

**RTD TRANSMITTER**  
(field- and PC-configurable)

MODEL **M2LR**

**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 and basic maintenance procedures.

The M2LR is programmable using the PC configurator software. For detailed information on the PC configuration, refer to the M2LRCFG instruction manual. The M2LRCFG PC Configurator Software is downloadable at M-System's web site: <http://www.m-system.co.jp>.

**POINTS OF CAUTION**

■ **POWER INPUT RATING & OPERATIONAL RANGE**

- Locate the power input rating marked on the product and confirm its operational range as indicated below:  
85 – 264V AC rating: 85 – 264V, 47 – 66 Hz, approx. 4 – 6VA

■ **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 +55°C (23 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.
- Be sure that the ventilation slits are not covered with cables, etc.

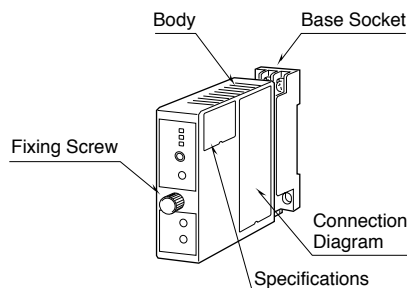
■ **WIRING**

- Do not install cables (power supply, input and output) 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**

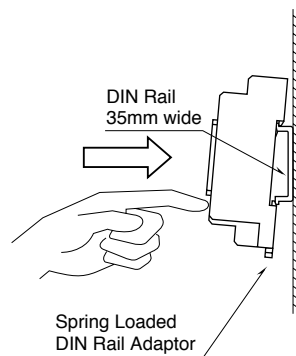


**INSTALLATION**

Loosen the fixing screw at the front of the unit in order to separate the body from the base socket.

■ **DIN RAIL MOUNTING**

Set the base socket so that its DIN rail adaptor is at the bottom. Position 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.

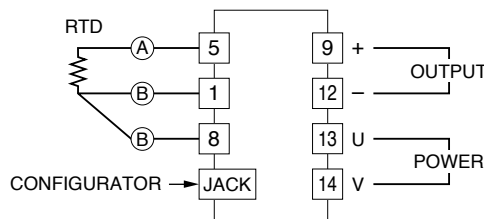


■ **WALL MOUNTING**

Refer to "EXTERNAL DIMENSIONS."

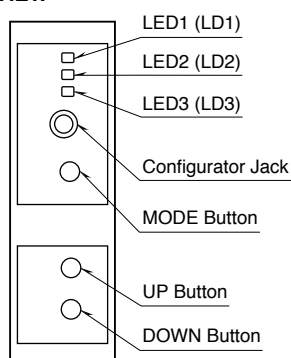
**TERMINAL CONNECTIONS**

Connect the unit as in the diagram below.

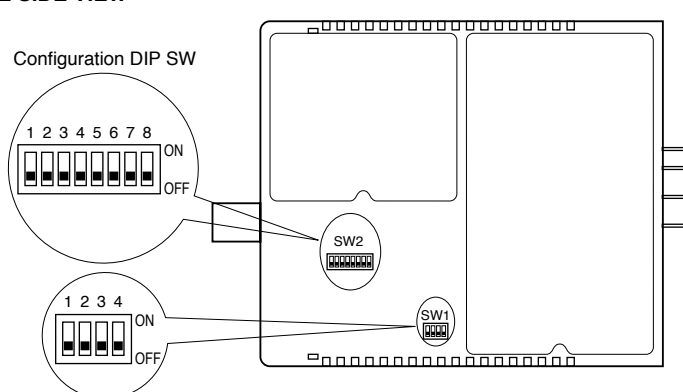


## EXTERNAL VIEWS

### FRONT VIEW



### SIDE VIEW



## CONFIGURATION MODE & DIP SW SETTINGS

When you program the transmitter module, two configuration modes are available: Field Configuration using DIP SW / control buttons, and PC Software.

The internal DIP switches are used to configure input and output type. Once the module is configured, precise ranges are set up with the front control buttons using a simulator connected to the input terminals and a multimeter connected to the output terminals as a reference.

The calibrated input and output ranges are stored in the internal memory. The module reads the DIP-switch-calibrated configuration only once after the power supply is turned on. Set the switches with the power supply removed. Selectable I/O type and ranges are listed in Table 6 and 7.

### DIP SW CONFIGURATION MODE

Turn the SW2-8 OFF to enable the DIP SW (Field Configuration) mode as shown in Table 1.

See Table 2 to configure the input and Table 4 for the output.

### PC CONFIGURATION MODE

Turn the SW2-8 ON to enable the PC Configuration mode as shown in Table 1. All programmable features can be set up on a PC regardless of other DIP SW setting except that the output type must be selected with the DIP SW1-1 through SW1-4 (See Table 5).

For detailed information on the PC configuration, refer to the M2LR CFG instruction manual.

### CONFIGURATION MODE (SW2)

Table 1

MODE	SW2-8	Configuration mode can be confirmed with the front LED.
DIP SW	OFF	
PC (*)	ON	

(\*) Factory setting

### INPUT TYPE (SW2)

Table 2

INPUT	SW2-7	SW2-6	SW2-5
JPt 100 (JIS '89)	OFF	OFF	OFF
Pt 100 (JIS '89)	ON	OFF	OFF
Pt 100 (JIS '97, IEC)	OFF	ON	OFF
Pt 50Ω (JIS '81)	ON	ON	OFF
Pt 1000	OFF	OFF	ON
Cu 10 @25°C	ON	OFF	ON
User's table	ON	ON	ON

### BURNOUT (SW2)

Table 3

BURNOUT	SW2-1	SW2-2
No burnout	OFF	OFF
Upscale (*)	OFF	ON
Downscale	ON	ON

(\*) Factory setting

### OUTPUT TYPE (SW2 & 1)

Table 4

OUTPUT	SW2-4	SW2-3	SW1-4	SW1-3	SW1-2	SW1-1
0 – 20mA	OFF	OFF	OFF	ON	OFF	OFF
-2.5 – +2.5V	OFF	ON	ON	OFF	OFF	ON
-10 – +10V	ON	OFF	ON	OFF	ON	OFF

### OUTPUT TYPE / PC CONFIG (SW1)

Table 5

OUTPUT	SW1-4	SW1-3	SW1-2	SW1-1
0 – 20mA	OFF	ON	OFF	OFF
-2.5 – +2.5V	ON	OFF	OFF	ON
-10 – +10V	ON	OFF	ON	OFF

Table 6

## ■ INPUT TYPE &amp; RANGE

	°C		°F	
	MIN. SPAN	MAX. RANGE	MIN. SPAN	MAX. RANGE
JPt 100 (JIS '89)	20	-200 to +500	36	-328 to +932
Pt 100 (JIS '89)	20	-200 to +650	36	-328 to +1202
Pt 100 (JIS '97, IEC)	20	-200 to +850	36	-328 to +1562
Pt 50 (JIS '81)	20	-200 to +649	36	-328 to +1200
Pt 1000	20	-200 to +850	36	-328 to +1562
Cu 10 @25°C	20	-50 to +250	36	-58 to +482

Table 7

## ■ OUTPUT TYPE &amp; RANGE

OUTPUT TYPE	MINIMUM SPAN	MAXIMUM RANGE	CONFORMANCE RANGE
DC Current	1mA	0 to 20mA	0 to 24mA
DC Voltage, Narrow Spans	0.25V	-2.5 to +2.5V	-3 to +3V
DC Voltage, Wide Spans	1V	-10 to +10V	-11.5 to +11.5V

## CHECKING

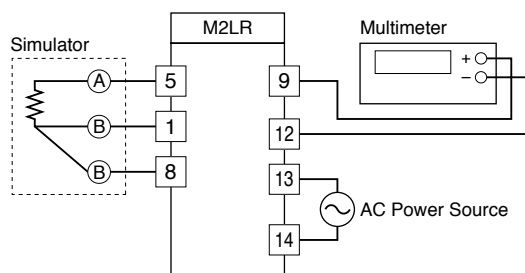
- 1) Terminal wiring: Check that all cables are correctly connected according to the connection diagram.
- 2) DIP SW setting: Check that the switches are set to appropriate positions.
- 3) Power input voltage: Check voltage across the terminal 13 – 14 with a multimeter.
- 4) Input: Check that the input signal is within 0 – 100% of full-scale.  
If the RTD or its extension wires are broken, the output goes over 100% (below 0% with downscale burnout) due to burnout function. Confirm the status indicator LED pattern and check leadwires in such a case.
- 5) Output: Check that the load resistance meets the described specifications.

## I/O RANGING & FINE ADJUSTMENTS

After the DIP SW setting is complete, set up the precise input and output range using the front control buttons. The front LEDs' colors and flashing patterns help you to easily identify the transmitter's status and confirm the set-up actions in each step of Calibration Modes. Please read the following explanations referring to "Calibration Flow Chart" in the next page.

### ■ PREPARATION (e.g. Input Pt 100: 0 – 100°C, Output 1 – 5V)

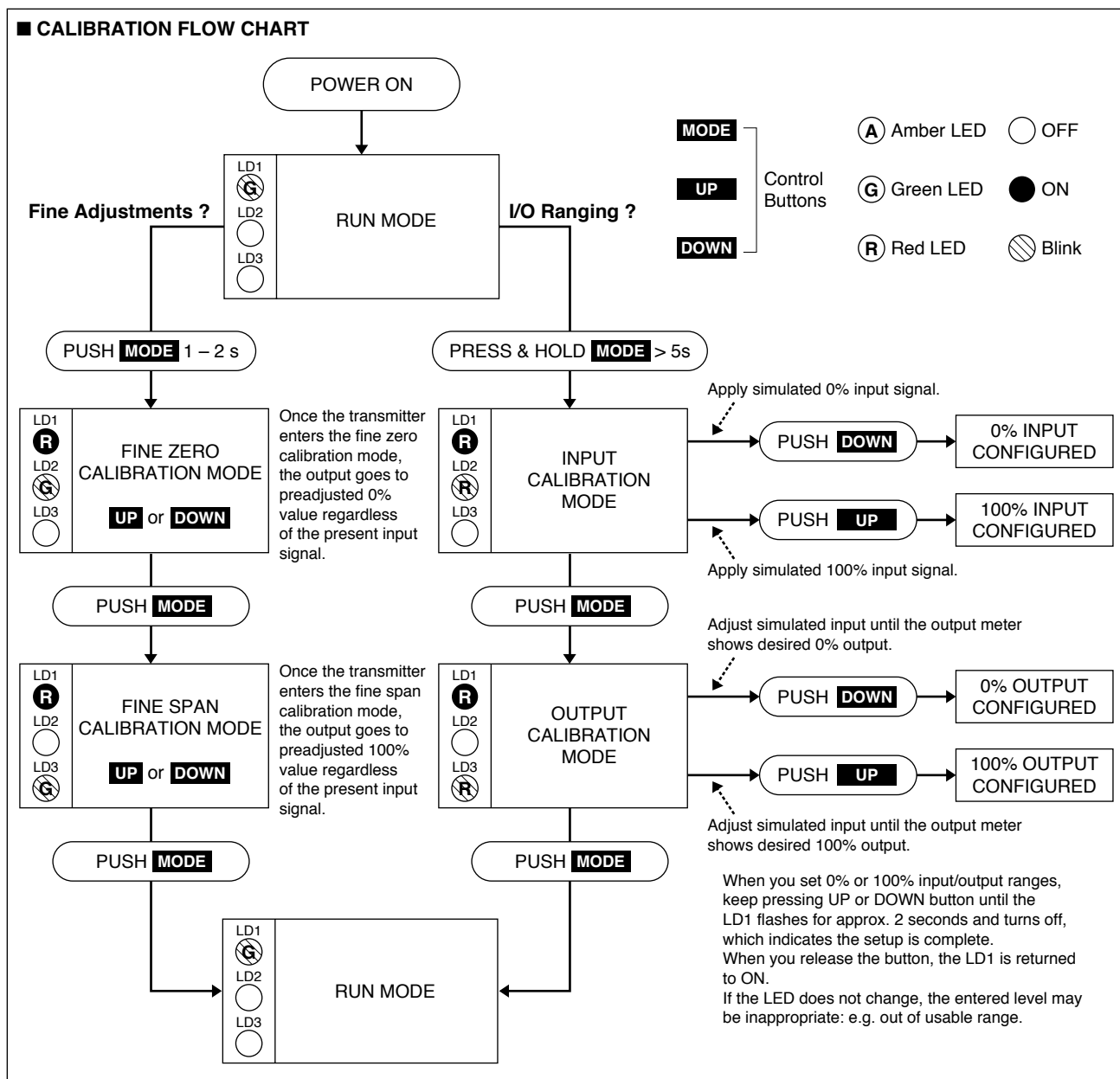
- 1) Mount the DIP-SW-configured M2LR on to a DIN rail.
- 2) Connect the M2LR to a simulator and a multimeter and to a DC power source as shown below.
- 3) Turn the power supply on and wait for 10 minutes.



### ■ INPUT & OUTPUT RANGING

[Example]

- 1) Run Mode: Confirm that the LD1 green light is blinking.
- 2) Input Configuration Mode: Press MODE button for longer than 5 seconds until the LD1 red light is ON and the LD2 red light is blinking.
- 3) 0% Input Ranging: Apply the desired minimum input level (e.g. 0°C) from the simulator and push DOWN button until the LD1 flashes for approx. 2 sec. and then turns OFF. When you release the button, the LD1 is returned to ON.  
The flashing LD1 means that the value is stored in the memory. If the LED does not change, the entered level may be inappropriate: too small a span, or out of usable range (same for all steps).
- 4) 100% Input Ranging: Apply the desired maximum input level (e.g. 100°C) from the simulator and push UP button until the LD1 flashes for approx. 2 sec. and then turns OFF. When you release the button, the LD1 is returned to ON.
- 5) Output Configuration Mode: Push MODE button and confirm that the LD3 red light instead of LD2 is blinking.
- 6) 0% Output Ranging: Increase or decrease the simulated input until the meter shows the desired minimum output level (e.g. 1V). Push DOWN button until the LD1 flashes for approx. 2 sec. and then turns OFF. When you release the button, the LD1 is returned to ON.
- 7) 100% Output Ranging: Increase or decrease the simulated input until the meter shows the desired maximum output level (e.g. 5V). Push UP button until the LD1 flashes for approx. 2 sec. and then turns OFF. When you release the button, the LD1 is returned to ON.
- 8) Run Mode: Programming complete, push MODE button and confirm that only the LD1 green light is blinking.



### ■ ZERO & SPAN ADJUSTMENTS

After the transmitter is installed and operational, fine zero and span tuning can be performed as explained below. Both zero and span are adjustable within  $\pm 15\%$ .

- 1) Run Mode: Confirm that the LD1 green light is blinking.
- 2) Fine Zero Calibration Mode: Press MODE button for 1 or 2 seconds until the LD1 red light is ON and the LD2 green light is blinking.
- 3) Use UP (increase) and DOWN (decrease) buttons to adjust the output to 0%.
- 4) Fine Span Calibration Mode: Push MODE button and confirm that the LD3 green light instead of LD2 is blinking.
- 5) Use UP (increase) and DOWN (decrease) buttons to adjust the output to 100%.
- 6) Run Mode: Push MODE button and confirm that only the LD1 green light is blinking.







Note 1: Calibration steps can be skipped when not needed by repeating pushing MODE buttons.





































Note 2: There is no stated order of setting 0% and 100% levels or no limitation of entering values for multiple times within one step of Calibration Mode. Signal level is stored each time the respective UP or DOWN button is pressed.

## STATUS INDICATOR LED

Combinations of the three front LEDs (LD1, LD2, LD3) indicate the transmitter's operating status by different flashing patterns.

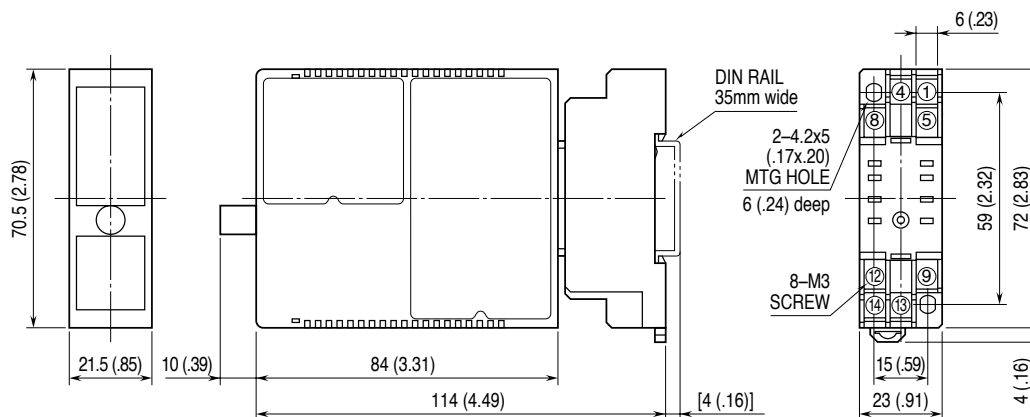
Examples are shown below.

	Amber LED		OFF
	Green LED		ON
	Red LED		Blink

NORMAL OPERATION (RUN) MODE			
LD1 	<b>PC Configuration RUN Mode</b> The transmitter is configured via PC and is in normal operating conditions.	LD1 	<b>DIP SW Configuration RUN Mode</b> The transmitter is configured via DIP SW and is in normal operating conditions.
LD2 		LD2 	
LD3 		LD3 	
ERROR MODE			
LD1 	<b>Parameter Error</b> Error occurred when reading parameters from the internal memory. Turn the power supply off and on. If the error still exists, reset the parameters to default and program the unit again.	LD1 	<b>Output Saturated in PC Configuration Mode</b> The output is below -15% or above +115%.
LD2 		LD2 	
LD3 		LD3 	
LD1 	<b>Communication Error</b> Internal CPU's communication error.  *1. LD1 may be one of the    .	LD1 	<b>Output Saturated in DIP SW Configuration Mode</b> The output is below -15% or above +115%.
LD2 		LD2 	
LD3 		LD3 	
LD1 	<b>AD Conversion Error</b> Internal AD conversion error.  *1. LD1 may be one of the    .	LD1 	<b>Burnout in PC Configuration Mode</b>
LD2 		LD2 	
LD3 		LD3 	
LD1 	<b>DIP SW Error</b> DIP SW configuration is inappropriate. Check the DIP SW setting referring to Tables 2 – 10.	LD1 	<b>Burnout in DIP SW Configuration Mode</b>
LD2 		LD2 	
LD3 		LD3 	

## HOW TO RESET TO DEFAULT STATUS

- 1) Set SW2-1 to ON position, SW2-2 to OFF position.
- 2) Turn on the power supply to the transmitter while pressing MODE button.
- 3) Wait until green light turns on at the LD1, LD2 and LD3.
- 4) Reset SW2-1 to OFF position. Turn off and on the power supply.

**EXTERNAL DIMENSIONS** unit: mm (inch)

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

**M-SYSTEM WARRANTY**

M-System warrants such new M-System product which it manufactures to be free from defects in materials and workmanship during the 36-month period following the date that such product was originally purchased if such product has been used under normal operating conditions and properly maintained, M-System's sole liability, and purchaser's exclusive remedies, under this warranty are, at M-System's option, the repair, replacement or refund of the purchase price of any M-System product which is defective under the terms of this warranty. To submit a claim under this warranty, the purchaser must return, at its expense, the defective M-System product to the below address together with a copy of its original sales invoice.

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