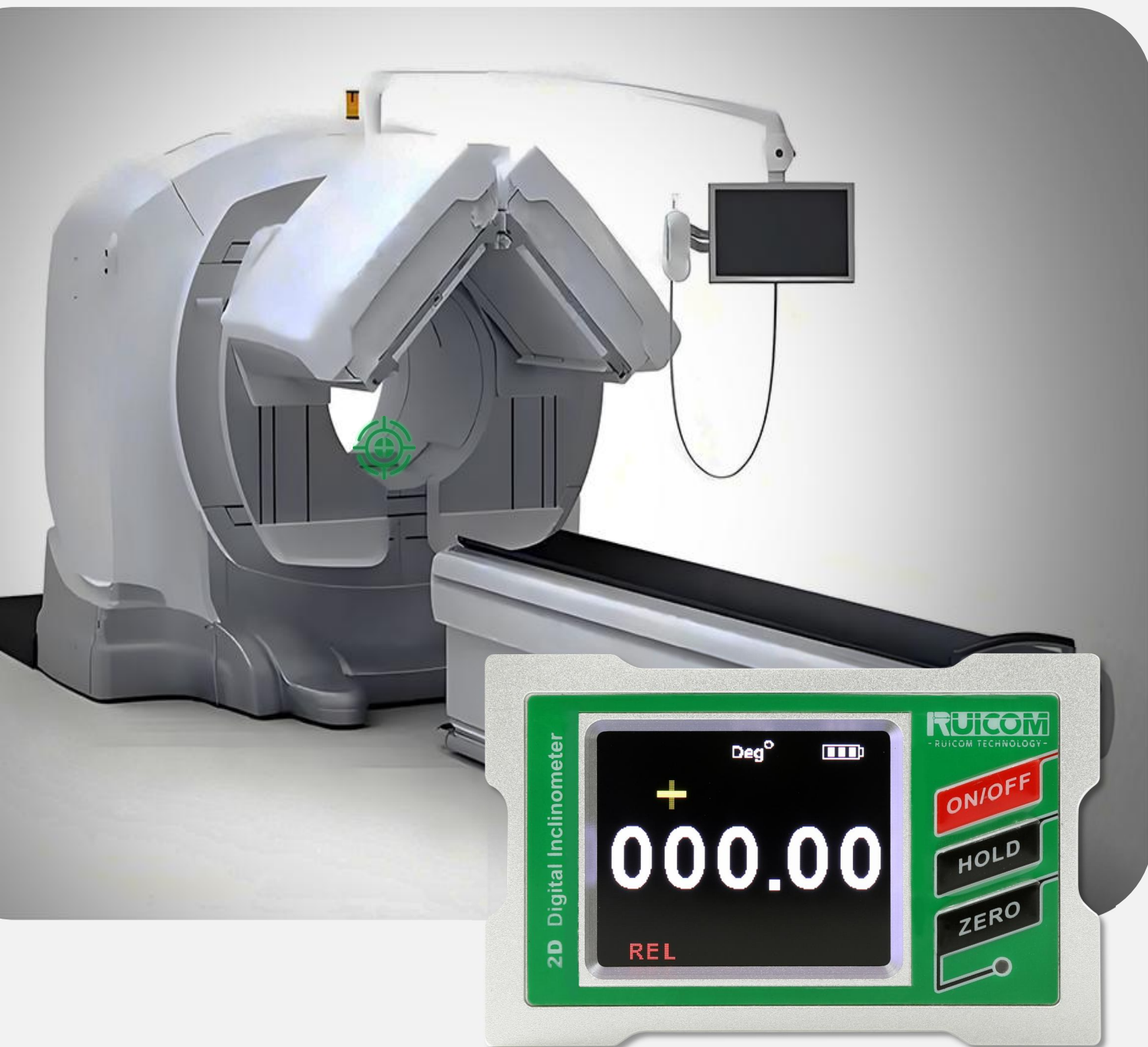




GDS4 Series Digital Inclinator

Product manual

V1.1-20260514

Technical Characteristics

- ❖ Accuracy: 0.05°;
- ❖ Angle resolution: 0.01°;
- ❖ Operating temperature: -10°C to +70°C;
- ❖ Range: single axis $\pm 180^\circ$, dual axis $\pm 90^\circ$;
- ❖ Absolute/relative measurement switchable;
- ❖ Strong magnetic adsorption design adapts to different installation requirements.



Product Introduction

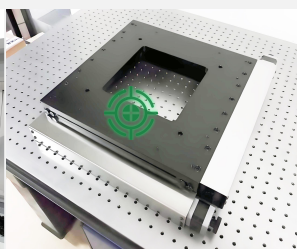
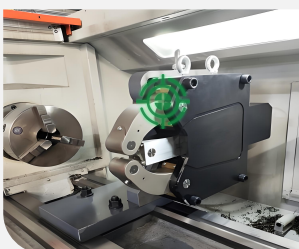
The GDS4 series is a high-precision digital inclinometer instrument independently developed by RUICOM Technology, specifically designed for angle control and measurement in industrial fields. The core of this product is based on a micro mechanical control system and a dual core measurement unit. During the measurement process, real-time compensation can be implemented on the X axis through the Y axis, and combined with cross compensation and temperature compensation model algorithms, fully utilizing the powerful computing power of micro mechanical electronic principles to ensure excellent measurement stability and repeatability of the instrument in long-term use.

Among them, GDS41180 supports single axis $\pm 180^\circ$ measurement, GDS4290 supports dual axis $\pm 90^\circ$ measurement, with a resolution of 0.01° and a full range accuracy better than 0.05°. It has the characteristics of rapid response and stable data output. The product is specially designed with strong magnetic adsorption installation on the side and bottom in terms of structure, allowing both reference surfaces to be used for measurement, greatly improving the convenience of customer use.

This series of products not only has strong scalability and easy operation in practical applications, but also has industrial grade reliability and excellent cost-effectiveness, which gives it a significant competitive advantage in the international market.

Application Field

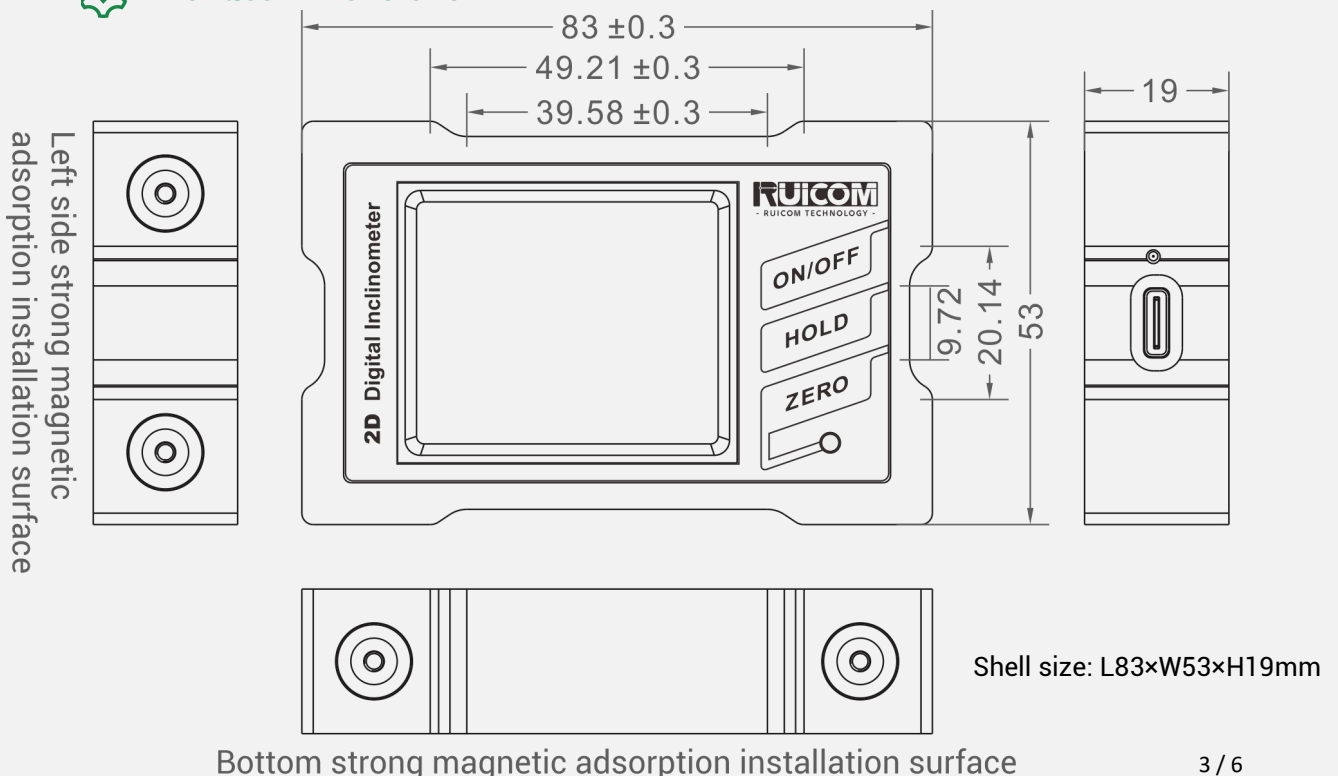
- | | |
|---|--|
| ❖ Construction Engineering Surveying | ❖ Vehicle positioning and four-wheel calibration |
| ❖ Pipeline laying and angle control | ❖ Road surface and slope gradient detection |
| ❖ Camera gimbal angle calibration | ❖ Mechanical equipment installation and leveling |
| ❖ Medical equipment posture measurement | |



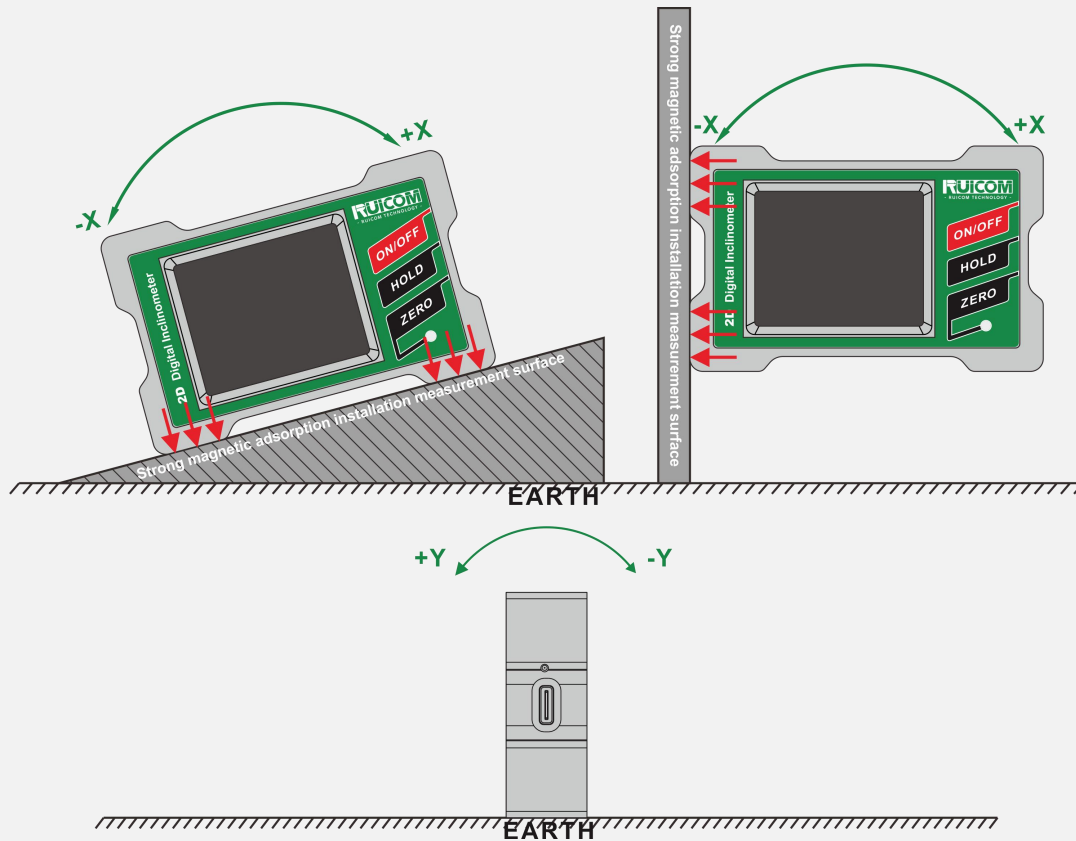
Specifications

PARAMETERS	GDS41180	GDS4290	unit
Measurement axis	Single axis	Dual axis	/
Angle measurement range	±180	±90	°
Angle measurement accuracy	0.05(full range)	0.05(full range)	°
Angle measure resolution	0.01	0.01	°
mm/m measure range	±999.9	±999.9	mm/m
mm/m measurement accuracy	0.9(full range)	0.9(full range)	mm/m
mm/m measurement resolution	0.1	0.1	mm/m
LCD visible area size	L40*W32		mm
Working temperature	-10 ~ +70		°C
Working humidity	85		%RH
Power supply	3.7V Charging Lithium battery		V
Ideal charging time	3		h
Battery continuous working time	8 (±0.5)		h
Data output signal	Type-C		/
Anti-vibration	10g@11ms、3 Axial Direction (Half Sinusoid)		g
Impact resistance	10grms/10~100Hz		g
Waterproof level	IP54		/
Material	Metal aluminum		/
Size	L83*W19*H53mm		mm
Weight	≤140		g

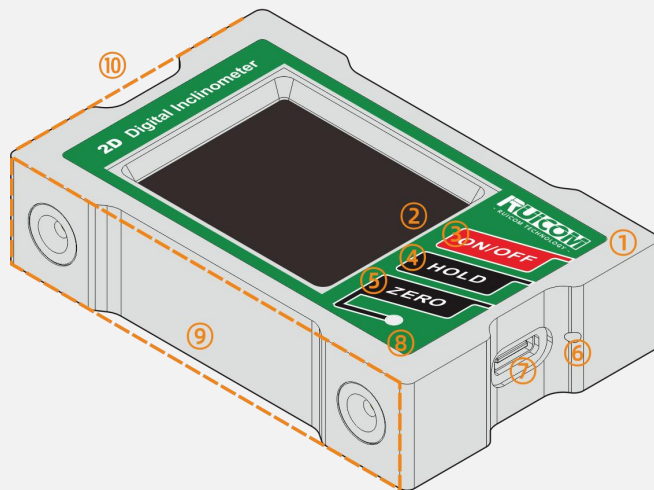
Product Dimensions



✓ Magnetic measuring surface



✓ Shell Function Description



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

- ① Metal wear-resistant structure: metal shell, hard and durable;
- ② Display area: data display touch screen operation area;
- ③ ON/OFF: Power on/off key, press and hold for 3 seconds to turn on or off;
- ④ HOLD: lock key, lock the current data, convenient for customer records;
- ⑤ ZERO: Switch between absolute measurement and relative measurement mode; (ABS is displayed on the screen for absolute status, and REL is displayed for relative measurement);
- ⑥ Reset hole: If the product crashes during use, please insert a small needle into the small

hole below the Type-C interface to reset;

⑦ Type-C port: used for charging and outputting data;

⑧ Charging indicator light: when the light is on, it means charging, and when the light is off, it means it is fully charged.

⑨ Bottom strong magnetic: the bottom strong magnetic adsorption mounting surface;

⑩ Strong magnetic on the side: the strong magnetic adsorption mounting surface on the left;

HOLD&ZERO: To switch the measurement unit, press and hold HOLD until the small lock sign appears on the screen, and then press ZERO to switch between the two measurement units of "angle" and "mm/m";

ON/OFF&HOLD: Press and hold ON/OFF, wait for the screen to turn black, then press HOLD, then the accuracy can be calibrated according to the screen;

ON/OFF&ZERO: Press and hold ON/OFF, wait for the screen to turn black, then press ZERO, then you can perform zero point correction according to the screen;

Note: The USB driver can be downloaded from the official website as the "GDS Series USB Driver".

Measurement Function Description

ABS: Indicates that the sensor is currently an absolute measurement.

REL: Indicates that the sensor is currently a relative measurement.

Deg°: Indicates that the current measurement unit of the sensor is degrees.

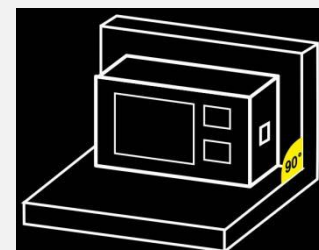
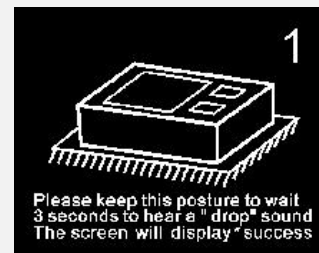
mm/m: Indicates that the current measurement unit of the sensor is mm/m.

 : Indicates that the sensor is currently in the screen lock state.

When the accuracy of the sensor decreases due to housing wear and other reasons, or the zero point is offset, the user can re-calibrate through calibration. The screen after entering the calibration is as shown on the right:

During the calibration process, the user needs to keep the sensor in different attitudes according to the screen prompts. There are 6 attitude points for the precision calibration and 2 attitude points for the zero point calibration. For each attitude point, the system will give one long, one short and two short beeps. Follow the instructions on the screen to place the sensor correctly. After waiting for 5-10 seconds, a long beep will appear. At this time, the system will conduct sampling, so it is necessary to keep the environment as stable as possible. The sampling will be carried out for 3-5 seconds, after which a short beep will appear, and then the sensor will be held to the next posture according to the screen prompts. After calibrating 6 points, the system automatically shuts down. Similarly, the zero point calibration can also be carried out according to the above steps.

Note: Regardless of zero point calibration or accuracy calibration, the horizontal reference plane of each attitude point must be the same, otherwise it may cause adverse effects on the calibration results. Therefore, it is recommended to first find an L-shaped calibration fixture (or any object with an L-shaped surface), and then at each attitude point, place the sensor against the L-shaped surface, as shown on the right:



Communication Protocol

GDS4 SERIES communicates with the host computer via USB, automatically outputs. Baud rate 9600

1. Data frame format: (8 data bits, 1 stop bit, no parity, default rate 9600)

Identifier (1byte)	Date Length (1byte)	Address code (1byte)	Command word (1byte)	Date domain	Check sum (1byte)
68					

Data format: Hexadecimal;

Identifier: Fixed 68H;

Data length: From data length to check sum (including check sum) length;

Address code: Acquisition module address, Default :00;

Data domain will be changed according to the content and length of command word;

Check sum: Data length / Address code / Command word and data domain sum, No carry.

2. COMMAND WORD ANALYSIS

CMD	Meaning/example	explain
0X84	Sensor automatic output E.g: 68 0D 00 84 00 20 10 10 05 25 00 50 50 9B	Data domain (9byte) SA AA BB SC CC DD SE EE FF SA AA BB : 3 characters represent the X axis return angle value, which is a compressed BCD code, S is the sign bit (0 positive, 1 negative) and AAA is a three-digit integer value; BB decimal places. SC CC DD : 3 characters represent the Y axis: the analysis method is the same as the X axis angle. SE EE FF : 3 characters reserved: In the example on the left, the angle is: X-axis 20.10°, Y-axis -5.25°.

Product Maintenance

1. The digital display angle instrument using 3.7 V rechargeable lithium battery, in order to improve the battery life, please recharge when the battery not completely to be used out.
2. Press power ON without digital display, please recharge in time.
3. The instrument reliability and can be used in the vibration environment, please don't high-altitude fall the instrument to avoid cause permanent damage.
4. If found instrument damage please don't disassemble it by yourself, please contact us at first for professional guidance, such as personal removed, subject to manufacturer shall refuse to repair.

Warning

1. This product has a high precision sensor and information processing circuit, it is forbidden to drop impact or to tear open outfit, otherwise the consequence is proud.
2. Don't press the multiple keys at the same time, it is easy to affect the service life of the Product.
3. This product should be placed in a safe place where Children can not touch.