RION TECH

Patent No.: ZL 201830753099.1

V1.5

DIGITAL DISPLAY INCLINOMETER

DMI410/DMI420

Technical Manual

PRODUCTION IMPLEMENTATION STANDARD REFERENCE

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

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

○ CE certification number: AT011611739E FCC certification number: AT011611740E

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

○ Revision time:2021-12-09

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

▶ 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

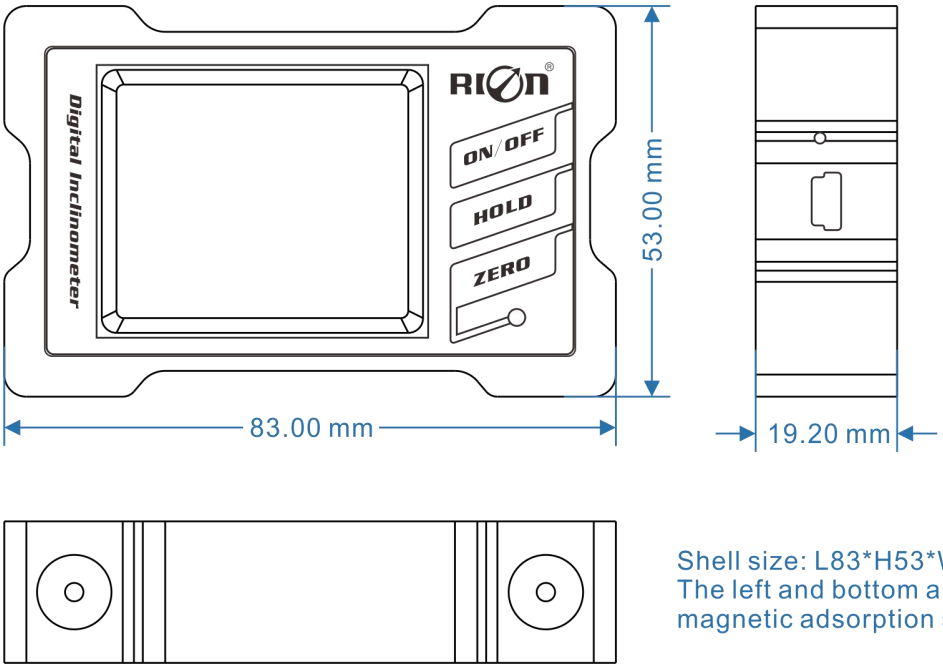
▶ TECHNICAL DATA

PARAMETERS	DMI410	DMI420
Angle measure range	±180 °	±90 °
Length measure range	0~±999.9mm/m	0~±999.9mm/m
Measure axis	Single axis	Dual axis
Angle measure accuracy	0.05 ° (full range)	0.05 ° (full range)
Angle measure resolution	0.01°	0.01°
Length measure accuracy	0.9mm/m(full range)	0.17mm/m(full range)
Length measure resolution	0.17mm/m	0.1mm/m
LCD visible area size	L40*W32mm	
Working temperature	-10℃ ~ +70℃	
Working humidity	85℃	
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	
Weight	≤140g	
Waterproof level	IP54	
Material	Metal aluminum	
Size	L83*W53*H19.2mm	

▶ ORDER INFORMATION

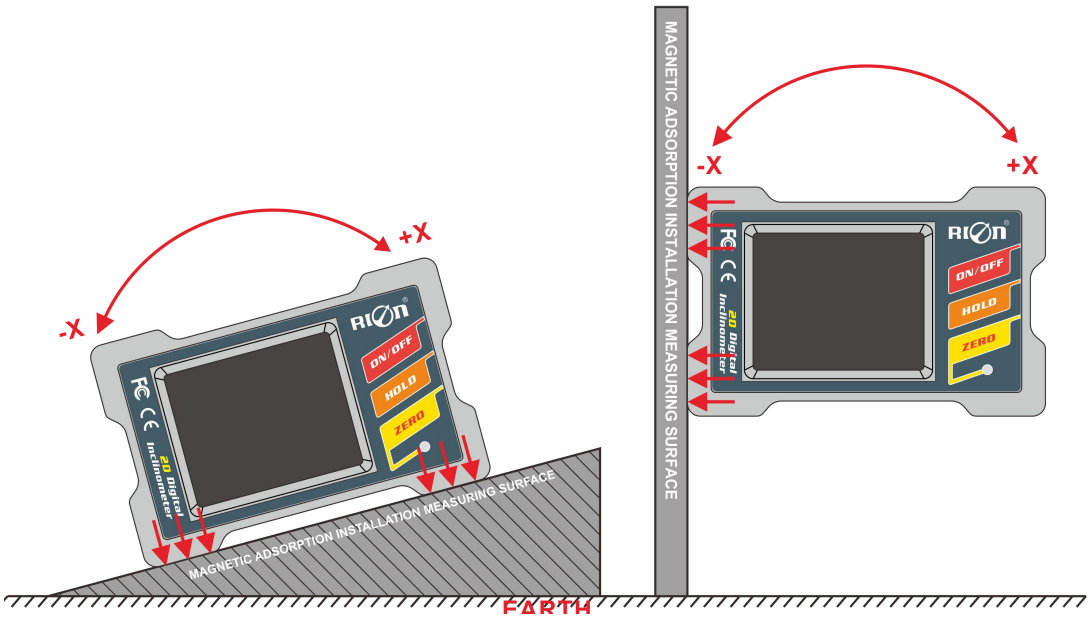
Item No.	Order description
DMI410	Standard single axis digital display inclinometer /measure range ±180°(length 0～±999.9mm/m)
DMI420	Standard Dual axis digital display inclinometer /measure range ±90°(length 0～±999.9mm/m)

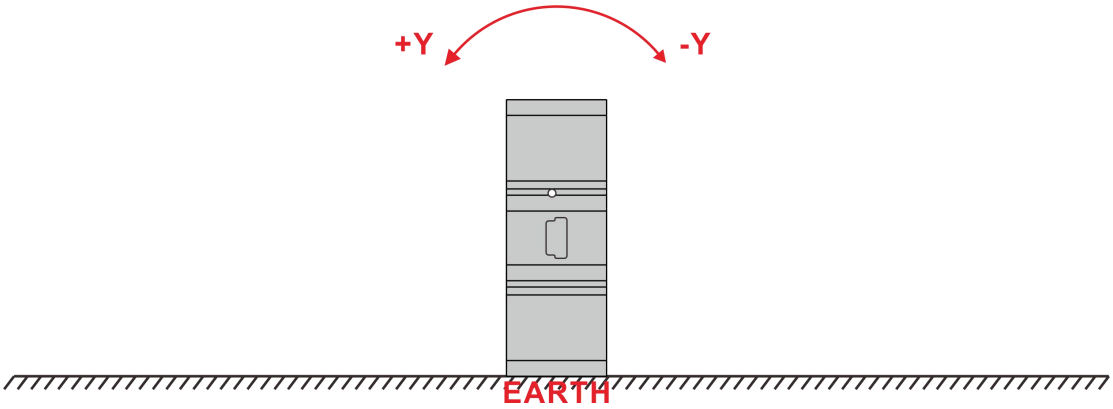
▶ DIMENSION



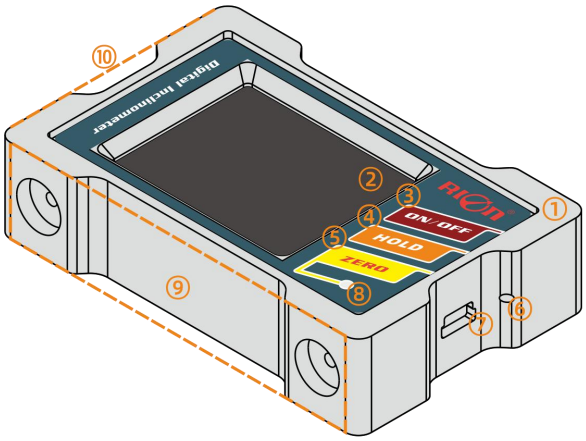
Shell size: L83*H53*W19.2mm
The left and bottom are strong magnetic adsorption surfaces

▶ MEASURING DIRECTION





▶ PRODUCT FUNCTIONS



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

ON/OFF: Press for 2seconds to power on or off ;

HOLD: This key to lock the current data, convenient customer records;

ZERO: This button can switch in the absolute and relative measurement mode;(screen display ABS means absolute status, display REL means relative measurement)

HOLD & ZERO: Press HOLD button until the screen appear a small lock sign then press ZERO, can switch in “Angle” and “mm/m” two units of measurement;

ON/OFF&HOLD: Press ON/OFF button until the screen to be black then press the HOLD button , can calibrate the accuracy according to the screen;

ON/OFF&ZERO: Press ON/OFF button until the screen to be black then press the HOLD button , can calibrate the ZERO according to the screen;

RESET HOLE: If the instrument occur a crash in working, key can't operation, can use the needlepoint hard object to insert into the hole for touch the button;

USB JACK: For charging purposes or Angle of external connection, data transmission;

WARNING LIGHT: Charging lights, lights up means is charging, light off mens has been filled with power then can take off the charger .(In order to keep the battery with a long life please don't use it as much as possible when it is charging with power.)

▶ FUNCTION MENU INSTRUCTION

ABS : Means at present the sensor is absolute measurement.

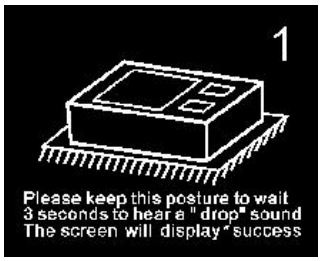
REL : Means at present the sensor is relative measurement.

Deg : Means at present the measurement unit of sensor is deg.

mm/m : Means at present the measurement unit of sensor is mm/m。

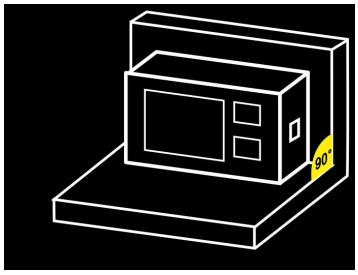
: Means at present the sensor is in screen lock status.

When because of casing attrition etc. Reasons then result in a decline in the sensor precision or ZERO offset , the user can re-calibrate through the calibration . The images as below after enter into the calibration:



During calibration, the user needs to maintain the sensor in different attitudes according to the screen indication,precision calibration has six attitude points, the ZERO has two attitude points. Each attitude point system will give one long and one short two tones, place the sensor correctly in accordance with the instructions on the screen, wait for 5-10 seconds, there will be a long tone, then the system will sample, so you need to try to keep a stable environment. Sampling will be conducted for3-5 seconds, after which there will be a short tone, then keep the sensor to the next attitude. When finished six points after calibration, the system will automatically shut down. Similarly, the zero calibration according to the above steps.

Note: Whether the zero calibration or precision calibration, each attitude point horizontal datum must be the same, otherwise the calibration results may give adverse effects. Therefore, it is recommended first to find a L-shaped calibration fixture (or any object with L-shape surface) , then in each attitude point, the sensor close to the L-shaped surface, as shown below:



▶ 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.

▶ 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°.

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