

Digi-Pas[®]

Installation and Operation Guidelines for DWL3000XY and DWL3500XY 2-Axis High Precision Digital Machinist Level

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1. DEVICE OVERVIEW

1.1. Technical Specification

	DWL-3000XY	DWL-3500XY
Measuring Range	0° ~ ±90.00° (Single-Axis) 0° ~ ±15.00° (Dual-Axis)	0° ~ ±20.000° (Single-Axis) 0° ~ ±10.000° (Dual-Axis)
Resolution & Repeatability	0.01° (175µm/M) (0.002 in/Ft)	0.001° (18µm/M) (0.0002 in/Ft)
Accuracy	± 0.01° at 0° to 10.00° ± 0.03° at other angles	± 0.001° at 0° to 2.000° ± 0.003° at other angles
Display	Color TFT LCD	
Power Supply*	4 x AAA 1.5V Batteries / USB	
Connectivity	USB 2.0 Cable (≤ 5 metre) Bluetooth (≤30 metre) (Optional)	
Material	PC ABS / Aluminium	PC ABS / Alloy Steel
Operating Temperature	10°F to 120°F or -10°C to +50°C (Calibrated for the entire temperature range)	
Dimension	188mm x 62mm x 37mm	
Weight (Approx.)	580g	1100g
Cross Axis Error	Negligible (± 0.0025°)	Negligible (± 0.00025°)
PC SYNC Software	Basic Edition Professional Edition (Optional)	
Vibrometer	2.0g	
User Self Calibration	Yes	

Table 1. Technical specification of DWL3000XY & DWL3500XY

Notes:

- Product specification and appearance are subject to change for product improvement without prior notice.
- *Alternative power can be obtained from External USB Power Source.
- Product performance to specification complies with accredited Calibration & Test Providers in USA, Japan, UK, and Germany to conform with NIST, JIS, UKAS & DIN under the International Laboratory Accreditation Cooperation (ILAC) and American Association for Laboratory Accreditation (A2LA). For more information, please visit "www.digipas.com".

1.2. Device Overview

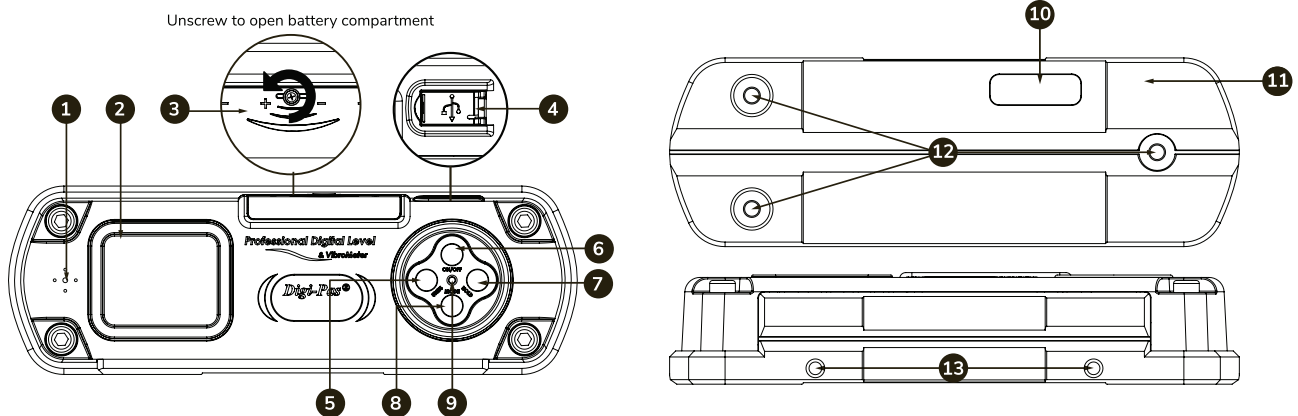


Figure 1. Overview of the Machinist Level

- | | |
|---|---|
| 1. Buzzer sound alert | 8. MODE: |
| 2. LCD Colour graphic digital display | 9. CAL / Activate calibration mode |
| 3. Battery Compartment of 4 x "AAA" size 1.5V batteries | 10. Product Serial Number |
| 4. USB Port | 11. Steel Alloy base with magnet |
| 5. Unit | 12. Base screw holes: For mounting dome screws to achieve 3-point contact base levelling* |
| 6. On/Off Button | 13. Side screw holes: For mounting |
| 7. HOLD / Right Scroll button | |

1.3. LCD Display Overview

1.3.1. Single Axis Mode

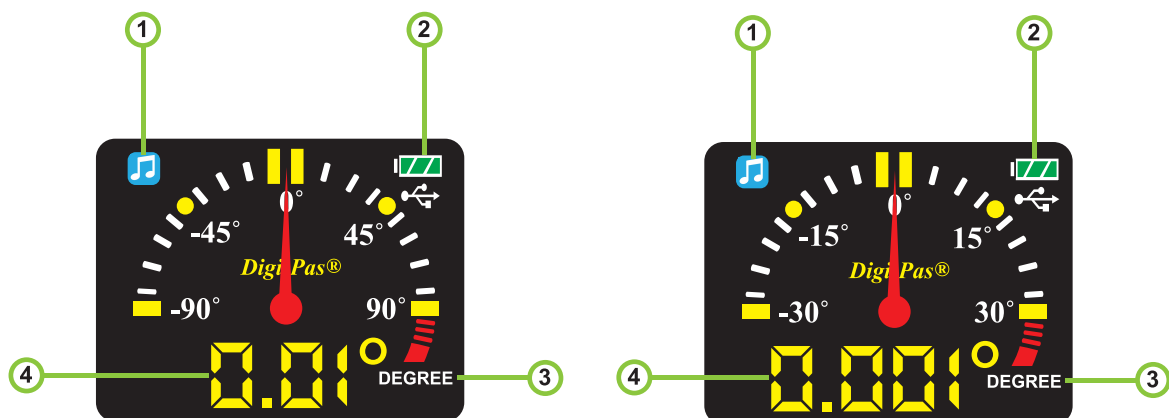


Figure 2. Single Axis Display DWL-3000XY & DWL-3500XY

- | | |
|--------------------|---------------------|
| 1. Sound Alert | 3. Battery Level |
| 2. Digital Reading | 4. Measurement Unit |

1.3.2. Dual Axis Mode

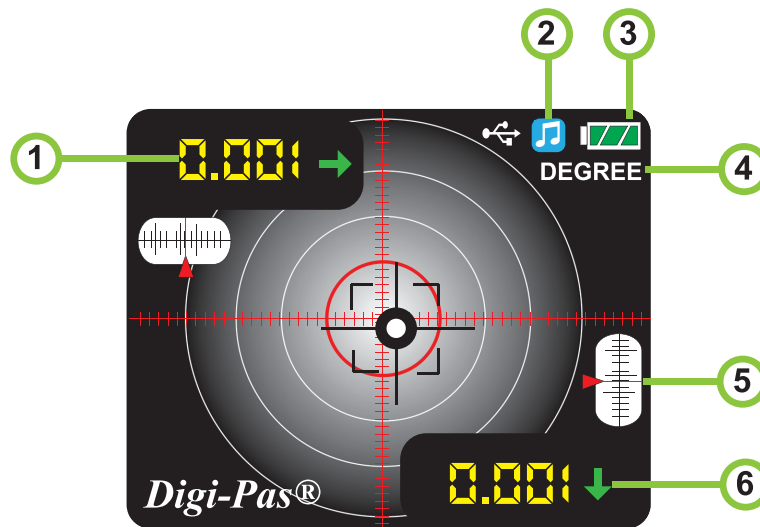


Figure 3. Dual Axis Display of DWL3500XY

- | | |
|--|--------------------------------------|
| 1. Horizontal (X) Axis Digital Reading | 4. Measurement Units |
| 2. Sound Alert | 5. Micrometer |
| 3. Battery Level | 6. Vertical (Y) Axis Digital Reading |

1.3.3. Dual Axis Mode

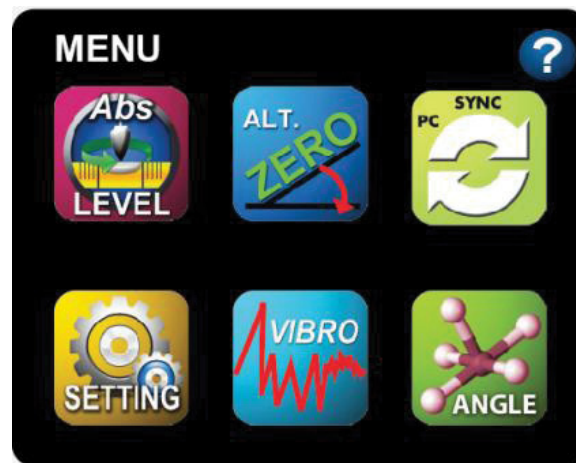


Figure 4. Main menu display DWL3000XY & DWL3500XY Bluetooth version

1.3.4. Main Menu Icon Features



ABSOLUTE LEVEL

Enable user to ensure each measurement reading is in accordance with the maximum device accuracy specified.

**ALTERNATE ZERO**

Enable user to measure relative angles at a common plane with respect to a reference angle. Set any angle to 0.00° as a reference.

**SETTING MENU**

Enable user to modify various parameters of the device.

**VIBRO METER**

Enables user to obtain real-time continuous vibration measurements displayed in line graph.

*This feature is only applicable to Bluetooth device.

**ANGLE METER**

Enables user to obtain real-time continuous angle measurements displayed in line graph.

*This feature is only applicable to Bluetooth device.

**SYNC MENU**

Enables user to select the connectivity (USB/Bluetooth) with a computer installed with PC Sync Software.

*This feature is only applicable to Bluetooth device.

**HELP MENU**

Enable user to have a quick and easy reference on Device's button configuration.

For Bluetooth device, the HELP icon is represented as “?” instead.

1.4. List of Items

Item No.	Description	Quantity
1	DWL 3000XY Precision Digital Level	1 Unit
2	Certificate of calibration	1 Set
3	AAA batteries	4 Pcs
4	USB 2.0 cable (3 Meters)	1 Pc
5	Quick Guide	1 Pc
6	Dome Screws	3 Pcs

Table 2. List of items included in DWL-3000XY product package

Item No.	Description	Quantity
1	DWL 3500XY Precision Digital Level	1 Unit
2	Certificate of calibration	1 Set
3	AAA batteries	4 Pcs
4	USB 2.0 cable (3 Meters)	1 Pc
5	Quick Guide	1 Pc
6	Dome Screws	3 Pcs

Table 3. List of items included in DWL-3500XY product package

2. OPERATION PROCEDURE

2.1. Initialization

1. Insert 4 pieces of “AAA” batteries into the battery compartment and press ON/OFF button. Alternatively, insert USB power source to the USB Port to power up the device. Take note that the device performance might be affected when poorly regulated USB power source is used.



Please ensure batteries are inserted incorrect polarity direction for a device to work.

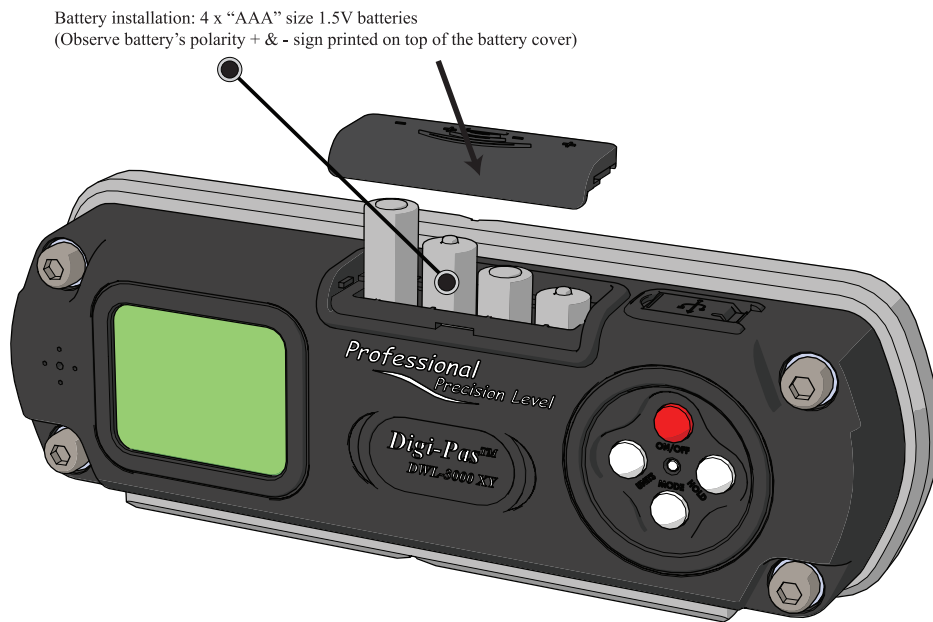


Figure 5. Power source of the device

- Initial Setup screen pops up. Press ON/OFF button to scroll up or MODE button to scroll down for selecting "Default Units". For DWL-3500XY it is required to select "Current Device Location", Select the nearest option when your location is not available in the default list. Scroll to select "Done" to continue.

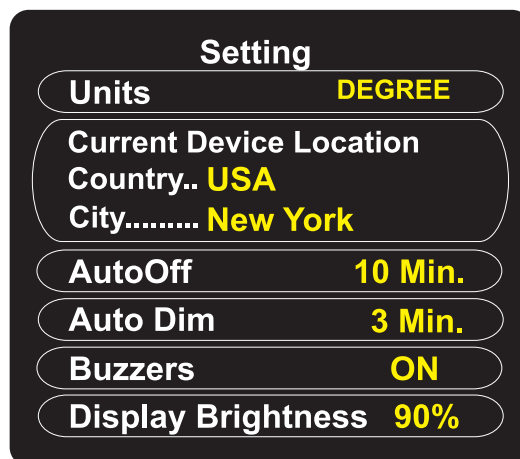


Figure 6. DWL-3500XY Device Initial Setup

- Allow sufficient time for device to warm up and stabilise after turning on the device.
- Device ready to use.



For maximum accuracy, perform calibration (refer to APPENDIX: User Calibration) or Absolute Level (refer to Chapter 2.3: Absolute Level Mode) before measurement.

Calibration tutorial video available on Digipas website, please visit the following link:
<https://www.digipas.com/support/video.php>

2.2. Mounting Device On Fixture or Work Piece

1. The two threaded holes are provided for mounting the device onto user-defined fixtures/machinery.

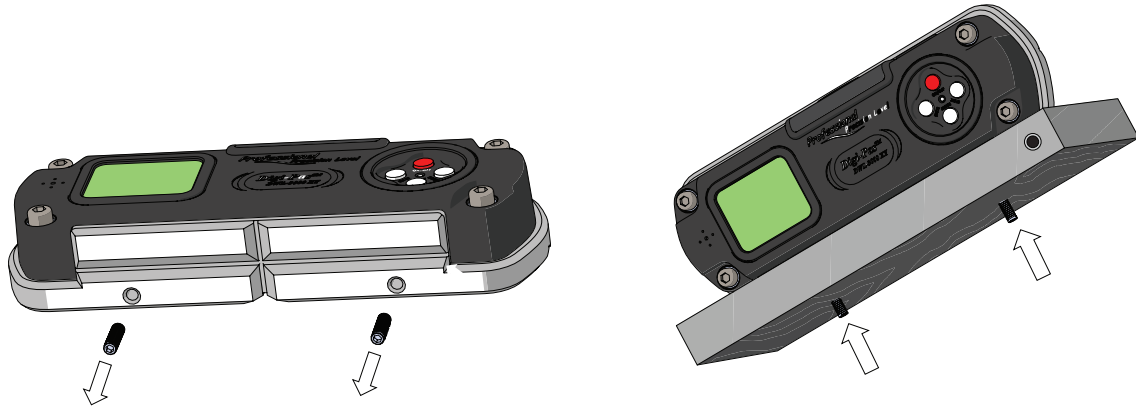


Figure 7. M5 screw location for mounting

2. To mount the device onto user's defined fixture or work piece. Remove both the set screw (M5), then replace with appropriate type of screws specified by user.

2.3. Single Axis & Dual Axis Mode Interface

To change display reading value from X to Y axis or vice versa. Turn the device vertically and the display screen will automatically change from metered into "Target Ball" or "Bull Eye" (refer to Sub-chapter 1.3: LED Display Overview for more details).



Please ensure the contact surfaces of the device and measuring plane are clean and free from dust particles.

The device is able to auto detect its position is single axis position or dual-axis.

2.4. Absolute Level Mode

1. Place the device on the surface to be measured. Press "**MODE**" button to start the measurement and wait until the loading bar is full.



Please ensure the contact surfaces of the device and measuring plane are clean and free from dust particles.

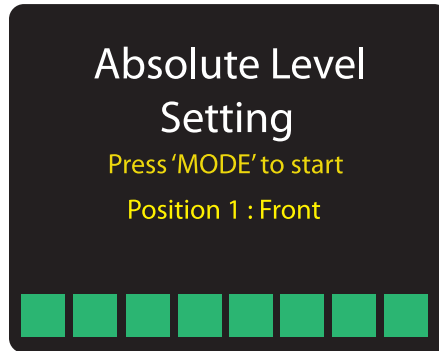


Figure 8. Absolute level setting position 1 display

2. Turn the device 180° and press MODE button again to start the measurement.



Figure 9. Absolute level setting position 2 display

3. Turn the device 180° and press MODE button again to start the measurement.

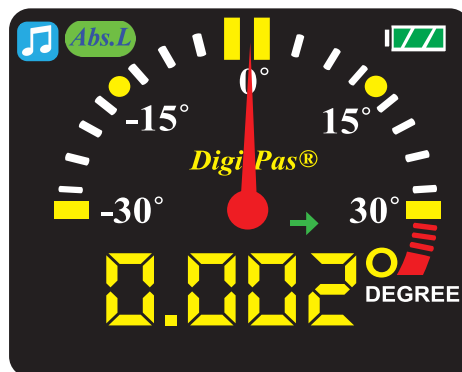


Figure 10. Absolute level display

2.5. Alternate Zero Mode

Place the digital level on the surface to be measured. Press “**MODE**” button to set the angle to 0° as a reference.



Please ensure the contact surfaces of the device and measuring plane are clean and free from dust particles.

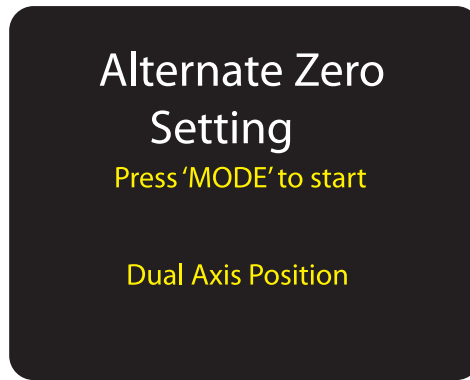


Figure 11. Alternate zero mode display

Single Axis Position : The **ALT.Z** logo is shown to indicate that the device is in Alternate Zero mode. A reference line is displayed to indicate the angle.

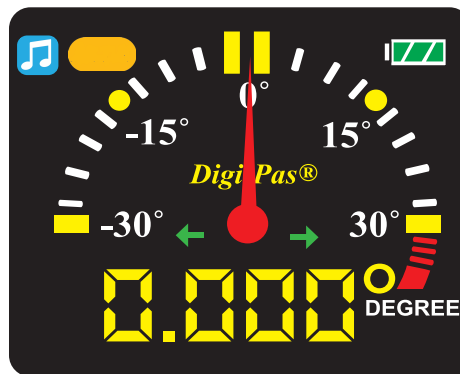


Figure 12. Alternate zero mode of single axis position

Dual Axis Position : The **ALT.Z** logo is shown to indicate the device is in the Alternate Zero mode. A reference crosshair is displayed to indicate the real angle.

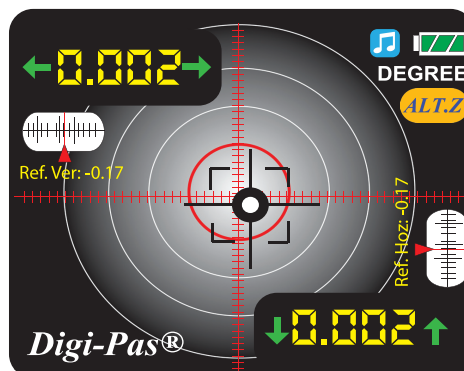


Figure 13. Alternate zero mode of dual axis position

2.6. SYNC Menu Mode

14. The status bar indicates current selected mode as Bluetooth then press "**MODE**" button. To change to USB mode, scroll the '**Left**' button.

 Bluetooth only available on Bluetooth version device.

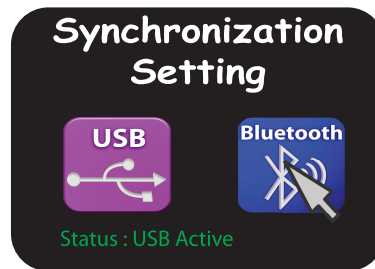


Figure 14. SYNC menu display

15. Reboot the device by turning off the device and then turn on the device again to activate the new setting.

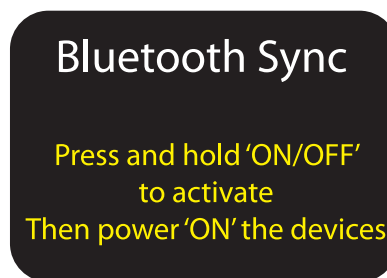


Figure 15. Bluetooth sync setting


16. Once Bluetooth mode is activated, the icon  will display on the single and dual-axis mode screen display.



Figure 16. Bluetooth sync mode

2.7. Angle Meter Mode

Place the digital level on the surface to be measured.



Please ensure the contact surfaces of the device and measuring plane are clean and free from dust particles.

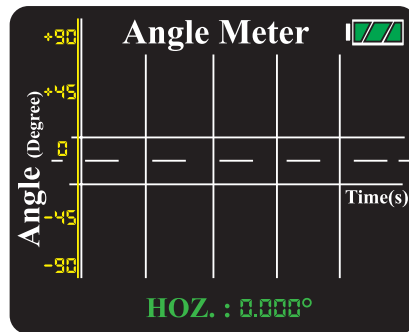


Figure 17. Operation of angle meter display

The Angle Meter displays real-time continuous angle measurements in line graph.

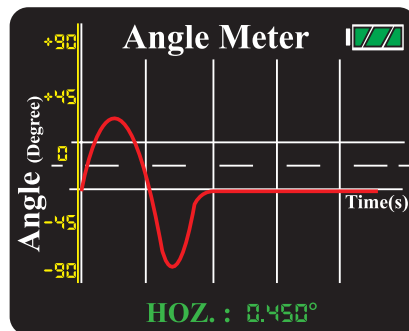


Figure 18. Freeze display of angle meter mode

User may “freeze” the screen by pressing the HOLD button. The HOLD icon pops up to indicate the screen is paused. To resume operation, press the hold button once.

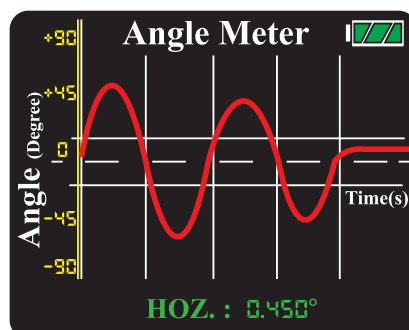


Figure 19. Angle meter mode

2.8. Vibro Meter Mode

Place the device on the surface to be measured. Press Auto Set button to set the line graph to the centre of display.



Please ensure the contact surfaces of the device and measuring plane are clean and free from dust particles.

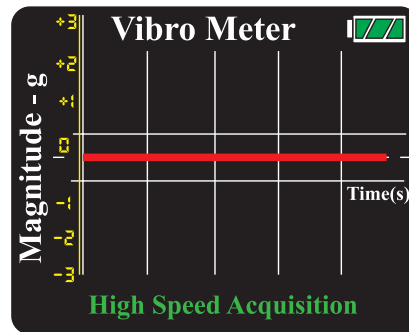


Figure 20. Operation of vibro meter mode

When the device detect the vibration, the relative magnitude (g) is shown on the graph.

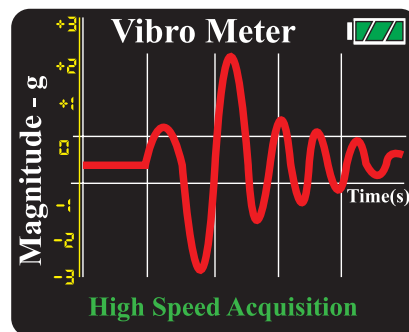


Figure 21. Freeze display of vibro meter mode

To change the scale and speed of the line graph, press the scale selection button or the speed selection button accordingly.

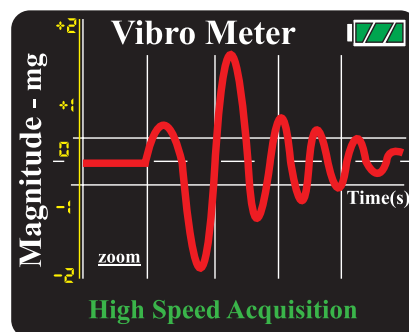


Figure 22. Vibro meter mode

2.9. Setting Menu

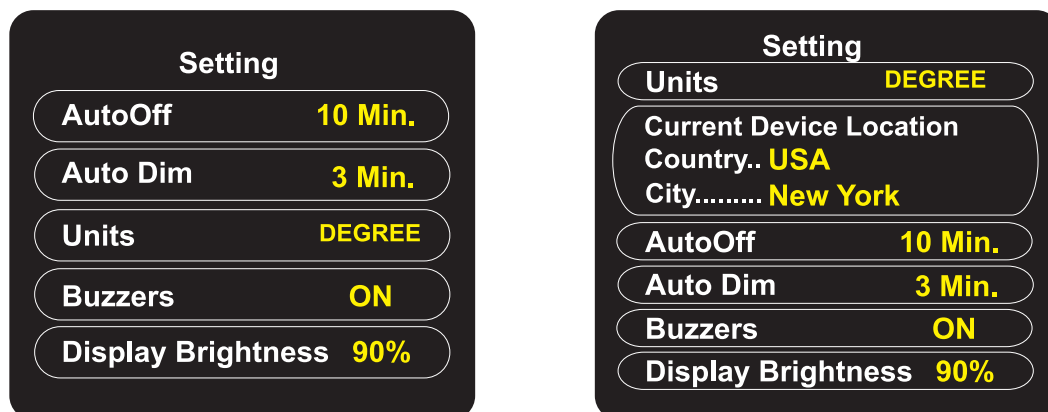


Figure 23. Setting menu display DWL3000XY & DWL3500XY

Menu	Description
Auto Off	To set automatic power off according to user defined time period.
Auto Dim	To set automatic dim according to user defined time period.
Units	To change the measuring unit (Degree, mm/M, In/FT).
Buzzer	To turn on/off the device buzzer.
Display Brightness	To set LCD brightness according to user defined level.

Table 4. Setting menu function

3. STORAGE AND CLEANING

4. Storage

Keep the device in the equipment box and maintain the storage temperature within -20°C to 60°C or -4°F to 140°F.

When the device is not in used, the batteries are to be removed from the device.

4.1. Cleaning

1. Keep the device dry and clean. Remove any moisture or dirt with a soft dry cloth before measurement to obtain the maximum accuracy. Do not use harsh chemicals, strong detergents or cleaning solvent to clean the device.
2. Do not submerge device in liquid while cleaning.

5. WARRANTY

Digi-Pas® 2-Axis High Precision Digital level is warranted to the original purchaser to be free from defects in workmanship and material. JSB Tech will, at its option, repair or replace any defective part which may malfunction under normal and proper use within a period of 2 (two) years from the date of purchase. The forgoing warranty shall not apply to defects resulting from misuse, abuse, assignment, or transfer by the Buyer. Buyer-supplied software or interfacing, unauthorized modification or operation outside of environment specifications for the product. JSB Tech does not warrant that the operation of instrument software, or firmware, will be uninterrupted or error free. The exclusive remedy under any and all warrants and guarantees, expressed herein, and we shall not be liable for damages from loss or delay of equipment uses, consequential, or incidental damage. No other Warranty is expressed or implied. JSB Tech specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

5.1. Limitation of Liability

In no event shall DIGIPAS TECHNOLOGIES, INC., (hereinafter, "the Company") be liable to you or any third party for any indirect, special, incidental, exemplary or consequential damages of any kind resulting from any breach of warranty or from the performance or use of the product. This includes without limitation: property damage, loss of value of the product or any third party products that are used with the product, or loss of use of the product or any third party products that are used with the product, even if the Company has been advised of the possibility of such loss or damages. The Company's total cumulative liability arising from or related to the product, whether in contract, tort (including negligence) or otherwise, shall not exceed the amount actually paid by you for the product. Some states and/or jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. If any limitation of liability shall be deemed invalid by any applicable law, then the limitations of liability set forth above shall apply to the maximum extent permitted under applicable law.

APPENDIX : USER CALIBRATION

Calibration Instruments:



	DWL3000XY	DWL3500XY
Granite Table	Grade AA (Levelled to ≤ 10 arcsec)	Grade AA (Levelled to ≤ 1.0 arcsec)
Master Square	Flatness : $\leq 2.0\mu\text{m}$ Perpendicularity: $\leq 2.0\mu\text{m}$ Parallelism: $\leq 2.0\mu\text{m}$	Not Required
Number of Calibration Steps	8	4

** Allow sufficient time for device to warm up and stabilise after turning on the device.

** Hold the device firmly and do not move the device during calibration process.

Calibration Procedure:



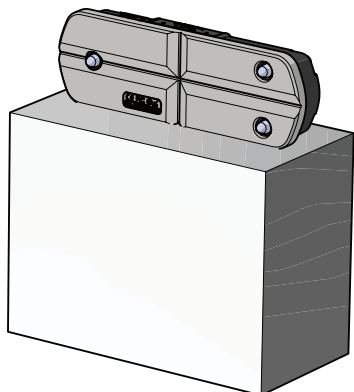
For DWL-3500XY model you only need to perform step 1 to step 4.

Calibration tutorial video available on Digipas website, please visit the following link:
<https://www.digipas.com/support/video.php>

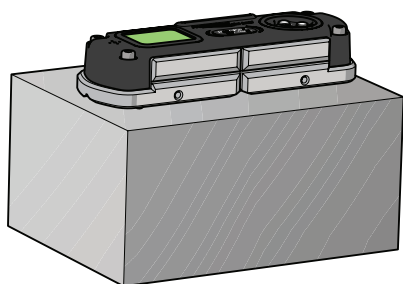


1. Power off the device. Press and hold the CAL button while concurrently press the ON/OFF button to get into calibration mode. "Calibration 1" will be shown on display screen.

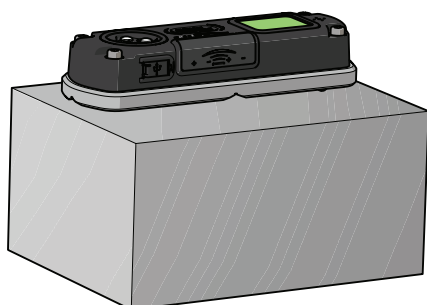
Place the device to Position 1. Press the MODE button once and wait until the countdown reach "0", the LCD screen displays "Calibration 2".



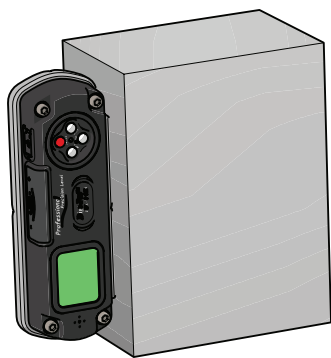
2. Turn the device 180° to Position 2. Press the MODE button again to start the calibration at "Position 2" and wait until the countdown reach "0", the LCD screen displays "Calibration 3".



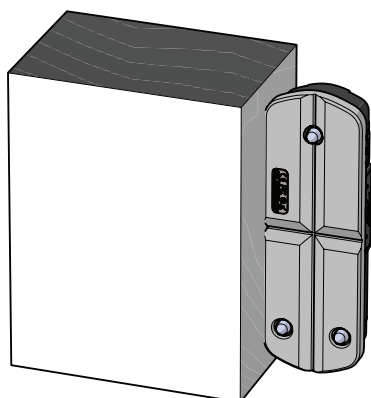
3. Place the device 90° on the side of Master Square as shown in Position 3. Hold the device firmly and do not move the device during each count down period. Press the MODE button again to start the calibration and wait until the countdown reach "0", the LCD screen displays "Calibration 4".



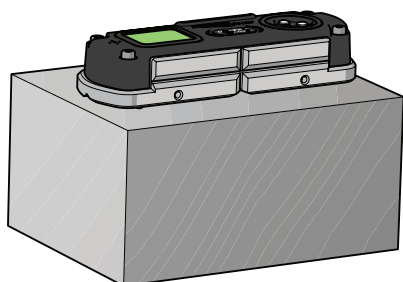
4. Turn the device 180° and place on the opposite side of the master square as shown in Position 4. Hold the device firmly and do not move the device during each count down period. Press the MODE button again to start the calibration and wait until the countdown reach "0", the LCD screen displays "Calibration 5".



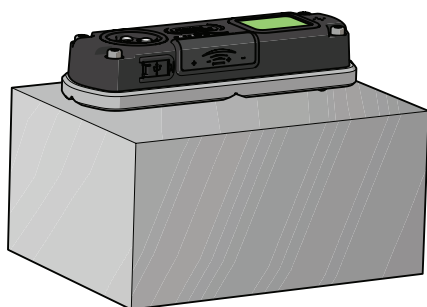
5. Rotate the device 180° as shown Position 5. Hold the device firmly and do not move the device during each count down period. Press the MODE button again to start the calibration and wait until the countdown reach "0", the LCD screen displays "Calibration 6".



6. Turn the device 180° and place on the opposite side of the master square as shown in Position 6. Hold the device firmly and do not move the device during each count down period. Press the MODE button again to start the calibration and wait until the countdown reach "0", the LCD screen displays "Calibration 7".



7. Place the device to Position 7. Press the MODE button once and wait until the countdown reach "0", the LCD screen displays "Calibration 8".



8. Turn the device 180° to Position 8. Press the MODE button again and wait until the countdown reach "0", the LCD screen will switch to measuring mode once calibration is completed.

APPENDIX : MOBILE APP

Digi-Pas Mobile App

Digi-Pas Level App is a user-friendly application, easily installed in any smartphones or tablets running on Apple/Android operating system. Users can fully utilize the remote wireless Bluetooth mobile connectivity for various Digi-Pas® 2-Axis High Precision Digital Levelling Devices to gain high productivity and quality alignment work.

This app has a FREE version (Digi-Pas Level) and a PAID version (Digi-Pas Level PAID). It instantly empowers machine installer to perform remote 2-Axis simultaneous levelling task, angle measurement, & 2D concurrent alignment activities by HALF the time, precision & 'one-man-operation' that traditional single-axis digital or 'bubble' levels are unable to match.

FREE Version



PAID Version

