Wisen innovation Vision Unit Geotechnical Safety Monitoring System User Guide

WiSen® Vision Unit
User Manual
Wuxi Wisen Innovation Co., Ltd.
July 2021

Revision History and Clarification

Rev.	Issue Date	Revisions	Written By	Revised By
V1.0	12/7/2021	1stIssue	Xiaoyan Huang	Dr. Yan Wu

Contents

Document Definition:

It defines the specifications (i.e., introduction, technical features, deployment, and maintenance methods) of the WiSen® Vision Unit. It is responsible to:

- When a Vision Unit is deployed at the Control center/Data center, the LED warnings can be configured with one or more projects. So that a visual and auditory warning system can be established in the center.
  This frees the operators from frequent checking of warning emails;
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Scope
Customer Site Project Managers and Engineers, Wisen Service Engineers, etc.

Product Introduction

The WiSen® Vision Unit is one of the key products in our patented WiSen® geotechnical safety monitoring system.
Our product has IP66 and is designed to work in a tough environment. It is small in size, reliable in performance, easy for maintenance, has high precision during sampling, and has a strong immunity to radio interference.

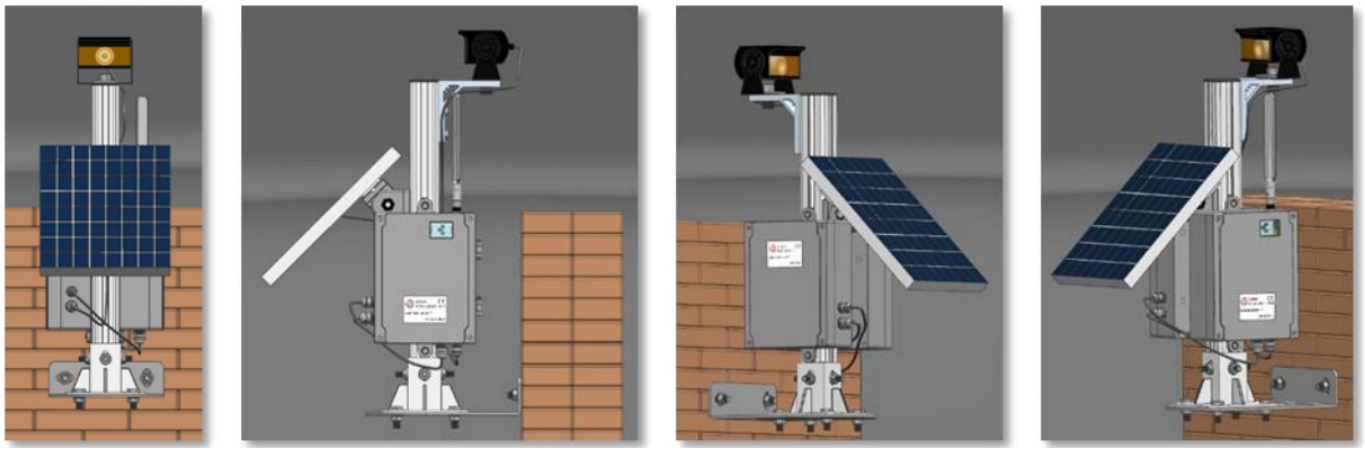
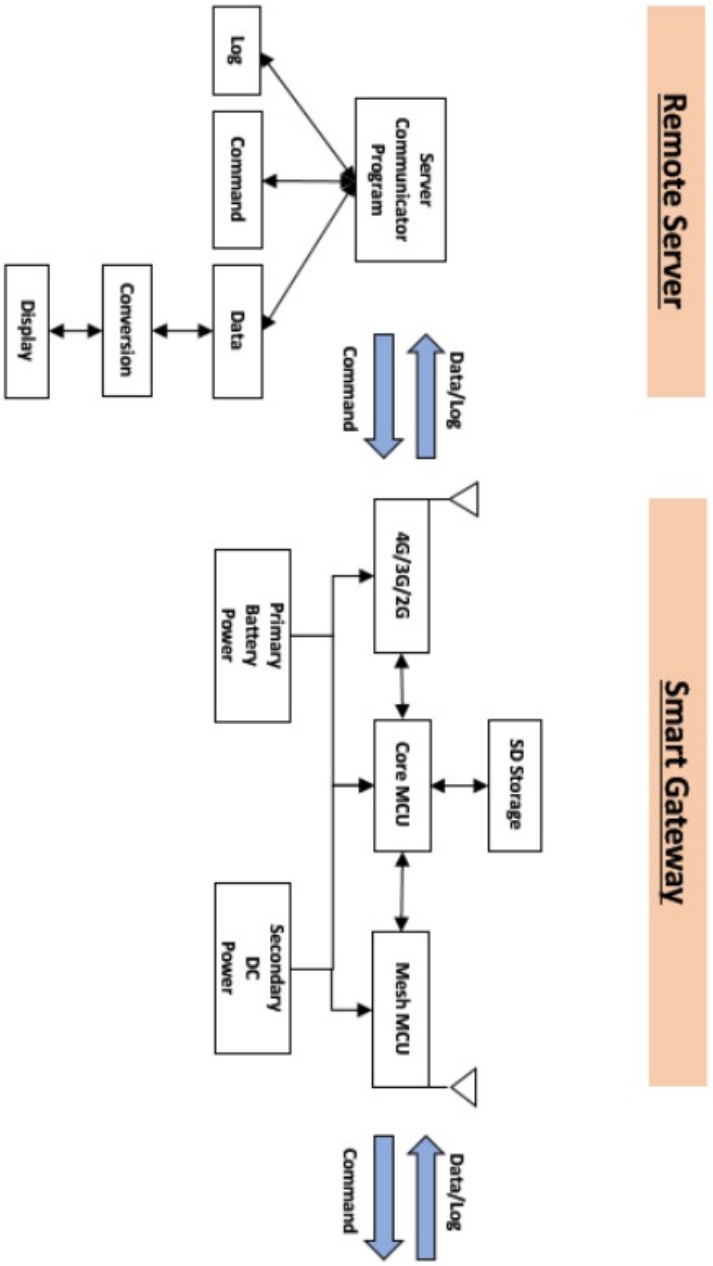
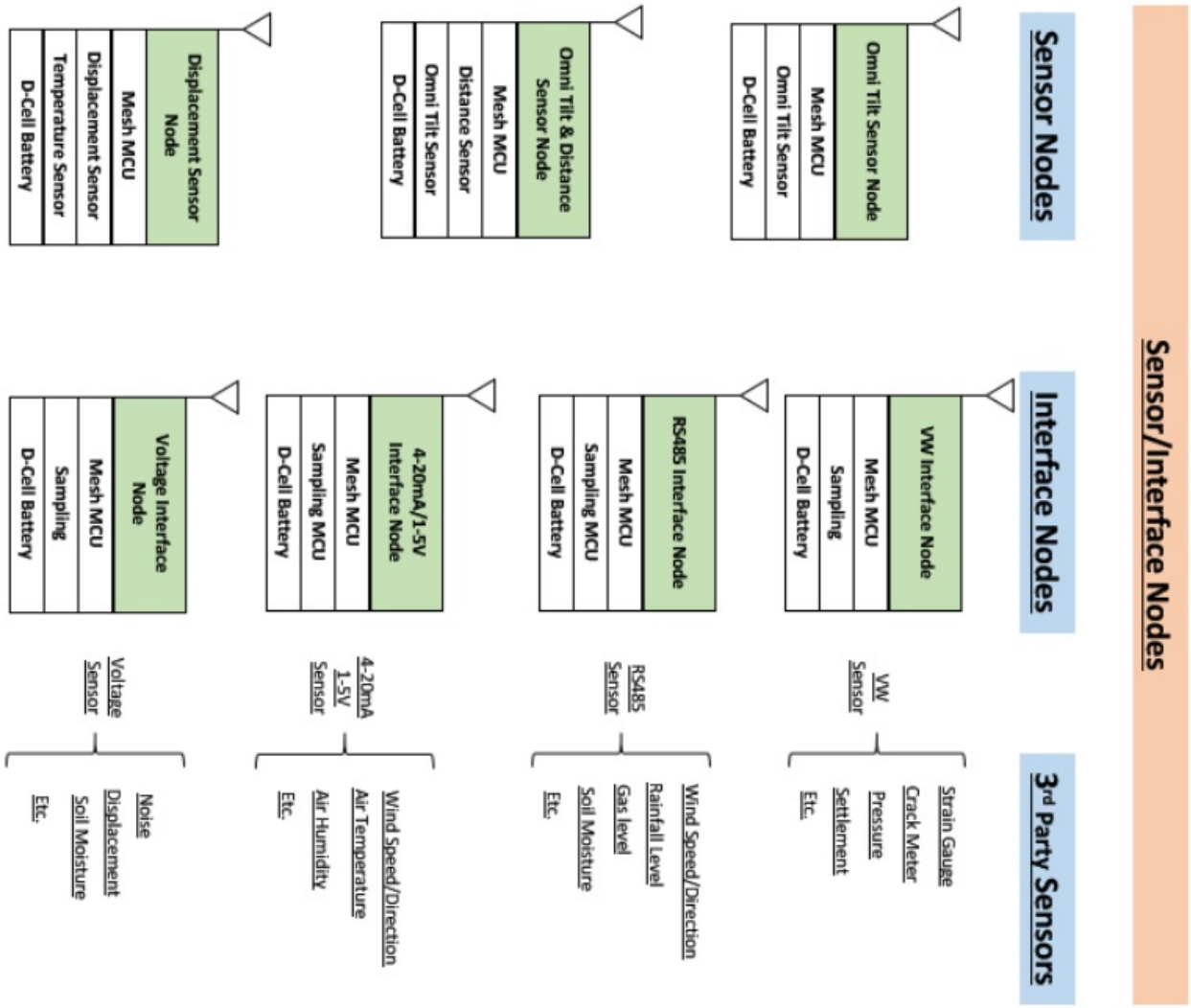


Figure 1. Vision Unit Overview.

Note: The vision Unit relies on a stable 4G connection, so its image data can be transferred smoothly and furthermore, the LED warnings can be received from a remote control centre.

System Structure Layout





Node & Radio Features

Node Features:

Basics	
Primary Battery Power	Qty. x 4 (3.6V Lithium primary D-Cell ER34615)
Secondary DC Power	7 – 32VDC @ Min. 2A (e.g. 110-240VAC to 12VDC adaptor) or Solar Unit
4G Network Stop Voltage	2.1V
Local Storage	≥180 days @T=10min, i.e., 26000 Images

L x W x H	180 x 140 x 60mm	
Weight	≤ 2.0kg	
Cable Gland	Qty. 1 x EMC-CMA12 for Camera connection; Qty. 1 x EMC-CMA14 for external DC input power connection	
Camera Mode (Factory Default Setting: Active Mode @ T=5min @ Lower Power LED Status)		
Passive Mode & Battery Life	Photo is not taken until a Photo-Taken command is sent, more specifically: – At T < 5min, a photo comes back at close to the real-time, internal battery life ≈ of 10 days; – At T ≥ 5min, a photo comes back with a delay of 1-2Ts, internal battery life ≈ 44 da ys @T=5min.	
Active Mode & Battery L ife (@ 4G Connection)	Photo is automatically taken at every T.	
	Sampling Time Interval – T	**No.**
	1min	3d
	5min (Default Setting)	16d
	15min	53d
	30min	91d
	60min	162d
	24hr (@Low Power Green Mode)	5Yrs+

Sampling Time Interval T	[1min, 1day]. Notice: at both Active and Passive modes, 1. The bigger the T value is, the more delay a user has when getting a photo; 2.The bigger the T value is, the less power consumption a node is, i.e., internal batte ry life can last longer.
Camera Image	
Image sensor	CMOS 2MP Colour
Image resolutions	1920 x 1080

Image compression	JPEG
Angle of view	Horizontal Plane 85°/ Vertical Plane 45°
Lens	3.6mm
External Cable Length	1.0m
Night vision image	Black & White
Night Vision Distance	1.0 to 8.0m
LEDS/Buzzer and On-Site Warning Issuing	
Volume	Max. 90dB@10cm
No. of LEDs	LED x 3 of Green/Blue/Red Colours + Low Power LED x 1 of Green

<table>
<tr><td>LED Flashing/Buzzer Frequency</td><td><table>
<tr><td>Red + Buzzer Warning (the highest warning level)</td><td>Twice at every 2s</td></tr>
<tr><td>Blue + Buzzer Warning</td><td>Once at every 3s</td></tr>
<tr><td>Green/Low Power Green Mode (normal level) No Buzzer</td><td>Once at every 4s</td></tr>
</table></td></tr>
<tr><td colspan="2">External Interface</td></tr>
<tr><td>Wireless Module</td><td>ONLY Wisen 7600E or plus Daughter Board @ Micro SIM card, WiFi module</td></tr>
<tr><td>Wired Port</td><td>RS232, Ethernet module</td></tr>
<tr><td colspan="2">WSN Interface</td></tr>
<tr><td>Mesh Wireless Interface</td><td>WiSen® Protocol</td></tr>
<tr><td colspan="2">Standard System Parameter</td></tr>
<tr><td>Temperature</td><td>Range: -40 to 85°C; Accuracy: ±1°C; Resolution: 0.1°C</td></tr>
<tr><td>Voltage</td><td>Accuracy: ±0.1V</td></tr>
<tr><td colspan="2">Industrial Standard</td></tr>
<tr><td>Casing and Painting Materials</td><td>Aluminium-Alloy Die Castings 12 (Epoxy Polyester Powder Coating)</td></tr>
<tr><td>IP Rating</td><td>≥ IP66</td></tr>
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Operating Temperature	-40 to 85°C
Fire Proof	Approved
Certificates	–

Terminologies

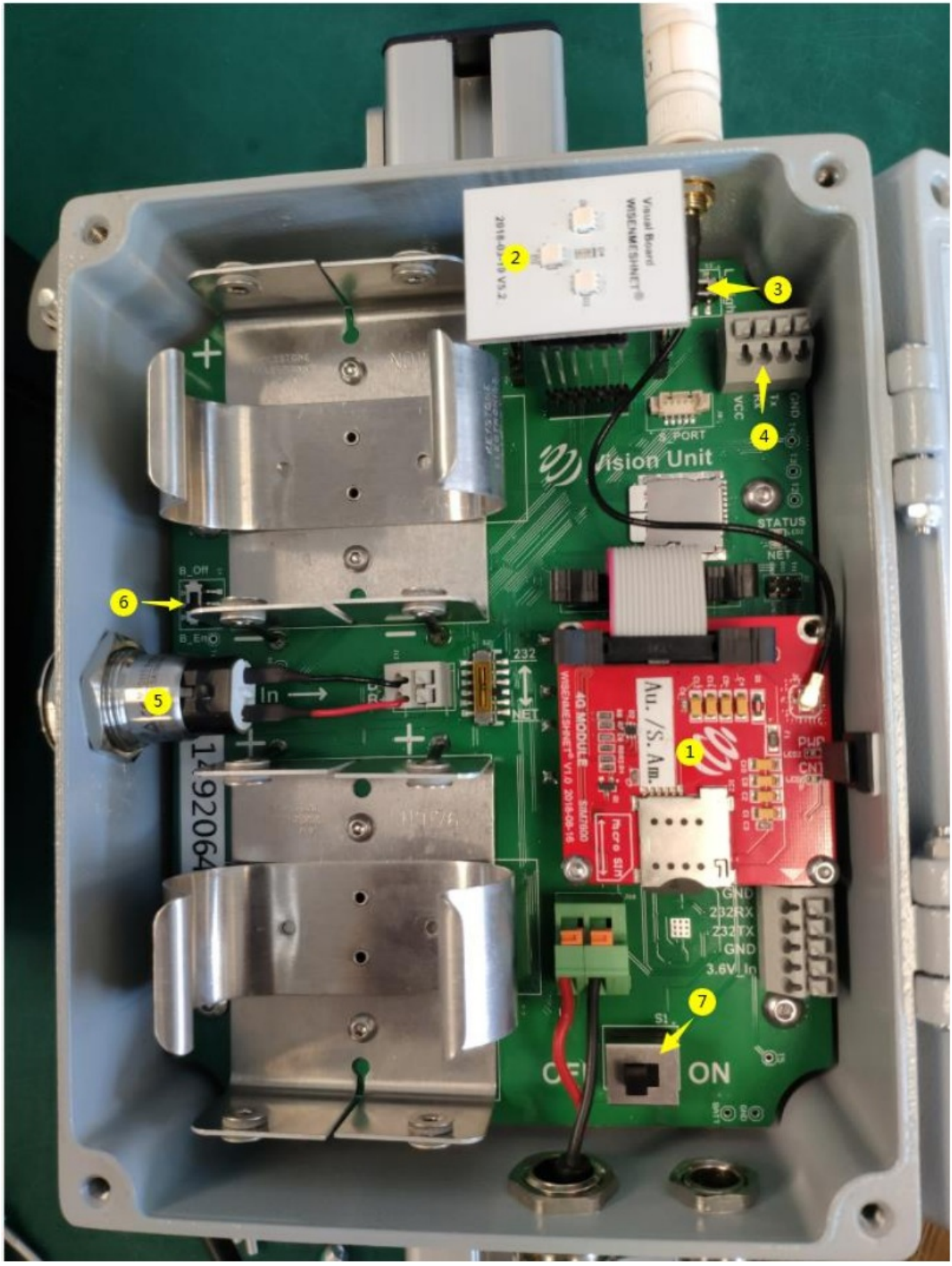


Figure 3. 4-Channel Laser Distance Sensor Node Internal Configuration Terminologies, where:

No.	Terminology
1	4G Daughter Board
2	LED Board
3	LED Switch
4	Camera wire terminal
5	Buzzer
6	Buzzer Switch
7	ON/OFF Switch

Operation Procedures

5.1 System Deployment Notifications

1. Location: The deployment location of a Vision Unit is usually determined by the desired monitoring or inspection location;
2. Clear notes must be taken so that the Laser Units direction of a monitored structure can be correctly interpreted;
3. All the Serial Numbers of the Vision Unit must be recorded against their site references;
4. All the node should have their antenna point upwards/downwards.

5.2 Deployment Procedures

1. Open the box: Take the node out of the package and open its lid;
2. Insert Battery: By default, a unit does not contain a D-Cell battery. Therefore the battery needs to be inserted.
3. Notice: +ve and –ve orientation must be correct, otherwise, the internal circuit may be damaged;
4. Antenna Installation: screw the antenna tightly onto the unit;
5. Power On: switch on the Vision Unit by On/Off Switch. Now you should be able to see 3 LEDs flashing 3 times, this means the node is on;
6. Tighten the 4 Cap-Hex-Head screws of the lid to secure the enclosure IP rating;
7. To validate the data/photo, please visit Wisen Visualisation Platform for further details.

5.3 Mounting Options

The node fixings must be rigid for the sensor to measure accurate data. Movement in the fixings will affect the readings.

General Maintenance and Notification

1. Once a Vision Unit is installed in the field, please minimize any man-made disturbance so that data quality can be maintained;
2. Radio communication will be impaired if the antenna is covered by metal or very moist soil material;
3. Due to the discharge characteristics of the recommended battery, a battery replacement should be carried out;
4. Our product will use all the possible capacity in a battery down to a stop (minimum) voltage, which has been specified in the Features table. When this occurs, our WiSen protocol will send you a warning then it will enter a deep sleep mode until a new battery is installed;
5. If the data/photo from units are shown unexpected results or are not being sent back, then please carry out an investigation using the following two-stage procedure:

A. Remote Inspection of historical data, to identify the following:
a) Whether the heart-beat message has been sent back successfully at each time interval;
b) Whether the battery voltage is too low, if yes, please change the battery unit;
c) Whether the 4G signal strength has become significantly weaker than it was previously. If yes, please check the antenna has been screwed on firmly.
B. On-site Inspection: If all the above are good, please arrange an on-site inspection to check:
a) Whether the Vision Unit has visible external damage;
b) Check the box lid to see if it is firmly tightened;
c) Whether the antenna is bent or damaged and that the node is not blocked by new construction, e.g., hoardings;
d) When it is possible, check that the signal strength is normal by using a spectrum analyzer;
e) Open the lid, to see whether the battery is firmly attached to its holder;
f) Use a multimeter to measure the battery voltage. If it is below the stop (minimum) voltage, replace the battery.

i. Case One: If any change has been made from the list above, please inspect the data from the remote server;
ii. Case Two: If all the actions from the list above have not cured the problem, please contact Wisen. We will be happy to help.

Package and Accessories

Standard:

No.	Items	Dimension (mm)	Qty.
1	Vision Unit	180x140x60	1
3	4G Antenna	200	1
5	Cap-Hex-Head Screw	M6x14	4
6	User Manual*	Downloadable from Wisen Visualization Platform.	
7	Inspection Report*		

Safety and Warning

Warning: Please read the following instructions carefully.
1 Operation Safety

- Before taking any action, please read all the information provided carefully, and keep the guidance documents safe;
- Ensure that any procedures and installations are correctly carried out. The communication cable and the case must be grounded.
- This product has been designed to meet a certain water-proof level. However, it becomes water vulnerable when the lid is open or if the cable gland has not been sealed properly.

2 Electric Safety

- To install the battery into a holder, please follow the “+” (positive) and “-” (negative) signs in any Wisen product. The wrong orientation of a battery could potentially cause unit damage. Notice: The orientation of the battery can vary among products.
- When disconnecting the battery, please take special care not to apply excessive force, otherwise, the battery holder and the nearby circuitry may be damaged.

3 Warning

- The battery in the product has a relatively high capacity, so please take special care during storage and usage.
- This product must not be disassembled under any circumstances, to do so will void the warranty and may leave the product in a dangerous state;
- If all the above are not followed, the manufacturer cannot be held responsible for any damage and injury caused to the users.

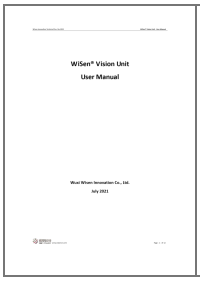
4 Caution

- The danger of explosion if the battery is incorrectly replaced. Replace only with the type recommended by the manufacturer.
- When disposing of the batteries, please contact your local authorities or dealer and ask for the correct method of disposal.

Contact

– Wuxi Wisen Innovation Co., Ltd.: www.wisencn.com
– Email: support@wisencn.com

Documents / Resources

	Wisen innovation Vision Unit Geotechnical Safety Monitoring System [pdf] User Guide Vision Unit Geotechnical Safety Monitoring System, Geotechnical Safety Monitoring System, Safety Monitoring System, Safety Monitoring, Vision Unit

References

- Wisen Innovation Ltd-
- Wisen Innovation Ltd-