**INSIZE**

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**2199**

**DUAI AXIS DIGITAI LEVEL AND GYRO ANGLE METER**

**OPERATION MANUAL**

**INSIZE**

| Code | Range | Resolution | Accuracy |
|------|-------|-----------|----------|
| **2199-1** | single axis level: 4x90°<br>dual axis level: ±40° | 0.01° | at 0°and 20°: ±0.08°<br>at 20°and 70°: ±0.15°<br>at 70°and 90°: ±0.08° |
| | gyro angle meter: 360° | 0.1° | ±0.5° |
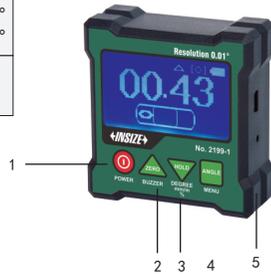
1-"ON/OFF" button
2-"ZERO" button
3-"HOLD" button
5-Magnetic surface
4-"ANGLE" button

1.Single-axis, dual-axis tilt Angle can be measured, and the large-screen LCD
  clearly displays the Angle
2.Rechargeable
3.V Shape case for easy to fit at the corner or pipe
4.5 Side Magnetic base
5.Audible alarming at settable angle range
6.Any angle measurement

7.Button Functions

| Button | Function Descriptions | | |
|--------|----------------------|---|---|
| | Normal Mode | | MENU Mode |
| POWER | In normal operation, this button turns the device ON/OFF. | | Serves as the escape key atmenu mode |
| ZERO | 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<br>Press and hold for 3 seconds to enable or disable sound. The 🔊 icon on LCD will be displaced accordingly. The buzzer alarming could be set at different accuracy level. Refer to section "Angle Alarming". | | Serves as the upward key for option selection. |
| HOLD | When pressed, the current value will freeze; the unit icon 【✿】 flashes to indicate the reading is on hold. | | Serves as the downward keyat menu mode. |
| ANGLE<br>*2199-1 only | Any angle measurement start button. Refer to section "AnyAngle"Press and hold for 3 seconds to enter MENU mode, for setmode options. | | Serves as the Set key. |

Note: parameters cannot be set in gyroscope mode

8.LCD Icons Representations

| | |
|--|--|
| 🔋 | Battery status indication icons<br>These icons indicate the battery level. There are 3 levels representing empty, half and full. |
| ◯ | In dual-axis mode, the LCD displays the direction of tilt graphically. It will show as E bubble to display the direction of tilt |
| 【✿】 | Degree mode. Flash when unit is in HOLD mode |
| 〔ⅢⅢ〕 | mm/M, the height of one end for 1m long plate. |
| 〔%〕<br>*2199-1 only | Gradient % mode. Flash when unit is in HOLD mode |
| 🔊 | Sound notification on.<br>Blank as off |
| ⛰ | Show this logo as relative value is showing. When the Zero button is pressed, the unit reset current angle to zero. |
| ▭◯ | Direction of tilt icons, show the tilt angle direction |
|  | Dual-Axis Mode. Both the X and Y axis angle will be showed.<br>Dual axis mode measures inclination up to ±40° for each axis before it automatically to single axis mode. |
|  | Single Axis Mode. Measure slope up to ±90°.<br>The triangle icon indicates the direction of tilt with respect to the bottom right corner of the unit. |

9.Battery Charging
  It 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 indicator 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.

10. Relative/ Absolute Measurement
    Relative Measurement
    LCD Icon: 

11. Absolute Measurement
    LCD Icon: Blank
    Relative and Absolute Mode Switching:
    Press and release the "ZERO" key to set the relative measurement zero point
    Press and release the "ZERO" key to cancel the relative zero point and back to absolute
    measurement mode.

12. Hold Function
    Holding Mode:
    LCD Icon blinking: 【 ✿ 】

13. 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.

14. 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.

15. Power auto off setting:
    1. Press and hold "ANGLE" key and enter MENU mode.
    2. Select "POWER" by "ZERO" and "HOLD" key, press "ANGLE" key to enter Power mode.
    3. Scroll "NEVER" or "30MIN" by "ON/OFF" and "HOLD" key.
    4. Press "ANGLE" key to confirm NEVER or 30MIN (30 minutes) sleep

16. 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, for accuracy drift, please follow
    Calibration. After factory set, please redo calibration to ensure the accuracy.

17. Restore to factory setting:
    1. Press and hold "ANGLE" key and enter MENU mode
    2. Select "FACTORY SET" by "ZERO" and "HOLD" key, press "ANGLE" key to enter

18. FACTORY SET mode
    3. Scroll "YES" or "NO" by "ZERO" and "HOLD" key
    4. Press "ANGLE" key to confirm

19. Language Setting:
    1. Press and hold "ANGLE" key and enter MENU mode
    2. Select "ENG" to English by "ZERO" and "HOLD" key
    3. Press "ANGLE" key to confirm

20. Angle Alarming
    Alarming Mode:
    LCD Icon: 

| ALARM SETTING | | ALARM SETTING | |
|---|---|---|---|
| SINGLE AXIS | ° | RANGE | ± |
| DUAL AXIS X | ° | TRIGGER AREA | |
| DUAL AXIS Y | ° | INSIDE OUTSIDE | |

21. Alarming Angle setting:
    1. Press and hold "ANGLE" key and enter MENU mode
    2. Select "ALARM" by "ZERO" and "HOLD" key, press "ANGLE" key to enter
       Alarm Setting
       Press and hold "ZERO" and "HOLD" key for fast scrolling the digit.
    3. Press "ANGLE" to enter setting value

| SINGLE AXIS | Vertical / Single axis mode alarming angle (Degree) |
|---|---|
| DUAL AXIS X | Horizontal/ Dual axis mode X axis alarming angle (Degree) |
| DUAL AXIS Y | Horizontal/ Dual axis mode Y axis alarming angle (Degree) |
| RANGE | The range (Degree)that will trigger the audible alarming<br>For example: SINGLE. set to 20.00<br>RANGE set to 01.00<br>While the unit is in +19° to +21°or -19 ° to -21°, the unit will alarm |
| TRIGGER AREA | INSIDEor OUTSIDE to set the alarm will alarm in of range or out of range |

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



A-face

Step1    A-face                    Step2
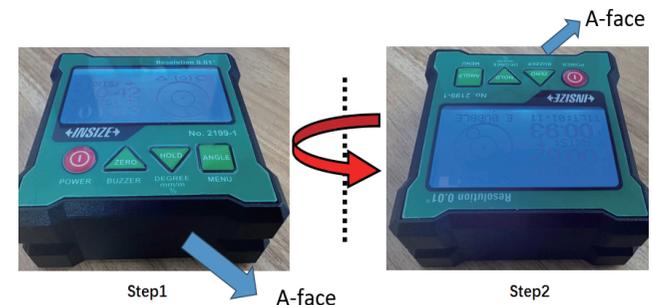
25. Any Angle Measurement Method:
    Example: Measure angle between two wooden walls is 77.0°



    Place at the first position,press "ANGLE"
    Rotate to final position, keep the rotational axis, LCD show the angle
26.Calibrate Gyro
1) Place the instrument on a flat surface and then press "ANGLE" and hold for 3
   seconds
2) Select "GYRO CAL" and then press "ANGLE", Follow the on-screen prompts
3) Flip 360° in clockwise and then press "ANGLE"
   Please rotate slowly to increase the accuracy
4) Return the instrument to a flat surface and then press "ANGLE"
5) Flip 360° counter clockwise and then press "ANGLE",Complete calibration
   Please rotate slowly to increase the accuracy



27.PC Communication
   It has a PC data logging function.
   For 2199-1You can not directly plug the USB cable between PC to protractor by a
   general USB cable.
   You need to optional purchase the PC adapter SVRS232
   You can continue to data logging X andY inclination data to PC.
   Sampling time is around 2 Hz.
   Specification:
 1) RS232 Com Port 9600 baud rate
 2) USB connection ( include a RS232 to USB adapter)
 3) Format will outputASCII: example for x is 0,Y is -88.88: " X+0000Y-8888"
    Detail can visit our website or contact our sales person.
28.Built-in Bluetooth, transmission distance is 15m (under the condition of no obstruction
   and no electromagnetic interference).
   When the level meter is turned on, the built-in Bluetooth will automatically open.
 1.For Android phones in China, download it via http://app.insize.cn/dl or scan the QR
   code.



    2. For IOS phones in China, search the app store under the name "INSIZE data
       management" to download.
    3. For Android and IOS phones outside of China, search "insisie. dms" in the app
       store to  download.

Android and iPhone APP (included), can choose real-time
display (continuous transmission) or single transmission

**Dual axis mode**                                   **Single axis mode**



- select continuous or single transmission mode and set tolerance
- bubble
- single axis and dual axis automatic switching
- real-time data (display in green when within tolerance and display in red when out of tolerance)
- x=0.59 y=-29.86
- send data
- clear data
- single transmission
- graph
- green background (within tolerance)
- red background (out of tolerance)

29. Note
    When calibrating or measuring, rotate evenly and slowly to ensure measurement accuracy.

At Step1, you measured X and Y value, X1 and Y1

At Step2, you measured X2 and Y2, in theory X1=-X2, Y1=-Y2.

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.

23. Calibration Procedure:

Step 1-2: Press and hold the "ANGLE" enter Menu mode. Select "Level CAL" mode, press "ANGLE". Place the unit on a flat table (no need perfect level table)

LCD display "Dual Axis Calibration", press "ANGLE" and buzzer will beep; wait until the beep sound stop. While the buzzer is beeping keep the unit stable.

Step 3-4: Then rotate the unit 180 degree with the other side against the same place. Press "ANGLE" again, and wait for the beep finished.



**Step 1-2**
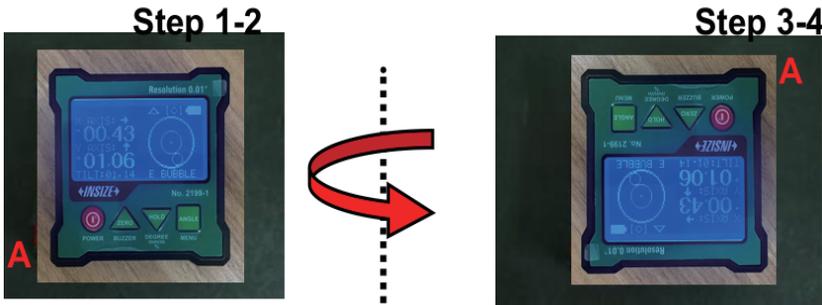
**Step 3-4**

Step 5-6: LCD display "Single Axis Calibration". Place the unit horizontal like the picture "STEP 3" and then press "ANGLE", wait until the beep sound stop.

Step 7-8: Then rotate the unit 180 degree at the same place. Press the "ANGLE" button again, and wait for the beep finished.



**Step 5-6**

**Step 7-8**
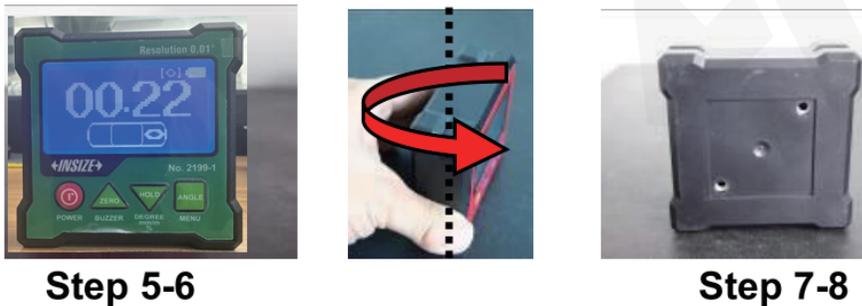
Step 9-10: LCD display "Single Axis Calibration", mention that the ON/OFF Key at upper side, hold on a flat wall. And then press "ANGLE" Key. Wait for the "Beep" sound stop.

Step 11-12: Then rotate the unit 180 degree with the other side against the same place of wall (ON/OFF Key at 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 "Return to main page" to go back for normal operation



**Wall**

**Wall**

**Step 9-10**

**Step 11-12**
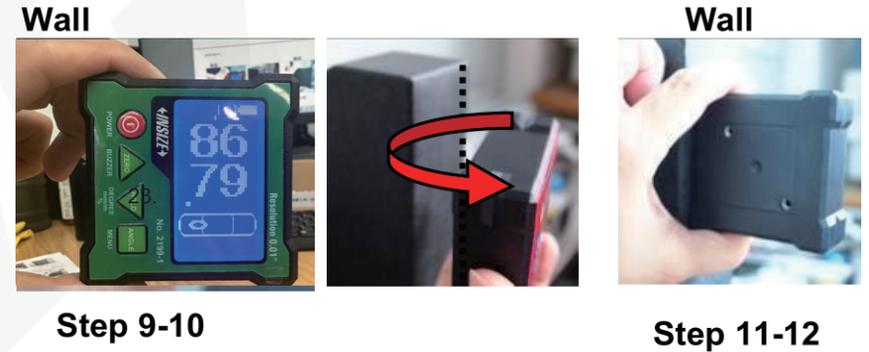
24. ANY ANGLE measurement:

Any angle measurement is using gyro technique.

You can measure the angle between two faces, not only in earth gravity direction.

1) Press Angle key at the first face, and then rotate slowly and must keep the rotation axis to another testing face

2) It will then show the angle once you not move the unit.

The rotation axis: