RION® RION TECH

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DIGITAL DISPLAY INCLINOMETER
DMI410/DMI420
Technical Manual

PRODUCTION EXECUTION STANDARD REFERENCE

○ Quality management system certification: GB/T19001-2016 idt ISO19001:2015 standard (Certificate No.: 128101)

○ Quality management system certification: IATF16949: 2016 (Certificate No.: T178487)

○ GJB9001C-2017 Standard Weaponry Quality Management System Certification (Registration number: 02622J31799R0M)

○ Intellectual property management system certification: GB/T29490-2013 standard (Certificate No.: 41922IP00281-06R0M)

○ High-tech Enterprise (Certificate No.: GR201844204379)

○ ShenZhen Professional Dedicated Unique Innovative Enterprice(No.: SZ20210879)

○ CE certification number: ATGZAHS190115001

○ FCC certification number: AT011611740E

○ RoSH certification number: 18300RC20410801

○ China National Intellectual Property Appearance Patent (Patent No.: ZL 202130363422.6)

○ Revision time:2023-3-9

Note: Product functions, parameters, appearance, etc. will be adjusted as the technology upgrades. Please contact our pre-sales business to confirm when purchasing.

DMI410/DMI420   DIGITAL DISPLAY INCLINOMETER

DIGITAL DISPLAY INCLINOMETER

▶ PRODUCT DESCRIPTION

DMI410&DMI420 is a digital display inclinometer which took RION company three years to develop professional for various industry angle control and measuring.The core of this product is using the micro-mechanical control principle, dual-core measurement unit, can use the Y-axis to compensate X-axis during the measurement process,a and then to use RION patent interleaved and temperature compensation model algorithm to play absolute operation advantages of the micro-mechanical electronic principles,to ensure that the instruments measurement with the long-term stability and repeatability. MI410 single axis ±180° measurement, DMI420 dual axis ±90° measurement，resolution 0.01 °，accuracy <0.05 degree full-scale，fast response, stable data, products specially designed for the sides and bottom with magnetic adsorption installation, both sides of the benchmark can be measured and using normally,very convenient to use ，This product series has strong scalability, convenient & practical application and industrial reliability, has absolute cost advantage and has an absolute competitive advantage in the international market !

▶ KEY FEATURES

★ Auto-angle interleaved compensation function
★ User can calibrate by himself
★ Night vision fours colors screen
★ Angle/length dual unit switch

★ Auto temperature drift compensation
★ Built-in recharge industry battaries
★ IP54 protection class
★ 100g High anti-impact

▶ APPLICATION

★ Building construction
★ Machinery installation
★ Turntable testing

★ Automobile four-wheel testing
★ Piping installation
★ Cloud deck angle detection

★ Road slope
★ Industrial platform
★ Production jig
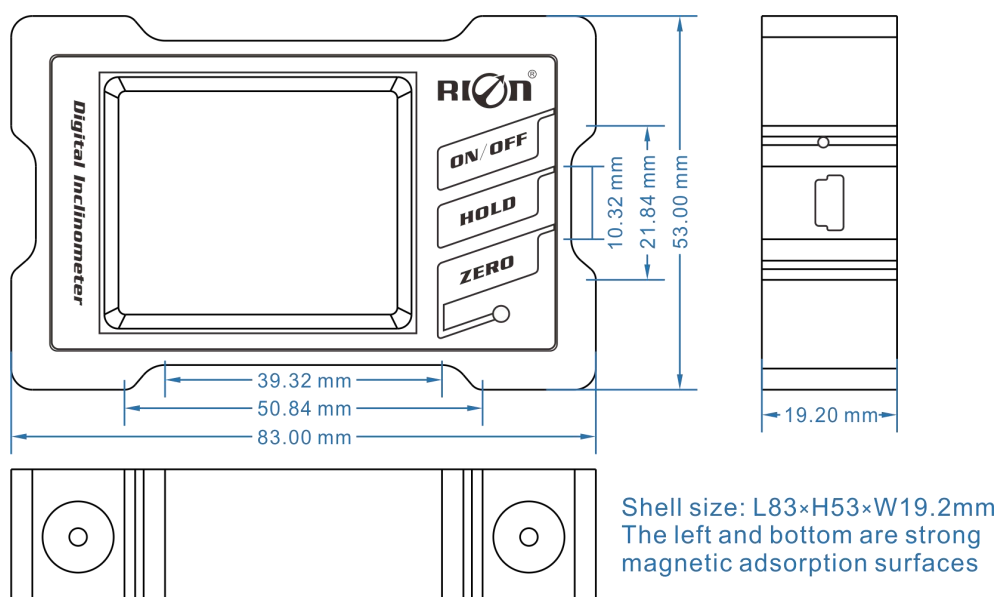
DMI410/DMI420   DIGITAL DISPLAY INCLINOMETER

▶ **SPECIFICATIONS**

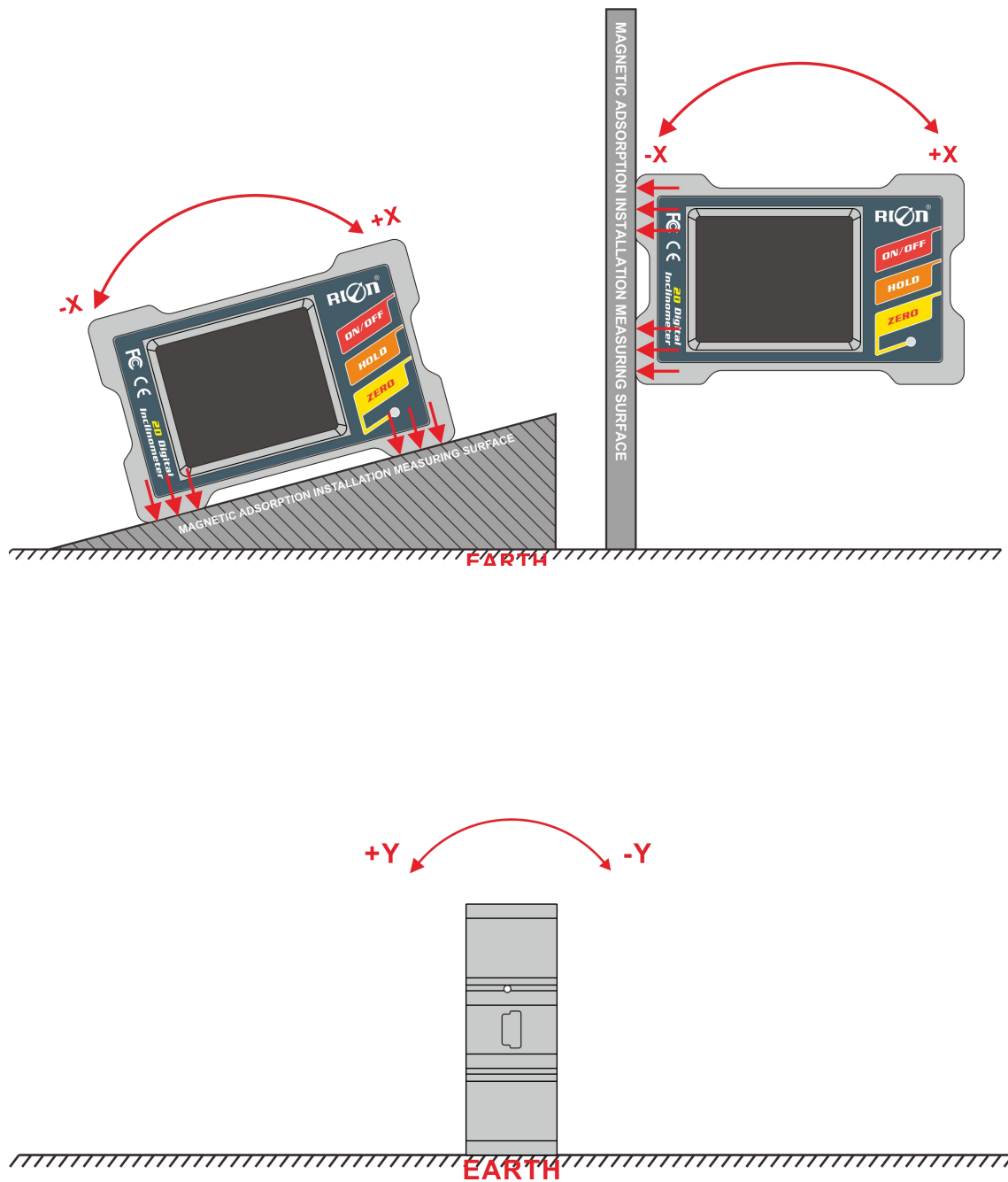| PARAMETERS	DMI410	DMI420
Measurement axis	Single axis	Dual axis
Angle measurement range	±180 °	±90 °
Angle measurement accuracy	0.05 °（full range）	0.05 °（full range）
Angle measure resolution	0.01°	0.01°
mm/m measure range	±999.9mm/m	±999.9mm/m
mm/m measurement accuracy	0.9mm/m(full range)	0.9mm/m(full range)
mm/m measurement resolution	0.1mm/m	0.1mm/m
LCD visible area size	L40*W32mm	
Working temperature	-10℃ ~ +70℃	
Working humidity	85%RH	
Power supply	3.7V Charging Lithium battery	
Ideal charging time	3h	
Battery continuous working time	8h（±0.5）	
Data output signal	Standard 5Pin USB connector	
Anti-vibration	10g@11ms、3 Axial Direction (Half Sinusoid)	
Impact resistance	10grms、10 ~ 100Hz	
Waterproof level	IP54	
Material	Metal aluminum	
Size	L83*W53*H19.2mm	
Weight	≤140g	

▶ **ORDER INFORMATION**

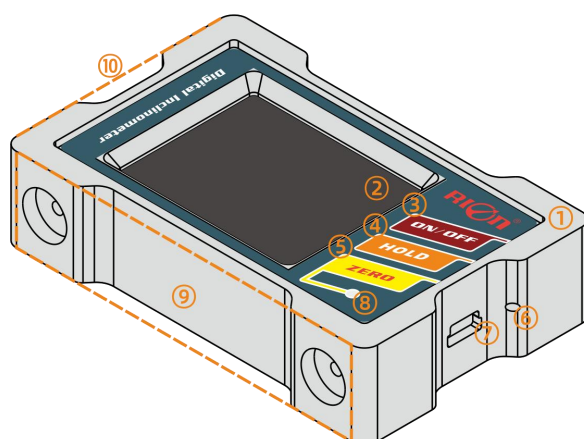| Item No.	Order description
DMI410	Standard single axis digital display inclinometer /measure range ±180°(length 0 ~ ±999.9mm/m)
DMI420	Standard Dual axis digital display inclinometer /measure range ±90°(length 0 ~ ±999.9mm/m)

▶ **DIMENSION**

Shell size: L83×H53×W19.2mm
The left and bottom are strong
magnetic adsorption surfaces

○INCLINOMETER   ○3D COMPASS   ○ACCELEROMETER   ○GYRO   ○NORTH FINDER   ○INS&IMU

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▶ MEASURING DIRECTION

○INCLINOMETER   ○3D COMPASS   ○ACCELEROMETER   ○GYRO   ○NORTH FINDER   ○INS&IMU
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DMI410/DMI420 DIGITAL DISPLAY INCLINOMETER

▶ PRODUCT FUNCTIONS

①Metal anti-wear structure
②Display area
③ON/OFF
④HOLD
⑤ZERO
⑥Reset hole
⑦USB jack
⑧Charging lamp
⑨Strong magnetic bottom
⑩Side 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 USB interface to reset；

⑦ USB jack: used for charging and USB2.0 virtual serial port output 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 HOLD, then you can perform zero point correction according to the screen；

Note: The USB driver can be downloaded from the official website of Ruifen "USB Driver for DMI Series Products"。

▶ FUNCTION MENU OPERATION INSTRUCTIONS

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

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

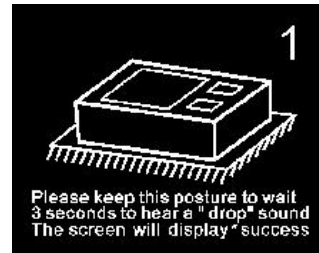**Deg°**：Indicates that the current measurement unit of the sensor is degrees。

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

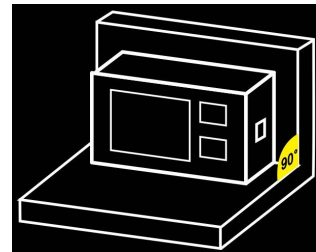🔒：Indicates that the sensor is currently in the screen lock state。

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:

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DMI410/DMI420 DIGITAL DISPLAY INCLINOMETER

▶ DMI410 /DMI420 COMMUNICATION PROTOCOL

DMI410/420 communicates with the host computer via USB, and DMI410/420 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：Fixed68H;

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

Command word	Meaning/example	explain
0X84	Sensor automatic output example: **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.

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