

# **EXR** pole camera system

# For pipeline inspection QPAD-HD II

# **User's Manual**





- Carefully read this manual before use.
- Keep this manual for reference at any time.

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#### I. INSTRUCTIONS

#### 1. QUALIFICATIONS OF THE OPERATOR

Operators must be trained before operating the equipment.

## 2. SAFETY REQUIREMENT

Strictly comply with the safety regulations prescribed by the company or municipal department. Except necessary authorization, qualification and professional training do not connect the equipment with the pipeline or other conductors. Use this equipment strictly with the requirement of this manual.

- 3. Do not disassemble the equipment without authorization, the company will not take any responsibility as a result.
- 4. Do not use the equipment near any electrical source; Do not use the equipment in an explosive environment; do not expose the battery in sun for a long time, Do not submerge the system in acids or caustics.
- 5. Caution: when inflating the probe, the gas shall be nitrogen with a pressure not more than0.1MPa (Never use high pressure to inflate the system).
- 6. Only use the supplied battery pack as a power source.
- 7. Only use the supplied battery charger to recharge the battery.

Keep the rechargeable battery away from high heat and equipment that can produce sparks.

Keep the rechargeable battery away from organic solvents and adhesives.

Do not remove the rechargeable battery pack from its protective casing.

Replace any damaged or defective battery.

8. Keep the battery pack and control box in dry environment.

Disposal of the used battery must be compliant with relevant local regulations.

- 9. Do not directly touch the camera head after a long time use, it may cause a burn injury.
- 10. Maintenance:

Wipe the equipment clean and dry after use and before packing.

Keep the equipment in a dry place and cool place.

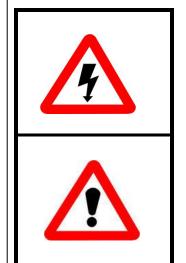
- 11. If the equipment is not used for a long time, please disconnect the battery from the equipment and isolate the battery to avoid battery leakage. Any damage or malfunction caused by misuse, e.g. battery leakage, is not warranted. Discharge and recharge the battery every one month when it does not use for a long time (See the Safety Instruction and Danger of the Li-ion Battery below mentioned).
- 12. Inspection over 10 meters below water is prohibited.
- 13. Connection of equipment with power is strictly prohibited; ensure to understand the correct connection method.
- 14. When working under the hazardous gas with high concentration, use the equipment after the hazardous gas is eliminated.
- 15. Ensure the equipment is installed probably before going down to the manhole.

## **II. WARNING LABEL EXPLANATION**

Please read this manual carefully before using the equipment.

Warning: This equipment has a light source; do not look directly at the beam.

**Warning:** To reduce the risk of fire or electric shock, do not place the equipment in wet conditions.



If you see this sign, be mindful of a risk of electric shock.

If you see this sign, it is the warning of important operation or, maintenance of the equipment.

#### III. SAFETY AND WARNINGS

Please realize that batteries might cause damages like leaking, fire or explode when misuse or defective. You must read these safety instructions and warnings before using or charging your batteries. Failure to read and follow the below instructions may result in fire, personal injury and damage to property if charged or used improperly. The following is only for general instructions and guidance. It may not cover all possible conditions of use. Any incident caused by the improper use, the manufacture will not assume any responsibility.



#### Danger

■ Please keep the battery dry. Do not put the battery into water, sea water or other liquid.

Otherwise the battery may short-circuit and get heat or damaged.

- Wire lead shorts can cause fire! If you accidentally short the wires, the battery must be placed in a safe area for observation for approximately 15 minutes. Additionally, if a short occurs and contact is made with metal (such as rings on your hand), severe injuries may occur due to the conductibility of electric current. ∘
  - Never make wrong polarity connection when charging and discharging battery.
- Never charge battery unattended. When charging battery you should always remain in constant observation to monitor the charging process and react to potential problems that may occur.
- When charging battery pack please put battery in a fire proof container. Please don't leave battery pack and charger on the wood material or carpet and unattended.
- In the event of a crash due to bad shipment or other reason, you must remove battery for observation and place in a safe open area away from any combustible material for approximately 15 minutes.
- If at any time you witness a battery starting to balloon, swell up, smoke or hot, discontinue charging process immediately, disconnect the battery and observe it in a safe place for

approximately 15 minutes. This may cause the battery to leak, and the reaction with air may cause the chemicals to ignite, resulting in fire.

■ Never store or charge battery pack inside your car in extreme temperatures, since extreme temperature could ignite fire.

## IV. PARTS DESCRIPTIONS AND FUNCTIONS

Pole camera for pipe inspection is a fast portable pipe inspection device, which is used to inspect the inside situation of manholes on the ground or other hidden facilities that are difficult to reach.

Motorized pipe inspection camera is composed of camera head (including camera and lights), control unit (tablet), standard pole, operation pole and cable etc.

## **Main Components:**

1. Camera head: including camera and light source, laser

2. Control Unit: Tablet, Android operation based

3. Standard Pole: Telescopic pole - extendable pole /support pole

**4. Battery pack:** large capacity lithium battery and charger



## 4.1 Camera head

The camera head unit includes high definition camera, LED and cable connector. The waterproof rating is IP68, and can work 10m under water.

The camera definition is 2.1 megapixels, with the function of auto and manual focus, zoom functions and can acquire high definition video.

The LED are composed of two groups of LED headlight, one is low beam light, and the other is high beam light, which can fully satisfy the lighting requirements of all kind of environments from DN50 upto DN2000.



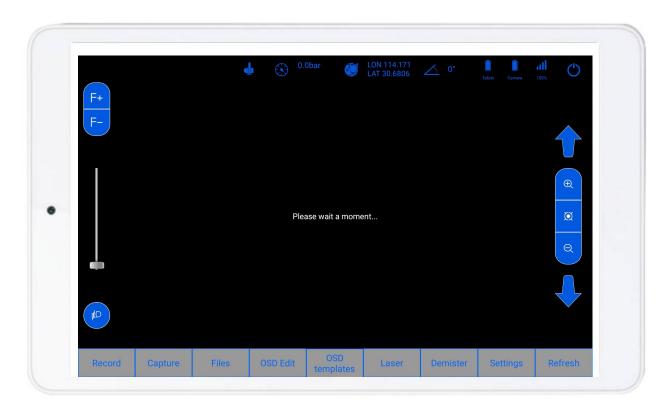


## Standard technical description

- Applied environment: urban water, waste water, combined pipe and water supply pipe, industrial waste water
- Applied pipe diameter: DN50mm upto DN2000mm;
- Light: main LED and auxiliary light;
- Image resolution: PAL mode, 2.1 megapixel;
- Control unit connection : wireless connection with control unit by WIFI;
- Power supply: battery, removable battery, single battery can last long 3 hrs (when it is charged full), total 3 pieces of batteries for a full working day;
- Waterproof: IP68;
- Weight: less than 3kg.
- Laser distance module is built-in for pipe defects location.

#### 4.2 Control unit

Pole camera system takes Android tablet to control and display and store the videos recorded inside the pipes, the inspection data is stored into the tablet hard disk.



You can choose your own tablet to install the software. Technical requirement: Android, 10.1" screen, screen resolution: 1920\*1200, recommended equipment: Sumsung Galaxy Tab A. Software interface for reference, we will update it regularly or irregularly, and guarantee to send it to distributors in time. For latest version, please kindly contact the local distributor.

## Standard technical description

- Control: Control camera zooming and focusing, light brightness adjustment, camera up and down by touch screen;
- Record and snap: for pipe inspection and defect;
- Playback: browse, playback videos or pictures;
- OSD: input texts by soft keyboard, overlay on the video and save the video;
- Work time: continuous working time≥8hrs, depends on the table type;
- GPS: GPS information overlay on the video, depends on the table type;
- Interface: USB, TF card etc;
- Others: WIFI, Bluetooth and 4G network;

- Connection: connect with camera by WIFI;
- Editable heading and ending of project information;
- Camera self-balance by one touch;
- Pair WIFI for the same equipment, quick connection;
- File name setting and editing by custom made;
- Camera pressure, inclination angle indication
- Laser distance measurement module shows the inspected distance
- Battery level of the system and the tablet indication, WIFI signal strength indication

### 4.3 Standard pole

#### Standard pole for operation

Portable pole camera configures a standard pole (telescoping type, 5 separate parts, length is 6m).

The operation pole is used to fix the camera head and support pole, and put the camera head into the manhole, control the camera head direction, angle and height.

The operation pole is made from carbon fiber; the tensile strength can be up to 100kg.



### Standard technical description

- Carbon pole: support camera, turn left and right, prevent shaking
- Fastening: fix each section of the pole
- Connector: fix the camera head and the pole
- Support pole with ruler: measure the depth of the water or other waste

#### **Support Pole**

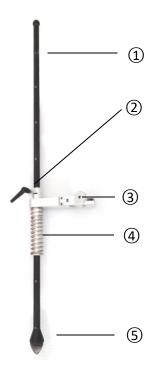
The Support pole is used to support the camera and adjust the camera height.

The length of the support pole is 0.8m; the rubber ground ball at the end is used as a buffer when it touches the ground, and the spring allows for fine positional adjustment.

There is a gauge on the support pole; the graduation shown on the pole is the distance between the camera center and ground ball. The block is adjustable and is fixed in its final position with the bolts supplied; this gives an accurate adjustment to the height of the camera.

- 1. Gauge: total length 80cm, 10cm/scale
- 2. Lock Ratchet: fix the gauge position, to reach and adjust the distance between head and ground
- 3. Camera Fastener: connect operation pole and gauge

- **4. Tightening Spring:** lightly adjust, buffer and protect the camera
- **5. Ground Ball:** support, buffer and adjust the position of the camera



## 4.4 Battery pack

Standard battery pack has three batteries and related adaptor. Connect the adaptor and put on the battery, you can charge battery, when the light on the adaptor turns on green, it indicates the battery is full.





## Precautions of battery using

- 1. Check if all the parts are in complete before using.
- 2. Ensure the power button is in "off position" when assembly.
- 3. During operation, if there is any abnormal situation (like battery heating, light flickering, pressure warning), contact the after sales people of the manufacturer at the first time.

- 4. After finish using, disassemble the parts when power is off, you must use the dry cloth to wipe off the water completely, and put them into the case after the temperature is in normal.
- 5. Specially attention there shall be no water between the battery and camera joint, keep it dry.
- 6. Attention the seal ring in battery joint, if it is burn (the battery is loose after assembly), contact the manufacturer in time and replace it.
- 7. If the bronze pins in the battery socket are oxidized, wipe them with alcohol first, and dry, keep in clean in daily use.
- 8. Attention the surrounding when using, do not use in strong static electricity or strong magnetic field.
- 9. High temperature, external shocking, short circuit will cause spontaneous combustion of battery, handle with care.
- 10. Battery charging temperature  $0^{\circ}\text{C}-45^{\circ}\text{C}$ ; discharging temperature  $-10^{\circ}\text{C}-55^{\circ}\text{C}$ .
- 11. Recommend storage temperature 25  $^{\circ}$ C.
- 12. Battery charging time: 6hrs (standard).
- 13. Battery shall be stored in room temperature, and charged to 40% to 60% battery volume. To prevent the battery over discharging, charge the battery every 3month when not use for long time.

## Warning



- 1. Use the specific battery charger to charge the lithium battery.
- 2. It is prohibited to put the battery besides the high temperature source, like fire, heater etc. and throwing battery into fire or heating device is prohibited.
- 3. It is prohibited to use or place the battery under high temperature (such as direct sunlight, or hot closed space like cars), it will cause battery over temperature and fire breaking or function invalid.
- 4. Keep the battery dry, do not emerge the battery into the water, sea water or other liquids. Otherwise the battery will be short circuit, and cause fire or damage.
- 5. It is prohibited to knock, throw or tread the battery.
- 6. It is prohibited to transport or store the battery with metal such as hair clips or necklaces etc.
- 7. It is prohibited to solder battery or battery cell, use nail or other sharp tool to pierce through the battery or cell.
- 8. It is prohibited to use battery in strong static electricity or strong magnetic field, otherwise it till destroy the battery safety protection device, and bring in hidden dangers.

- 9. If the battery smells during use or storage, becomes warm, changes color, or distortion, or any other abnormal phenomenon during the charging, remove the battery from socket immediately and stop using.
- 10. Keep the battery joint clean, otherwise it will cause function invalid because of bad contact.
- 11. If the battery is leaking, and the electrolyte goes into the eyes, do not wipe it with hands, use water to clean eyes, and go to the hospital immediately, otherwise it will hurt eyes.
- 12. Do not charge the battery in unwatched condition.

### **Others**

- 1. Customers are not allowed to use the battery out of the scope specified in this manual, or use the battery out of the specified conditions;
- 2. Trio-Vision will not take any responsibility of any accidents by using the battery out of the specified conditions in this manual;
- 3. Trio-Vision will inform the improvement actions of the battery operation in written forms.

## 4.5 Tripod for the pole camera

Tripod is optional part, usually it is used for holding the pole camera and keep its stability during inspection work.



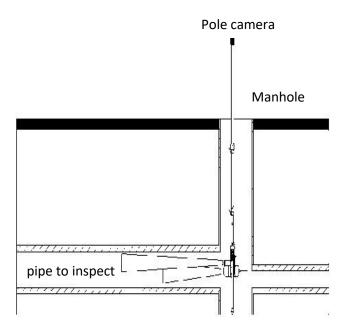
## V. Installation an Operation

#### 5.1 Installation

- 1. Adjust support pole, insert the control pole into the socket on the top of camera, match the marks on the pole and the camera, and lock it. (The installation can't be finished if the groove on the control pole doesn't align with camera clamp.)
- 2. Screw off the battery case cover anti-clockwise, insert the battery slightly, (the battery chip is on the upside), screw on the battery case clockwise.
- 3. Turn on the camera head, the light will flash for a moment. Turn on the tablet.
- 4. Click software icon and start software, select product WIFI, connect with WIFI and enter software.



## 5.2 Operation

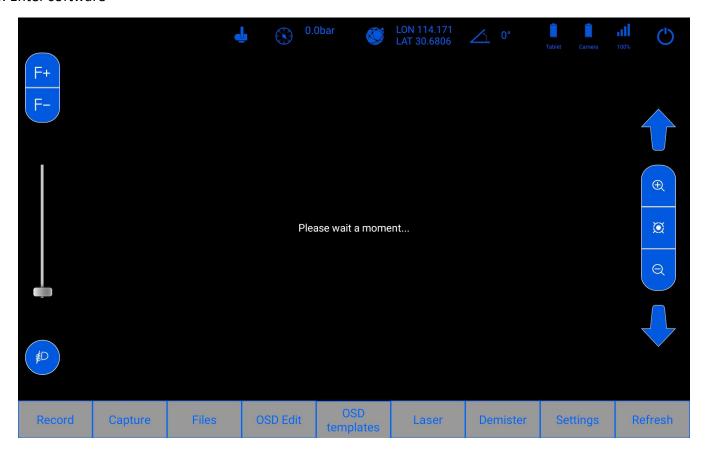


- 1. Visually measure the pipeline diameter and the distance from the top to the bottom; adjust the probe position through the support pole, the camera head shall be 90 degree with the support pole.
- **2.** Put the camera head into the pipe and adjust the length of the standard control pole. When the support pole reaches the bottom of the pipe, adjust the camera to the center of the pipeline.
  - **3.** Start inspection.
- **4.** Adjust the position of the camera head manually according to the display on the screen, until it shows the whole condition inside the pipe.
  - **5.** Adjust the light brightness according to the video on the screen.
- **6.** Click "record", input text information, and adjust focus(near/far), when adjust focusing, the speed shall not be too fast, it shall be push forward little by little, one point by one point, until the fault is found. Point the camera to the pending fault, the problem can be detected clearly. After a while, continue to inspect until to the max. inspection distance or to next manhole. After finish this part, zooming in the camera gradually, and check the pipe conditions again, to see if there is any other fault.
- **7.** Save the video, the file name will be created automatically or named by the operator for future consultant.
  - 8. Take out from the manhole, and retract the control pole for the operation of next manhole.

## **VI. Software Operation**

## 6.1 Basic procedure

- 1. Double click the icon on the tablet desktop, start the software.
- 2. When you enter the system for the first time, click to connect with camera WIFI (HDQPAD 11XXX), **password is 12345678**, save the password and bind with the equipment, this WIFI is specially for this equipment in the future. (This may be different depending on different system.)
- 3. Enter software

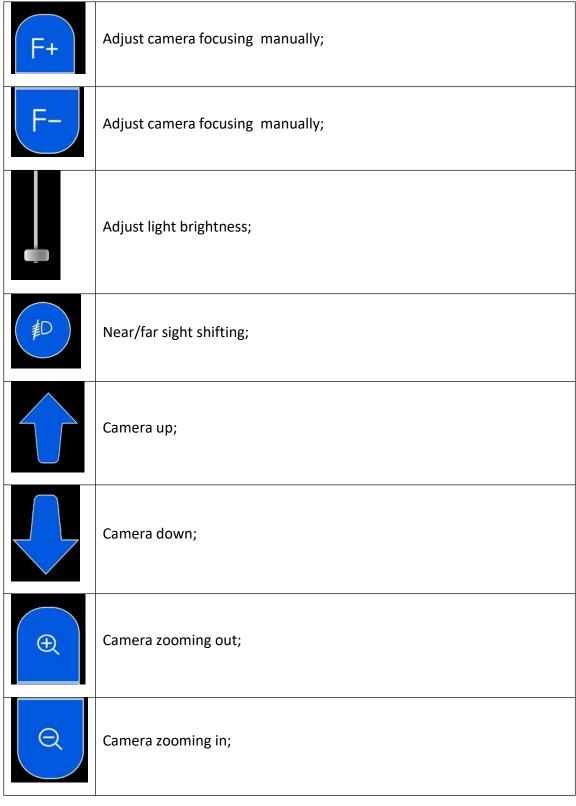


(This may be different depending on different software version.)

## 6.2 Camera status display area

0.0bar	Camera pressure indication, pressure value=1.5 bar is normal, pressure over 1.5 bar, the icon will flash. 1.0-1.3bar is lack of pressure, the icon will turn red, the camera sealing is failure, re-pump the camera and verify the sealing.
	icon displays as, click again to cancel this function and the icon changes to Self-balance status, the camera will keep in horizontal position automatically, the camera can't tilt up and down.
LON 114.171 LAT 30.6805	Display longitude and altitude, BeiDou GP navigation is supported.
<u> </u>	Camera inclination angle
Tablet	Tablet battery level
Camera	Camera battery level
100%	WIFI connecting and setting
()	Exit

## 6.3 Camera control area





Camera one-key re-center;

## 6.4 System function area

Record	Click to start video record, the icon will turn red;
Capture	Picture capture;
Files	Preview the recorded file and captured pictures;
OSD Edit	Overlay text information on videos;
OSD templates	Edit project information;
Laser	Laser distance measurement function on/off, the in-time value shows at the left corner of the screen.
Demister off	Camera demist function on/off;
Settings	Select system functions;
Refresh	Refresh: when video quality is not good, blurry, refresh the system.

## 6.5 Secondary menu

1. WIFI connection and binding

Select WIFI (HDQPAD 11XXX), password is 12345678, save password and click" connect and save".



Click icon , the WIFI name will display in the dialogue, click "save and connect", this WIFI will be saved in the equipment and will be connected automatically in the future.



#### 2. File browse

Click it to browse the recorded videos and pictures, the recorded videos, pictures and will be filed as the project name.



## 3. OSD setting

When recording, if you need record the project information, tick"Auto subtitle display at recording start" and "Auto Subtitle display at recording end" the project information will display 6 seconds at the beginning or end of the video. Tick" Auto subtitle display during recording", the project information will always display in the video.





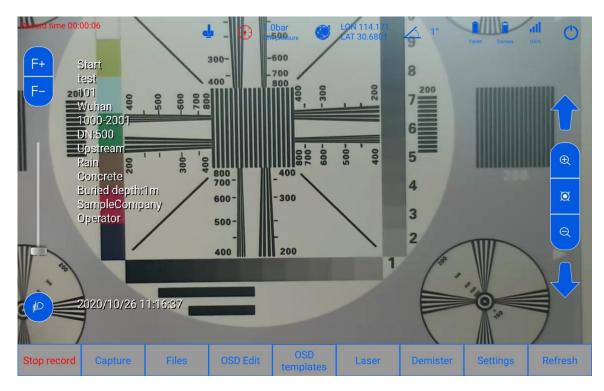
Click "Displayed subtitle setting", display the project information on the video, and adjust the sequence. Click "Load OSD history", directly read the OSD setting history, click "save and display OSD", save the setting information in this page.

### 4. Text

Click this icon to add text information over layering on the video, click again this icon to finish writing, the text generation area is white semi-transparent background;

Version: TVS-QPAD-HD-II.EN.EXR.2021.002

**OSD Edit** 



## 5. System setting

Click this button, enter into system setting, set date format, font size, length unit, language and file save path, consult equipment temperature, pressure information and set heading and ending, see below picture: to enter system setting, set the time, font, file save path etc, pay attention to the temperature and pressure indication. Click "Display GPS on video", the GPS information will display on the screen.



"video file name setting": change file name, or select corespondent method of naming files.

### VII. Maintenance and Service

- 1. After finish inspection work, do not soak or wash the equipment, mix disinfectant and water at ratio, use soft cloth to clean the controller and main body, and wipe off with a dry towel, put into specific packages. Do not squeeze impact or shock the equipment to avoid unnecessary damage.
- 2. Turn off when the equipment is not in use, put it into the specific package, and protect in safe area, to extend the service life.
- 3. If the equipment will not be used for a long time, charge the battery every three months. Check the sealing of camera assembly if it is not used after six months, return to manufacturer if abnormal.
- 4. Keep clean of the camera rotation shaft, as there is space in the shaft, during usage or after use, keep it clean. If there is foreign matter blocked, take it out carefully, contact with distributor in time, and avoid mechanical damage of shaft.
- 5. If the pole camera is broken down in field and need treatment in emergency, an experienced technician must be responsible, please contact Trio-Vision after-sales department. If the equipment has malfunction within the warranty time, send to professional service staff for repair, any person without experience with service is prohibited to dismount or assemble the equipment.

# VIII. Troubleshooting

Description	Judgment	Solution	
Black screen,	1. WIFI is not connected	1.Check WIFI and connect it	
Camera can't be	2. Permission is not allowed	2. Allow all the permissions of pole camera software in tablet setting.	
Connected	3. Airplane mode is open	3. Close airplane mode	
	1. Enable Bluetooth	1. Close Bluetooth in laptop	
	2. Large base station around	2. Stay far away from base station.	
Video lag or color	3. Water in wireless emission module	<ul><li>3. Wipe the wireless module by dry cloth.</li><li>4. Close battery saving mode, and reboot</li></ul>	
screen	4. Laptop in battery saving mode	the software.	
	5. The transmission between laptop and camera is blocked.	5. Operation with 0.5m around the manhole	
	1. The camera lens is polluted.	Use special cleaning cloth to wipe the lens.	
	2. Fog inside the pipe	2. Open both manhole covers for air	
Image dim	3. Camera lens has fog	ventilating.	
	4. Camera shakes or too many	3. Turn on anti-fog mode	
	obstacles, focus is not clear	4. Hold the camera and use manual focus.	
	5. Too much light interference	5. Ensure only pole camera light inside the pipe and adjust the light brightness.	
	1. Indoor environment.	1. Move to outdoor place.	
No GPS	2. Signal is shielded.	2. Leave signal shielding area.	
information	3. GPS function is not activated.	3. Turn on GPS function in tablet and software.	
	1. Battery connection loosing.	1. Replace seal ring and contact after-sales.	
Shut off automatically	2. Foreign material in battery joint.	<ol> <li>Replace battery and contact after-sales.</li> <li>Replace battery and contact after-sales.</li> </ol>	
	3. Oxidation in battery joint.	,	
Camera can't move up and down	Foreign material in camera seam crossing.	Clean the foreign material and contact after-sales.	
Tablet can't be charged	1. The tablet is not used for long time, the battery is in protection mode.	1. Contact for tablet after-sales.	

## IX. Daily maintenance

Part	Maintenance	Maintenance/inspection method	Maintenance/inspection necessity	Frequency
	Battery socket pins	Insert the battery for 10 times continuously, turn on power, the power light is on.	Prevent power off after battery shaking, reduce the project delay.	6 months
	Air pressure	Observe the pressure displayed on the screen, pump if it is low.	Prevent water	1 months
Camera head	Lamp lens	Clean the lens with water and wipe with dry cloth.	Prevent the smudge to influence the light, or lens broken and pressure lacks to cause the system leaks and burnt.	Every time
	All lens	Clean the lamp lens, camera lens and laser lens with water, and wipe with dry cloth.	Prevent the smudge to influence the light, or lens broken and pressure lacks to cause the system leaks and burnt.	Every time
Bolts	All visible bolts	Tighten with correspondent tool	Prevent the bolts shaking after long time using, and cause pressure leaking or influence the subsequent operation.	6 months
Complete unit	Appearance	Clean up the mud, sewage outside the unit with water and dispose it.	Prevent the dry mud jam the motor, and appearance is not good.	Every time
Tablet	RAM	Turn on and check the RAM	Prevent the videos filled full and influence the subsequent operation.	Irregular

# X. Specifications

Description	Qty	Technical parameter and explanation	
Anti-explosive EXR camera head	1	<ol> <li>Used for: rain, sewage, combination and industrial waste water pipes;</li> <li>For pipe diameter: 50mm~2000mm;</li> <li>Dimension: approx 160mm * 165mm * 298mm</li> <li>Zooming: 30x optical, 12x digital; f4.5-144mm; F1.6(w)-4.8(t)</li> <li>Light: two groups of light source, far sight: 5W ×2 LED, near sight: 3W ×3 LED, the light brightness can be adjusted, min. illumination 0.01Lx</li> <li>Resolution: PAL/NTSC mode, 2.1 megapixel, 1920×1080 (max. resolution);</li> <li>Connection: connection with tablet by WIFI</li> <li>Vertical rotation 120 degree, up 30 degrees, down 90 degrees, one key re-center</li> <li>Follow-up function: the motor speed runs slower when the zooming is in.</li> <li>Built-in air pressure sensor, safe pressure 4.5~12.5PSI</li> <li>Power supply: battery , removable and replaceable, single battery working time: 3 hrs, standard 3 pcs, single battery weight approx. 0.55kg.</li> <li>Waterproof: IP68, 10m underwater</li> <li>Working temperature: -10°C-55°C;</li> <li>Laser distance module is built in</li> </ol>	
Standard pole	1	<ol> <li>Material: carbon fiber;</li> <li>Telescoping: telescoping pole, total 6m</li> <li>Connection: threading, fast extending</li> <li>Height adjustment: support pole height is 80cm, with scale, integrated with height adjustment device, and a rubber buffer ball at the end.</li> <li>Weight: approx 3kg</li> </ol>	
Transportation case	1	<ol> <li>High strength integrated transportation case:</li> <li>Portable and easy transportation</li> </ol>	

## **Technical accessory**

- 1-To adjust the pole
- 2-To charge the battery
- 3-To inflate

# Instruction To adjust the pole:







# **Instruction To Charge:**



## Connect like this:



## Instruction to inflate:

The tool





Release the screw by using the tool.



Use the other end of the tool to inflate.

