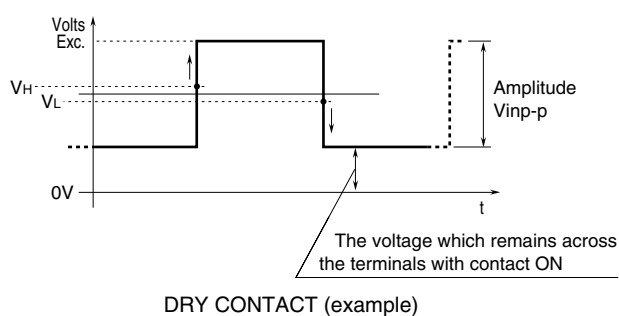
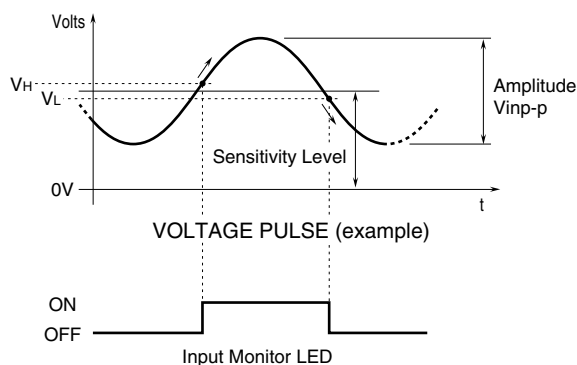
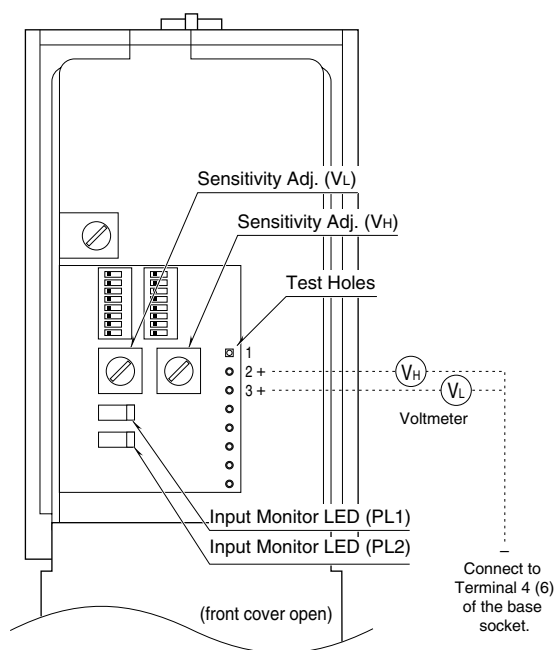
- 1) Connect the negative probe of voltmeter to the terminal 4 (6) of base socket. See the figure to the right.
- 2) If you need a noise filter, turn on the SW1/2-5 or SW1/2-6.
- 3) Connect the positive probe to the test hole No. 2 and turn the  $V_H$  potentiometer until the meter shows desired value.\*1
- 4) Connect the positive probe to the test hole No. 3 and turn the  $V_L$  potentiometer until the meter shows desired value.\*1
- 5) Apply input signal and check that input monitor LED (PL1 or PL2) blinks according to the input signal.\*2

\*1. For the  $V_H$  ( $V_L$ ) sensitivity level less than 5 V, turn off the SW2-3 (SW1-3). For less than 10 V, turn on the SW2-3 (SW1-3).

The voltage values approx. half the amplitude are recommended for normal use.

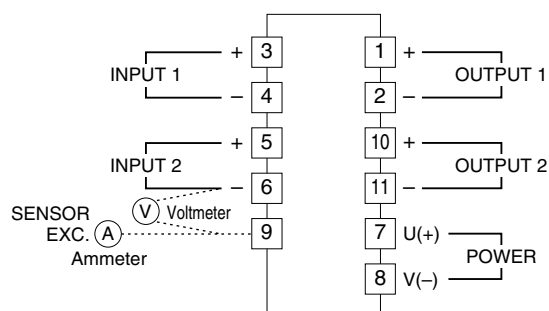
You had better have a reasonable span between  $V_H$  and  $V_L$  in order to prevent noise interference.

\*2. If the LED does not blink correctly, the sensitivity level may be out of the pulse amplitude. Check the offset, amplitude, etc. and go through the adjustment procedure again.



## ■ SENSOR EXCITATION ADJUSTMENT

You can change the sensor excitation voltage with the sensor excitation adj. located behind the front cover. If you need to change it, check that the required current is within the specification.

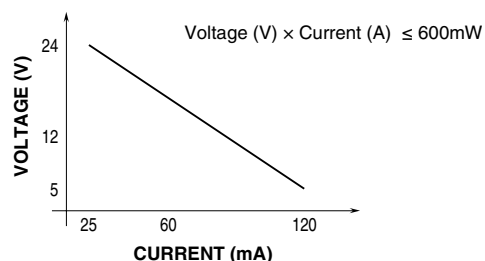


## • How to Change the Excitation

A voltmeter and ammeter of class 0.5 or better accuracy are required.

- 1) Connect the voltmeter across the terminal 9 – 6.
- 2) Connect the ammeter to terminal 9.
- 3) Turn the potentiometer until the meter shows the desired value.

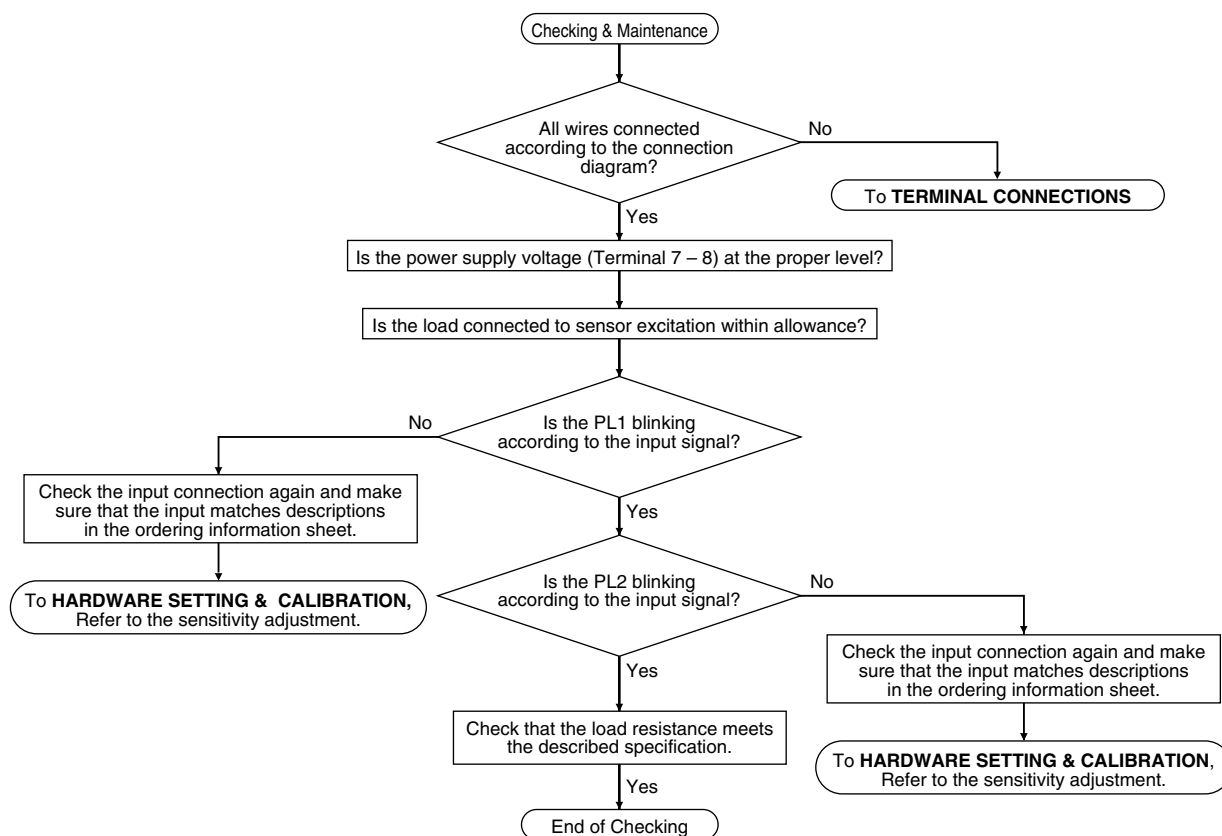
Check that the current value indicated on the ammeter is within the allowable limit. If the value is greater than the limit, lower the voltage value or connect a separate power source. Otherwise, the transmitter may fail.



## MAINTENANCE

### ■ TROUBLESHOOTING

Refer to the flow chart below.



## LIGHTNING SURGE PROTECTION

M-System offers a series of lightning surge protector for protection against induced lightning surges. Please contact M-System to choose appropriate models.