

PULSE DURATION RECEIVER (field-programmable; built-in excitation)

MODEL

JTY2

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, operation of the Programming Unit (model: PU-2x)* specific to this model 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 and Software Setting in this manual.

*When you need to change software settings, please refer to the Operation Manual for Model PU-2x (EM-9255), Section B: (B-1) Introduction, (B-2) General Operation Description, (B-3) Operation Flow chart for general information.

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 – 132V AC rating: 85 – 132V, 47 – 66 Hz, approx. 6VA
12, 24 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°C (23 to 140°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

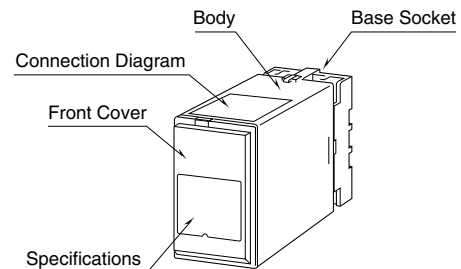
■ WIRING

- 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

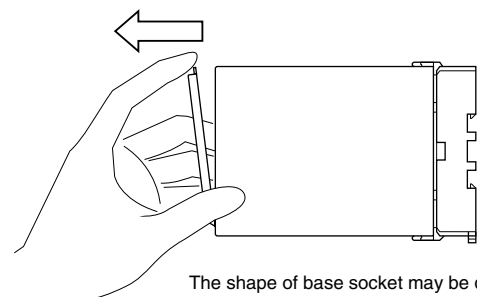
- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

COMPONENT IDENTIFICATION



■ HOW TO OPEN THE FRONT COVER:

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

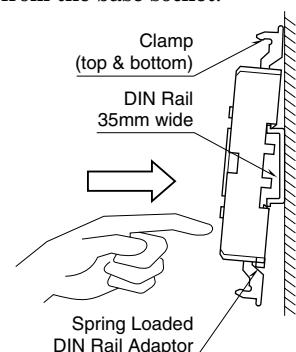


INSTALLATION

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

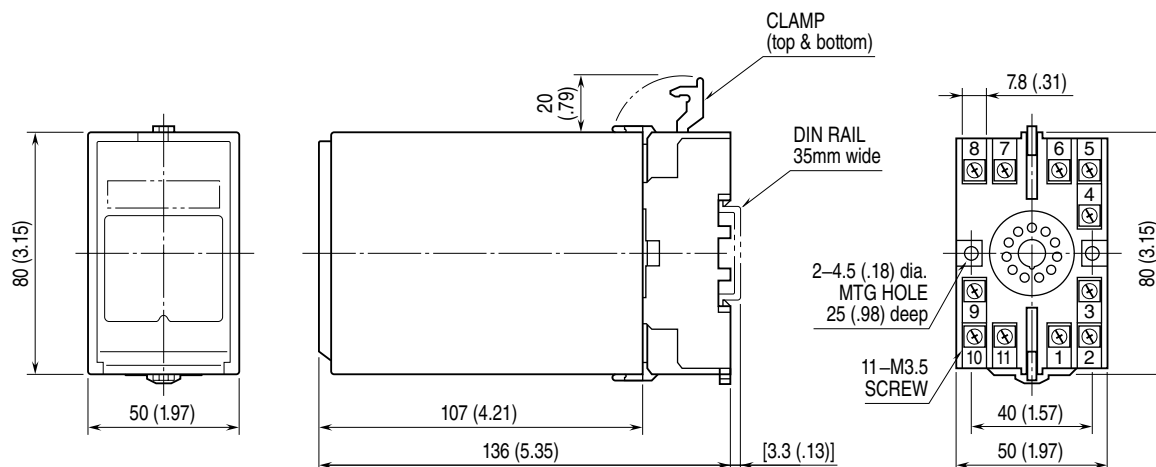
Refer to "EXTERNAL DIMENSIONS."

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

TERMINAL CONNECTIONS

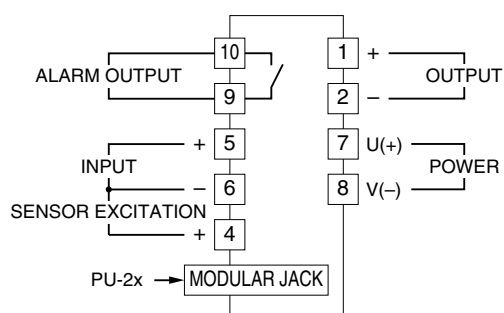
Connect the unit as in the diagram below or refer to the connection diagram on the top of the unit.

EXTERNAL DIMENSIONS unit: mm (inch)



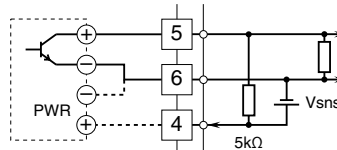
• When mounting, no extra space is needed between units.

CONNECTION DIAGRAM

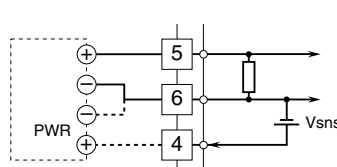


Input Connection Examples

■ Dry Contact or Mechanical Contact

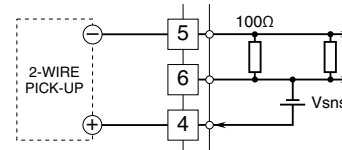


■ Voltage Pulse

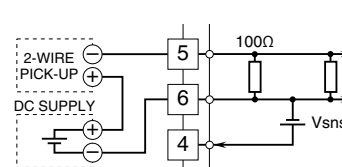


■ 2-Wire Current Pulse

• Built-in Excitation

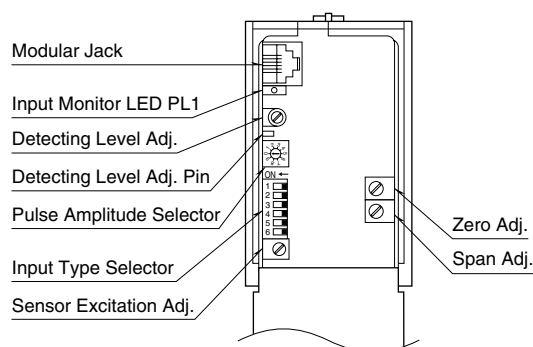


• External DC Supply



HARDWARE SETTING & CALIBRATION

FRONT PANEL CONFIGURATION



PULSE AMPLITUDE (rotary switch) (*) Factory setting

For voltage pulse input, select the pulse amplitude (V p-p) among the switch positions 0 through 6. For open collector or two-wire current pulse input, set the switch to 7. DO NOT SET to 8 or 9. The power supply to the unit must be turned off when changing the setting.

SW	PULSE AMPLITUDE	MAX. INPUT VOLTAGE
0	50 – 100V p-p	50V
1	25 – 50V p-p	50V
2	10 – 25V p-p	25V
3	5 – 10V p-p	10V
4	1 – 5V p-p	5V
5	0.5 – 1V p-p	1V
6	0.1 – 0.5V p-p	0.5V
7(*)	Open collector or two-wire current pulse	

DIP SWITCH SETTING (*) Factory setting

SW6 is not used. The power supply to the unit must be turned off when changing the setting.

Input Type

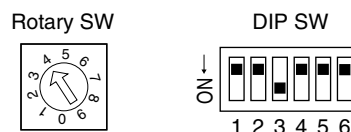
INPUT TYPE	SW1	SW2	SW3	SW4 thr. 6
Open collector (*)	ON	OFF	ON	OFF
Voltage pulse	OFF	OFF	ON	OFF
Two-wire current pulse	OFF	ON	ON	OFF

EXAMPLE 1: VOLTAGE PULSE with Amplitude 5V p-p, DC Offset 2.5V

Input type: Voltage Pulse

Input amplitude: 1 – 5V p-p

The rotary switch and DIP switch are configured as shown below.

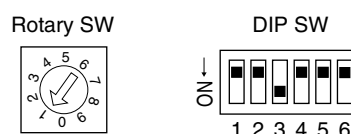


EXAMPLE 2: VOLTAGE PULSE with Amplitude 35V p-p, DC Offset 15V

Input type: Voltage Pulse

Input amplitude: 25 – 50V p-p

The rotary switch and DIP switch are configured as shown below.



DETECTING LEVEL

A specific sensitivity scale is applied according to the pulse amplitude setting. The scaled input voltage is then compared to the preset detecting level.

The scaled H level voltage must be higher than the detecting level so that the pulse state is accurately detected.

SW	PULSE AMPLITUDE	SENSITIVITY SCALE
0	50 – 100V p-p	1/20
1	25 – 50V p-p	1/10
2	10 – 25V p-p	1/5
3	5 – 10V p-p	1/2
4	1 – 5V p-p	1
5	0.5 – 1V p-p	5
6	0.1 – 0.5V p-p	10
7	Open collector or two-wire current pulse	1

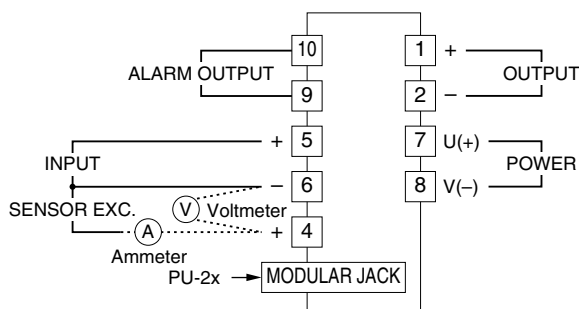
How to Change the Detecting Level

A pulse generator which can simulate the selected input type and waveforms with appropriate amplitude is required.

- 1) Set the rotary switch and the DIP switch to an appropriate input type and pulse amplitude.
- 2) Connect the positive probe of the pulse generator to the terminal 5, the negative probe to the terminal 6 of the base socket.
- 3) Set the pulse generator output to 1 kHz with the duty ratio 50%, and apply the signal to the transmitter.
- 4) Connect the Programming Unit to the modular jack and execute [GROUP 01] [ITEM 06] to show the input duty ratio.
- 5) Press [ENTER] key multiple times to adjust the detecting level until the display shows 50.00 ±0.1%. This adjustment affects the transmitter's accuracy. Be sure to set the duty ratio within 0.1% allowances.
- 6) Confirm that the input monitor LED (PL1) is ON (it should actually be blinking in 1 kHz). If the LED does not turn on, the detecting level may be out of the pulse amplitude range. Change the detecting level 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.

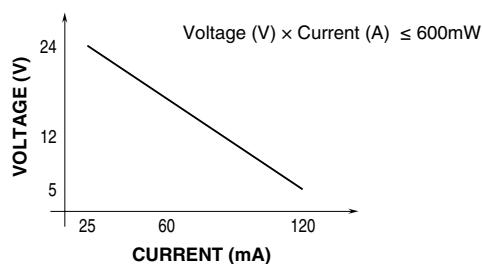


• How to Change the Excitation

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

- 1) Connect the voltmeter across the terminals 4 – 6.
- 2) Connect the ammeter to terminal 4.
- 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.



■ ANALOG OUTPUT ADJUSTMENT

This unit is calibrated at the factory to meet the ordered specifications, therefore you usually do not need any calibration.

For matching the signal to a receiving instrument or in case of regular calibration, adjust the output as explained in the following.

• 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.

- 1) ZERO: Apply 0% input and adjust output to 0%.
- 2) SPAN: Apply 100% input and adjust output to 100%.
- 3) Check ZERO adjustment again with 0% input.
- 4) When ZERO value is changed, repeat the above procedure 1) – 3).

SOFTWARE SETTING

Please refer to the Operation Manual for Model PU-2x (EM-9255), Section B: (B-1) Introduction, (B-2) General Operation Description, (B-3) Operation Flowchart for general information.

[GROUP 01]

ITEM	MDFY.	DATA INPUT	DISPLAY	DEFAULT	CONTENTS
01	S			N/A	MAINTENANCE SWITCH
		0	MTSW : MON.MODE		0: Data indication only.
		1	MTSW : PRG.MODE		1: All 'P' marked parameters are modifiable.
02	P	Alphabets & No	TG : XXXXXXXXXX	N/A	Tag name entry (10 characters max.)
03	P	Percentage	OUTPER XXX.XX	N/A	Output monitor (%) & simulation output
05	D	No input	INPPER XXX.XX	N/A	Input monitor (%)
06	D	No input	INDUTY XXXXXX	N/A	Input duty ratio (%)
07	D	No input		N/A	Input specification selected with the front rotary switch
			SW : IN_V 1/20		SW = 0, Voltage pulse input, Sensitivity scale = 1/20
			SW : IN_V 1/10		SW = 1, Voltage pulse input, Sensitivity scale = 1/10
			SW : IN_V 1/5		SW = 2, Voltage pulse input, Sensitivity scale = 1/5
			SW : IN_V 1/2		SW = 3, Voltage pulse input, Sensitivity scale = 1/2
			SW : IN_V 1/1		SW = 4, Voltage pulse input, Sensitivity scale = 1/1
			SW : IN_V 5/1		SW = 5, Voltage pulse input, Sensitivity scale = 5/1
			SW : IN_V 10/1		SW = 6, Voltage pulse input, Sensitivity scale = 10/1
			SW : IN_OC, mA		SW = 7, Open collector or two-wire current pulse input
			SW : no use		SW = 8, (not used)
			SW : no use		SW = 9, (not used)
08	P	Numeric	AVERAGE XX	4	Cycles for the moving average calculation, 0 to 30
08	P	Numeric	HI CUT XX	1	High samples to be discarded, 0 to 10
10	P	Numeric	LO CUT XX	1	Low samples to be discarded, 0 to 10
11	P			0	Linearization
		0	STRAIGHT		Without
		1	CURVED		With (ITEM 60 to 91 for segment data input)
12	P	Percentage	ZERO XXX.XX XXX.XXX	0.00	Input zero duty ratio (two methods are available) 1. Enter a specific duty ratio in % (0.00 – 100.00%) 2. Apply a simulated input and press [DATA] [ENTER]
13	P	Percentage	SPAN XXX.XX XXX.XXX	100.00	Input span duty ratio (two methods are available) 1. Enter a specific duty ratio in % (0.00 – 100.00%) 2. Apply a simulated input and press [DATA] [ENTER]
19	P	Percentage	FINZER XXX.XX OUTPER XXX.XX	0.00	Fine zero adjustment When data is entered, output (%) is shown.
20	P	Percentage	FINSN XXX.XX OUTPER XXX.XX	100.00	Fine span adjustment When data is entered, output (%) is shown.
21	P			1	Alarm mode
		0	NO ALARM		No alarm trip
		1	UPPER ALARM		High alarm trip
		2	LOWER ALARM		Low alarm trip
22	P	Percentage	ALARM XXX.XX	100.00	Alarm setpoint (-15.00 to +115.00%)
23	P	Percentage	ALMHYS XX.XX	1.00	Alarm deadband (hysteresis) (0.00 to 20.00%)
24	P	Seconds	ALTIME XXXX.X	3.0	Alarm delay at the startup (2.0 to 1000.0 seconds)
25	P			0	No input alarm
		0	TMOUT ALM : OFF		Without (Hi/Lo setpoint alarm only, ITEM 22 – 24)
		1	TMOUT ALM : ON		With (Hi/Lo setpoint alarm + no input alarm, ITEM 26)
26	P	Seconds	TMOUT XXX.X	1.0	No input detecting time (0.1 to 100.0 seconds) When no input is detected for the specified time period, the duty ratio is forced to 100%/0%.
27	P			1	Input pulse logic
		0	ACTIVE LO		Non-inverted: Lo level with the voltage pulse/two-wire current pulse or ON with the open collector is valid.
		1	ACTIVE HI		Inverted: Hi level with the voltage pulse/two-wire current pulse or OFF with the open collector is valid.

ITEM	MDFY.	DATA INPUT	DISPLAY	DEFAULT	CONTENTS
60	P	Percentage	X (01) : XXX.XX	0.00	Linearization table (16 points) Set at the maximum of 16 pairs of input (X) and output (Y) calibration points in %. Fill data from the lowest ITEM No. from the lowest calibration point and add as many as required. The output in the undefined range is maintained at the value of the first and the last calibration points.
61	P	Percentage	Y (01) : XXX.XX	0.00	
:	:	:	:		
:	:	:	:		
:	:	:	:		
90	P	Percentage	X (16) : XXX.XX	0.00	
91	P	Percentage	Y (16) : XXX.XX	0.00	

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.

ROM Version Indication

[GROUP 00] [ITEM 99]

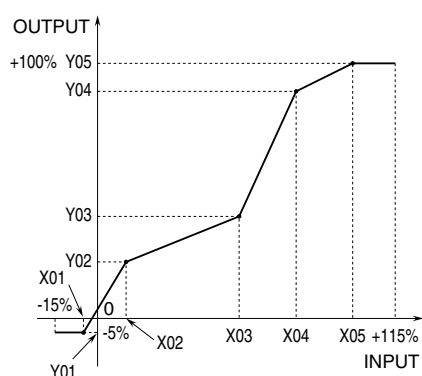
■ LINEARIZATION TABLE

The I/O curve is approximated at 16-point segments. Set only the required pairs of I/O points. Refer to the figure below.

X (nn) : Input %

Y (nn) : Output %

Range : -15.00 to +115.00%



[[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.

■ NO INPUT DETECTING TIME

When no input is detected for a preset time period, the transmitter provides an output equivalent to 0% or 100% duty ratio according to the input status.

Select the time to be longer than the ON/OFF or Hi/Lo levels of the input pulse.

		INPUT LOGIC	
		NON-INVERTED	INVERTED
Open collector input	OFF state longer than the preset time period	Output equivalent to 100% duty ratio	Output equivalent to 0% duty ratio
	ON state longer than the preset time period	Output equivalent to 0% duty ratio	Output equivalent to 100% duty ratio
Voltage pulse, Two-wire current pulse input	H state longer than the preset time period	Output equivalent to 100% duty ratio	Output equivalent to 0% duty ratio
	L state longer than the preset time period	Output equivalent to 0% duty ratio	Output equivalent to 100% duty ratio

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) Input: Check that the input signal is within 0 – 100% of the full-scale.
- 4) Output: Check that the load resistance meets the described specifications.

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 “ANALOG OUTPUT ADJUSTMENT” procedure.

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.