INSTRUCTION MANUAL

FREQUENCY TRANSMITTER
(front configurable)

MODEL **MXPA**

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, connection and basic maintenance procedures.

POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

- This equipment is suitable for Pollution Degree 2 and Installation Category II (transient voltage 2500V). Basic insulation (signal input to output to power input: 300V) is maintained. Prior to installation, check that the insulation class of this unit satisfies the system requirements.
- Altitude up to 2000 meters.
- The equipment must be mounted inside a panel.
- Insert a noise filter for the power source connected to the unit. TDK-Lambda Noise Filter Model RSAN-2006 or equivalent is recommended.
- The equipment must be installed such that appropriate clearance and creepage distances are maintained to conform to CE requirements. Failure to observe these requirements may invalidate the CE conformance.
- 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.

■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:

100 – 240V AC rating: 85 – 264V, 47 – 66 Hz,
approx. 5.6VA at 100 V AC
approx. 7.6VA at 200 V AC
approx. 9.0VA at 264V AC
24V DC rating: 24V ±10%, approx. 5W
110V DC rating: 85 – 150V, approx. 5W

■ 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.

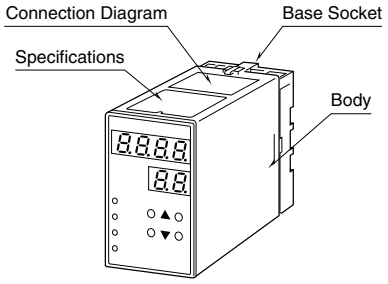
■ WIRING

- 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

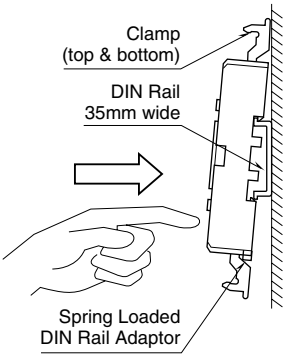


INSTALLATION

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. 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.



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

■ WALL MOUNTING

Refer to "EXTERNAL DIMENSIONS."

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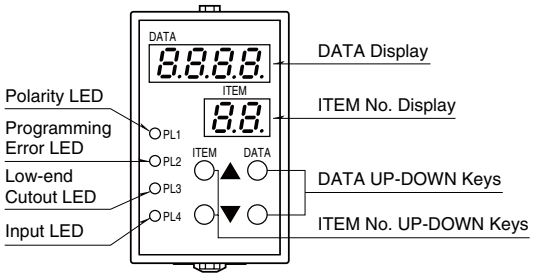
FRONT VIEW & PROGRAMMING

■ PROGRAMMING PROCEDURE

1) Press ITEM UP or DOWN key until ITEM display indicates “01”.
2) Press DATA UP or DOWN key and choose “2” on DATA display.
   1: Data indication only.
   2: All parameters are modifiable.
3) Press ITEM UP or DOWN key until ITEM display shows the ITEM No. you need to change.
4) Press DATA UP or DOWN key and choose a DATA No. or value you need on DATA display.
5) Repeat above 3 and 4. (Entered data is stored 1 sec. after the operation has been complete.)
6) Press ITEM UP or DOWN key until ITEM display indicates “01”.
7) Press DATA UP or DOWN key and choose “1” on the display.
8) Press ITEM UP or DOWN key until ITEM display indicates “P”. DATA display shows process input. You can now check data setting by choosing ITEM No.

Note: DO NOT press UP and DOWN keys simultaneously.



ITEM	MDF. CODE	DATA	CONTENTS	DEFAULT
P	N/A	-9999 – 9999	Input display in engineering unit (as set in ITEM 18/19)	---
01		1, 2, 3	Modification code 1: Data indication only. 2: All parameters are modifiable. 3: Only ITEM 75 is modifiable.	1
02	N/A	0, 1, 10, 20	Status indication (“0” is normally indicated.) 0: Normal 1: Memory error 10: PV overrange (out of -9999 to 9999) 20: Input overrange (out of -15 to +115%)	---
03	N/A	0, 1, 2, 3, 4	Input type 0: A (Open collector) 1: A2 (Mechanical contact) 2: B (Voltage pulse) 3: H (Two-wire current pulse) 4: J (RS-422 line driver pulse)	A: 0 A2: 1 B: 2 H: 3 J: 4
04	N/A	0, 1, 2	Output type 0: V1 (-1 – +1V) 1: V2 (-10 – +10V) 2: Z1 (0 – 20mA)	V1: 0 V2: 1 Z1: 2
05	N/A	-15.0 – 115.0	Input indicated in % (of the range set in ITEM 08/09)	---
06/L	2	-15.0 – 115.0	Output indicated in % with ITEM 01 DATA 1 Loop test output with ITEM 01 DATA 2 (‘L’ is indicated as ITEM No.) (Use DATA UP/DOWN key to set the output signal.)	---
07	2	0 – 7	Input frequency range 0: 0 – 10 mHz (selectable range 0.00 – 11.50 mHz) Minimum increments 0.01 mHz 1: 0 – 100 mHz (selectable range 0.0 – 115.0 mHz) Minimum increments 0.1 mHz 2: 0 – 1 Hz (selectable range 0.000 – 1.150 Hz) Minimum increments 0.001 Hz 3: 0 – 10 Hz (selectable range 0.00 – 11.50 Hz) Minimum increments 0.01 Hz 4: 0 – 100 Hz (selectable range 0.0 – 115.0 Hz) Minimum increments 0.1 Hz 5: 0 – 1 kHz (selectable range 0.000 – 1.150 kHz) Minimum increments 0.001 kHz 6: 0 – 10 kHz (selectable range 0.00 – 11.50 kHz) Minimum increments 0.01 kHz 7: 0 – 100 kHz (selectable range 0.00 – 115.0 kHz) Minimum increments 0.1 kHz (0, 1, 2, 3 selectable with mechanical contact)	5 (3 for mechanical contact)
08	2	0 – 1150	0% input frequency *1	0.000 (0.00*2)
09	2	0 – 1150	100% input frequency *1	1.000 (10.00*2)

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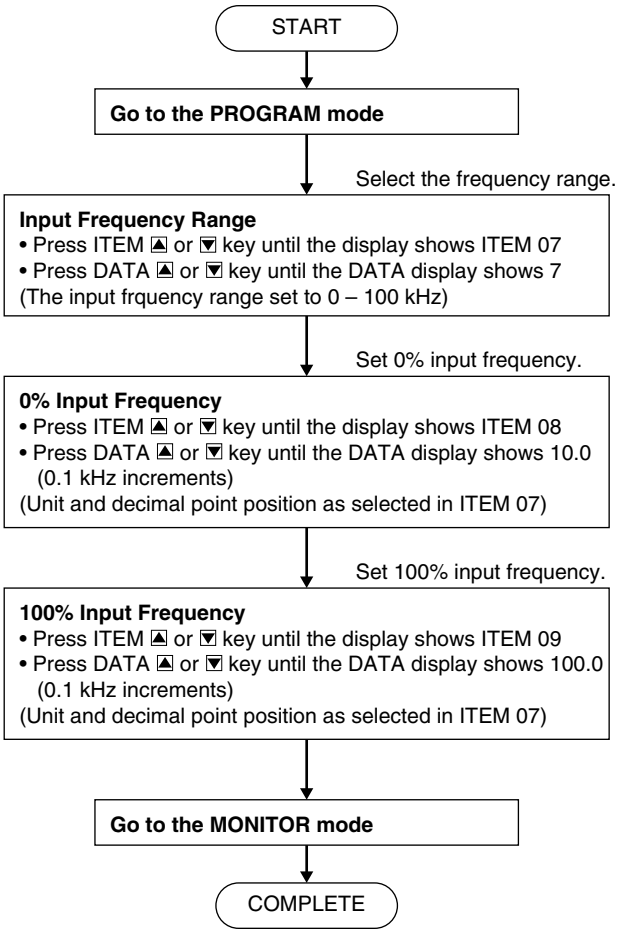
ITEM	MDF. CODE	DATA	CONTENTS	DEFAULT
10	2	0, 1, –	Input voltage amplification factor Selectable only with voltage pulse input. ' – ' indicated for other input types, meaning this setting is unavailable. Set to '5 times) only when the input spans narrower than 2 Vp-p is provided. 0: 1 time 1: 5 times	Code B: 0 Others: –
11	2	0, 1, –	Input pulse sensing Selectable only with voltage pulse input. ' – ' indicated for other input types, meaning this setting is unavailable. 0: DC coupled 1: Capacitor coupled With the capacitor coupling, frequencies lower than 20 Hz or sine or similar waveform spans narrower than 1 Vp-p.	Code B: 0 Others: –
12	2	0, 1, 2, 3, 4, –	Input pulse detecting level, automatic setting Selectable only with voltage pulse input. ' – ' indicated for other input types, meaning this setting is unavailable. 0: Cancel automatic setting (manual setting in ITEM 13/14) 1: High level (V_L = approx. 5.0V, V_H = approx. 6.0V), DC coupling use 2: Medium level (V_L = approx. 2.0V, V_H = approx. 2.5V), DC coupling use 3: Low level (V_L = approx. 1.0V, V_H = approx. 1.5V), DC coupling use 4: Capacitor coupling use (V_L = approx. 0.0V, V_H = approx. 0.5V)	Code B: 2 Others: –
13	2	0.5, 1.0 – 10.0, –	Input pulse detecting level, V_H, manual setting (0.1V increments) Selectable only with voltage pulse input. ' – ' indicated for other input types, meaning this setting is unavailable.	Code B: 2.5V Others: –
14	2	0.0, 1.0 – 10.0, –	Input pulse detecting level, V_L, manual setting (0.1V increments) Selectable only with voltage pulse input. ' – ' indicated for other input types, meaning this setting is unavailable.	Code B: 2.0V Others: –
15	2	0, 1	Chattering filter 0: Disable 1: Enable (time constant = approx. 5 msec.)	Code A2: 1 (fixed) Code J: 0 (fixed) Others: 0
16	2	-19.99 – 19.99	Output zero adjustment (%) (fine adj. of the value set in ITEM 24)	0.00
17	2	-19.99 – 19.99	Output span adjustment (%) (fine adj. of the value set in ITEM 25)	0.00
18	2	-9999 – 9999	0% display scaling *3	0.0
19	2	-9999 – 9999	100% display scaling *3	100.0
20	2	0, 1, 2, 3	Decimal point position for ITEM P, 18, 19 0: _ _ _ _ 1: _ _ _ . _ 2: _ _ . _ _ 3: _ . _ _ _	1
21	2	0, 1 – 60	Power-saving mode 0: Continuous display 1 – 60: Time before display turned off (minutes)	10
22	2	-15.0 – 115.0	Low-end cutout (%) (of the input % displayed in ITEM 05) Deadband 1% (The low-end cutout cancelled when the input goes above the setpoint by 1%.)	-15.0
23	2	1 – 1000	Averaging non-uniform pulses (Number of pulses to be averaged for one rotation of a flowmeter) Frequency range ≤ 100 Hz: 1 – 1000 0 – 1 kHz: 1 – 100 0 – 10 kHz: 1 – 10 0 – 100 kHz: 1 (No other setting is available.)	1
24	2	-1.00 – 1.00	Output code V1 0% output voltage (V) *4	-1.00
25	2	-1.00 – 1.00	100% output voltage (V) *4	1.00
24	2	-10.0 – 10.0	Output code V2 0% output voltage (V) *4	-10.0
25	2	-10.0 – 10.0	100% output voltage (V) *4	10.0
24	2	0.0 – 20.0	Output code Z1 0% output current (mA) *4	4.0
25	2	0.0 – 20.0	100% output current (mA) *4	20.0
26	2	0, 1	Linearization table 0: Disable 1: Enable *5	0
27	2	-15.0 – 115.0	Linearization point 1, input (%)	0.0
28	2	-15.0 – 115.0	Linearization point 1, output (%)	0.0
29	2	-15.0 – 115.0	Linearization point 2, input (%)	0.0
30	2	-15.0 – 115.0	Linearization point 2, output (%)	0.0
:	:	:	:	0.0
73	2	-15.0 – 115.0	Linearization point 24, input (%)	0.0
74	2	-15.0 – 115.0	Linearization point 24, output (%)	0.0
75	3	0, 1	Reset all settings *6	0
76	N/A	---	ROM version	---
77	2	0, 1	Sensor excitation 0: Deactivated 1: Activated	1

ITEM	MDF. CODE	DATA	CONTENTS	DEFAULT
78	2	5 – 24	Excitation voltage (V)	5
79	2	-10 – 10	Excitation voltage, fine adj. approx. 0.2V by every key pressing (24V max.)	0

*1. Unit and decimal point position as set in ITEM 07. ITEM 08 < ITEM 09.
*2. For mechanical contact input.
*3. Of the range selected in ITEM 08/09. ITEM 18 < ITEM 19.
*4. ITEM 24 < ITEM 25.
*5. Linearization is disabled during the loop test output.
*6. Press DATA UP key and choose DATA 1. Double-click DATA DOWN key. The display shows DATA 0 after the initialization is complete.

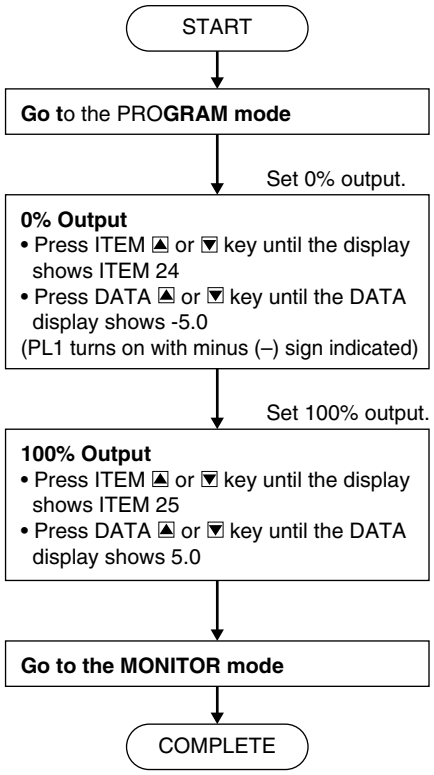
■ SELECTING INPUT RANGE

[E.G.] Input range 10 kHz to 100 kHz



■ SELECTING OUTPUT RANGE

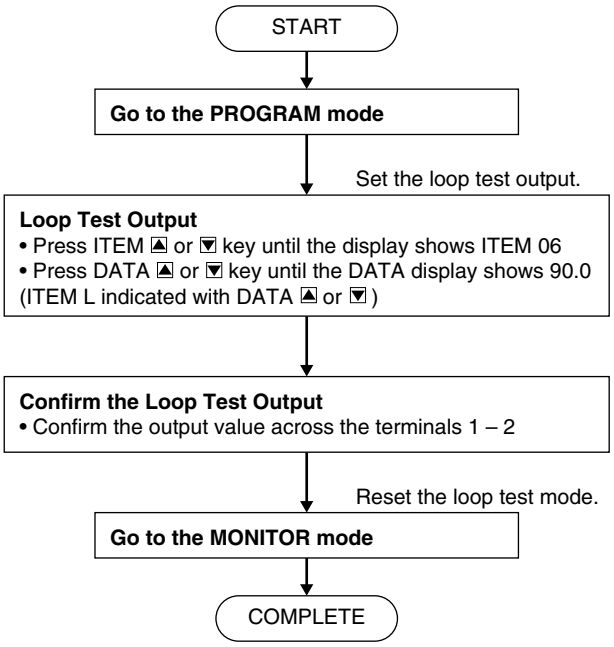
[E.G.] Output range -5.0 to +5.0V



■ LOOP TEST OUTPUT

The loop test output is enabled when ITEM L (06) is selected in the PROGRAM mode.

[Example] Loop test output 90.0%



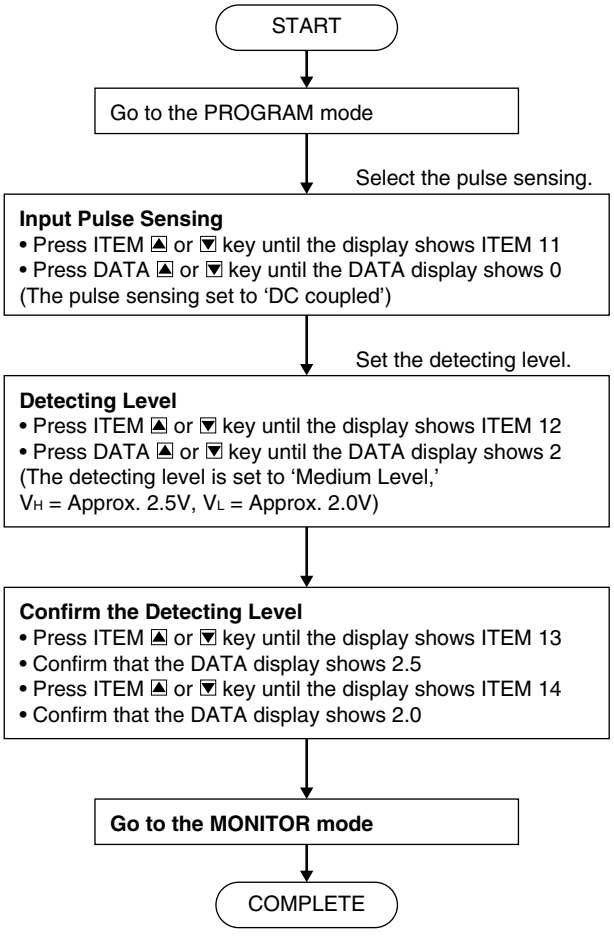
■ DETECTING LEVEL

(Usable only for the voltage pulse input)

[Example 1] Medium level

(V_H = appprox. 2.5V, V_L = approx. 2.0V)

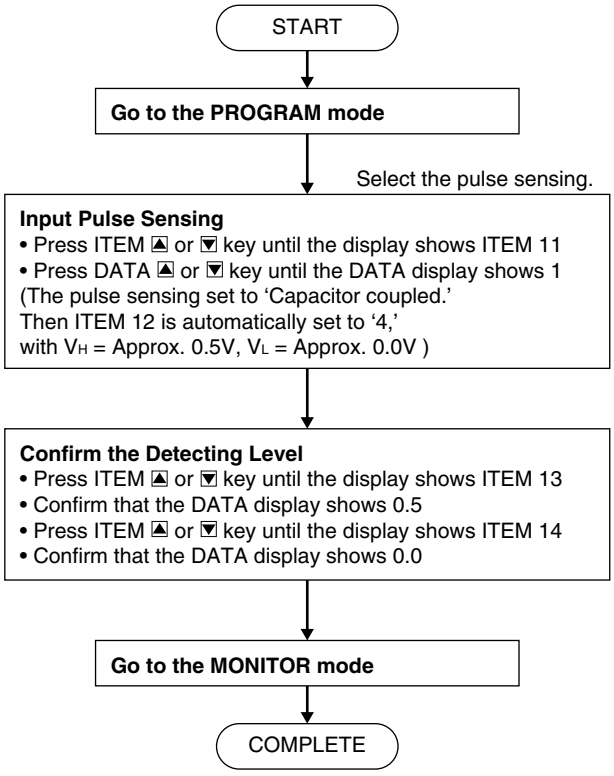
The automatic level setting (High, Medium and Low) is available only for the DC coupling.



[Example 2] Capacitor coupling use

(V_H = appprox. 0.5V, V_L = approx. 0.0V)

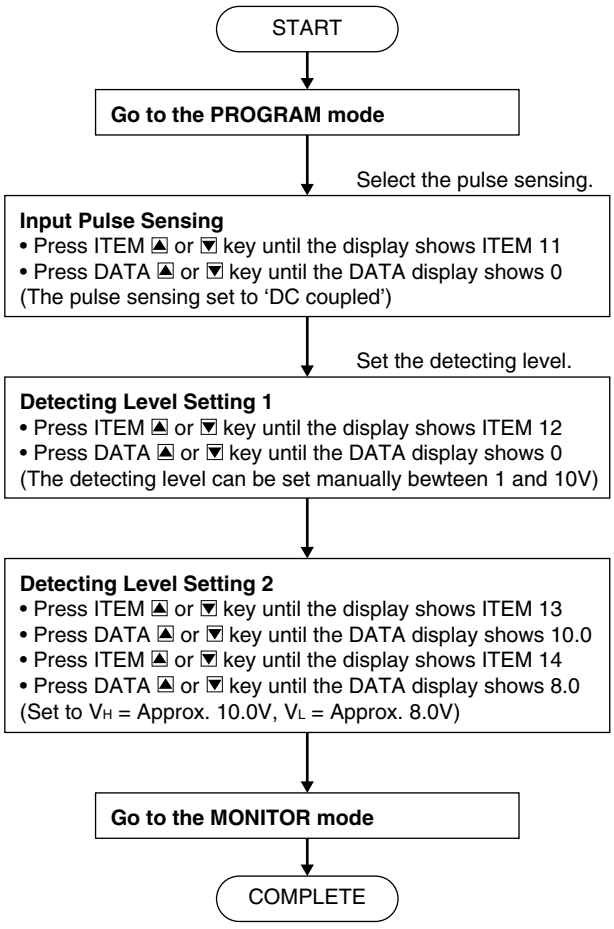
This option is selectable only for the capacitor coupling.



[Example 3] Manual setting

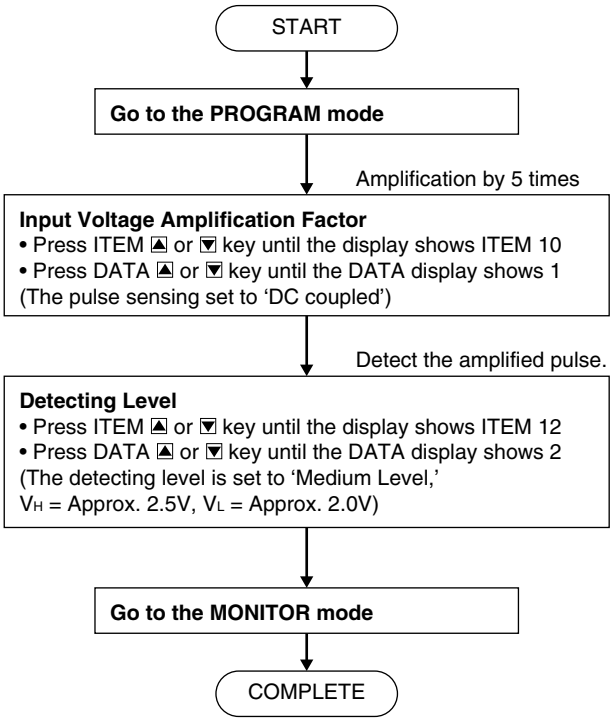
(V_H = appprox. 10.0V, V_L = approx. 8.0V)

The manual level setting is available only for the DC coupling.



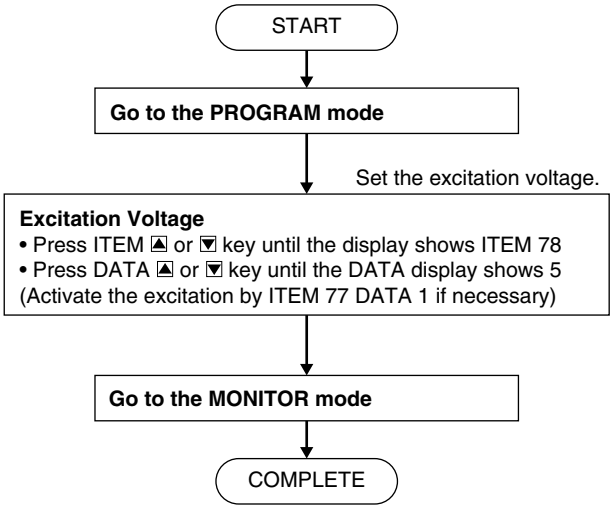
■ INPUT VOLTAGE AMPLIFICATION FACTOR

[Example] Waveform of 1Vp-p with DC offset 0.5V is amplified by 5 times to be detected.



■ SENSOR EXCITATION

[Example] Excitation 5V



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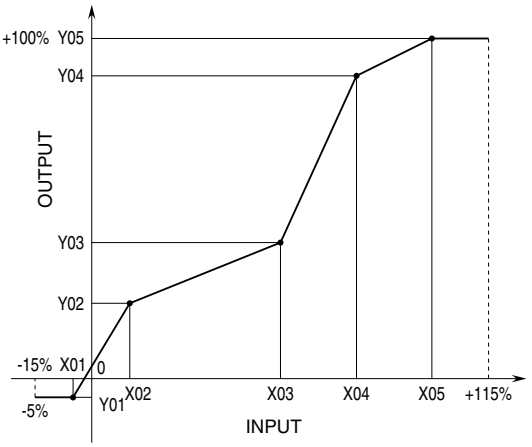
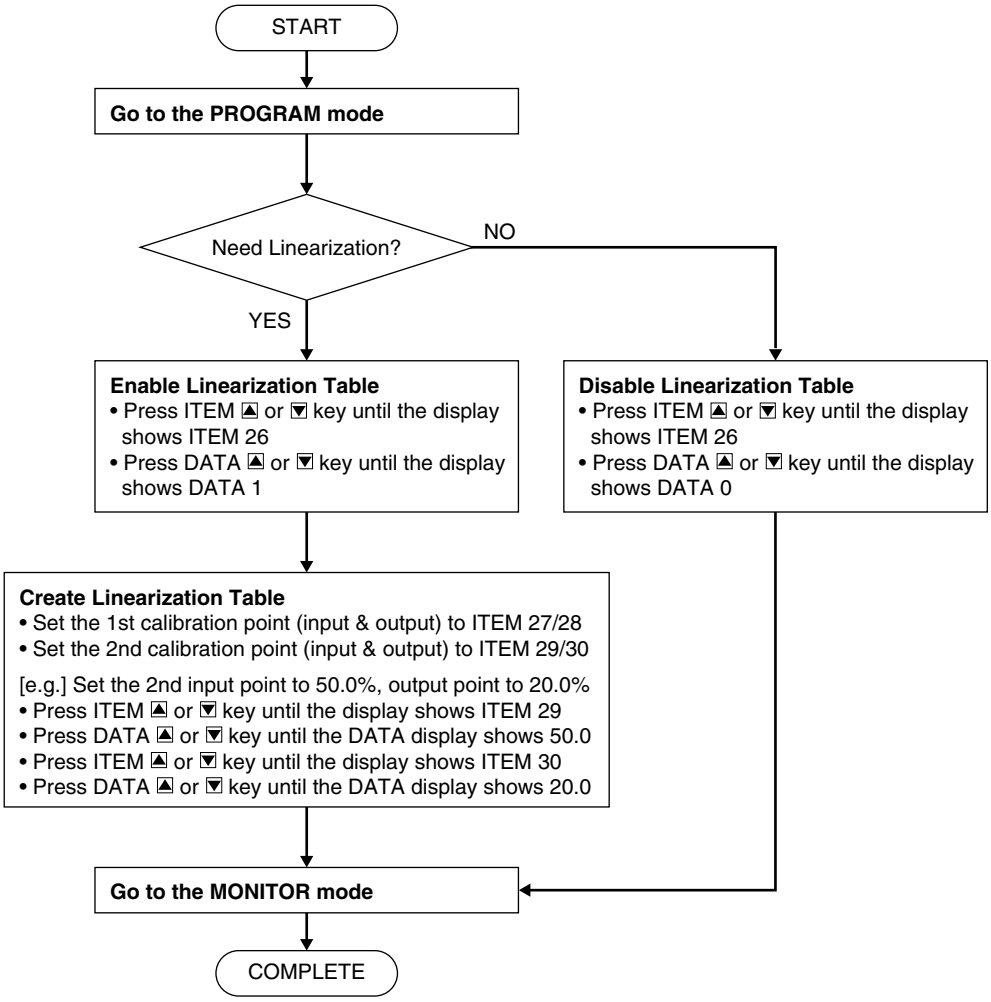
■ LINEARIZATION

Max. 24 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.





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■ **DISPLAY RANGE SCALING**

[E.G.] Display range -6500 to +300

START

Go to the PROGRAM mode

Select the decimal point position for ITEM P, 18, 19.

Decimal Point Position
- Press ITEM ▲ or ▼ key until the display shows ITEM 20
- Press DATA ▲ or ▼ key until the DATA display shows 0

Set 0% scale value.

0% Scaling
- Press ITEM ▲ or ▼ key until the display shows ITEM 18
- Press DATA ▲ or ▼ key until the DATA display shows -6500

(PL1 turns on with minus (–) sign indicated)

Set 100% scale value.

100% Scaling
- Press ITEM ▲ or ▼ key until the display shows ITEM 19
- Press DATA ▲ or ▼ key until the DATA display shows 300

Go to the MONITOR mode

COMPLETE

■ **RESET ALL SETTINGS**

START

Go to the RESET mode
- Press ITEM ▲ or ▼ key until the display shows ITEM 01
- Press DATA ▲ or ▼ key until the display shows DATA 3

Reset All Settings
- Press ITEM ▲ or ▼ key until the display shows ITEM 75
- Press DATA ▲ key to show DATA 1 and double-click DATA ▼ key

(The display returns to DATA 0 when the setting is complete)

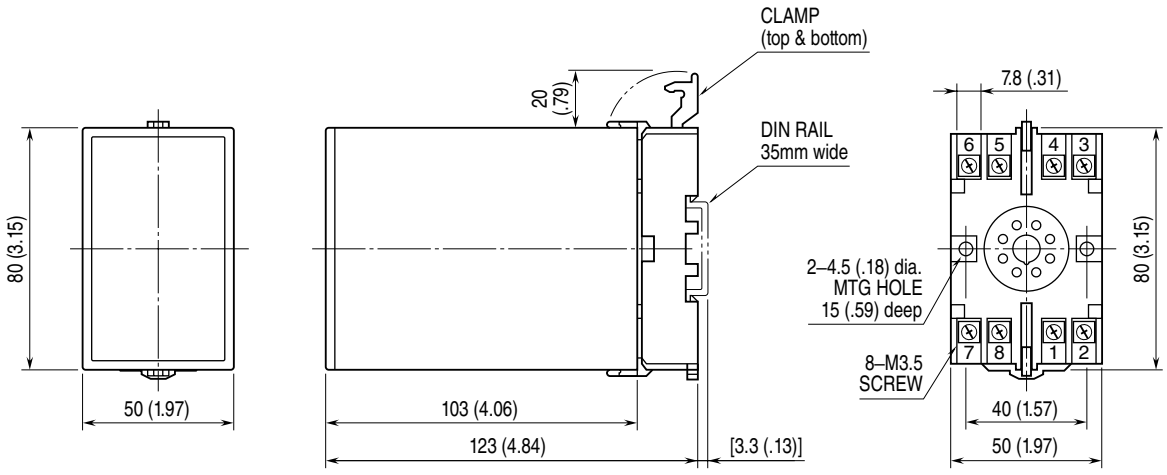
Go to the MONITOR mode

COMPLETE

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.

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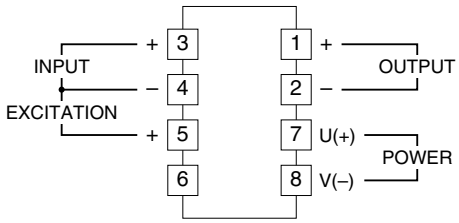
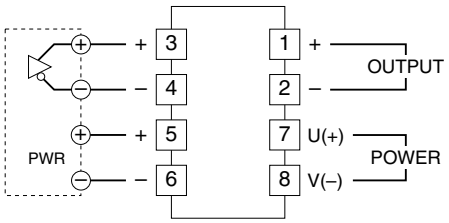
■ CONNECTION DIAGRAM

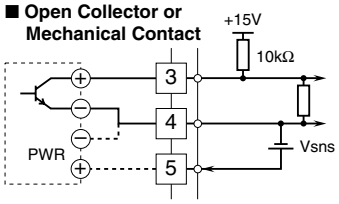


■ RS-422 Line Driver Pulse

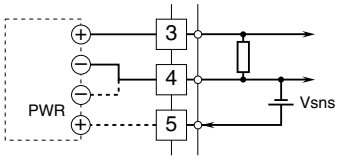


Input Connection Examples

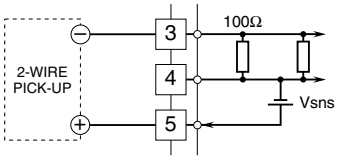
■ Open Collector or Mechanical Contact



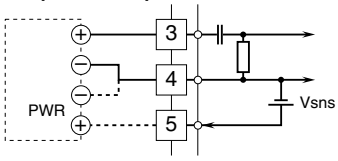
■ Voltage Pulse
• DC Coupled



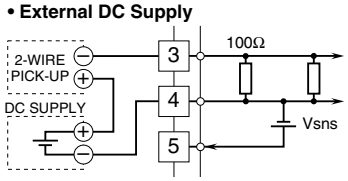
■ 2-Wire Current Pulse
• Built-in Excitation



• Capacitor Coupled



• External DC Supply



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 the input signal.
4) Output: Check that the load resistance meets the described specifications.

ADJUSTMENT PROCEDURE

For matching the signal to a receiving instrument or in case of regular calibration, proceed as follows.
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) Turn the unit into Program mode.
2) Simulate 0% input and adjust the PV display to show 0.0 (ITEM 16).
3) Simulate 100% input and adjust the PV display to show 100.0 (ITEM 17).
4) Simulate 0% input again and check the PV display.
5) When the PV value is changed, repeat the above procedure 2) – 4).
6) Return the unit into Monitor 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 as explained earlier (ITEM 16 and 17).

LIGHTNING SURGE PROTECTION

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

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