



GDS8 Series Digital inclinometer

Product manual

V2.2-20260907



Technical Highlights

- ❖ Full-range accuracy better than 0.005°;
- ❖ Repeatability error $\leq 0.003^\circ$;
- ❖ Supports absolute/relative measurement switching;
- ❖ It can record key measurement data;
- ❖ Strong magnetic adsorption design adapts to different installation requirements;
- ❖ Angle over-limit alarm can be set.

Product Introduction

RUICOM Technology GDS8 series digital inclinometer is a high-precision angle measurement and control device specifically developed for industrial applications. This product, the result of three years of technological breakthroughs, employs micro-mechanical sensing technology and features dual measurement cores. Through a dynamic compensation mechanism between the Y and X axes, combined with a proprietary cross-compensation algorithm and temperature compensation model, it significantly improves measurement accuracy and long-term stability.

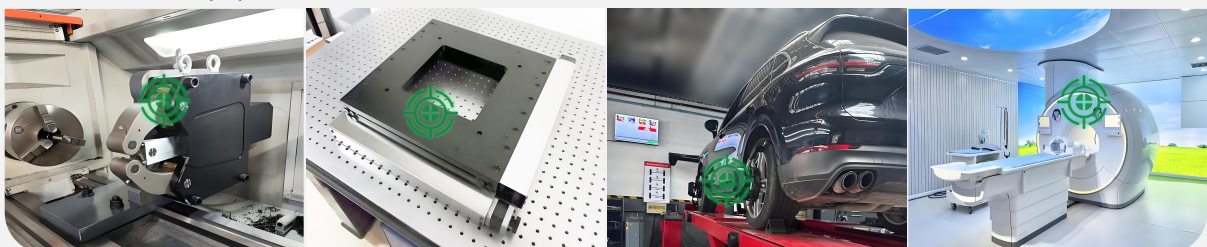
Product Features:

1. Supports single/dual-axis measurement, single-axis with a range of $\pm 45^\circ$.
2. Resolution 0.001° , full-range accuracy $< 0.005^\circ$.
3. Fast-response design, stable and reliable data output.
4. Innovative magnetic structure, supporting multi-directional installation (side/bottom).
5. Equipped with data storage function, supporting switching between three measurement units (angle/degree/minute/second/mm/m).

This product offers significant advantages in industrial reliability, ease of operation, and cost-effectiveness. Its technological innovation has been protected by multiple patents, enabling it to meet the precise measurement needs of various harsh industrial environments.

Application Scope

- ❖ Architectural surveying
- ❖ Road and slope gradient detection
- ❖ Mechanical equipment installation and leveling
- ❖ Tooling and fixture leveling and control
- ❖ Medical equipment attitude measurement
- ❖ Vehicle alignment and four-wheel calibration
- ❖ Pipeline laying and angle control
- ❖ Pipeline laying and angle control
- ❖ Camera pan-tilt head angle calibration



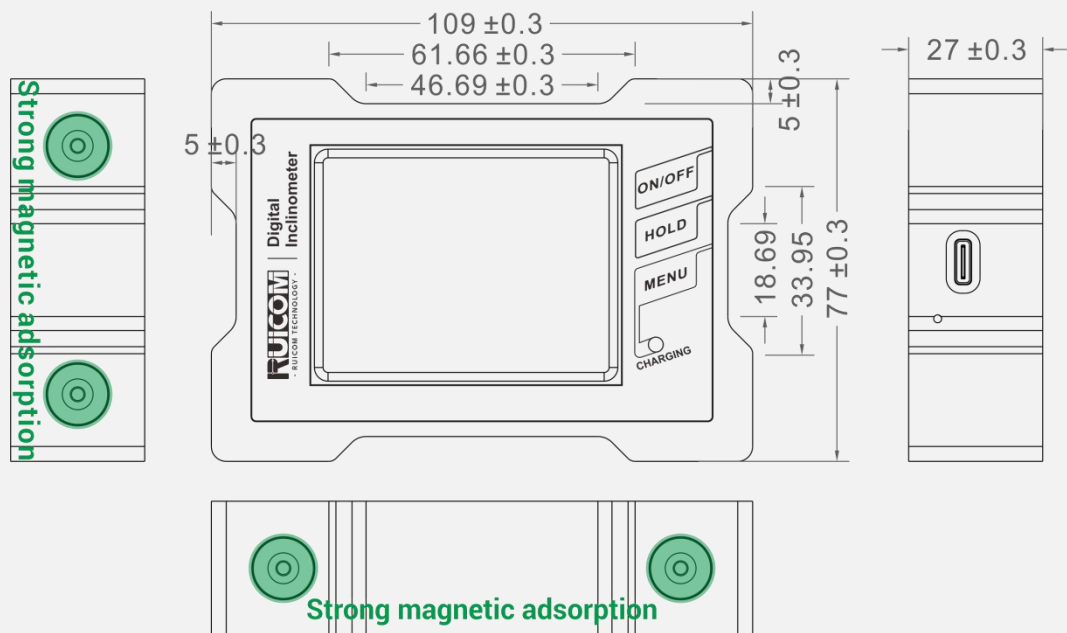
Performance parameters

Parameter	GDS810			GDS820		Unit
Measuring Axis	Single-axis			Dual-axis		Axis
Angle Measurement Range	±15°	±30°	±45°	±15°	±30°	°
Angle Measurement Accuracy (Full Range)	<0.005	<0.01	<0.03	<0.005	<0.01	°
Angle Measurement Resolution	0.001	0.001	0.001	0.001	0.001	°
mm/m Measurement Range	267	577	1035	267	577	mm/m
mm/m Measurement Accuracy	0.1	0.2	0.5	0.1	0.2	mm/m
mm/m Measurement Resolution	0.02	0.02	0.02	0.02	0.02	mm/m
Repeatability	0.003	0.003	0.003	0.003	0.003	°
Measurement Mode	Three modes can be set: angle, degrees/minutes/seconds, and millimeters/meters.					
Operating Temp	-10°C ~ +70°C					
Operating Humidity	85%RH					
Power Supply	3.7V					
Ideal Charging Time	5 hours					
Battery Continuous Operating Time	11 hours					
Data Output Signal	Type-C					
Included Host Computer Software	VC application software					
Vibration Resistance	10g@11ms, triaxial (half-sine wave)					
Shock Resistance	10grms / 10~100Hz					
Waterproof Rating	IP54					
Material	Anodized aluminum alloy					
LCD Screen	64-color true-color luminous display screen					
LCD Viewable Area Size	L57.6*W43.2mm					
Dimensions	L109×W77×H27mm					
Weight	≤350g					

Order selection

Model	Axis	Measurement range
GDS8	1: Single-axis	15: ±15°
	2: Dual-axis	30: ±30°
		45: ±45°(Only Single-axis)
E.g: GDS810-15: Single axis, ±15° measurement range.		

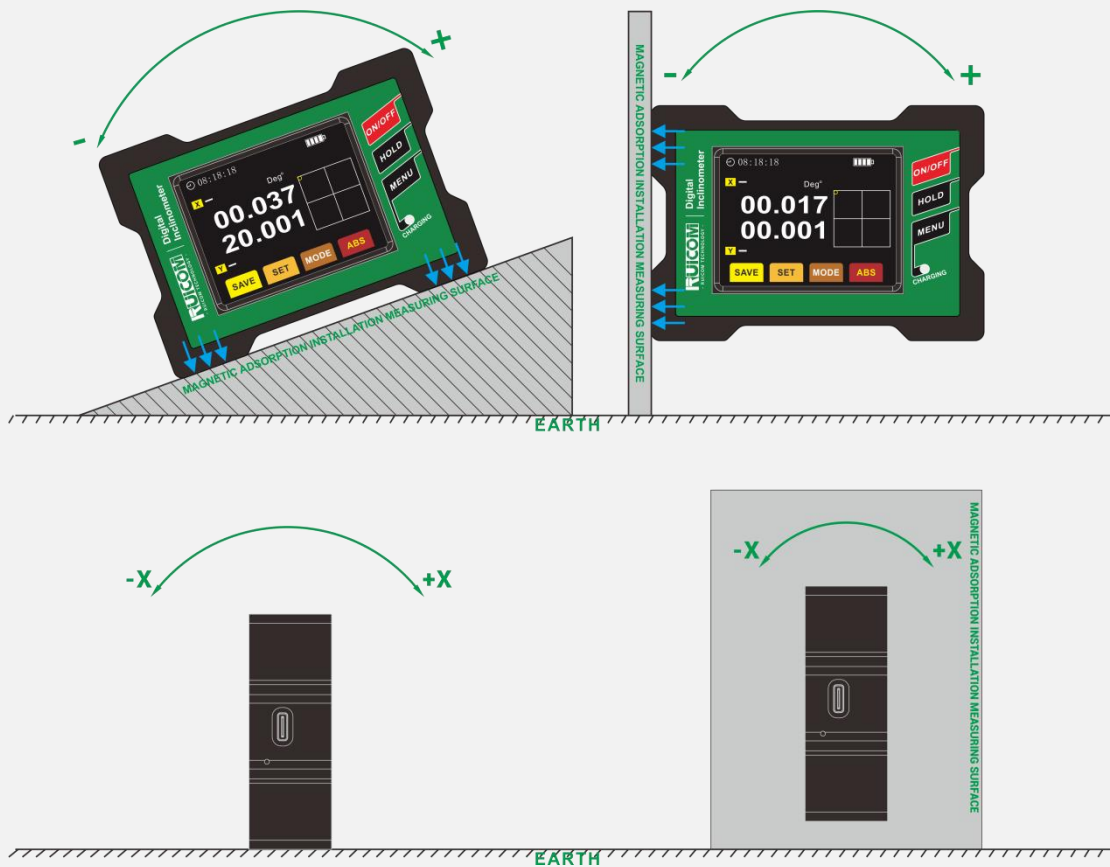
✓ Product Dimensions



Shell: 109×77×27mm

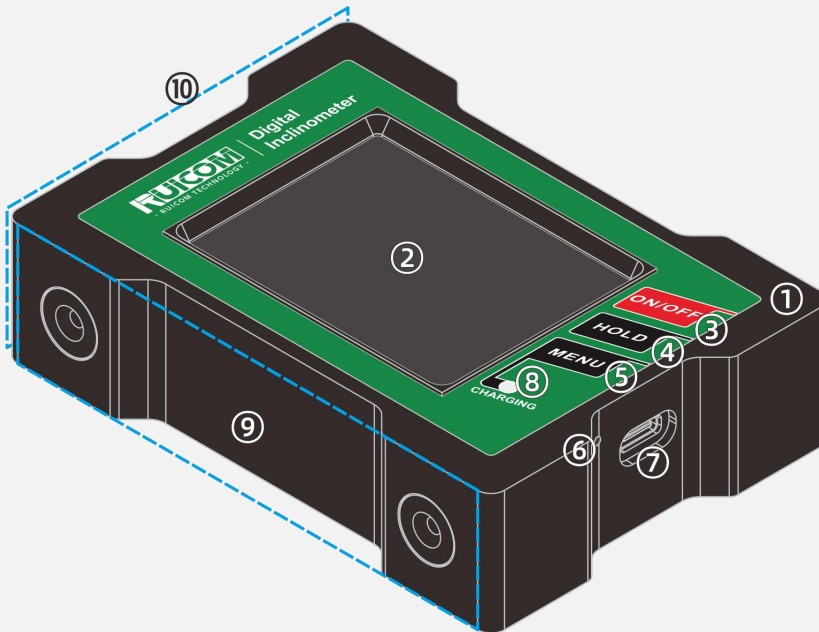
Strong magnetic adsorption installation on the left and bottom sides

✓ Magnet measuring surface





Function Description



- ① Metal anti-wear structure
- ② Display area
- ③ ON/OFF
- ④ HOLD
- ⑤ MENU
- ⑥ Reset hole
- ⑦ Type-C socket
- ⑧ Charging indicator
- ⑨ Strong magnetic bottom
- ⑩ Side magnetic

- ① Metal anti-wear structure: Durable metal casing;
- ② Display area: Data display touchscreen operation area;
- ③ ON/OFF: Press and hold for 3 seconds to power on or off;
- ④ HOLD: This key locks the current data for easy recording;
- ⑤ MENU: Press the MENU key to disappear the menu, press again to reappear;
- ⑥ Reset hole: If the device freezes during use, insert a small pin into the small hole below the Type-C port to reset it;
- ⑦ Type-C: Used for charging and serial port data output;
- ⑧ Charging indicator light: Light on indicates charging, light off indicates fully charged; (To ensure battery life, do not use while charging.)
- ⑨ Bottom magnet: Bottom strong magnetic attachment for mounting surface;
- ⑩ Side magnet: Left side strong magnetic attachment for mounting surface;



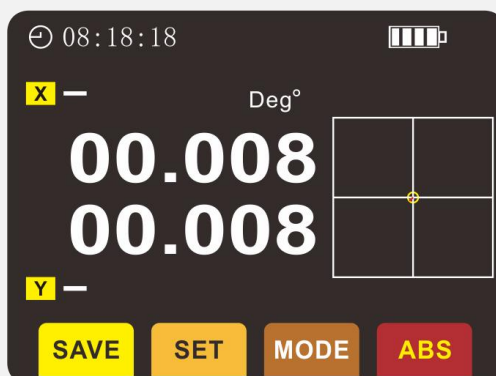
Operating Instructions

1. Product right-side button operation:

1.1 ON/OFF Power button: Press and hold for 3 seconds until you hear a "beep..." to power on. Power off is the same process.;



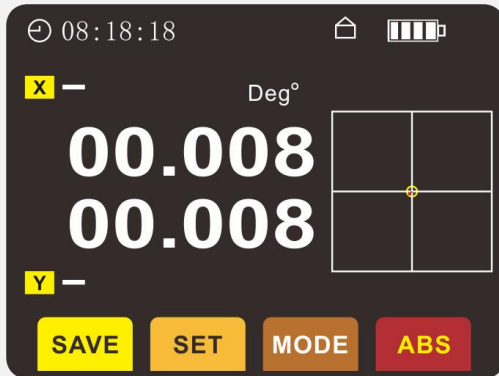
Boot screen



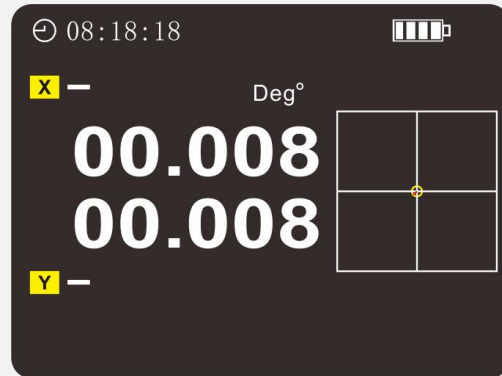
After booting up the interface

1.2 HOLD lock button: Locks angle data. Press once to lock data, press again to unlock. An icon will appear in the upper right corner of the screen.

1.3 MENU button: Click to hide the menu bar, then click to show the menu bar.



Data lock screen display

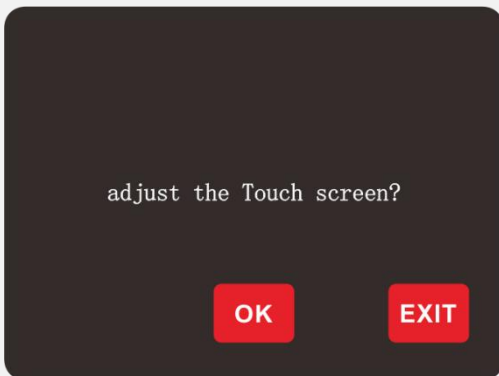


Menu bar hidden interface display

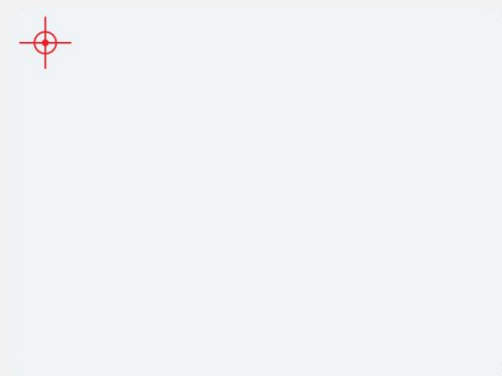
1.4 Press MENU and HOLD simultaneously to enter touchscreen calibration.

1.4.1 Click OK to enter touchscreen calibration, click EXIT to exit touchscreen calibration;

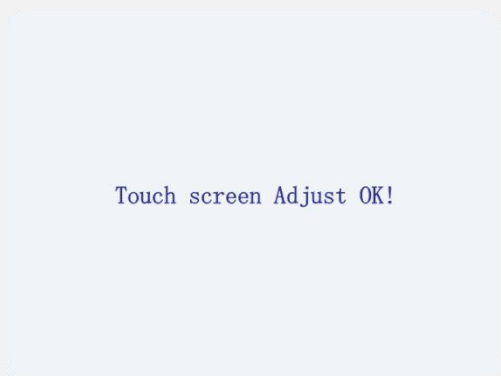
1.4.2 To enter touchscreen calibration, tap the small red dots in the four corners of the screen in sequence. Each tap moves the red dot once, and the calibration will automatically exit after the red dot has moved four dots.



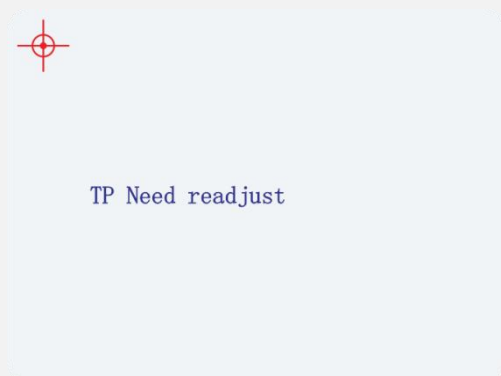
Enter the touchscreen calibration



Calibrate the interface in the



Touchscreen calibration successful
prompt screen



Touchscreen calibration error
message prompting recalibration

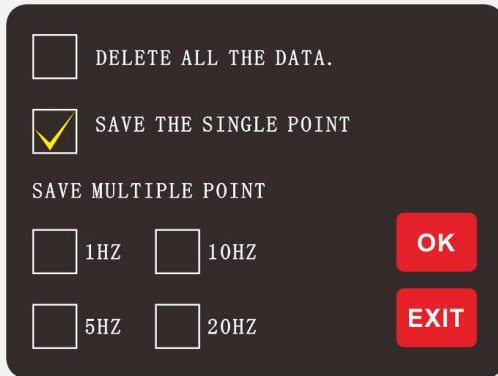
2. Bottom menu function:

2.1 Click the **SAVE** button on the touchscreen to access the save option.

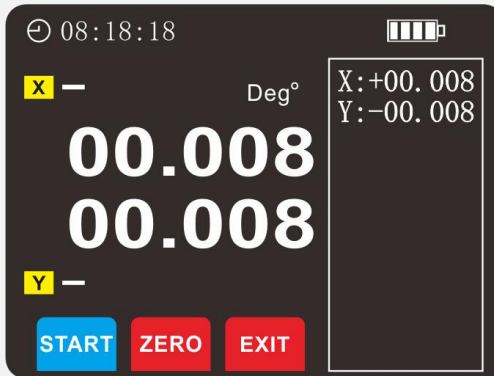
2.1.1 **DELETE ALL DATA** Delete saved data;

2.1.2 **SAVE THE SINGLE POINT** Single save;

Click **START** to start saving the relevant data, which will be saved to the SD card; Select single save, and the data will be displayed in the right frame of the interface. A maximum of 6 sets of data can be displayed for a single axis, and a maximum of 12 lines of data can be



Single save selection interface

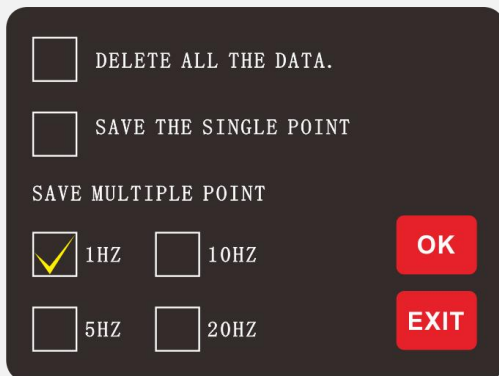


Single save data display interface

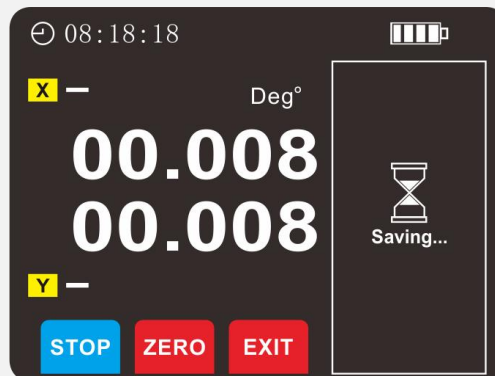
displayed for a dual axis; **ABS/ZERO** switch button; **EIXT**: Save data and exit the interface.

2.1.3 **SAVE MULTIPLE POINT**(Save frequency options: 1Hz/5Hz/10Hz/20Hz);

Select to save multiple times consecutively; the interface will not display the data, and it will be saved directly to the SD card. After the data acquisition is complete, click **STOP** to stop saving the data; **ABS/ZERO** switch button; **EIXT**: save data and exit the interface.



Multiple consecutive single save selection interface

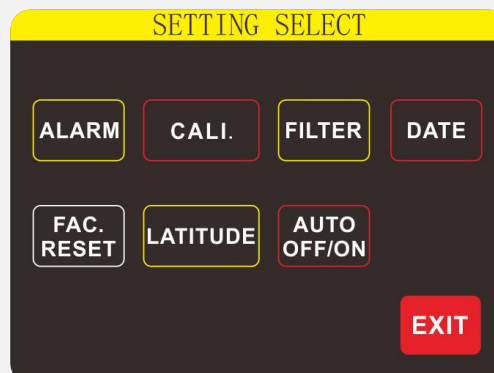


Save the data display interface multiple times in a row

2.1.4 **OK** Save selection and exit the interface

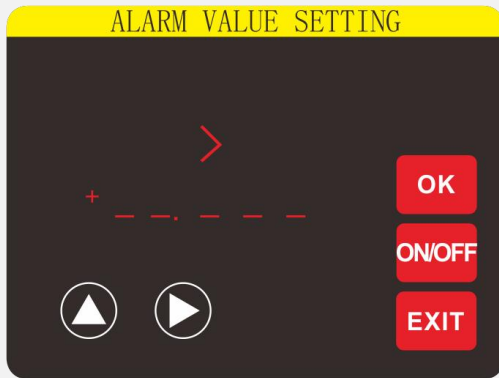
2.1.5 **EXIT** Abandon selection and exit the interface.

2.2 Tap the **SET** button on the touchscreen to enter the settings interface. There are six function buttons: (If you don't need to select anything, simply tap **EXIT** to exit).

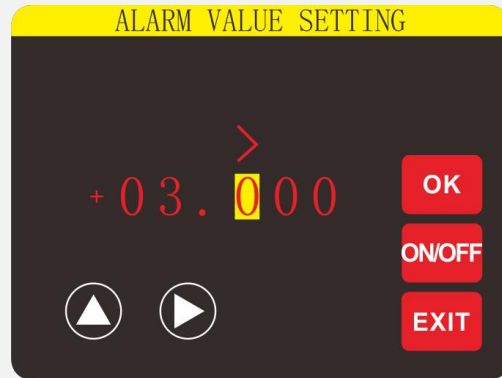


Multiple consecutive single save selection interface

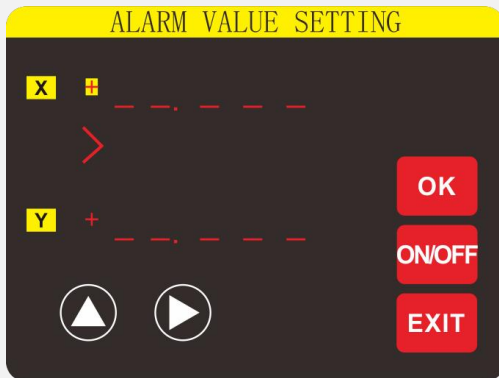
2.2.1 ALARM(Alarm Angle Settings)



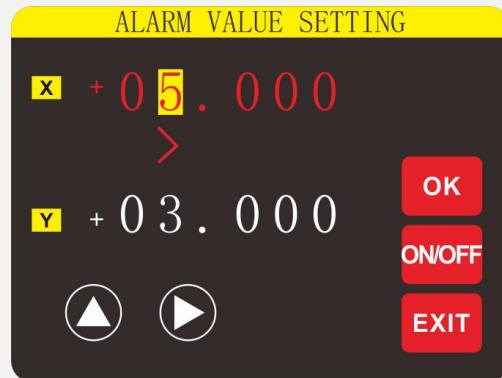
Single-axis alarm angle interface



Single-axis alarm angle setting



Dual-axis alarm angle interface



Dual-axis alarm angle setting

Instructions:

1. Click ON/OFF to open the alarm angle setting. The display will show numbers. When the setting is closed, it will display " _ _ . _ _".
2. For dual-axis products, click the X or Y axis data angle to select the corresponding axis angle setting.

3. Click ▲: Set the data for the corresponding position.

► : Select the corresponding position of the data to be set.

Angle symbols: +: Alarm when greater than the corresponding angle

-: Alarm when less than the corresponding angle

±: Alarm when outside the range

For example: Setting X: +03.00 will trigger an alarm when the X angle is +3.3° and >3°.

Setting Y: -04.00 will trigger an alarm when the Y angle is -4.6° and <-4°.

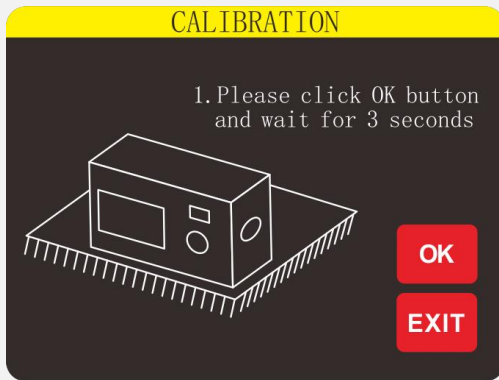
Setting Y: ±05.00 will trigger an alarm when the Y angle is -6° and exceeds -5° to +5°.

4. Click OK to save the angle settings. The angle settings will only take effect after this step.

5. EXIT: Exit the angle setting save.

2.2.2 CALI(Calibration settings)

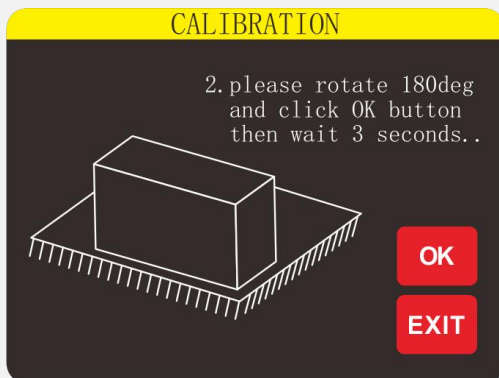
Click OK and follow the prompts to perform the relevant actions.(Zero-point calibration requires a high-precision platform; please do not proceed if this is not available.)



Product calibration interface



Waiting for calibration interface



Product calibration interface

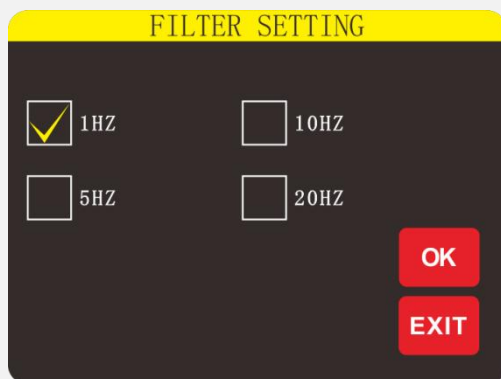


Product calibration successful prompt screen

2.2.3 FILTER(Filter frequency setting)The factory default is 20Hz.

Select the desired filtered output frequency;

OK: Selection successful; EXIT: Exit selection.



Filter frequency setting interface

2.2.4 DATE(Date setting)

Set date and time to display and save data;

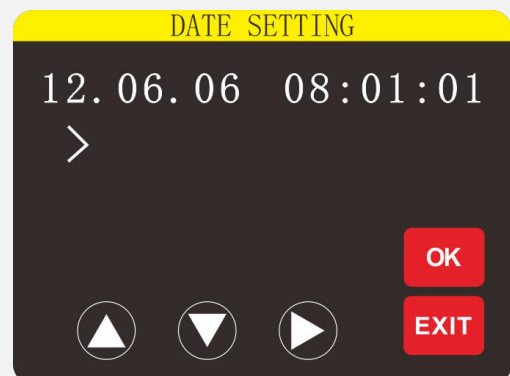
► : Select the year, month, day, hour, minute, and second; this can be cycled;

▲: Increase the corresponding value;

▼: Decrease the corresponding value;

OK: Save settings;

EXIT: Exit the date setting interface without saving.



Date settings interface

2.2.5 FAC.RESET(Set to factory reset)

The parameters that are restored include alarm angle, filter frequency, and calibration angle.



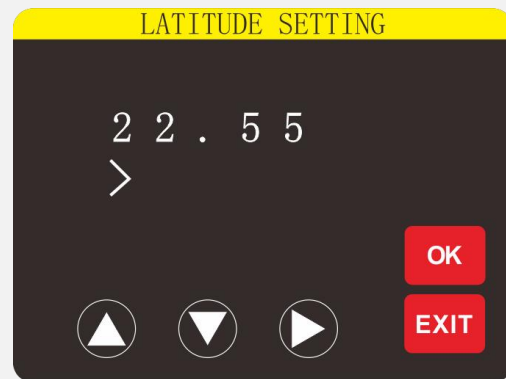
Factory reset screen

2.2.6 LATITUDE(Local latitude setting)

Set the local latitude value. Since the Earth's gravitational field varies from place to place, customers only need to set the local latitude, and the product will automatically calculate the local gravitational field and correct for accuracy errors.

As shown in the right image, click Latitude Settings.

1. Click the "▲" button to increase the corresponding digit value by 0-9;
2. Click the "▼" button to decrease the corresponding digit value by 0-9;
3. Click the "►" button to select the tens digit, units digit, tenths digit, hundredths digit, and cycle to the right;
4. Click OK: Save the latitude settings;
5. Click EXIT: Exit the settings.



Local latitude settings interface

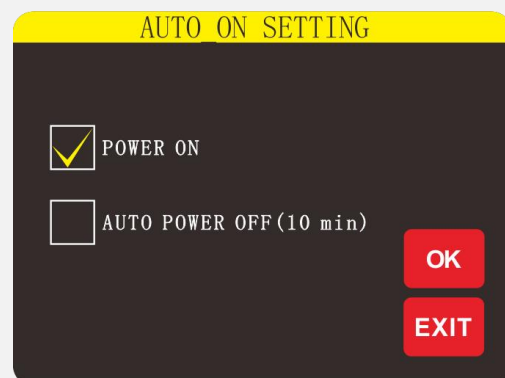
2.2.7 AUTO ON/OFF(Automatic shutdown settings)

As shown in the right image, Selecting "POWER ON" keeps the product powered on;

Selecting "AUTO POWER OFF (10min)" will automatically power off the product after 10 minutes of inactivity (this is the default setting).

OK: Save settings

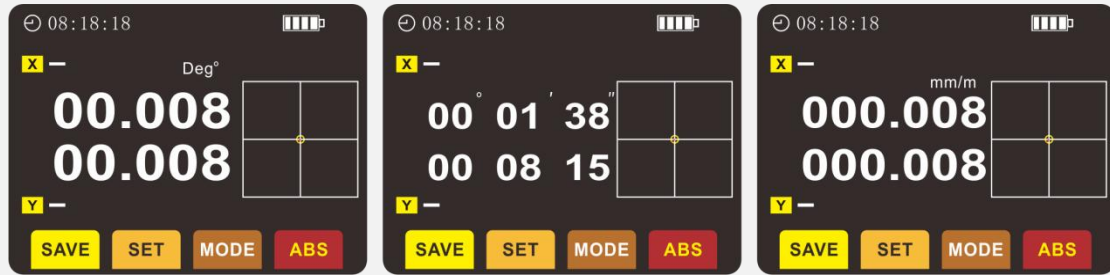
EXIT: Exit without saving settings



Automatic shutdown settings interface

2.3 Data unit mode selection

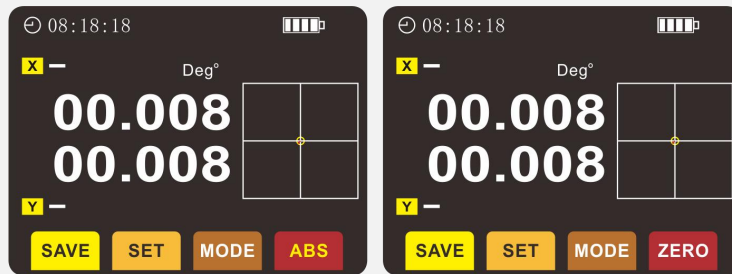
Each press of MODE switches between three unit modes: degrees, degrees-minutes-seconds, and millimeters-meters.



2.4 ZERO/ABS Absolute Relative

Zero: Click to set the current angle to zero.

ABS: Click to switch to absolute zero.



Communication Protocol

1. Data frame format: (8 data bits, 1 stop bit, no parity, default rate 115200)

Identifier (1byte)	Data Length (1byte)	Address Code (1byte)	Command Word (1byte)	Data Field	Checksum (1byte)
68					

Data format: hexadecimal;

Identifier: Fixed at 68;

Data Length: Length from the data length to the checksum (including the checksum);

Address Code: Address of the acquisition module, default is 00;

Command Word: Keyword for the operation command;

Data Field: Varies according to the content and length of the command word;

Checksum: The sum of the data length, address code, command word, and data field, without considering carry-over;

E.g.: 68 04 00 04 08 (Length 04 + Address Code 00 + Command Word 04 = 08).

2. Command Word Parsing

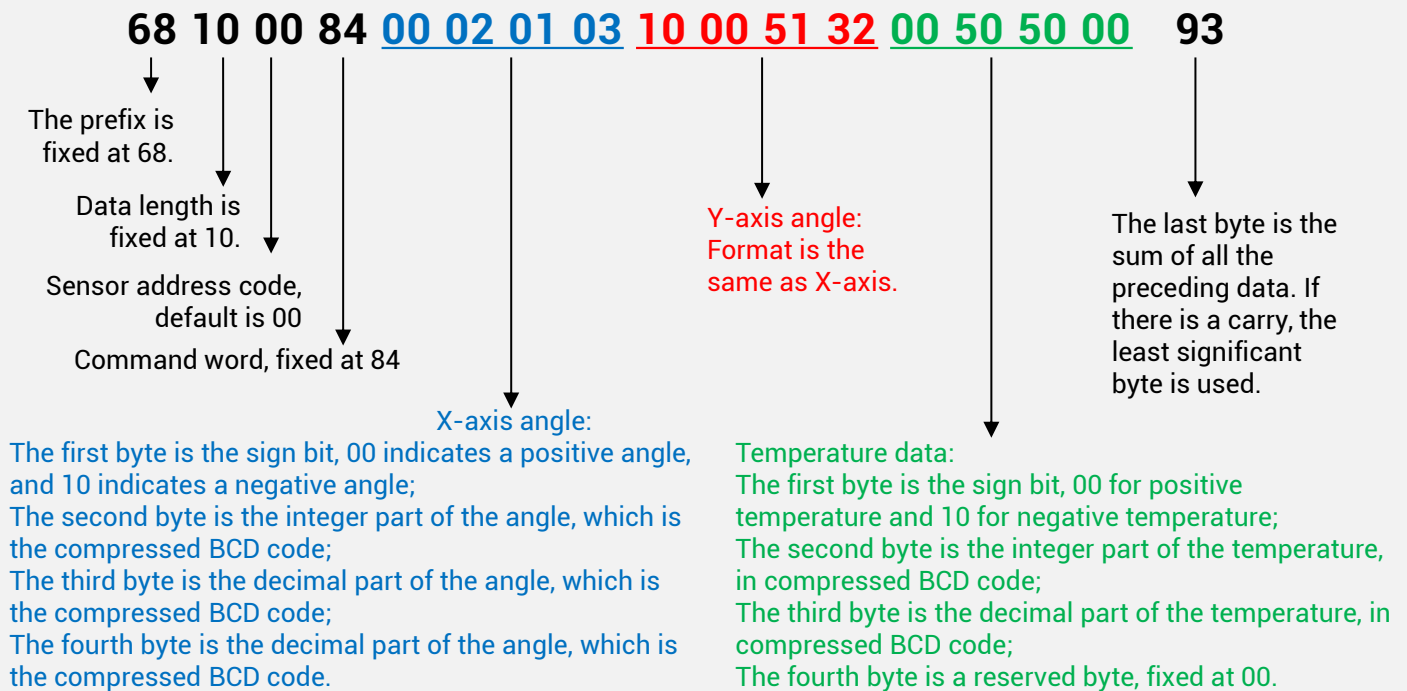
Command words	Meaning/Examples	Explanation
0X04	Simultaneous Angle Reading Command E.g: 68 04 00 04 08	Data Field(0byte) No Data Field Command

0X84	Sensor Response E.g: 68 10 00 84 00 00 20 08 10 00 25 28 00 37 70 00 C0	Data Field(12byte) AA AA BB BB CC CD DD DD EE EE FF FF AA AA BB BB: 4 characters represent the X-axis; CC CC DD DD: 4 characters represent the Y-axis; EE EE FF FF: 4 characters represent temperature data; Angle format is the same as X-axis or Y-axis parsing method: In the example on the left, the angle is: X-axis +00.200°, Y-axis -00.252°; Temperature: 37.7°. (Angle parsing uses the thousands place and discards the ten-thousands place; temperature data parsing only retains one decimal place.) 0A: Checksum, the hexadecimal sum of all data, excluding the prefix 68.
0X05	Set Relative/Absolute Zero Point: The current angle can be set to zero for relative measurement, or an absolute factory zero point can be set and saved after power failure. E.g: 68 05 00 05 00 0A	Data Field(1 byte) 00: Absolute Zero 01: Relative Zero
0X85	Sensor Response Command E.g: 68 05 00 85 00 8A	Data Field(1 byte) The number in the data field represents the sensor's response result. 00: Setting successful FF: Setting failed
0X32	Read Data Saved on SD Card: E.g: 68 04 00 32 36	Data Field(0 byte)
0XA2	Sensor Response Command Example: 68 18 00 A2 AA AA AA AA AA AA AA AA BB BB BB BB CC CC CC CC DD DD DD DD CS	Data Field(19 byte) The number in the data field represents the sensor's response result. AA AA AA AA AA AA AA AA : Year, Month, Day, Hour, Minute, Second BB BB BB BB: X-axis data details are in the X-axis parsing defined in the data format; CC CC CC CC: Y-axis data details are in the Y-axis parsing defined in the data format; DD DD DD DD: Reserved.

Inclination data format definition

Baud rate: 115200, 8 data bits, 1 stop bit, no parity.

For example: X-axis: +02.010° Y-axis: -00.513°



Product Maintenance

1. The digital angle meter uses a 3.7V rechargeable lithium battery. To extend battery life, please charge the battery before it is completely depleted.
2. If there is no digital display after turning on the power switch, please charge the meter immediately.
3. This instrument is highly reliable and can be used in vibrating environments, but please do not drop it from a height, as this will cause permanent damage.
4. If you find any damage to the instrument, please do not disassemble it yourself. Please contact our company immediately for professional guidance and repair. Any instrument disassembled by an individual will be refused repair by the manufacturer.

Warning

1. This product contains high-precision sensors and information processing circuits. Dropping, impacts, or unauthorized disassembly are strictly prohibited; any consequences arising from such actions will be the sole responsibility of the user.
2. Do not press multiple buttons simultaneously, as this may shorten the product's lifespan.
3. This product should be placed in a safe location out of reach of children.