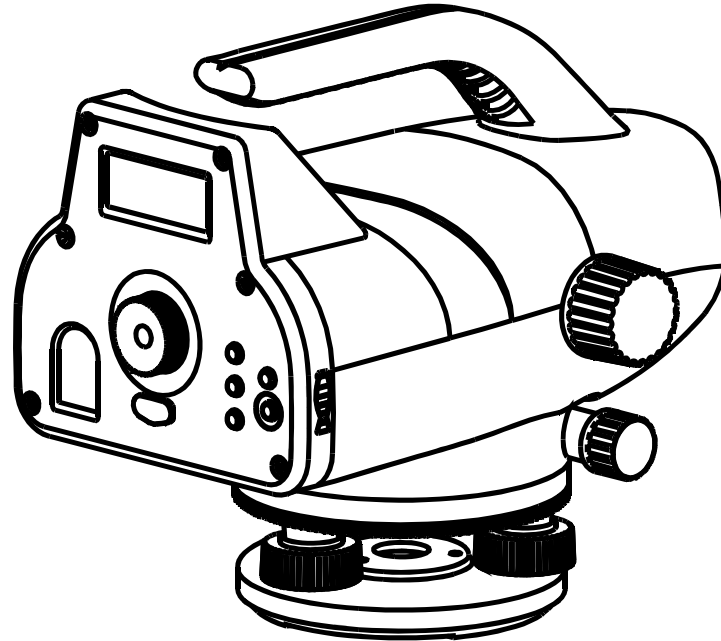


# *Digital Level*



**User Manual**

## **General**

Thank you for purchasing our digital level. To ensure correct operation, please read this manual carefully and keep it for future reference. Before using, check the packing list to make sure that all ordered items are included. Some of the diagrams in this manual are simplified to be understandable.

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## **1. Features and Functions :**

This product is a new type of digital level with the latest digital readout which helps users both read the result efficiently and reduce visual measurement errors. The digital level meets the requirements of various kinds of construction surveying, topographic surveying, agricultural surveying and leveling surveying. There is also a self-compensating design which can improve work efficiency.

This instrument is totally enclosed. It is IP55 certified, demonstrating almost complete protection from particles and a good level of protection against water. The instrument can be used at temperatures between  $-20^{\circ}\text{C}$  and  $+50^{\circ}\text{C}$ .

## 2. Specifications

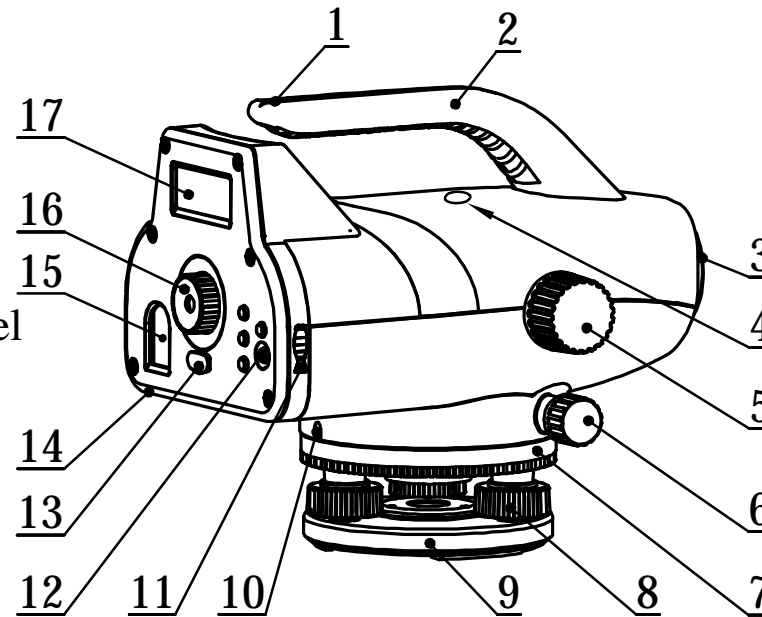
Magnification		32X
Image		Erect
Standard Deviation on 1 km of Double Leveling	Electronic measurement	$\pm 1.0\text{mm/km}$
	Visual Measurement	$\pm 1.5\text{mm/km}$
Accuracy of Distance Measurement	$D \leq 10\text{m}$	$< \pm 10\text{mm}$
	$10\text{m} < D \leq 50\text{m}$	$< \pm 0.1\%D$
	$D > 50\text{m}$	$< \pm 0.2\%D$
Measuring Range		2m~100m
Minimum Displayed Value	Elevation	0.0001m
	Distance	0.001m
Measuring Time		$< 3''$
Measuring Unit		m
Graduation of Horizontal Circle		$360^\circ$

Telescope	Resolving power	3"
	Field of View	1°20'
Compensator	Type	Magnetic Damping and Pendulum Mechanism
	Compensation Range	±15'
	Compensation Accuracy	0.3"/min
	Setting Accuracy	±0.4"
Data Storage	Internal	1000 Records
	Interface	Micro-USB
Circular Level Sensitivity		8'/2mm
Power Supply	Rechargeable Li-ion battery	2200mAh
	Continuous Working Time	>20 Hours
Net Weight		1.9Kg
Waterproof Grade		IP55
Operating Temperature		-20°C ~ 50°C

### 3. Instrument Description

#### 3.1. Parts of the Instrument

1. Coarse Sight
2. Lifting handle
3. Objective lens
4. Trigger Key
5. Focusing hand wheel
6. Horizontal tangent hand wheel
7. Graduated circle
8. Footscrews
9. Tribrach
10. Graduated circle indicator
11. Power/Communication connector
12. Keys
13. Reticule adjusting window
14. Circular bubble adjusting screw
15. Window for circular bubble
16. Eyepieces
17. Display





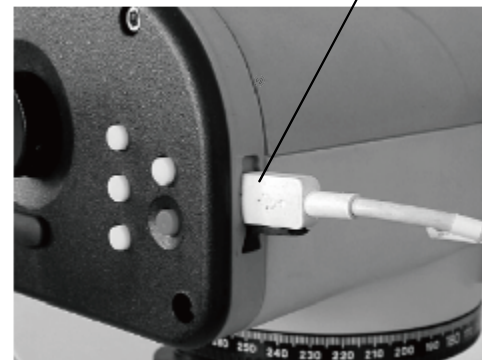
### 3. 2、 Charging and Using the Battery

- a. Connect the charger to the Power/Communication connector on the side of the instrument and plug the adapter into the 220-volt AC outlet.
- b. A flashing battery symbol indicates that the battery is being charged; complete four blocks indicate that the battery is fully charged.
- c. Disconnect the charger when the charging is complete.

Attention: Charge the battery every three or four months if the instrument has been stored for long periods.



Fully Charged



Power/Communication  
connector

### 3.3、 Keyboard



Key	The First Function Mode	The Second Function Mode
ΔH ↓	Display the height difference between the measuring point and the previous measuring point	Confirm
REC ▲	Store the data	Move the selection up
FUNC ▼	Trigger measurement	Move the selection down
MENU	Switch between function modes	Set parameters
⏻/⚙️	Power ON/OFF	LCD backlight ON/OFF

#### Comments ⏻/⚙️:

- 1、 Press and hold the key for two second to turn on or off the instrument; press and hold the key for less than two second to turn on or off the LCD backlight.
- 2、 When the LCD backlight mode is on, the instrument will turn off the LCD backlight automatically after a five-minute inactivity. After the automatic

turning off, press any key to turn the backlight on.

3、 When the LCD backlight mode is off, press the power key to turn the backlight on.

4、 Comments on the Trigger Key:



Trigger Key is a label on top of the shell.

It is a touch switch.

Touch the label to trigger measurement.

### **3.4 、 Barcode Leveling Staff**

Since electronic measurement is applied to this level, appropriate staff is required. Please note that the measurement accuracy of the instrument depends on the precision of the scale of the staff. The appropriate barcode leveling staff must be employed to facilitate the use of this level.

## **4. Operating Instructions**

### **4.1 Setup Stability**

When setting up the tripod, make sure that the feet grip the ground without slipping around. Level the head of the tripod as well as possible. Extend the tripod legs to a comfortable height for observation. Tightly screw the instrument to the head plate. Make sure that the instrument is fully charged before measuring.

### **4.2 Leveling**

Screw the footscrew to level the instrument until the circular bubble is centered. At this point, the sightline is horizontal. The circular bubble can be observed directly through the image rotation prism (See 6.1 Circular Bubble).

### **4.3 Focusing and Sighting**

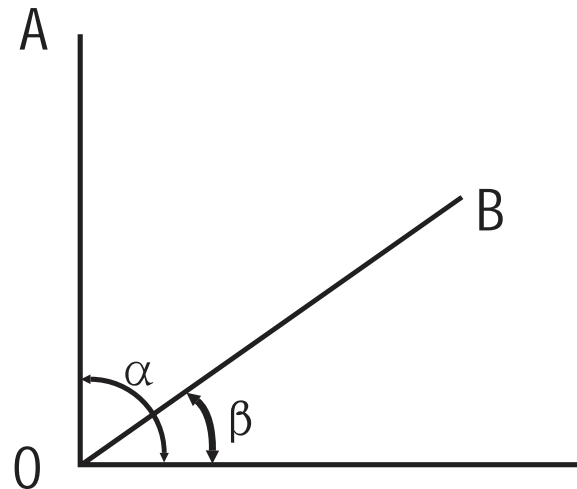
Use the telescope to sight a piece of white paper or the sky. Turn the telescope eyepiece until the line pattern of the crosshair is sharply defined. Observe through the coarse sight. Move the instrument to approximately sight the leveling staff. Turn the focusing hand wheel until there is no parallax and the staff is sharply defined. Turn the horizontal tangent hand wheel until the vertical wire of the crosshair is accurately on the center of the staff.

wire of the crosshair is accurately on the center of the staff.

#### 4.4 Horizontal Angle Measurement



Align the vertical wire of the reticule with point A, and then the angle reading of the graduate circle indicator will be  $\alpha$ . Turn the instrument and sight point B, and then the angle reading of the graduate circle indicator will be  $\beta$ .

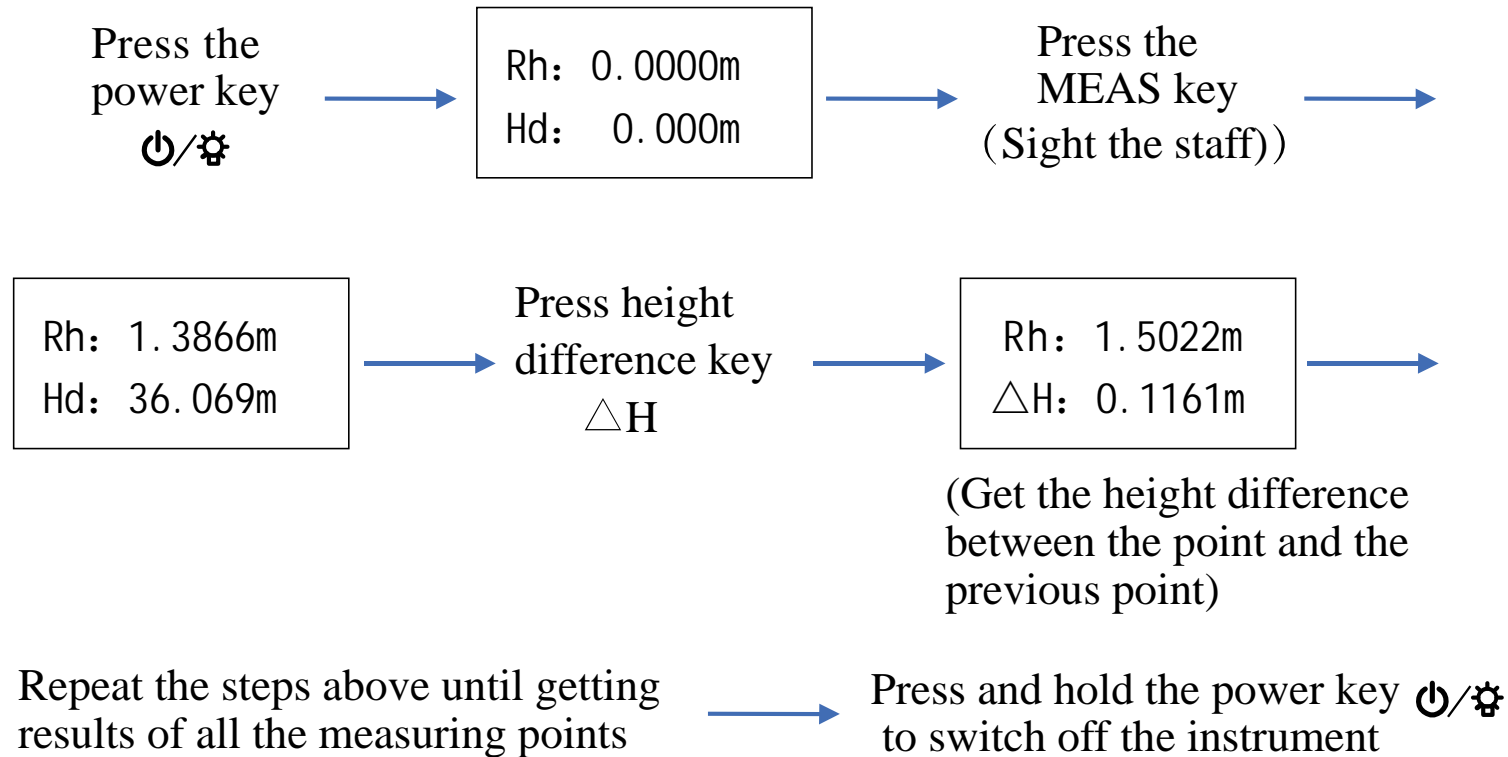
Then  $\angle AOB = \alpha - \beta$



Horizontal Angle Measurement

## 4.5、 Leveling Surveying

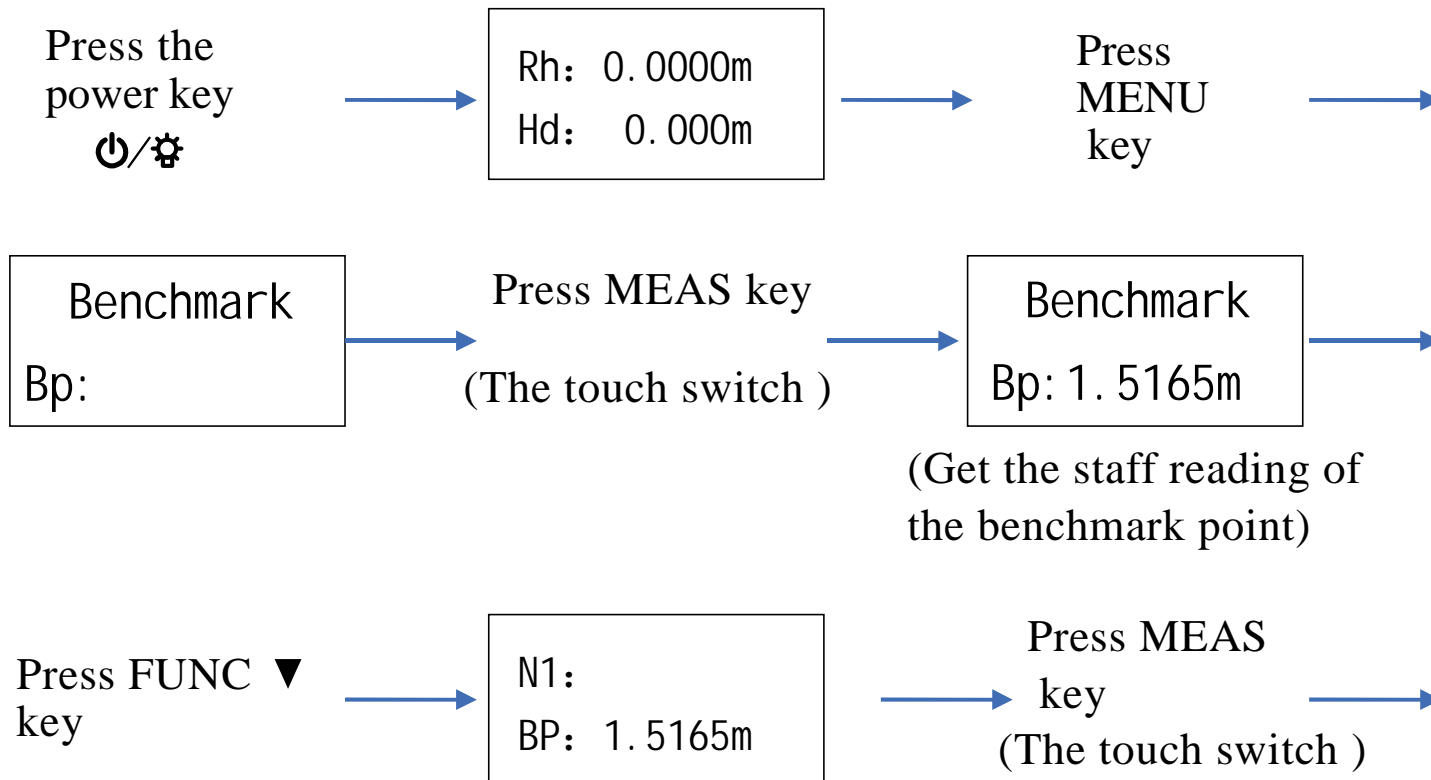
- a. Press the power  key to switch the instrument on. Observe through the coarse sight and approximately sight the barcode on the leveling staff.
- b. Turn the focusing hand wheel until there is no parallax and the staff is sharply defined. Turn the horizontal tangent hand wheel until the vertical wire of the crosshair is accurately on the center of the staff. Adjust the position of the staff if the horizontal wire of the crosshair is not perpendicular to the staff.  
Since the steering range of the horizontal tangent hand wheel is small, when the wheel cannot be turned anymore, turn it backwards in two or three circles. Then sight the target again and center it using the horizontal tangent hand wheel.
- c. After pressing the trigger key on the side to get the result, press height difference key and the height difference page will be displayed. After pressing the trigger key again, the instrument will calculate the height difference and display the result.
- d. After the measurement is finished, press and hold the  key to switch off the instrument.



**Attention:** To store the results of this measuring mode, press the store key.  
The record can be exported to computers through software.

## 4.6、 Leveling Surveying with Certain Benchmark

To use this mode, set a benchmark first and measure several points (nine points at most). The height differences between the points and the benchmark point will be calculated.

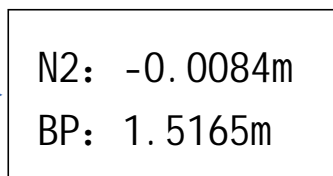






(Get the height difference between the NO.1 point and the benchmark point)

Press MEAS key  
(The touch switch )



(Get the height difference between the NO.2 point and the benchmark point)

Repeat the steps and measure the other points. Nine points can be measured at most.

Press FUNC ▼  
or REC ▲  
(To check the measurement of every point)

Press MENU key for four times (exit) and switch to the normal measuring mode

### Notice:

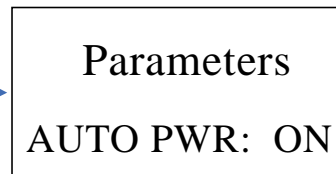
1. Press  $\Delta$ H key to switch between the display of staff reading of the benchmark point and the display of the sighting distance of the current measuring point.
- 2: Under this mode the record cannot be stored. The record will be automatically deleted after exiting.

## 5. Parameter Settings

### 5.1、 Auto shutdown

When the auto shutdown mode is switched on, the instrument will shut down automatically after a thirty-minute inactivity.

Press MENU  
key for three  
times



Press  $\Delta$ H key  
to switch



Press MENU  
key twice

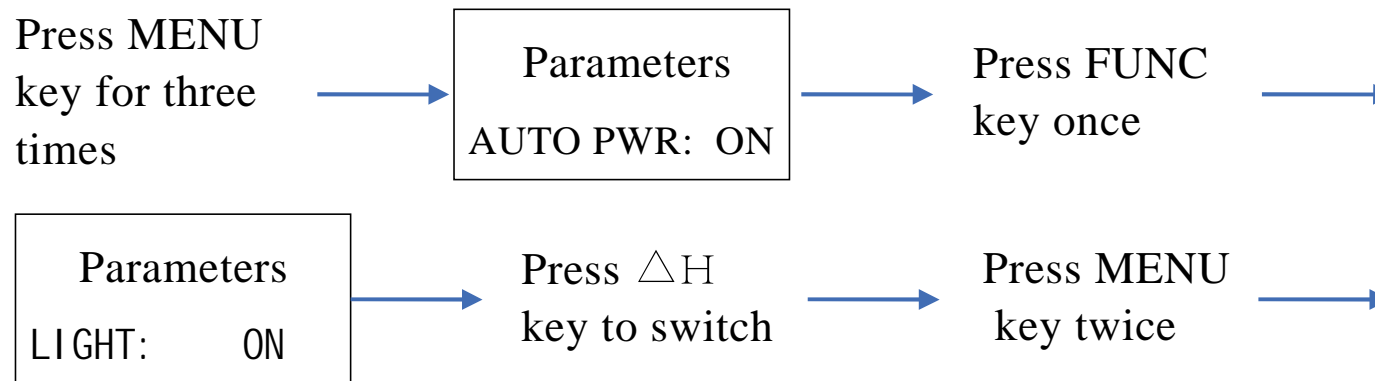


Return to the leveling  
survey mode

## 5.2、 LCD Backlight

When the LCD backlight mode is on, the instrument will turn off the LCD backlight automatically after a five-minute inactivity. After the automatic turning off, press any key to turn the backlight on.

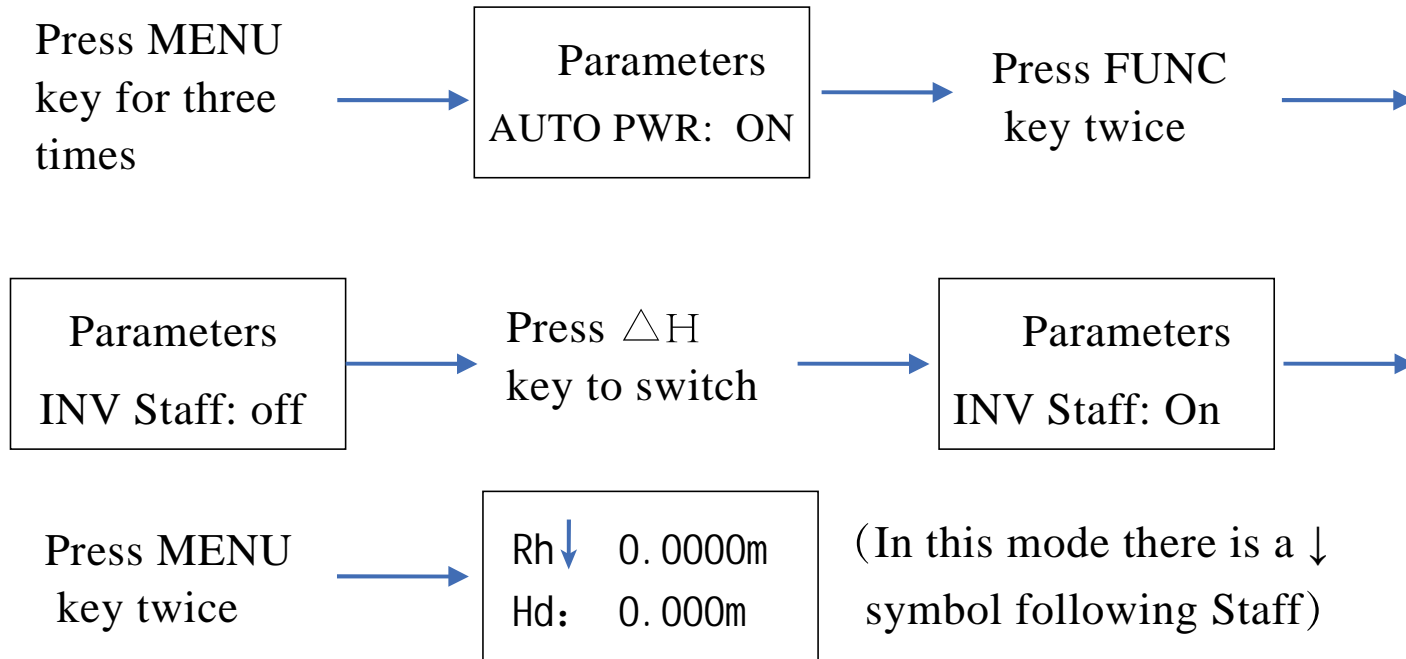
When the LCD backlight mode is off, press the power key to turn the backlight on.



Return to the leveling survey mode

### 5.3、 Inverse Staff Mode

In this mode, the staff can be inverted for measurements from the ceiling. After switching to this mode, take the following steps to switch the mode off to make normal measurement.



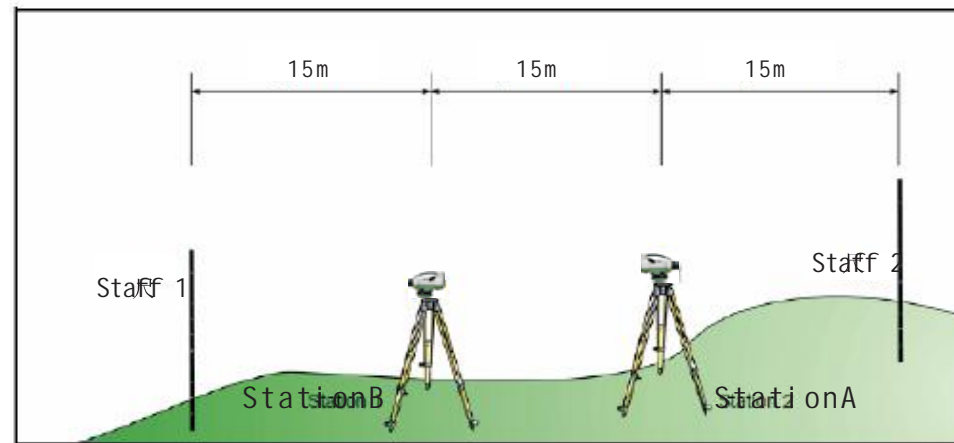
## **6. Test and Calibration**

### **6.1 Circular Bubble**

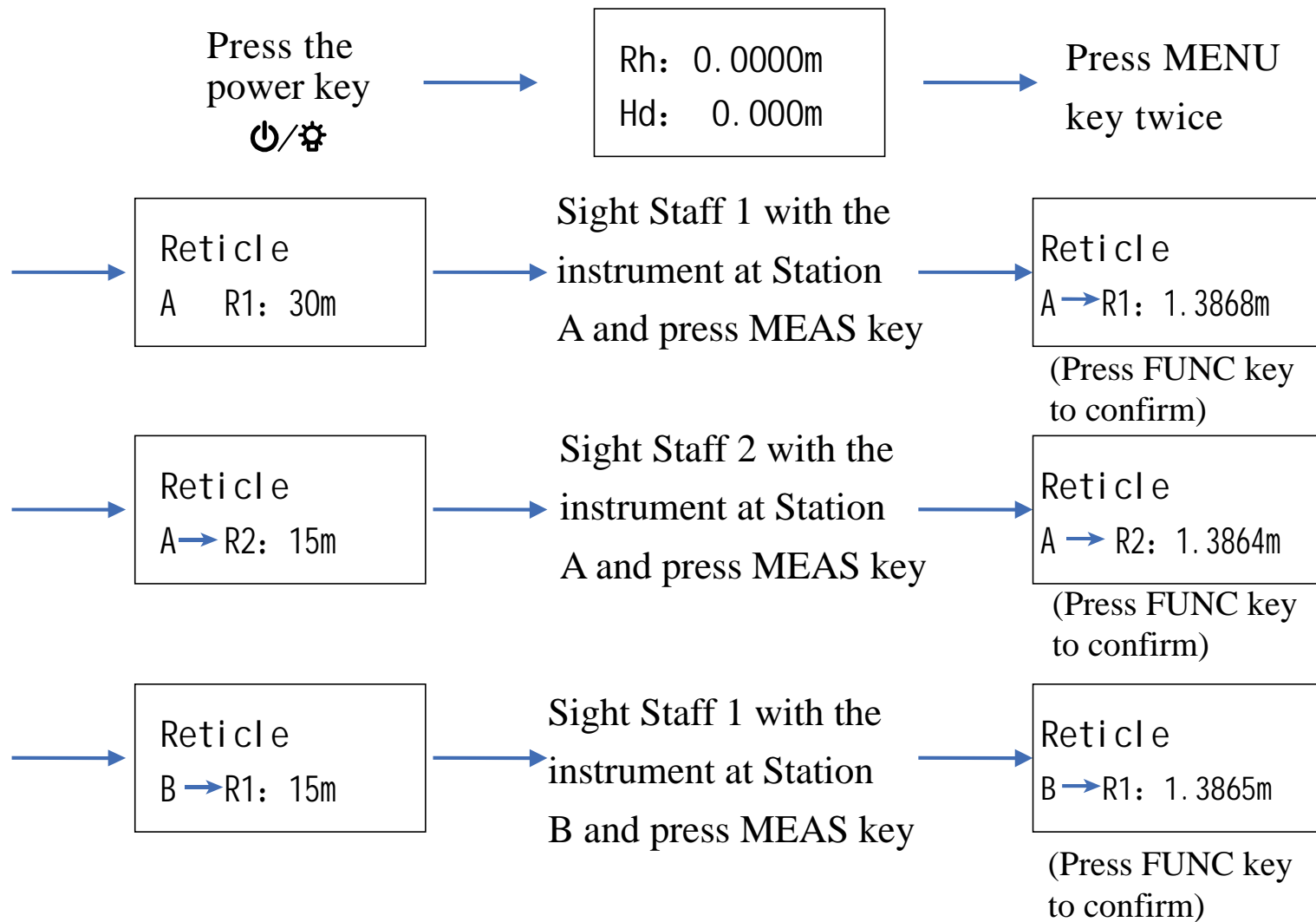
After setting up the tripod and mount the instrument, rotate the footscrews to center the circular bubble. Turn the instrument 180 degrees round and if the bubble moves away from the mid-position, calibration will be needed. Eliminate half the residual deviation by means of footscrews and half by adjusting the circular bubble with the adjustment screws using the hexagon spanner. Tighten a screw and the bubble will move towards the screw; loosen a screw and the bubble will move away from the screw. First adjust the closest screw to the connecting line between the center of the bubble and the mid-position until the bubble is centered. If the bubble cannot be centered with the single screw, adjust another screw. Repeat the procedure until the bubble is centered. The bubble is adjusted correctly if it is always on the center wherever the telescope sights. At this point the compensator is within its working range.

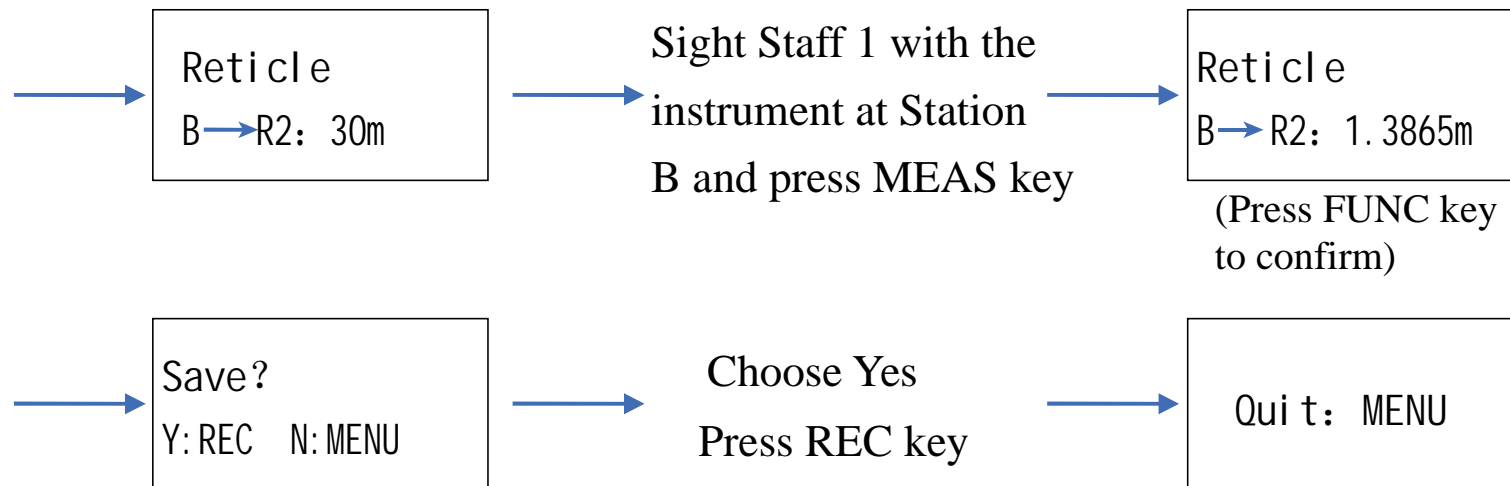
## 6.2 Interest Point Detection

To avoid the influence of transport, storage and temperature on the measurement result, interest point detection is needed.



Set up two staffs (1, 2) roughly 45 m apart. Divide this distance into three and define two instruments stations (A, B) about 15 m away from the staffs on the connecting line between them. Measure both staffs from each of these stations.





**Attention:**

1. Make sure that the circular bubble is on the center before measurement.
2. During the calibration, if there is no reading after pressing MEAS key, check if the distance between the instrument and the staff is right. The position must not be changed. For example, when the required distance between instrument and staff is 30m (a deviation within  $\pm 5\text{m}$  is acceptable), there will be no reading if the distance is not within 25m to 35m.



## **7.Data export manual for Digital Level**

1. connect to the computer using USB cable.
2. Execute "level\_data\_manage" on PC.  
Press [Read] button to retrieve saved data from Digital Level.

### **Instruction:**

[Save]: export and save data as Excel Document

[Cope]: copy displayed data into clipboard

[Read]: retrieve saved data from Digital Level

### **Note:**

After exporting and saving data to PC, the Excel document can be opened by Office Excel.

## 8.Maintenance

**Cleaning:** Wipe the exterior paint. Blow the dust off the lens and wipe the lens with clean cotton wool carefully, using small amounts of ethanol if necessary. Do not use gasoline or water. Do not touch the lens by hands. Carefully wiping wet instrument. Take the wet instrument out of the container to allow the moisture to evaporate. Do not leave wet instrument in the container. Keep the container clean and dry.

**Storage:** When the instrument has to be stored for long periods, take it out of the container to an airy place in order to avoid mould on the lens. Store the instrument in a dust-free, airy and low-humidity environment. In humid climate, desiccator or fume hood can be used. In cold climate, do not take the instrument into room when not in use but leave it at outside temperature to avoid moisture on lens and inside the instrument.

**Transport:** During long distance transport, put the instrument into the container with Styrofoam or other shockproof material.

**Calibration:** Often test the instrument and calibrate it following the instruction if necessary.

## **9.Packing List**

Plastic Container X 1

Digital Level X 1

Charging Line X1

2 mm Hexagon Spanner X 1

2.5 mm Hexagon Spanner X 1

Adjusting Pin X 1

Operator's Manual X 1

Plumbob (Optional) X 1