

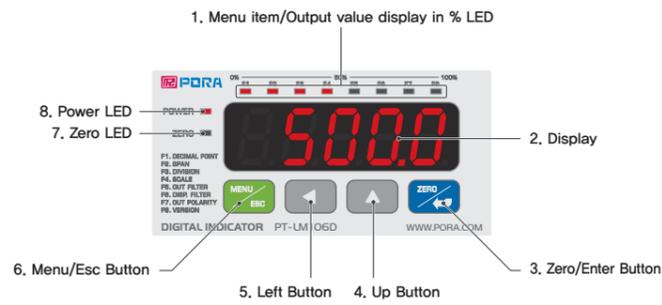
Operating Instructions

PT-LM106D (Digital Tension Indicator)



Before Start Using It

1. Description of Control Part



Button	Description																																				
1 Menu item/ Output value display in % LED	The current Output value is displayed in % on the basic screen. <div style="text-align: center;"> <table border="1"> <tr> <td>0%</td> <td>12.5%</td> <td>25%</td> <td>37.5%</td> <td>50%</td> <td>67.5%</td> <td>75%</td> <td>87.5%</td> <td>100%</td> </tr> <tr> <td>(All off)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>F1</td> <td>F2</td> <td>F3</td> <td>F4</td> <td>F5</td> <td>F6</td> <td>F7</td> <td>F8</td> </tr> </table> <p>(The current item is displayed in menu mode.)</p> </div>	0%	12.5%	25%	37.5%	50%	67.5%	75%	87.5%	100%	(All off)										F1	F2	F3	F4	F5	F6	F7	F8									
0%	12.5%	25%	37.5%	50%	67.5%	75%	87.5%	100%																													
(All off)																																					
	F1	F2	F3	F4	F5	F6	F7	F8																													
2 Display	The current tension value is displayed.																																				
3 Zero/Enter Button	It sets zero point when pressed for 3 seconds, (It operates as an enter button in menu mode.)																																				
4 Up Button	This button is used to increase the set value.																																				
5 Left Button	This button is used to move to the left.																																				
6 Menu/Esc Button	When pressed for 3 seconds, the system enters menu mode and following items can be set. <table border="1"> <thead> <tr> <th>NO.</th> <th>Contents</th> <th>Condition when hipped</th> <th>Setup Scope</th> </tr> </thead> <tbody> <tr> <td>F-01</td> <td>DECIMAL POINT</td> <td>0.0</td> <td>0 ~ 0.000</td> </tr> <tr> <td>F-02</td> <td>SPAN</td> <td>200.0</td> <td>0 ~ +99999</td> </tr> <tr> <td>F-03</td> <td>DIVISION</td> <td>1</td> <td>1, 2, 5</td> </tr> <tr> <td>F-04</td> <td>SCALE</td> <td>200.0</td> <td>0 ~ +99999</td> </tr> <tr> <td>F-05</td> <td>OUT FILTER</td> <td>10</td> <td>0 ~ 99</td> </tr> <tr> <td>F-06</td> <td>DISP. FILTER</td> <td>10</td> <td>0 ~ 99</td> </tr> <tr> <td>F-07</td> <td>OUT POLARITY</td> <td>0</td> <td>0, 1</td> </tr> <tr> <td>F-08</td> <td>PROGRAM RSION</td> <td>***</td> <td>-</td> </tr> </tbody> </table> (It operates as an ESC button in menu mode.)	NO.	Contents	Condition when hipped	Setup Scope	F-01	DECIMAL POINT	0.0	0 ~ 0.000	F-02	SPAN	200.0	0 ~ +99999	F-03	DIVISION	1	1, 2, 5	F-04	SCALE	200.0	0 ~ +99999	F-05	OUT FILTER	10	0 ~ 99	F-06	DISP. FILTER	10	0 ~ 99	F-07	OUT POLARITY	0	0, 1	F-08	PROGRAM RSION	***	-
NO.	Contents	Condition when hipped	Setup Scope																																		
F-01	DECIMAL POINT	0.0	0 ~ 0.000																																		
F-02	SPAN	200.0	0 ~ +99999																																		
F-03	DIVISION	1	1, 2, 5																																		
F-04	SCALE	200.0	0 ~ +99999																																		
F-05	OUT FILTER	10	0 ~ 99																																		
F-06	DISP. FILTER	10	0 ~ 99																																		
F-07	OUT POLARITY	0	0, 1																																		
F-08	PROGRAM RSION	***	-																																		
7 Zero LED	It keeps lighting when zero setup is completed or there is no change in the tension.																																				
8 Power LED	It keeps lighting when the power is on.																																				

Features of the product and precautions

(Please do not fail to read it before start using the product.)

It is a digital type Tension Indicator and quickly and precisely displays the tension value.

Please check if there is any problem with the product and if the items included are as per the packing list. For performance and safe use of this product, please start using the product after fully understanding following cautions. In particular, please do not use this equipment for other purpose than originally intended and do not remodel it at random.

Precautions for Installation

- Maintain the right vertical and horizontal angles of the product for installation.
- Install the product in a place devoid of vibration, shock, high temperature or humidity, direct sunlight, much dust, or air containing much salt or ions.
- Do not install the product within the vicinity of inflammable gases or steam or dust.
- Wire the product as provided in the following drawings and check if all cables are properly connected.
- Ensure the earthing terminal is correctly grounded.
- Ensure the product is detached from the power supply cables or the cables with much electrical noise.
- Make sure the load resistor is connected before measuring the outputs.

Warning
 For the installation and wiring of the controller, completely isolate it from the external power supply. Failure to do so may result in an electrical shock or damage to the controller.

Warning
 Use anti-explosive products where there are high risks of inflammation or explosion. Failure to do so may result in a fire or explosion. Use the anti-explosive products suitable to the given conditions.

Precaution
 Check the surrounding environment. Do not install the controller where it can be exposed to excessive dust, conductive dust, corrosive gases, high temperature or rainy wind. It also should not be installed in the places susceptible to vibrations or shocks. Failure to do so may result in damages to, or malfunctioning or lowered performance of the controller.

Precautions for Use

- Unwarranted operation of the controller may cause the defects of the object materials.
- PORA shall NOT be responsible for any damages to the controller caused by such operations.

3) Input and Output Specification

Category	Terminal No.	Signal	Specification
Power	Terminal No.⑥	0	100~240Vac ±10%, 50/60Hz Power consumption 10VA
	Terminal No.⑦	110V	
	Terminal No.⑧	220V	
Output	Terminal No.⑨	FG	D class earthing (100Ω or lower)
	Terminal No.⑩	EXC1+	
	Terminal No.⑪	EXC1-	
Tension Detector	Terminal No.⑫	SIG1+	5Vdc 100mA(max) for Tension detector
	Terminal No.⑬	EXC2+	
	Terminal No.⑭	EXC2-	
	Terminal No.⑮	SIG1-	
	Terminal No.⑯	SIG2+	
	Terminal No.⑰	SIG2-	
Tension Signal	Terminal No.⑱	SHIELD	Terminal for shield earthing
	Terminal No.①	V/O	Voltage output (load resistance at maximum scale: 1kΩ)
	Terminal No.②	GND	
	Terminal No.③	I/O	Current output (load resistance at maximum scale: 500kΩ)
	Terminal No.④	GND	

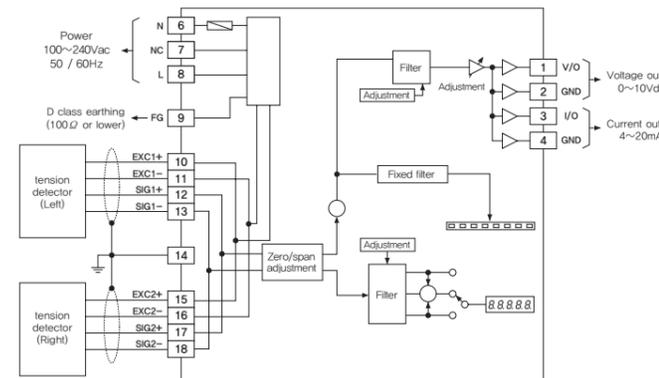
3. Alarm Table

Alarm No.	Alarm Contents	Details
AL 01	The meter input is exceeded.	The meter input voltage is exceeded.
AL 02	Zero input voltage scope is exceeded.	Input voltage scope is exceeded when adjusting the zero point.
AL 03	Span load short.	Span adjustment failed due to low input voltage of the meter when adjusting the span.

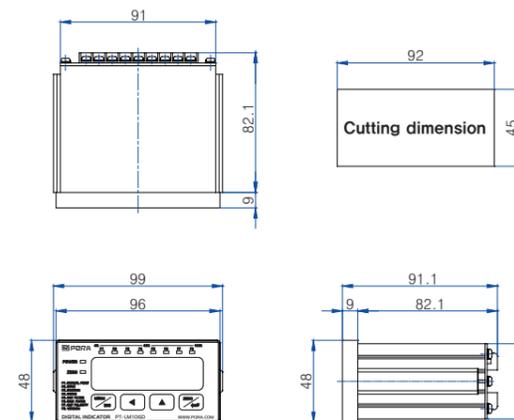
*You can press any key to return to the previous screen when an alarm is displayed.

Caution : Alarm for exceeded meter input **AL-01**
 Exceeded input alarm is displayed when an excessive load (about 120% of the rated load or more) is applied to the tension detector and, if the equipment is used in this condition, it may cause damage of the meter. When exceeded input alarm is displayed, please use the equipment after removing the cause for the exceeded input alarm without fail.

4. External Connection Diagram



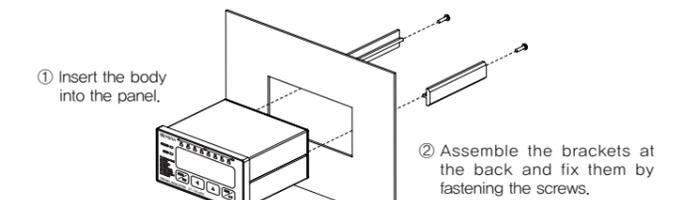
5. External Dimension



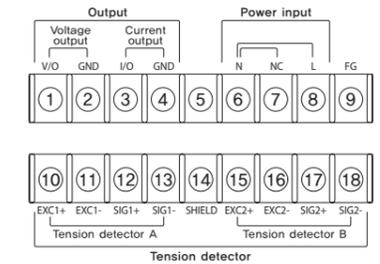
6. Installation and Wiring

1) Installation method

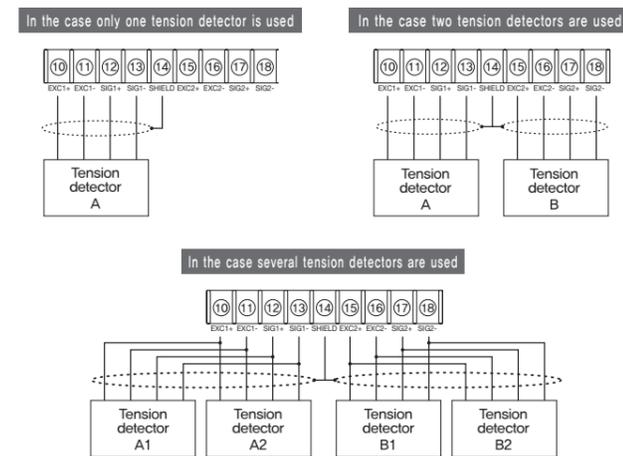
Firmly fix it to the panel as follows:



2) Terminal Layout



3) Tension Detector Connection



2. Product Specification

1) Functional Specification

Display	Digital display of 5 digits by 7 segment LED
LED Display	Identification display of tension value output in %, power display and zero display by 8 LEDs
Compatible Sensor	Load cell type tension detector (120Ω, 350Ω, 700Ω)
Voltage Applied to Load Cell	5Vdc ±5%, 100mA (4 load cells of 350Ω can be connected.)
Maximum Value Display	-19999 ~ +99999
A/D Converter	High precision AD is used (24bit-Σ-Δ), 500 times/sec
D/A Converter	High precision DA is used, 500 times/sec
Nonlinearity	0.01% F.S.
Maximum Load Cell Input Voltage	Max. ±20mV Min. 0mV *Standard input : Rated output 3mV/V load cell (recommend)
Zero Point Adjustment Scope	0mV ~ ±20mV
Input Sensitivity	0.5μV/V or higher
Accuracy	Zero point: ±0.1μV/°C RTI max.
Input Noise	±0.3μV Vpp or lower
Input Impedance	10MΩ or higher
AD Internal Resolution	1/200,000
AD External Resolution	1/30,000
Size and Weight	99(W) x 48(H) x 91.1(D) 375g

2) Environmental Specification

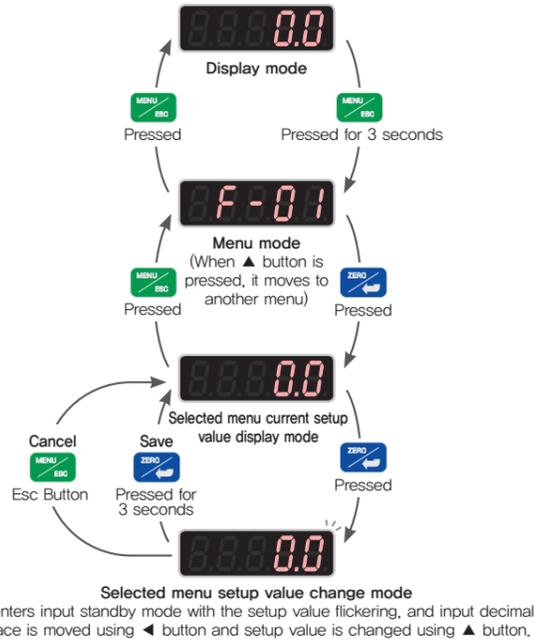
Operation Temperature	-10~50°C
Operation Humidity	35~85%RH or lower (non-condensing)
Seismic Resistance	In accordance with JIS C0040, 10 ~ 55 Hz 0.5mm (Maximum 4.9m/s ²), 2 hours each in directions of X, Y and Z
Impact Resistance	In accordance with JIS C0040, 98m/s ² , 3 times each in directions of X, Y and Z
Maximum Tolerated Power Noise	By a noise simulator with noise voltage of 1000 Vp-p, Noise width of 1μs and frequency of 0 ~ 100Hz
Insulation Resistance	5MΩ or higher at 500Vdc Megger (for the whole terminal set and between local terminals)

Basic Setup

Buttons to be used for setup

[MENU Button], [ESC Button] When pressed for 3 seconds; entry to menu mode When pressed once; cancel button	[LEFT Button] Shift of setup input decimal place	[UP Button] Shift of setup menu item/ increase of setup value	[ZERO Button], [ENTER Button] When pressed for 3 seconds; zero point adjustment When pressed once; enter button

Sequence of display movement



1. Zero Point Setup

The zero point is set. Zero point setup is carried out with no fabric in the roller.

- When [Zero Button] is pressed for 3 seconds on the basic screen, zero point setup is completed and "Zero" message is displayed.

Caution : Exceeded zero input voltage scope alarm AL-02
Exceeded zero input voltage scope is displayed when the tension value is too highly set (by about 50% or more of the rated load) when setting the zero point, and, as display of this alarm means that the fabric may be caught by the detector or some mechanical load is applied, zero point should be set again after removing the cause.

2. Decimal Point Display Setup (F-01)

It sets the number of decimal places. Maximum up to 3 decimal places can be displayed.

- Shift of decimal place

- Enter menu mode by pressing [Menu Button] for 3 seconds on the basic screen.

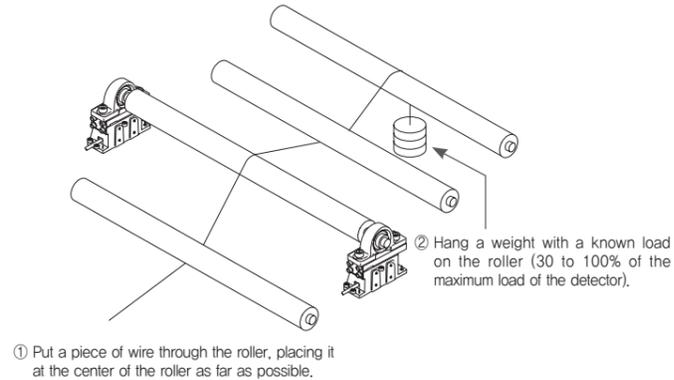
- Shift to F-01 item by pressing [▲ button] and select it by pressing [Enter button].

- When [Enter button] is pressed, it enters input standby mode with the setup value flickering. Select the desired number of decimal places by pressing [◀ button] and [▲ button], and save it by pressing [Enter button] before returning back to the previous item by pressing [Esc button].

3. Span Setup (F-02)

Before carrying out setup, please hang a weight equivalent to 30 to 100% of the maximum capacity of the tension detector to the roller as shown in following figure.

Example In the case of a tension detector with maximum load of 100Kg, a weight of 30 to 100Kg is selected.



- Select F-02 item by pressing [Enter button].

- When [Enter button] is pressed, it enters input standby mode with the setup value flickering. Enter the load of the weight by pressing [◀ button] and [▲ button], and save it by pressing [Enter button] before returning back to the previous item by pressing [Esc button].

Caution : Span Load Shortfall Alarm AL-03
Span load shortfall alarm is displayed in the case the load of the weight is too light (about 5% or less of the rated load) to be set as the standard value when setting the span. We recommend to set the span value using a weight of load equivalent to 30 to 100% of the rated load of the detector.

Other Setup

1. Resolution Setup (F-03)

In the case it is inconvenient because the tension value changes rapidly, the display interval may be changed by setting the resolution.

- Shift to F-03 item by pressing [▲ button] and select it by pressing [Enter button].

- When [Enter button] is pressed, it enters input standby mode with the setup value flickering. Enter the desired resolution by pressing [◀ button] and [▲ button], and save it by pressing [Enter button] before returning back to the previous item by pressing [Esc button] (select among 1, 2 and 5).

When set to 1	When set to 2	When set to 5
A value from 1 to 9 will be displayed at the last digit.	A value among 0, 2, 4, 6 and 8 will be displayed at the last digit.	0 or 5 will be displayed at the last digit.

2. Maximum Tension Scale Setup (F-04)

The maximum tension scale to be used shall be set.

- Shift to F-04 item by pressing [▲ button] and select it by pressing [Enter button].

- When [Enter button] is pressed, it enters input standby mode with the setup value flickering. Enter the maximum tension scale to be used by pressing [◀ button] and [▲ button], and save it by pressing [Enter button] before returning back to the previous item by pressing [Esc button].

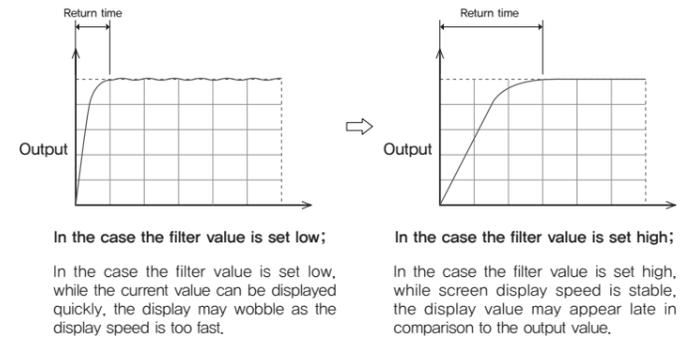
3. Filter Setup

1) Output Filter Setup (F-05)

If the output value wobbles as it is too slow or too fast, set an output filter within the scope of 0 to 99.

- Shift to F-05 item by pressing [▲ button] and select it by pressing [Enter button].

- When [Enter button] is pressed, it enters input standby mode with the setup value flickering. Enter the desired filter value by pressing [◀ button] and [▲ button], and save it by pressing [Enter button] before returning back to the previous item by pressing [Esc button].



2) Display Filter Setup (F-06)

The speed of tension value displayed on the screen is set to a value between 0 and 99.

- Shift to F-06 item by pressing [▲ button] and select it by pressing [Enter button].

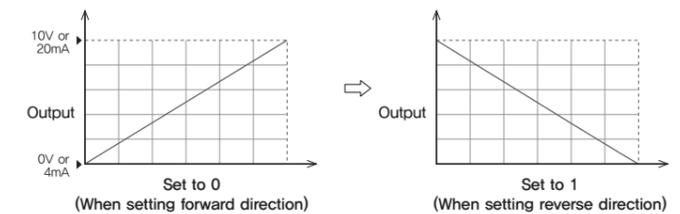
- When [Enter button] is pressed, it enters input standby mode with the setup value flickering. Enter the desired filter value by pressing [◀ button] and [▲ button], and save it by pressing [Enter button] before returning back to the previous item by pressing [Esc button].

4. Filter Setup (F-07)

Forward/Reverse of the output value is set (forward direction = 0, reverse direction = 1).

- Shift to F-07 item by pressing [▲ button] and select it by pressing [Enter button].

- When [Enter button] is pressed, it enters input standby mode with the setup value flickering. Select Forward/Reverse by pressing [◀ button] and [▲ button], and save it by pressing [Enter button] before returning back to the previous item by pressing [Esc button].



Error Detection

This product does not contain any consumable item which causes short life time of the product. However, please check following matters periodically.

- Whether the internal temperature has abnormally increased due to a heat source or direct light
- Whether foreign substances or electrically conductive particles have infiltrated into the device
- Whether there are other problems such as loosening of wires and terminals

Item	Phenomenon	Actions to take
Related to Power	Power is unable to be turned on.	* Check connection condition of power cable. * Check if the voltage of the power between AC input terminals is AC 110V or AC 220V, and whether wiring is properly done to the relevant terminal box (AC 220V when initially shipped)
	Weight changes to (-).	* Check whether connection is made reversely to SIG+ terminal and SIG- terminal among load cell connection terminals.
Operational Disorder	Weight increases at a certain rate or does not return to zero point.	* Check disconnection of cable at the load cell connection part. * As load cell defect is suspected, measure the insulation resistance of the load cell (100Ω or higher at normal condition)
	In the case the weight value wobbles.	* Remove foreign substances from measuring part and its contact with other device * As load cell defect is suspected, measure the input and output resistance of the load cell.

※ If other phenomenon or problem occurs, please contact PORA.

Terms of Quality Assurance

- Every purchaser of Pora's products is eligible for complimentary after-sales services for any defects or errors that may have occurred under the normal conditions of use for the prescribed period of time.
- Pora's products are guaranteed for one year (12 months) from the time of purchase.
- If you want to have your serviced as per this certificate, please contact your nearest dealer or Pora's head office. Provided, you are responsible for all the expenses that may be incurred by sending, bringing or transporting the product to your dealer or to us.
- You may not be eligible for our complimentary services even within the complimentary service period under the following cases.
 - Troubles or damages caused by the mishandling or incorrect use of the product
 - Troubles or damages caused by the maintenance, modifications or disassembling by any other than our designated dealers or Pora's head office.
 - Troubles or damages caused by fire, earthquakes, floods, thunderbolts or other natural disasters.
 - Troubles or damages caused by the dropping, shocks, excessive pressure and vibrations, dusts, sinking under water or other improper handling.
 - Troubles or damages caused by the improper management (soaking or excessive heat)
 - Troubles or damages caused by the use of other expendables or parts than the regular ones approved by Pora.
 - In case the purchaser fails to present this certificate for service
 - Troubles or damages caused by other products connected with the product.
 - In case this certificate is not filled with such descriptions as the purchase date and company name (supplier), or such descriptions including the purchase date are either forged or fabricated.
- This certificate shall not be applicable to the parts (housing, glass, connectors, etc.) or expendables (oil, filter, fuse, lamp, etc.)
- Pora shall not be responsible for any damages incidental to the troubles or damages of the product. (expenses incurred or the loss of profits due to the missed use of the product, or the damages to other devices that replaced Pora's product)
- Pora's products have gone through extensive precision manufacturing processes and tests, and any errors for the products ranging from ±1 to 2mm shall not constitute any request for the replacement of the product.

Service Certificate

Customer	Name	Company
	Telephone	E-mail
	Address	
Dealer	Name	Telephone
	Address	
Product Name		
Purchase Date		
Problem		

- Thank you purchasing this product.
- This certificate guarantees our complimentary after-sales services for our products
- Please keep this certificate properly as we may reject to offer complimentary services if you fail to present this certificate to us.