INSTRUCTION MANUAL

POTENTIOMETER TRANSMITTER
(field-programmable)

MODEL **HJM**

BEFORE USE ....

Thank you for choosing us. 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 our 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 and connection, hardware setting, and basic maintenance procedures.
When you need to change software settings, please refer to the Operation Manual for Model PU-2x (EM-9255), Section A.

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:
  24V DC rating: 24V ±10%, approx. 90mA

■ 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.

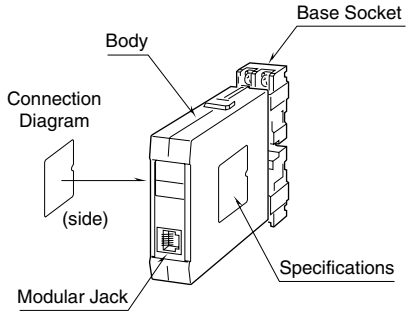
■ WIRING

- 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

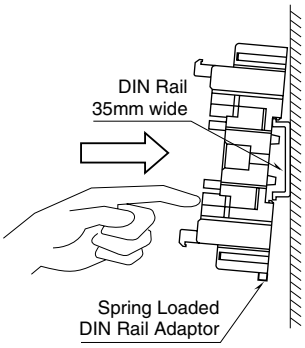


INSTALLATION

Pull out the body in pressing the 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.”

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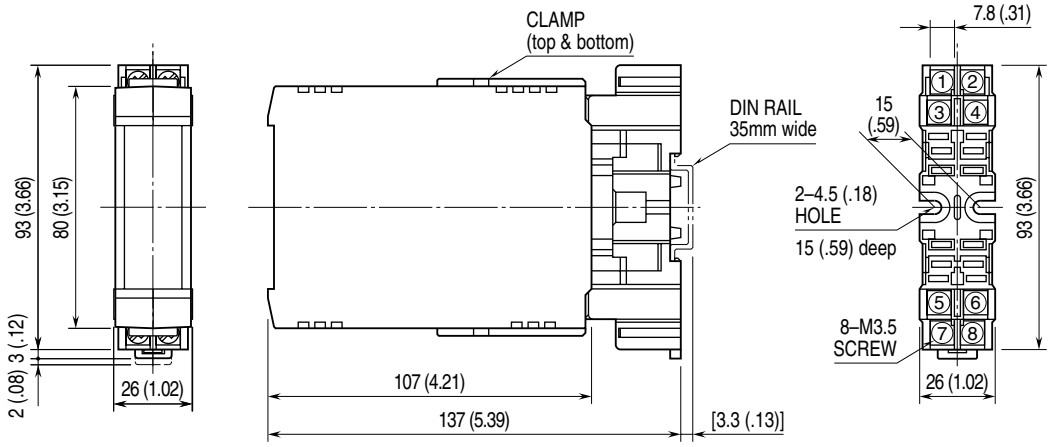
TERMINAL CONNECTIONS

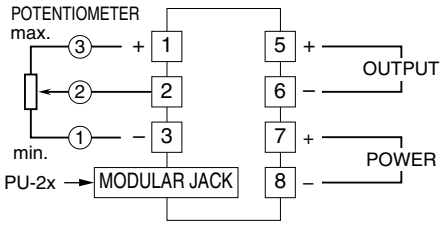
Connect the unit as in the diagram below or refer to the connection diagram on the side of the unit.

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



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

■ **CONNECTION DIAGRAM**



WIRING INSTRUCTIONS

■ SCREW TERMINAL

Torque: 0.8 N·m

CHECKING

1) Terminal wiring: Check that all cables are correctly connected according to the connection diagram.
2) Power input voltage: Check voltage across the terminal 7 – 8 with a multimeter.
3) Output: Check that the load resistance meets the described specifications.

ADJUSTMENT PROCEDURE

This unit is calibrated at the factory with the total resistance input, therefore you do not need any calibration if you use the potentiometer's total resistance.
When you do not use the total resistance or in case of regular calibration, adjust the output as explained in the following. Zero and span are adjusted with using the Programming Unit (model: PU-2x).
Refer to the Operation Manual for Model PU-2x for explanations how to use the programmer.

■ WARNING ON USE OF THE PROGRAMMING UNIT

- Be sure to disconnect the Programming Unit before you turn on/off power supply to the unit.
- The output signal is held when the Programming Unit is connected. You need to disconnect when confirming current output values.

■ HOW TO CALIBRATE THE OUTPUT SIGNAL

Use a signal source and measuring instruments of sufficient accuracy level. Turn the power supply on and warm up for more than 10 minutes.

• Calibrating the Output Range Proportionally to the Actual Input Resistance Range

The output range can be calibrated for input ranges narrower than the total resistance, to match the actual input resistance range, by using the linearization table (ITEM 60 through 91) to compensate unused resistance ranges (See the following figures).
If upper and lower overranges need not to be considered, only two calibration points will suffice.

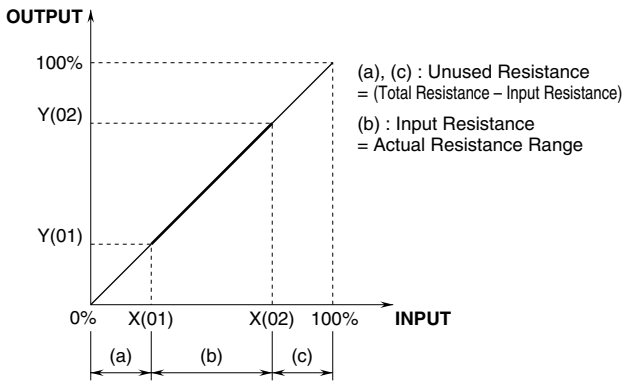


Figure 1. Unused Resistance

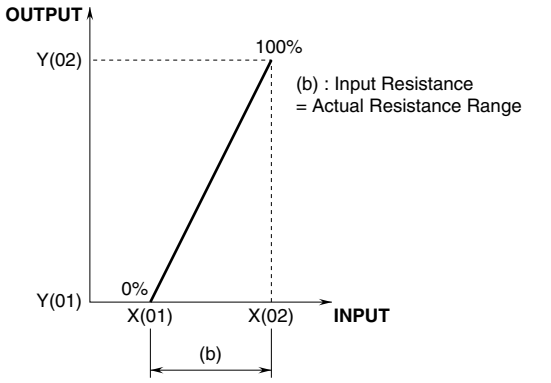


Figure 2. Example of Linearization

1) Confirm actual lower-range and upper-range resistance in percentage against the total resistance range 0 – 100%.
   In order to do this, provide actual resistance values and confirm them on the Programming Unit (ITEM 05: Input Status Monitor in %).
2) Turn the unit into Program mode (ITEM 01).
3) Enable use of the linearization table (ITEM 10: Pm-2: curved).
4) Set the lower-range input in % at ITEM 60.
5) Set the lower-range output in %, usually '0' (zero), at ITEM 61.
6) Set the upper-range input in % at ITEM 62.
7) Set the upper-range output in %, usually '100', at ITEM 63.

Table 1 shows an example of settings when you need to use 10 – 90% of the total resistance and calibrate this range to 0 – 100%.

Table 1. Setting Example

[GROUP 01]

ITEM	MDFY.	DATA INPUT	DATA EXAMPLE
01	S	1	MTSW : PRG. MODE
60	P	10.00	X (01) : 10.00
61	P	0.00	Y (01) : 0.00
62	P	90.00	X (02) : 90.00
63	P	100.00	Y (02) : 100.00

Modification Code

S: Modifiable at any time.
P: Modifiable only when the MAINTENANCE SWITCH is in the "PRG" mode.

• Fine Output Calibration
Using the Programming Unit (ITEM 19, 20)

ITEM 19 is for Zero, and ITEM 20 is for Span.

1) Turn the unit into Program mode (ITEM 01).
2) Apply simulated 0% input. Increase/decrease values (default: 0%) at ITEM 19 until the output signal is calibrated to actual 0%.
3) Apply simulated 100% input. Increase/decrease value (default: 100%) at ITEM 20 until the output signal is calibrated to actual 100%.
4) Apply simulated 0% input again and check 0% output.
5) When 0% value is changed, repeat the above procedure 2) – 4).

   The 0% value may be shifted when the output span is greater than the input span (gain > 1).

• Using Linearization Table

Please have the PU-2x Operation Manual ready at hand. Max. 16 calibration points defined by sets of input and output values can be programmed. Use only necessary number of points, arranged in order from the smallest input value. Enable use of the linearization table (ITEM 10: Pm-2: curved) in order to activate the settings.

X (nn) : Input Signal in %
Y (nn) : Output Signal in %
X or Y : -15.00 to +115.00%

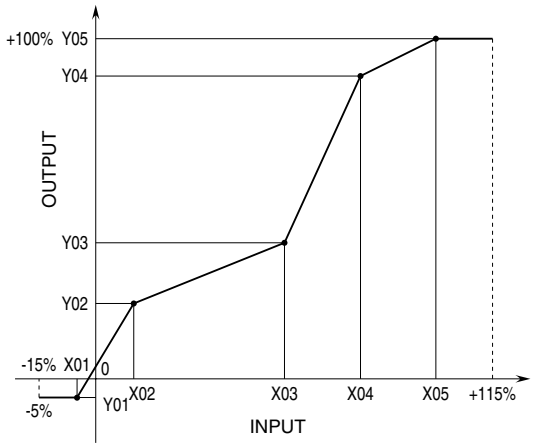


Figure 3. Linearization Table

[GROUP 01]

ITEM	MDFY.	DATA EXAMPLE
60	P	X (01) : XXX.XX
61	P	Y (01) : XXX.XX
62	P	X (02) : XXX.XX
63	P	Y (02) : XXX.XX
64	P	X (03) : XXX.XX
65	P	Y (03) : XXX.XX
66	P	X (04) : XXX.XX
67	P	Y (04) : XXX.XX
68	P	X (05) : XXX.XX
69	P	Y (05) : XXX.XX
70	P	X (06) : XXX.XX
71	P	Y (06) : XXX.XX
72	P	X (07) : XXX.XX
73	P	Y (07) : XXX.XX
74	P	X (08) : XXX.XX
75	P	Y (08) : XXX.XX
76	P	X (09) : XXX.XX
77	P	Y (09) : XXX.XX
78	P	X (10) : XXX.XX
79	P	Y (10) : XXX.XX
80	P	X (11) : XXX.XX
81	P	Y (11) : XXX.XX
82	P	X (12) : XXX.XX
83	P	Y (12) : XXX.XX
84	P	X (13) : XXX.XX
85	P	Y (13) : XXX.XX
86	P	X (14) : XXX.XX
87	P	Y (14) : XXX.XX
88	P	X (15) : XXX.XX
89	P	Y (15) : XXX.XX
90	P	X (16) : XXX.XX
91	P	Y (16) : XXX.XX

Modification Code

S: Modifiable at any time.
P: Modifiable only when the MAINTENANCE SWITCH is in the "PRG" mode.

PROGRAMMABLE ITEMS

The following items can be monitored and programmed. For detailed explanations, please refer to the Operation Manual for Model PU-2x (EM-9255), Section A.

[GROUP 01]

ITEM	MDFY.	DATA INPUT	DISPLAY	CONTENTS
01	S			MAINTENANCE SWITCH (lock command)
		0	MTSW: MON.MODE	MONITOR mode: data monitoring only
		1	MTSW: PRG.MODE	PROGRAM mode: "P" marked data modifiable
02	P	Alphabets & No.	TG: XXXXXXXXXX	Tag name entry (10 characters max.)
03	P	Number (%)	OUTPER XXX.XX	Output status monitor (%) & simulation output
05	D	No input	INPPER XXX.XX	Input status monitor (%)
10	P			LINEARIZATION
		41	Pm-1: straight	Without
		42	Pm-2: curved	With (ITEM 60 to 91 for data input)
19	P	Percentage	FINZER	Fine zero adjustment Initial status shows actual bias (%). When data is entered, output (%) is shown.
20	P	Percentage	FINSPN	Fine span adjustment Initial status shows actual gain (%). When data is entered, output (%) is shown.

LINEARIZATION TABLE

60	P	Percentage	X (01) : XXX.XX	Input 1
61	P	Percentage	Y (01) : XXX.XX	Output 1
:	:	:	:	:
:	:	:	:	:
91	P	Percentage	Y (16) : XXX.XX	Output 16

Modification Code

D: No modification (writing) possible. Used only for monitoring (reading).
S: Modifiable at any time.
P: Modifiable only when the MAINTENANCE SWITCH is in the "PRG" mode.

MAINTENANCE

Regular calibration procedure is explained below:

■ CALIBRATION

Warm up the unit for at least 10 minutes. Apply 0%, 25%, 50%, 75% and 100% input signal. Check that the output signal for the respective input signal remains within accuracy described in the data sheet. When the output is out of tolerance, recalibrate the unit according to the "ADJUSTMENT PROCEDURE" explained earlier.

LIGHTNING SURGE PROTECTION

We offer a series of lightning surge protector for protection against induced lightning surges. Please contact us to choose appropriate models.