

# 1. Specification

Specification	
Model No.	LVM-01
Minimum read value	0.01mm Inclination/ 1m
Power	alkali cell: LR03 x 4pcs
Auto Power off	30 minutes after Power is turned on
Battery life	50 hours
Dimensions	Φ109 x H56mm
Weight	995g
Accessories	alkali cell: LR03 x 4pcs Japanese manual, Guarantee certificate, Inspection sheet

## LED Indication

### Low mode

LED (RED) blinking : over 0.8mm Inclination/ 1m

LED (RED) on : within 0.8mm Inclination/ 1m

LED (ORANGE) blinking : within 0.6mm Inclination/ 1m

LED (YELLOW) blinking : within 0.4mm Inclination/ 1m

LED (GREEN) blinking : within 0.2mm Inclination/ 1m

LED (BLUE) blinking : within 0.1mm Inclination/ 1m

### High mode

LED (RED) blinking : over 0.08mm Inclination/ 1m

LED (RED) on : within 0.08mm Inclination/ 1m

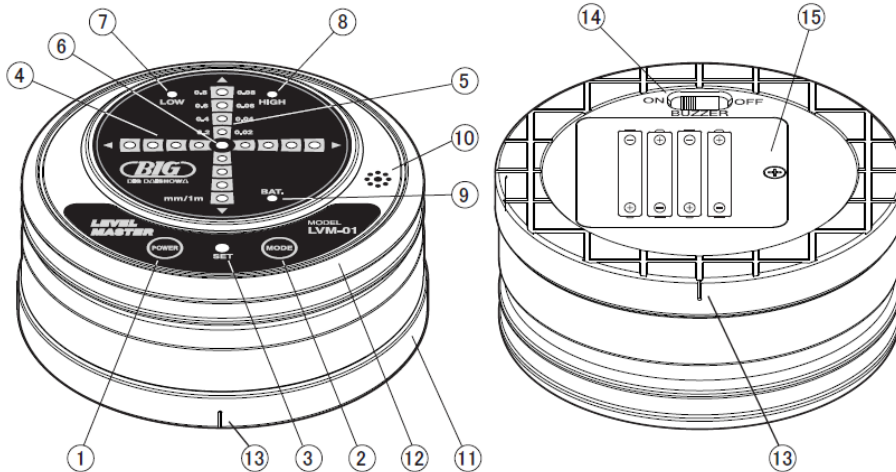
LED (ORANGE) blinking : within 0.06mm Inclination/ 1m

LED (YELLOW) blinking : within 0.04mm Inclination/ 1m

LED (GREEN) blinking : within 0.02mm Inclination/ 1m

LED (BLUE) blinking : within 0.01mm Inclination/ 1m

## 2. Name and function



\*\*Note: You need to calibrate the Level Master depending on the conditions where it is used.

(1) Power On  $\longleftrightarrow$  Off Switch

(2) Mode Switch High  $\longleftrightarrow$  Low Switch

(3) Zero Switch \*\*

Zero Switch to calibrate

(4) Level Indication (X axis)

In Low mode: 0.8mm-0.1mm Inclination/ 1m

In High mode: 0.08mm-0.01mm Inclination/ 1m

(5) Level Indication (Y axis)

In Low mode: 0.8mm-0.1mm Inclination/ 1m

In High mode: 0.08mm-0.01mm Inclination/ 1m

(6) Level Indication (Center position)

In Low mode: within 0.1mm Inclination/ 1m

In High mode: within 0.01mm Inclination/ 1m

(7) Mode display: LED (RED) is on when Low mode.

(8) Mode display: LED (Green) is on when Low mode.

(9) Battery alarm LED

LED (ORANGE) is on when battery is less than 4V.

(10) Buzzer

When center position LED is on, buzzer makes sound.

(11) Base body

(12) Body case

(13) Mark: Mark to check X & Y axis.

(14) Buzzer On  $\longleftrightarrow$  Off Switch

(15) Battery box

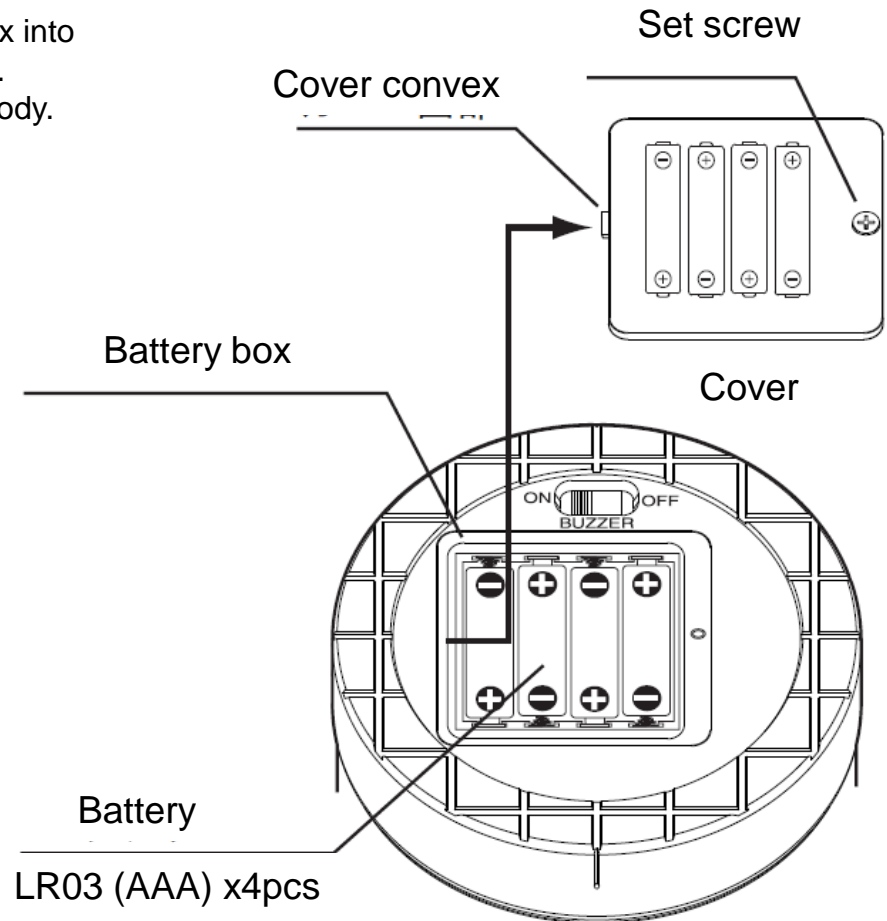
Battery box to set 4pcs of LR03 batteries.

### 3. How to set battery

- ① Loosen the screw on the battery box cover.
- ② Set 4 batteries (LR03: AAA battery) as described on the bottom of the battery box.
- ③ After setting batteries in the battery box, insert the convex into the concave and set the battery cover on the battery box. Then tighten the screw and fix the battery cover on the body.

**Note:**

Make sure to check the battery polarity. If you set the battery improperly, the unit does not work and it might cause some damage on the electric circuit.



## 4. Preparation before use

### 4-1 Setting

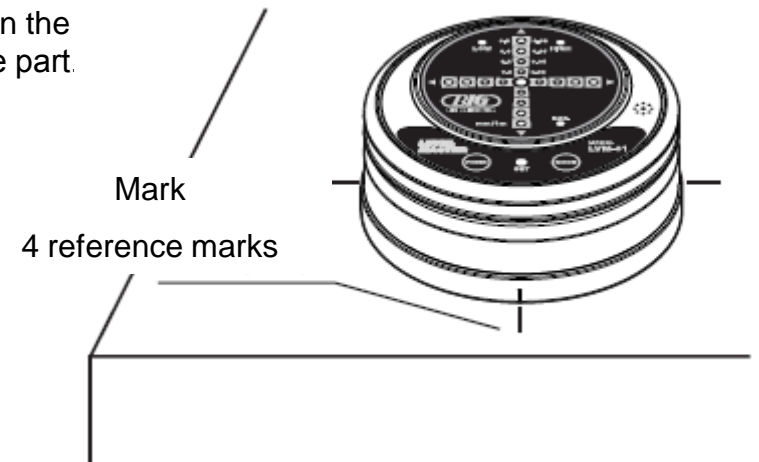
If you have much temperature difference between the inventory location and workshop, leave the unit in the workshop for the appropriate time to adapt it.

(e.g. In case of 10C difference, 15-20 minutes is required.)

### 4-2 Calibration

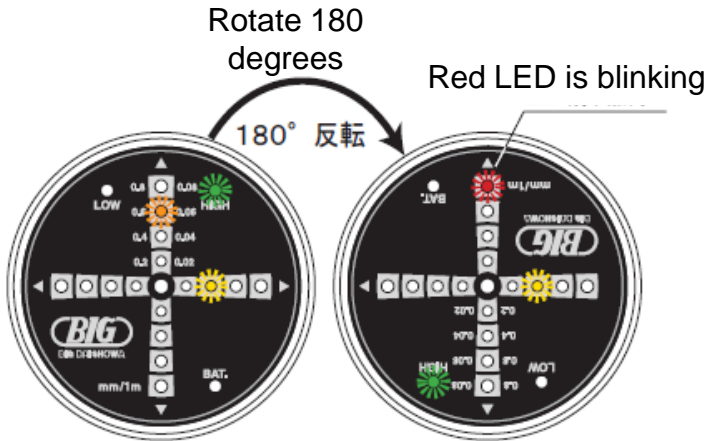
Note:

- ① Depending on the environment and condition of base level, the LED does not always stay in the center (0 position). Make sure to calibrate the unit depending on the environment to be used.
- ② Place the unit in the center of base level. Before placing the unit on the base level, make sure to remove the oil and dirt on the bottom of Level Master as well as those & scratch marks on the base level.
- ③ Mark 4 reference marks (2 marks for X-axis, 2 marks on Y-axis) on the base level according to 4 reference marks on Level Master's base part.
- ④ Turn on the Power switch.
- ⑤ Calibrate the Level Master as explained below:



# How to check levels in High Mode

Case 1

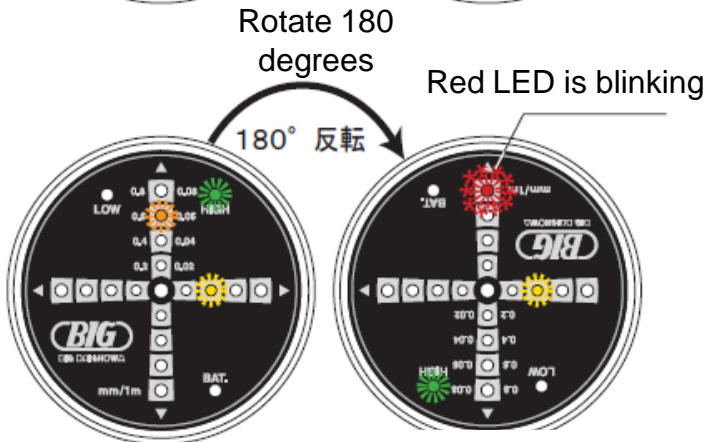


- ① When the Power is on, X & Y levels are within 0.08 micron.
- ② After 180 degree rotation, X & Y levels stay within 0.08 micron.

See Page 9 →

**How to calibrate in High Mode**

Case 2

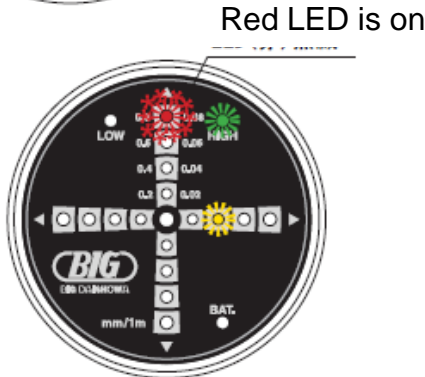


- ① When the Power is on, X & Y levels are within 0.08 micron.
- ② After 180 degree rotation, 1 of X & Y levels is out of 0.08 micron. Red LED is blinking.

See Page 6 →

**How to check levels in Low Mode**

Case 3



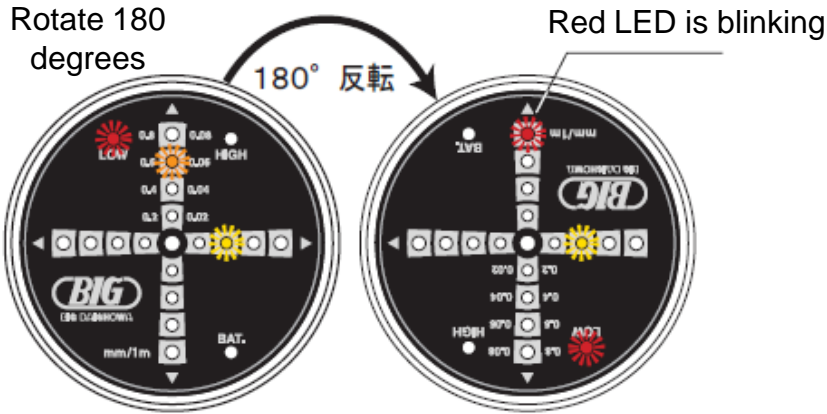
- ① When the Power is on, 1 of X & Y levels are out of 0.08 micron. Red LED is blinking.

See Page 6 →

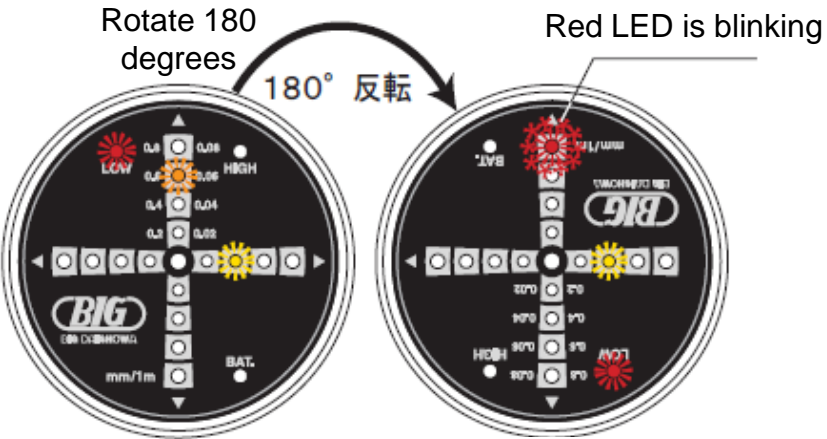
**How to check levels in Low Mode**

## How to check levels in Low Mode

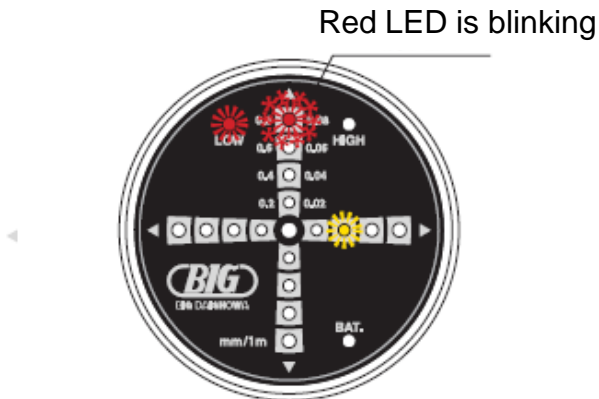
Case 1



Case 2



Case 3



- ① Change the Mode to [Low Mode].
- ② After the mode is changed, X & Y levels are within 0.8 micron.
- ③ After 180 degree rotation, X & Y levels stay within 0.8 micron.

See Page 7→

**How to calibrate in Low Mode**

- ① Change the Mode to [Low Mode].
- ② After the mode is changed, X & Y levels are within 0.8 micron.
- ③ After 180 degree rotation, 1 of X & Y levels is out of 0.8 micron.
- ④ Adjust the levels so that both of X & Y levels stay within 0.8 micron.

See Page 7→

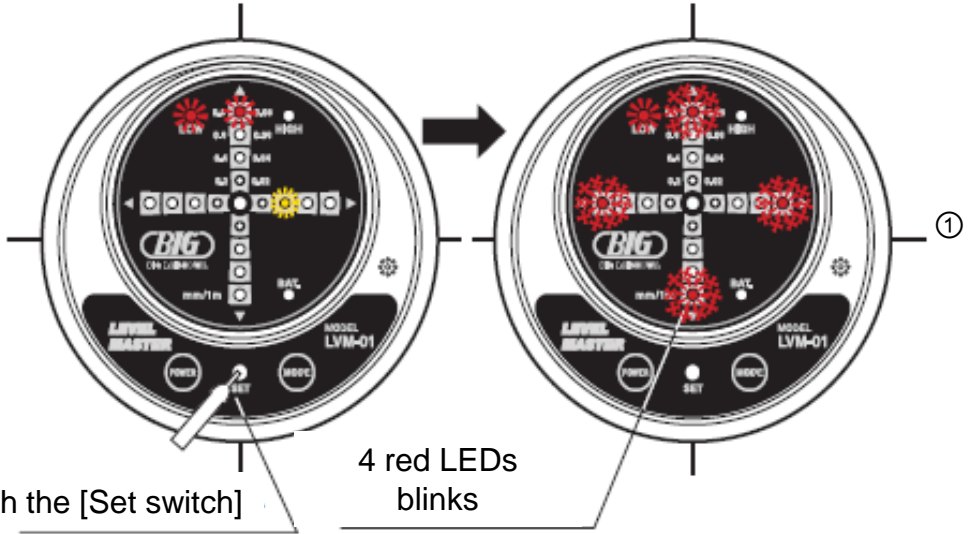
**How to calibrate in Low Mode**

- ① Change the Mode to [Low Mode].
- ② After the mode is changed, 1 of X & Y levels is out of 0.8 micron. Red LED is blinking.
- ③ Adjust the levels so that both of X & Y levels stay within 0.8 micron.

See Page 7→

**How to calibrate in Low Mode**

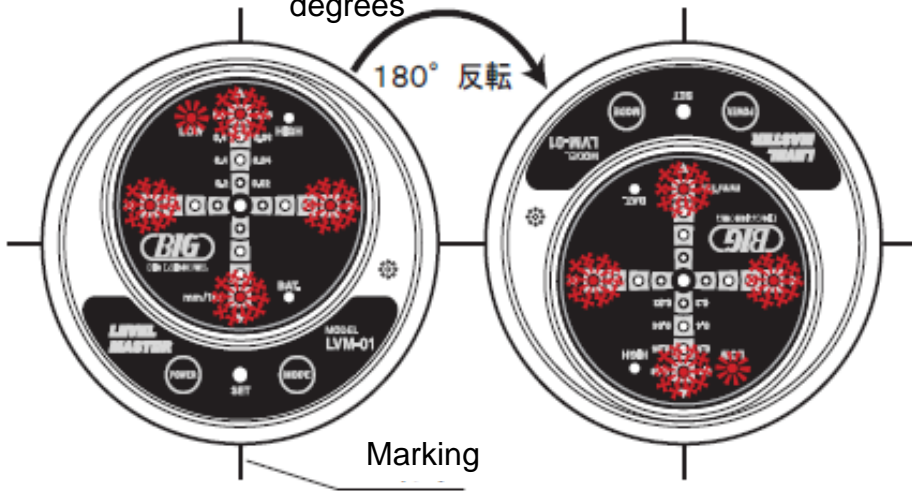
# How to calibrate in Low Mode



① Push the [Set switch] with a stick whose nose is narrow and round. 4 red LEDs start to blink.

**Note:**  
 In case of calibration in Low Mode, adjust the levels of base level within 0.8 micron in advance. You can not conduct the calibration when levels are over 0.8 micron.

Rotate 180 degrees



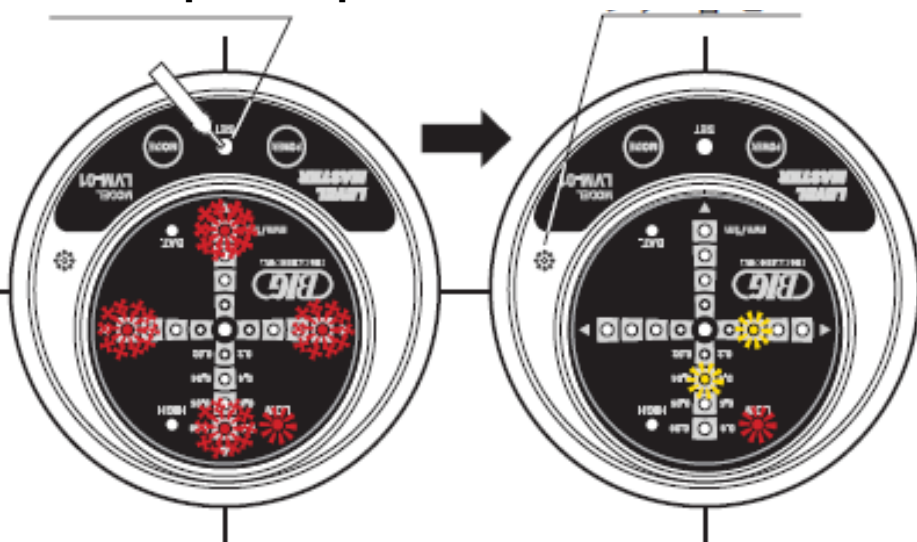
② Rotate the Level Master for 180 degrees referring to the markings on base level. Misalignment and insufficient rotation less than 180 degrees causes the error in calibration process.



Buzzer sounds

Push the [Set switch]

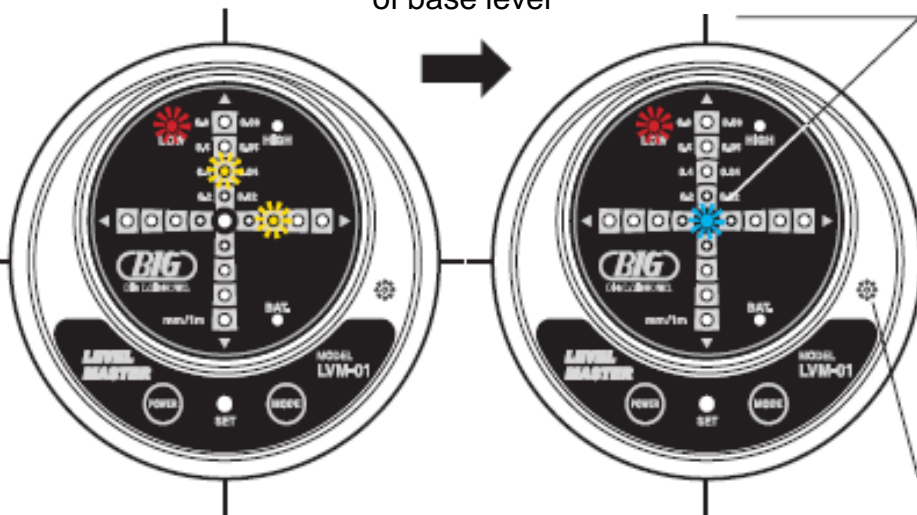
[Pi: ]



③ Push the [Set switch] once again. Buzzer sounds [Pi: ] and calibration is completed.

Adjust the levels of base level

Blue LED is on ④



④ Adjust levels of X & Y axis of base level within 0.1 micron.  
If one of 2 levels is adjusted within 0.1 micron, Blue LED is on and buzzer sounds [Pi, Pi]. When both of 2 axis are adjusted within 0.1 micron, Blue LED is on and buzzer sounds [Pi, Pi, Pi].

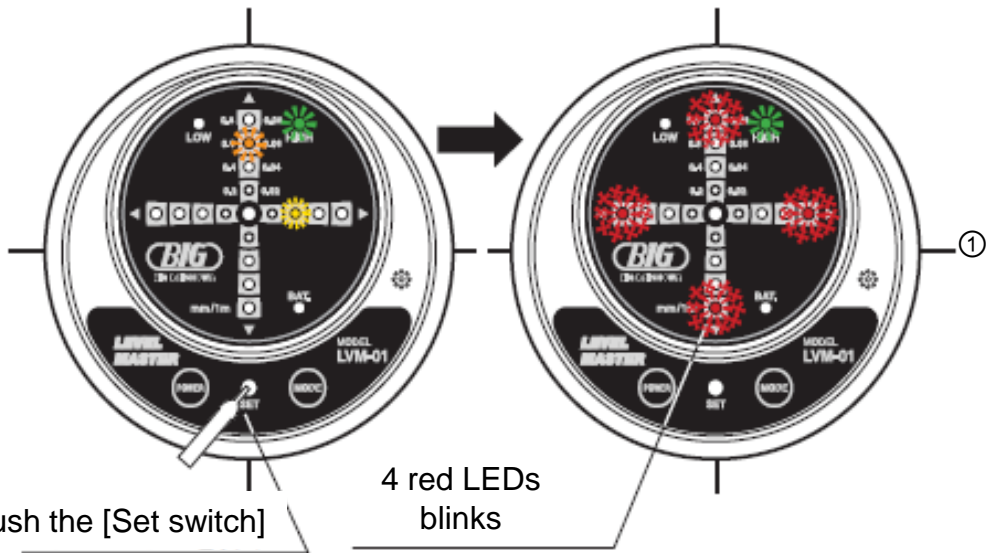
See Page No.9 →

**How to calibrate in High Mode**

Buzzer sounds  
[Pi, Pi, Pi]



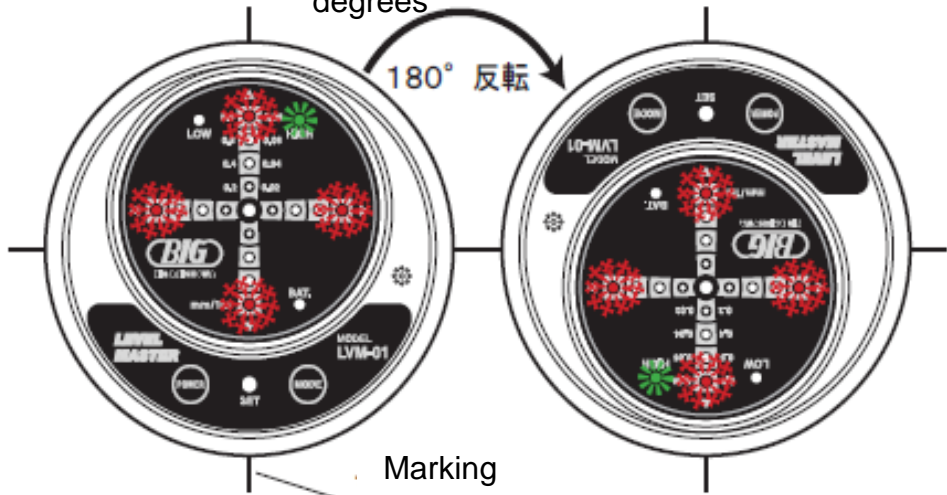
# How to calibrate in High Mode



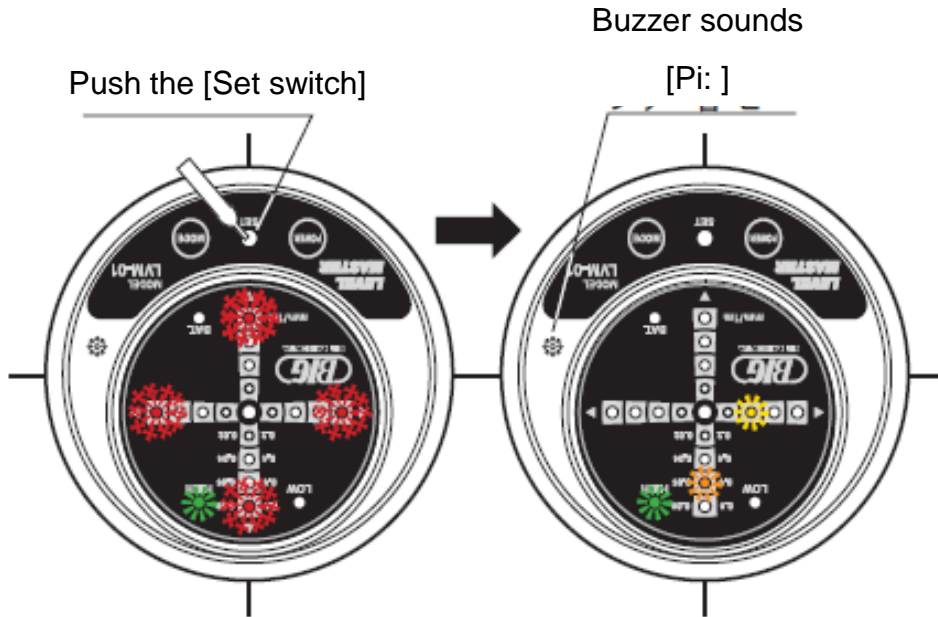
① Push the [Set switch] with a stick whose nose is narrow and round. 4 red LEDs start to blink.

**Note:**  
In case of calibration in High Mode, adjust the levels of base level within 0.08 micron in advance. You can not conduct the calibration when levels are over 0.08 micron.

Rotate 180 degrees



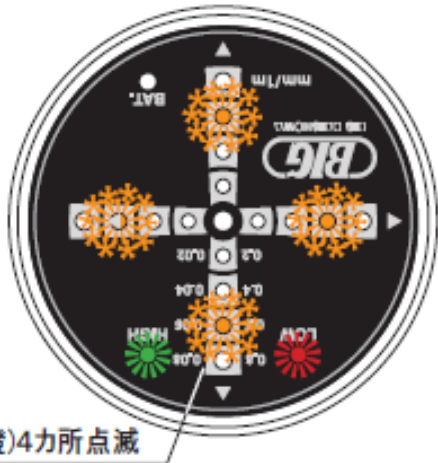
② Rotate the Level Master for 180 degrees referring to the markings on base level. Misalignment and insufficient rotation less than 180 degrees causes the error in calibration process.



③ Push the [Set switch] once again. Buzzer sounds [Pi: ] and calibration is completed.

↓

**Now please start leveling.**



4 orange LEDs start to blink

In case of [Calibration] in Low Mode:

\*When the actual level is over 0.8 micron,

In case of [Calibration] in High Mode:

\*When the actual level is over 0.08 micron,

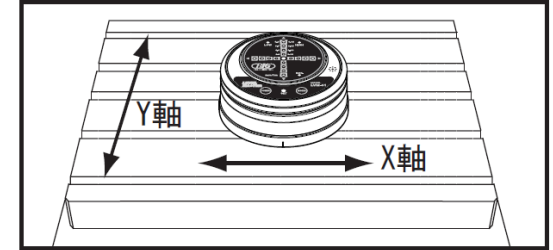
Even if you push the [Set switch] after rotating 180 degrees to complete the calibration procedure, 4 orange LEDs (on 0.6 micron position in Low Mode/ on 0.06 micron position in High Mode) start to blink and buzzer sounds [Pi, Pi, Pi, Pi] to inform you that you can not complete the procedure.

## 5. How to use

### 5-1 Leveling

(1) Clean the bottom surface of Level Master and Machine table. (Scratch and dent mark, oil, dust etc)

(2) Place the Level master on the base level. X & Y axis need to be carefully adjusted.



(3) Turn on the power of Level Master.

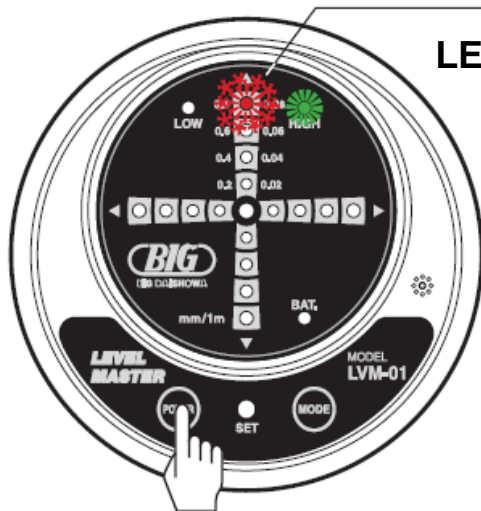
(4) When the power is turned on, High mode is the initial setting. (Inclination: 0.01mm-0.10mm)

If LED (RED) is blinking at 0.08mm, the inclination is over 0.1mm.

And you need to change the Mode from High to Low. (0.1mm-1mm)

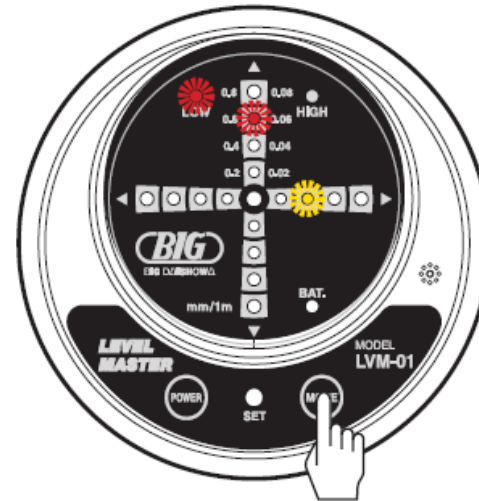
If LED (RED) is on or other LED is on, the inclination is within 0.08mm, follow the procedure (7) below in High mode.

When Level Master is turned on,



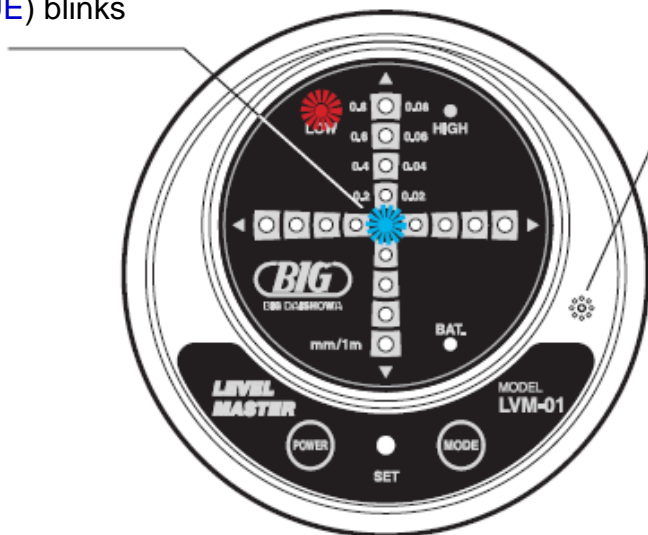
LED (RED) blinks

Change Mode from High to Low



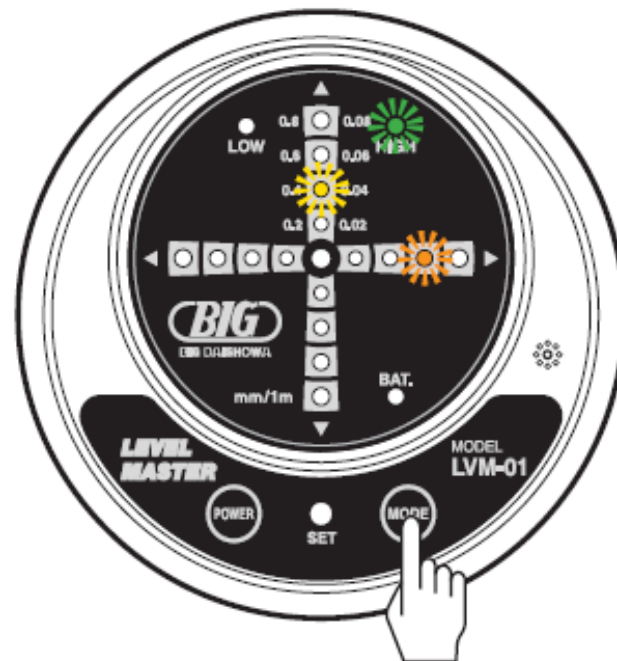
- (5) In Low mode, adjust the level and make LED (BLUE) light on. When LED (BLUE) is on, the inclination is within 0.1mm.  
When only 1 of 2 axis (X,Y) is adjusted until inclination= within 0.1, LED (BLUE) blinks and buzzer makes sound like “Pi, Pi”  
When both of 2 axis (X,Y) is adjusted until 0.1 inclination, LED (BLUE) lights on and the buzzer makes sound like “Pi, Pi, Pi”.

LED (BLUE) blinks



Buzzer makes sound

- (6) Change Mode from Low to High.

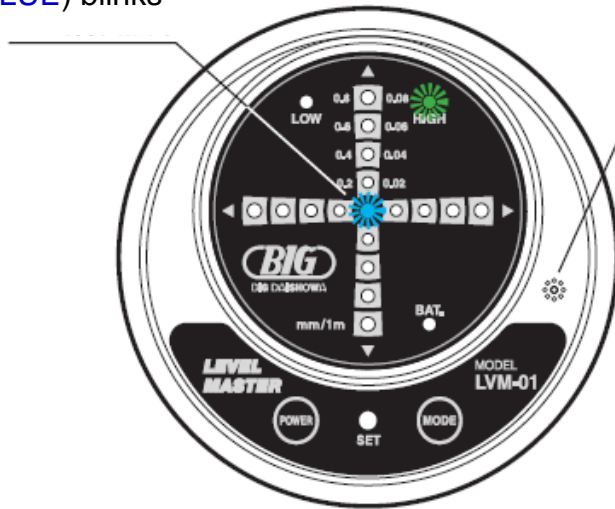


(7) Adjust the level and make LED (BLUE) light on.

When only 1 of 2 axis (X,Y) is adjusted until inclination= within 0.01, LED (BLUE) blinks and buzzer makes sound like “Pi, Pi”  
When both of 2 axis (X,Y) is adjusted until 0.01 inclination, LED (BLUE) lights on and the buzzer makes sound like “Pi, Pi, Pi”.

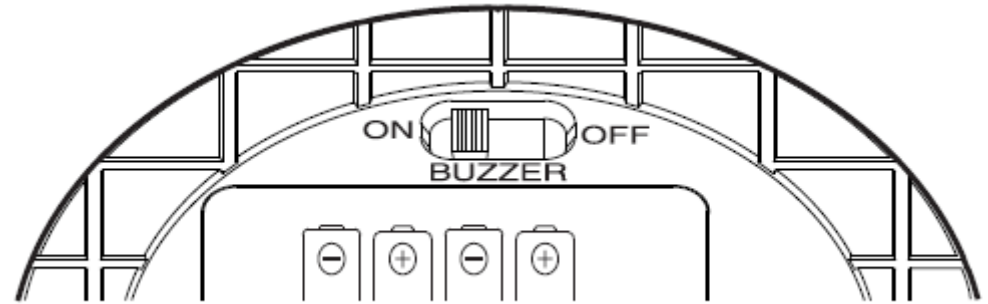
LED (BLUE) blinks

Buzzer makes sound



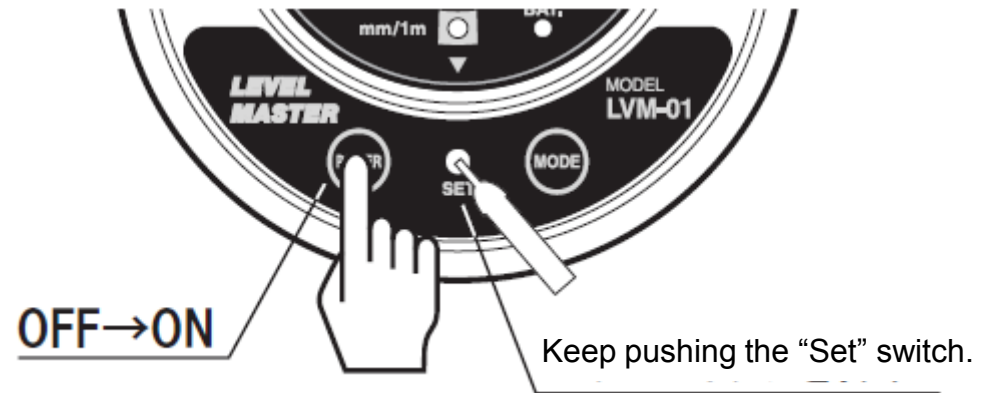
## 5-2 Buzzer setting

You can turn on/ off the buzzer.



## 5-3 Default setting

If you want to return to the default setting, keep pushing the “Set” switch and turn on the Power. Data inside Level Master will be cleared.





## 6. Note

- To keep the absolute level within 0.01mm, use the surface flat with good flatness.
- The diameter of Level Master is dia.109mm. Even 2 micron particle causes 0.018mm error per 1m.
- Level Master is the high precision device. Do not give the outer shock to it.  
After the use, apply the oil on the bottom and store it in the dedicated box.
- Storage temperature should be within 0-40 Celsius.
- Avoid splashing the coolant liquid. Do not leave Level master on the machine table, surface flat and jig.
- Do not make the disassembling and modification at customer. It inferior the performance and life of Level Master.
- Remove the battery if the unit is not used for the long period.

## 7. Guarantee

Guarantee period : 1 year after delivery

Any trouble or damage by:

- exposure to vibration or shock of 3G or more,
- intentional disassembling,
- misuse, unauthorized repair or remodeling,
- transport, move, fall, etc. after purchase or
- fire, earthquake, wind and flood, thunder, salt water and any other natural disaster

is, however, excluded from the scope of guaranty.