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# SlopeView TLL-90 User Guide

V20100426



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# 1) Introduction

The SlopeView TLL-90 is a low cost and high accurate device for measuring surface and single axis inclinations. It is based on the revolutionary technology called Micro-Electro-Mechanical Systems (MEMS), in conjunction with sophisticated software techniques to accomplish a guaranteed accuracy of better than  $\pm 0.05^\circ$  and with measurement resolution of  $0.01^\circ$  in the favorable measurement range.

SlopeView TLL-90 provides not only ultra high precision measurement of angle but also bundles with a Class2 tile laser for extending the angle projection and provides alignment aid for the user's work. Together with other distinguished features such as dot matrix LCD, beeper alert and precision settings, SlopeView TLL-90 is the best tool to make your work better and easier.





## Features:



- 1) High accuracy  $\pm (0.05^\circ + 1\%)$  , high resolution  $0.01^\circ$
- 2) Laser Alignment
- 3) Dual and Single axis with user friendly LCD display angle
- 4) Rechargeable
- 5) V Shape metal case for easy to fit at the corner or pipe.
- 6) Magnetic base
- 7) Audible alarming at settable angle range

## 2) Specifications


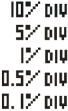

<b>Accuracy:</b>	$\pm (0.05^\circ + 1\%)$
<b>Measuring range:</b>	Single axis: $360^\circ$ , Dual axis: $\pm 40^\circ$
<b>Resolution:</b>	$0.01^\circ$
<b>Response time:</b>	<0.4 second
<b>Laser Beam:</b>	Class 2, 635nm red laser, < 1mW
<b>Audio sound:</b>	60dB @ 30cm
<b>Operating temperature:</b>	0 to $50^\circ\text{C}$
<b>Storage temperature:</b>	$-10$ to $60^\circ\text{C}$
<b>User Interface:</b>	Mono-color LCD with backlight
<b>Supply Power:</b>	Rechargeable Li-Ion Battery, 3.7Volt.
<b>Charger port:</b>	5V 500mA Mini type-B USB port
<b>Power Consumption:</b>	Standby: 200uA, Operation: 20mA.
<b>Standby Battery Life:</b>	2000 hours
<b>Operating Battery Life:</b>	40 hours
<b>Dimensions (in mm):</b>	93(L) x 66(W) x 28(H)
<b>Magnetic Base:</b>	affix at the bottom and back.

### 3) Button Functions




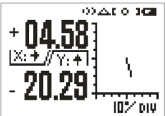
Button	Function Descriptions	
	Normal Mode	Set Mode
	In normal operation, this button turns the device ON/OFF. Press and hold for 3 seconds to enable or disable backlight	During set function, this button serves as an escape key for each selection menu.
	When pressed, the current reading is set to zero; subsequent measurements are relative to this reading. The LCD will show the  icon to indicate the device is in zero mode. Press and hold for 3 seconds to enable or disable sound. The  icon on LCD will be displaced accordingly. The buzzer beep could be set at different accuracy level. Refer to section " <b>Angle Alarming</b> ".	Serves as the upward key for option selection.

	<p>When pressed, the current value will be <b>mm</b> frozen, the unit icon <b>[ ° ]</b> will be flash to indicate the reading is on hold. Press and hold for 3 seconds to change the measurement unit to either degree/mm per meter. The measurement unit will be displayed on the LCD accordingly.</p>	<p>Serves as the downward key for option selection.</p>
	<p>Press and hold for 3 seconds to enter Set mode, for set mode options. Press to turn laser ON/OFF. The laser line is aligned in parallel with the Top and Bottom side edges, and it is in perpendicular with the Back side. To switch on/off the laser beam, simply press the Laser Button again.</p>	<p>Serves as Set key for selected option.</p>

## LCD Icons Representations

	<p>Battery status indication icons These icons indicate the battery level. There are 3 levels representing empty, half and full. When the</p>
	<p>In dual-axis mode, the LCD displays the direction of tilt graphically. The unit of scale is displayed below the graph with different scales. The scale is adjusted automatically depending on the measured angle. These icons show the available scales.</p>
	<p>These 2 icons show the unit of the measurement. User can switch the measured unit to either mm/m (mm per meter) or in degree mode. The mm/m unit indicates how many mm/m to level. It is calculate by:  <math display="block">\text{mm/m} = \sin (\text{Angle}) * 1000 \text{ mm}</math></p>



	<p>Sound notification on. Blank as off</p>
	<p>Show this logo as relative value is showing. When the Zero button is pressed, the unit reset current angle to zero.</p>
	<p>Direction of tilt icons, show the tilt angle direction with respect to the unit bottom right hand corner.</p>
	<p>Dual-Axis Mode. Both the X and Y axis angle will be showed. Dual axis mode measures inclination upto +30 degree for each axis before it automatically switch to single axis mode.</p>



Single Axis Mode. Measure slope upto +90 degree.

The triangle icon indicates the direction of tilt with respect to the bottom right corner of the unit.



## 4) Battery Charging

The SlopeView TLL-90 has a built in Lithium Ion rechargeable battery. A standard charger is supplied that the input voltage is 110V to 240V AC, 50/60Hz, and the output is 5V DC, 500mA. The charger operating procedure is list below:


- 1) Plug the Charger into AC socket, the RED on the charger should turned ON,
- 2) Plug the USB charging cable to the Charger,
- 3) Insert the other end of the USB cable to the unit,
- 4) The battery icon on the LCD blinks to indicate charging in process. Upon charging complete, the icon stops blinking.
- 5) The charging time is approx. 3 hours.

The unit could also be charged by connecting the USB cable to the unit and a computer's USB port. This has the same effect when charging the unit with the provided adaptor.

Note: When the unit is turned OFF, and plug in the USB charge cable, the LCD will no show anything, it is NORMAL. Once the unit is turned ON, the battery icon should flash indicating the unit is in charging mode.


## 5) Degree or mm Measurement Mode

### Degree Mode:

LCD Icon: [  ]

Degree mode 360° for one circle, it will display the tilt angle relative gravity leveling.

### mm/m Mode:

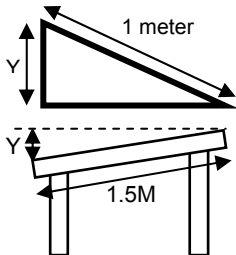
LCD Icon: 

Millimeter per meter mode. Place the tester in a tilt plane.

LCD display Y (mm) for the plane is 1 M length.

For example, if you are setting a table to level.

- Table surface is 1.5M length
- Set to MM mode; place the device on the table.
- The reading is 5mm/m on LCD
- That means  $Y = 5 \times 1.5 = 7.5\text{mm}$  difference from leveling.




### Degree and mm/m Mode Switching:

Press and hold the “HOLD” key for 3 seconds to switch between the Degree and mm mode.

## 6) Relative/ Absolute Measurement

### Relative Measurement

LCD Icon: 

### Absolute Measurement


LCD Icon: **Blank**

### Relative and Absolute Mode Switching:

- 1 Press and release the “” key to set the relative measurement zero point
- 2 Press and release the “” key to cancel the relative zero point and back to absolute measurement mode.

## 7) Hold Function

### Holding Mode:

LCD Icon blinking: 

### Holding function:

1. Press and release the “HOLD” key to activate holding function, digit will freeze.
2. Press and release the “HOLD” key to cancel the holding function.

## 8) Auto Power Off

For no movement in 30 minutes, the unit will power off.  
Or we can set to never sleep mode at below instruction.

### **Power auto off setting:**

1. Press and hold "Laser/Set" key and enter MENU mode
2. Select "POWER" by "Zero" and "Hold" key, press "Laser/Set" key to enter Power mode
3. Scroll "NEVER" or "30MIN" by "Zero" and "Hold" key
4. Press "Laser/Set" key to confirm NEVER or 30MIN (30 minutes) sleep

## 9) Restore Factory Setting

When you find that the unit is abnormal, you can restore the unit to factory setting.  
All calibration setting will be restored to factory setting.


*\*Not suggest restore to factory setting in normal status, if for accuracy drift, please follow **Calibration**. After factory set, please redo calibration to ensure the accuracy.*

### **Restore to factory setting:**

1. Press and hold "Laser/Set" key and enter MENU mode
2. Select "FACTORY SET" by "Zero" and "Hold" key, press "Laser/Set" key to enter FACTORY SET mode
3. Scroll "YES" or "NO" by "Zero" and "Hold" key
4. Press "Laser/Set" key to confirm

## 10) Angle Alarming

Alarming Mode:

LCD Icon: 

**Alarming Angle setting:**

1. Press and hold "Laser/Set" key and enter MENU mode
2. Select "BUZZER" by "Zero" and "Hold" key, press "Laser/Set" key to enter BUZZER setting  
Press and hold "Up" and "Down" key for fast scrolling the digit.
3. Press "Laser/Set" to enter setting value

BUZZER	
>SINGLE :	00.00
DUAL.X :	00.00
DUAL.Y :	00.00
RANGE :	00.50

SINGLE	Vertical / Single axis mode alarming angle (Degree)
DUAL.X	Horizontal/ Dual axis mode X axis alarming angle (Degree)
DUAL.Y	Horizontal/ Dual axis mode Y axis alarming angle (Degree)
RANGE	The range (Degree)that will trigger the audible alarming For example: SINGLE. set to 20.00 RANGE set to 01.00 While the unit is in $+19^{\circ}$ to $+21^{\circ}$ or $-19^{\circ}$ to $-21^{\circ}$ ; the unit will alarm

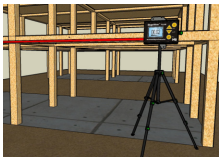
# 11) Laser Alignment

## Laser ON/OFF:

Press and release "Laser/Set" key to switch the tile laser on or off.

## Draw a laser line on wall in different angle:

- 1) Install the metal plate with tripod and place near the wall
- 2) Tune the metal plane at vertical angle.
- 3) Place the TLL90 on the metal plate, the magnetic base will stick the TLL90 on the metal plate.
- 4) Laser on; tune the position of the TLL90 to set to your specific angle.

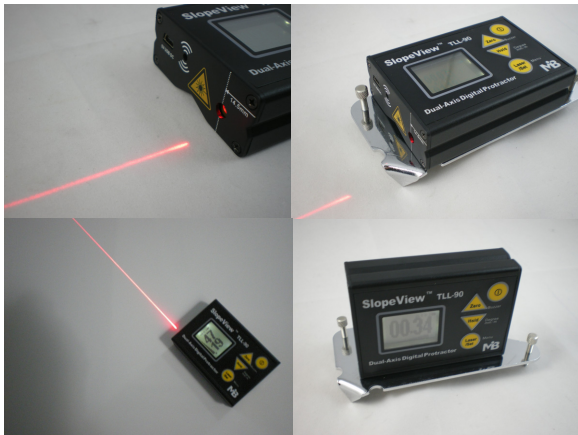


## Draw a vertical line or horizontal line without tripod:

- 1) Place the metal plate on a table
- 2) Place TLL90 on the metal plate with dual axis mode
- 3) Tune the 2 screw and let the metal plane become level
- 4) You can then laser on the TLL90 and it will project a vertical or horizontal line to the wall within 5m.







## 12) Calibration

Calibrate the unit, once you found that there is accuracy drift on the unit. You can verify the accuracy at below step:



At Step1, you measured X and Y value,  $X_1$  and  $Y_1$

At Step2, you measured  $X_2$  and  $Y_2$ , in theory  $X_1 = -X_2$ ,  $Y_1 = -Y_2$ .

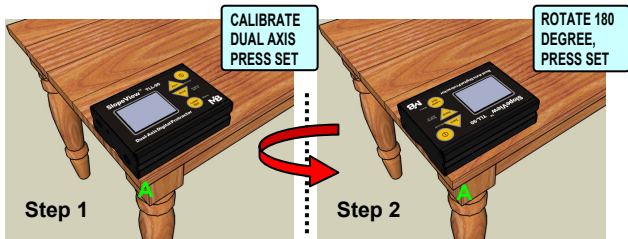
If the error is too large, you can enter calibration mode to eliminate the error

Accuracy drift is causing by large ambient temperature change (5 to 10 Degree Celsius) or the unit has been dropped.

## Calibration Procedure:

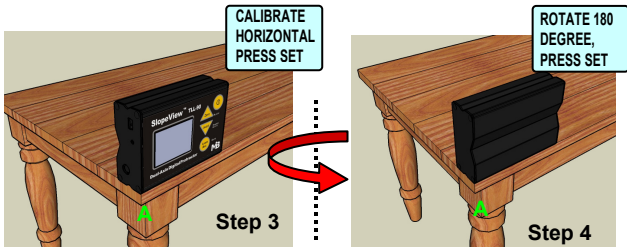
**Step 1:** Press and hold the “Laser/Set” key enter Menu mode. Select “Calibration” mode, press “Set”. Place the unit on a flat table (no need perfect level table) LCD display “CALIBRATE DUAL AXIS PRESS SET”, press set and buzzer will beep; wait until the beep sound stop. While the buzzer is beeping keep the unit stable

**Step 2:** Then rotate the unit 180 degree with the other side against the at the same place. Press the Set button again, and wait for the beep finished.



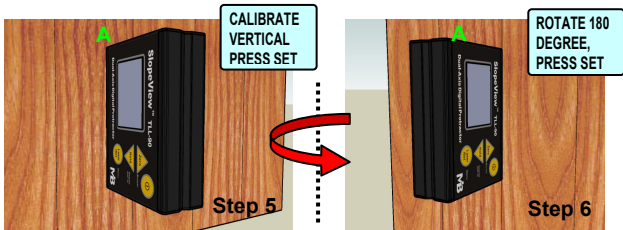
**Step 3:** LCD display “CALIBRATE HORIZONTAL PRESS SET”. Place the unit horizontal like the picture “STEP 3” and then press Set, wait until the beep sound stop.

**Step 4:** Then rotate the unit 180 degree at the same place. Press the Set button again, and wait for the beep finished.



**Step 5:** LCD display “CALIBRATE VERTICAL PRESS SET”, mention that the LCD in upper side, hold on a flat wall. And then press “Laser/Set” Key. Wait for the “Beep” sound stop.

**Step 6:** Then rotate the unit 180 degree with the other side against the at the same place wall (LCD in upper side). Press the Set button again, and wait for the beep finished. Now, the LCD should go back to the selection menu. The calibration is done, by selecting “Back” to go back for normal operation



## 13) PC Communication

Slopeview TLL-90 has a PC data logging function.

You can not directly plug the USB cable between PC to TLL-90 by a general USB cable.

You need to optional purchase the PC adapter (model number: SV-RS232)

You can continue to data logging TLL-90 X and Y inclination data to PC.

Sampling time is around 2 Hz.

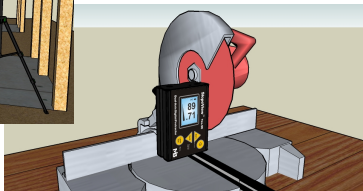
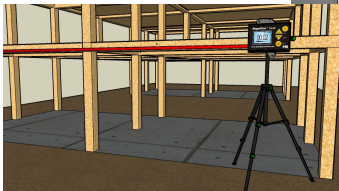
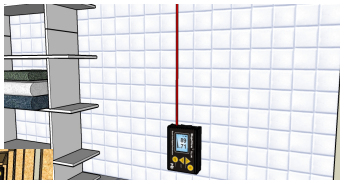
Specification:

- 1) RS232 Com Port 9600 baud rate
- 2) USB connection (SV-RS232 include a RS232 to USB adapter)

Detail can visit our website or contact our sales person.

## 14) Application

- Interior decoration
- Construction area
- Plumbing
- Floors & Stairs
- Woodwork



## 15) Warranty

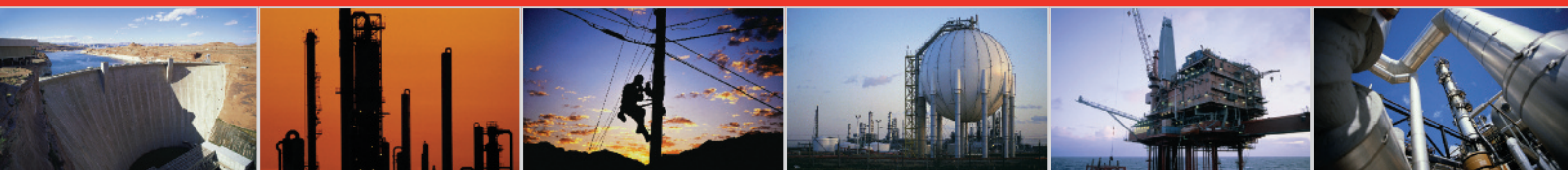
The SlopeView TLL-90 comes with 12 months warranty from the date of purchase. The warranty ensures the SlopeView TLL-90 is free of defects in materials and workmanship during manufacturing. In case of malfunction or defects due to materials or workmanship, MIB Instruments Co. will repair or replace the device provided that the original purchaser meets the following guidelines:

- 1) Notify the dealer from whom the unit was purchased about the failure,
- 2) Return the unit to the dealer,
- 3) Provide original receipt of purchase,

This warranty does not cover damage resulting from accident, misuse or abuse, tampering, disassembled or attempted by unauthorized agencies. This also includes units that have been modified in any fashion, or units that have not been maintained in accordance with the instructions in this manual.  
END.



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