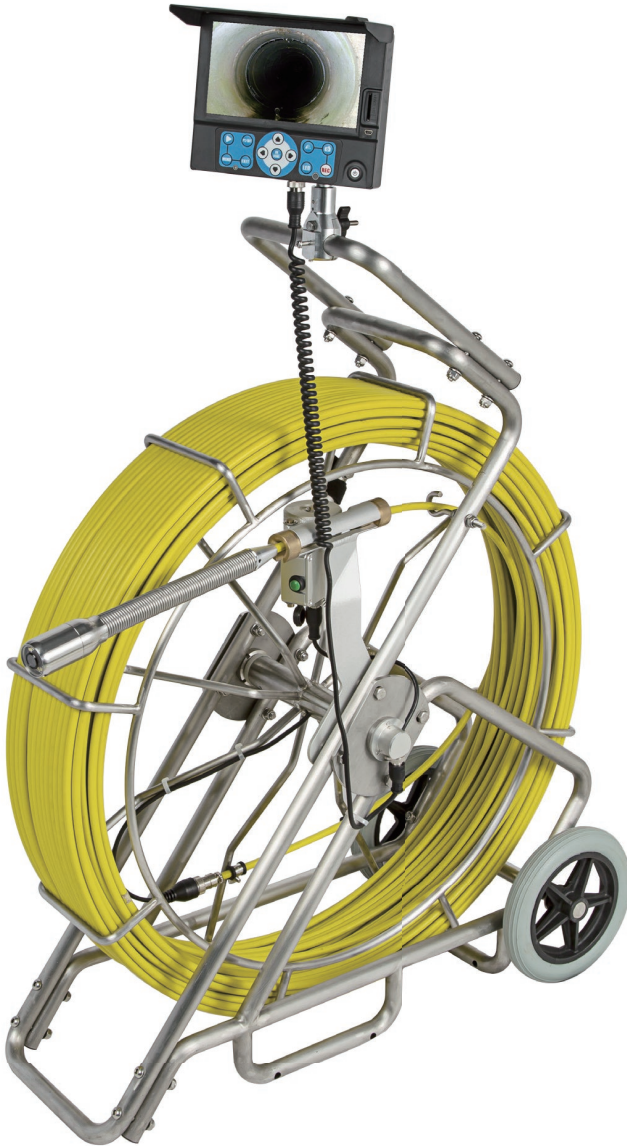


# Pipe Inspection Camera System

## Operation Manual



**Read this Operation Manual carefully before using this tool**

## **[ INTRODUCTION ]**

The pipe inspection camera system is a powerful set of tools that helps you locate and diagnose problems in a pipeline system.

The system is widely used in inspections of Sewer, central air conditioning, chimney, plumbing, building, cable pipe and pipes ventilation systems and other places.

## **[ GENERAL SAFETY RULES ]**

### **PRECAUTIONS**

Read all safety warnings and instructions. Failure to follow warnings and instructions may result in electric shock, fire and/or serious injury.

Save this operation manual for future reference.

1. Do not operate this device in explosive atmospheres, such as in the presence of flammable liquids, gases, hazardous chemicals, superheated liquid or heavy dust. It may create sparks which may ignite the dust or fumes.
2. The camera head and the push cable are waterproof, however, the DVR and connector cable are not. Do not expose them to water or rain. This increases the risk of electrical shock.
3. Avoid using the device in environments of extreme cold, heat or humidity as it may damage the device.
4. Do not drop or press hard on the device.
5. Always backup your data before connecting your SD memory card to this system. The manufacturer is not responsible for any data of damage on your SD memory card for any reason.
6. Do not disconnect the unit while recording or playing back. It may damage the unit and/or the SD memory card.
7. Only qualified person are allowed to repair this device. Service or maintenance performed by unqualified person could result in injury.
8. Do not use this device in places where there is high voltage equipment. The device doesn't contain high voltage protection and isolation.
9. Check or maintain this device regularly, repair it or replace new parts if there is any damage.

## **[ APPLICATION AND KNOW YOUR TOOL ]**

### **APPLICATION**

Suitable for pipes at diameter of 50mm-400mm.

### **KNOW YOUR TOOL**

The pipe inspection camera system includes the following four main parts: camera head, push cable, meter counter device and LCD monitor.

The camera includes 512Hz transmitter (optional), self-leveling device, adjustable brightness LEDs, high quality anti-scratch sapphire glass lens cover; stainless steel housing; The sapphire glass cover and stainless steel housing can protect the camera from scratching, knocking, etc.

The flexible stainless steel spring and other related components provide a flexible transition; which makes the push cable be easier to pass through bended pipes.

Battery is built into LCD to provide power for camera and DVR monitor.

### **Camera**

1. Stainless steel shell
2. Leds
3. Isolation ring
4. Sapphire lens cover

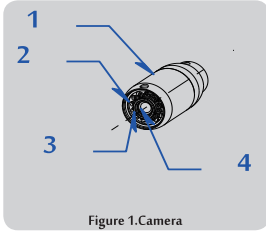


Figure 1.Camera

### **Remote control**

1. Menu: Select Menu
2. Playback: Playback Mode
3. Pt/Wt: Reserve Function
4. Exit: Exit Menu
5. Up: Select Up/Previous Item
6. OK & Home: Confirm/Select Menu
7. Left: Select Left Item
8. Right: Select Right Item
9. Down: Select Down/Next Item
10. Mirror: Mirror And Flip Image
11. LED: Adjust The Led Brightness
12. REC: Start/Stop Recording
13. Photo: Take Photo

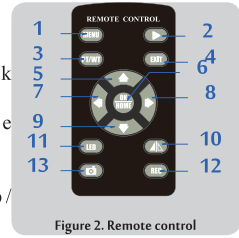


Figure 2. Remote control

### **DVR and Bracket**

1. Playback: playback mode
2. Left: select left item
3. Menu: select menu
4. Power indicator led
5. Exit: exit menu
6. OK & home: confirm/select menu
7. Down: select down/next item
8. LED: change the led brightness
9. IR for remote control
10. REC: start/stop recording
11. Power switch
12. Right: select right item
13. Photo: take photo
- 14.USB 2.0 To PC
15. SD card slot
16. Mirror: mirror and flip image
17. UP: select up/previous item
18. PT/WT: reserve function
19. Color TFT LCD
20. Sun visor
21. Aviation cable video head
- 22.Wheel clip
- 23.Wing nuts
- 24.Heavy hex bolts

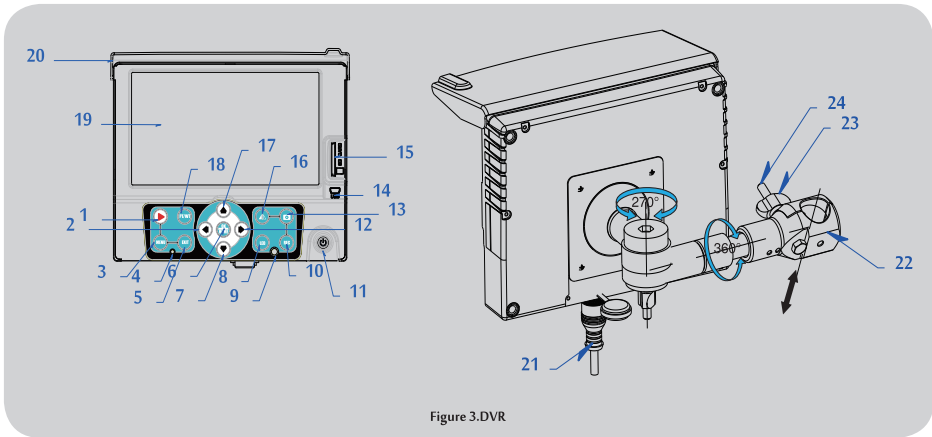


Figure 3.DVR

# [ DESCRIPTION SPECIFICATIONS AND STANDARD EQUIPMENT ]

## ***SPECIFICATIONS***

	ITEM	PARAMETER
General	Operating Temperature	-10°-50°/+14°-+122°
	Operating Humidity	30%RH-90%RH
	Storage Temperature	-20°-60°/+4°-+140°
	Power adapter	Input:110VAC~240V AC, Output:12V DC 1500mA
	MEAS.	84.8×39.8×93.5cm (LxWxH)
	Weight	25Kg(Approx)
Camera	Sensor	1/3" Sony CCD
	TV-Line	480 TV-Line
	View Angle	125°
	transmitter	512Hz Built-in (Selectable)
	Self leveling	Built-in
	Focus Distance	20cm (approx)
	Depth of field	100cm(approx)
	Camera Size	⊘ 38mm×81mm ( Main body )
	Camera Length	318mm
	Front Lens	Sapphire
	Shell Material	304#Stainless Steel
	Lighting	Built-in 12×LED (White)
	Water-Proof	20m water (Camera fix on Cable)
	Power Supply	DC12V
Current Consume	60mA (LED OFF) `` 140mA (LED ON)	
DVR	Screen	7-inch 16:9 super bright high-definition color LCD screen
	Resolution	800×480 RGB
	Mirror and Flip	Support image mirror, Flip, Mirror & Flip
	Video Resolution	PAL 720×576 25FPS Max , NTSC 720×488 30FPS Max
	Video Encoding	H.264
	Photograph	720×480/720×576
	Audio Recording	Local Sound
	Out Put	TV and Audio output
	External Memory	Support SD Memory Card up to 32GB
	Data Output	USB2.0 To PC
	LED Driver	Built-in Dimmer
	Play Back	Video, Photo and Audio
	Language	English, German, French, Spanish, Italian, Chinese, Japanese, Russian, Portuguese
	Power Supply	DC 12V input
	Current Consume	700mA Max
	Battery Capacity	7.4V 5200mAh Li-ion Battery
	Life Time	6 Hour
	Charge Time	8 Hour
Cable Wheel	Cable Diameter	⊘ 9mm
	Cable Length	60/80/100/120meter (Selectable)
	Meter Counter	Built-in



**Standard configuration**

**Tools kit**

- P1. Screwdriver
- P2. Operation manual
- P3. Bolts and nuts (4x)
- P4. Inner hexagon spanner
- P5. 72 Roller Skid (for pipe diameter 3 "-4")
- P6. Car charger
- P7. Text writer
- P8. Power adapter
- P9. 120 universal Skid (for pipe diameter 5 "- 12")
- P10. Hexagon spanner
- P11. Remote control

**Machine**

- M1. Wheel
- M2. Frame
- M3. Coil and push rod
- M4. Dvr and bracket
- M5. Meter counter device
- M6. Guide spring
- M7. Camera
- M8. Handle

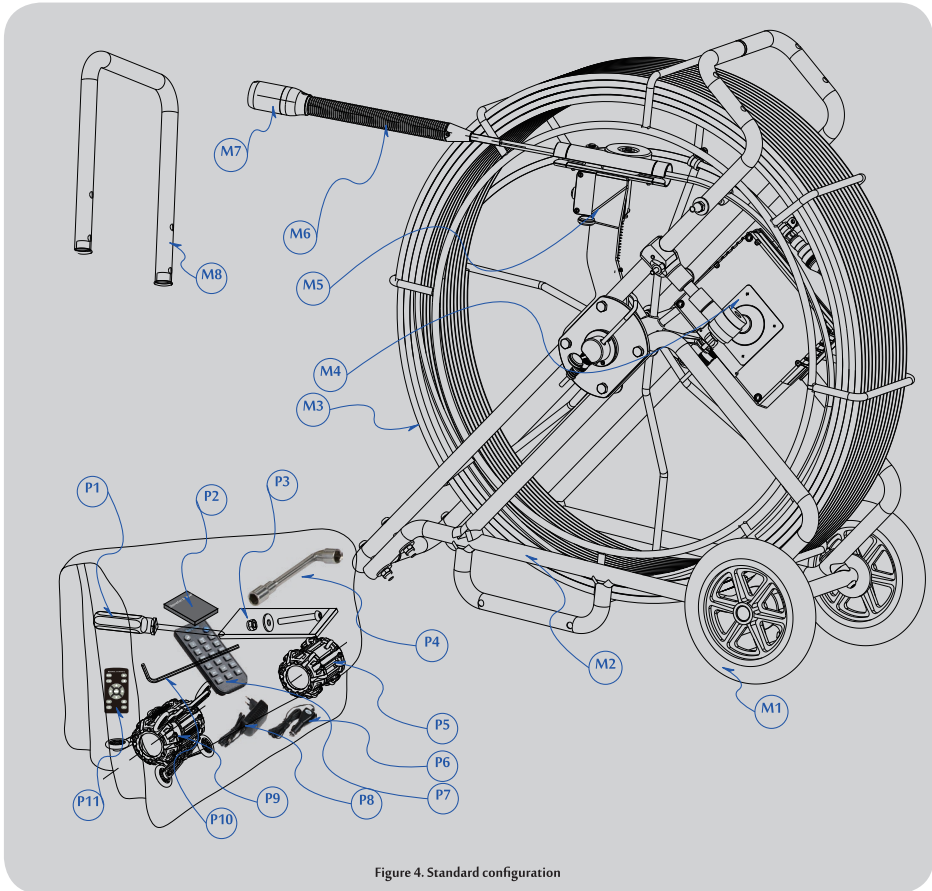
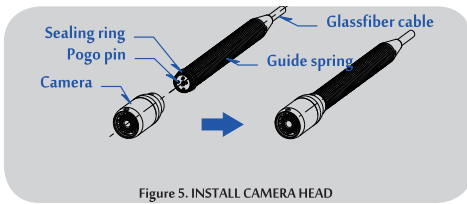


Figure 4. Standard configuration

## 【 INSTALLATION 】

To reduce the risk of serious injury during use, follow these procedures for proper assembly.

### 1. INSTALL CAMERA HEAD (See Figure 5)

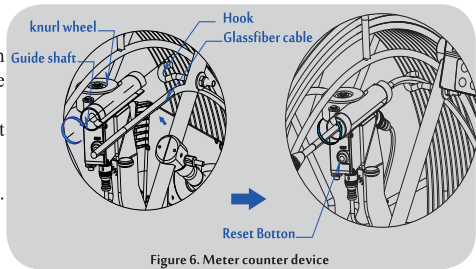


Take out camera, grip the guide spring and screw the camera head tightly clockwise. Ensure the seal ring and the gold pins are in good status before installing camera head.

### 2. Meter counter device (See Figure 6)

Clockwise rotate the guide shaft to parallel the open slot, install fiberblase cable into the guide shaft and the wire hook, to ensure the accuracy of meter counter. Then anticlockwise the guide shaft till its open slot upward and toward left.

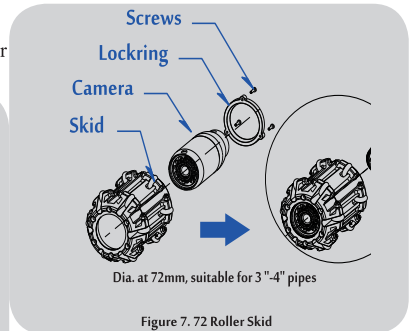
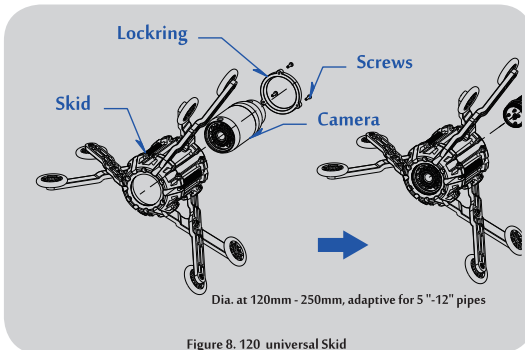
Press the reset button to clear zero, in order to recount.



### 3. INSTALL SKID

Roller skids are used to keep the camera head in the center of different sized pipes and also to keep camera head away from mud at the bottom of pipes, in order to keep camera head clean and also view best quality images. There are two kinds of roller skids:

- 1) 72 Roller Skid (dia. at 72mm, suitable for 3"-4" pipes) . (See Figure 7)
- 2) 120 -universal Skid (dia. at 120mm - 250mm, adaptive for 5"-12" pipes) . (See Figure 8)



Please choose an appropriate skid according to the size of the pipe. Put the camera into the skid, press and lock the lockring properly.

### 4. Install handle (See Figure 9)

This product includes an extension handle for people with different height to operate it.

Take out the handle and bolt pack from tool bag, align the four holes in the handle frame, fit with bolts, washers, and finally tighten the whole Hexagon Lock-Nuts.

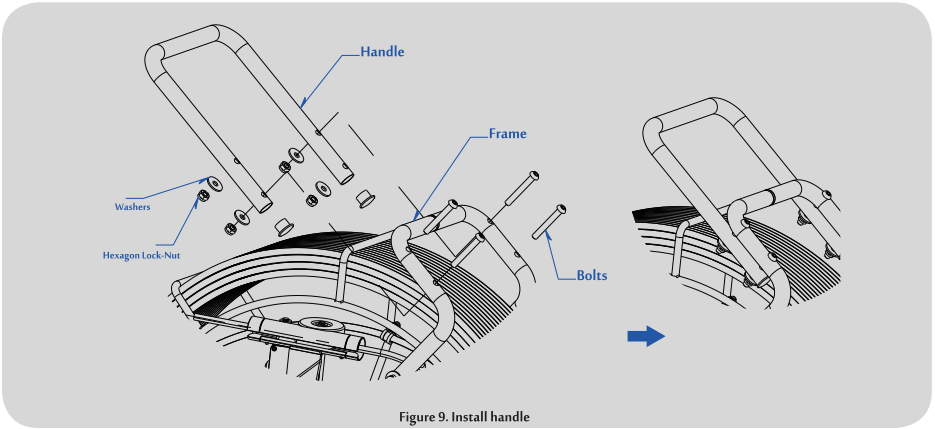


Figure 9. Install handle

### ***5. Install the wheel assembly (See Figure 10)***

Take out the wheel assembly from the package, unscrew the nuts and washers, fit the bolt into wheel hole and finally tighten the Hexagon Lock-Nuts.

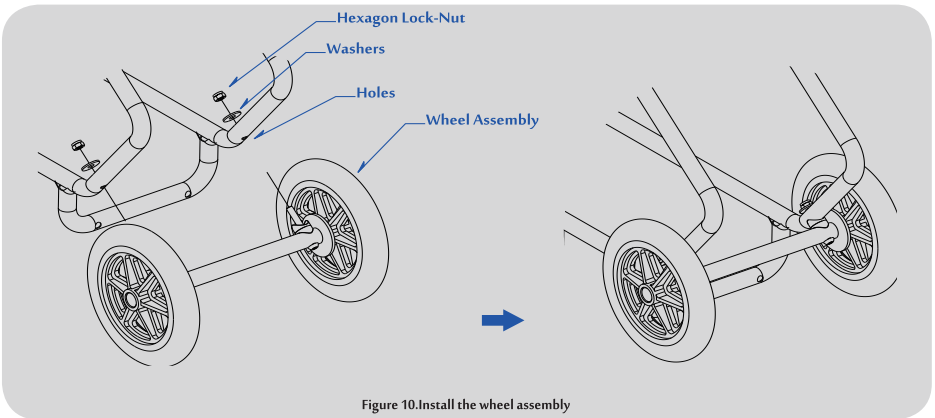


Figure 10. Install the wheel assembly

## [ FUNCTION GUIDE AND OPERATING INSTRUCTIONS ]

### ***DVR ICON***

1. SD Card
2. Battery Level
3. Image Reverse
4. Image Reverse & Mirror
5. Image Mirror
6. Timestamp
7. LED Brightness
8. Record
9. Meter Counter (optional function)

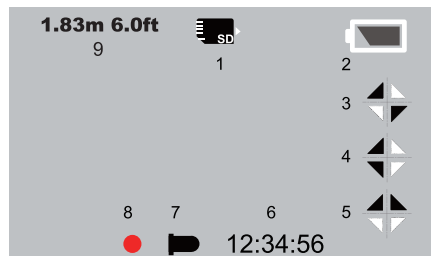



Figure 11. Screen icon Definition

# [FUNCTION GUIDE]


## 1. Live video

Press  to turn on/off DVR to enter the live video mode, then press  to enter playback mode.

Press  to start/stop recording.

Press  to mirror or/and reverse the image.

Press  adjust the brightness of camera LEDs.

Press  to take a picture.

## 2. Video Option

Press  to enter the video option menu. Press  and  to select items that you need, press  to confirm the selection. Press  or  to change the value. Press  to save the setting. Press  to exit video option and save.

- Size D1 (720\*576) / VGA (640\*480) / QVGA (320\*240)
- Video Seg: 10min/20min/30min/40min/OFF. Set 10-40min to restrict files length and open cycle-cover. Elder files will be covered by new files when SD card is full. Set OFF to close this function.
- Meter Counter: Reserve function.
- Sound: Turn on/off the local sound in Video Recording.
- Timestamp: Enable/Disable time stamp on screen.

## 3. Playback






Press  the button to enter the playback, the user can browse, preview and playback media files.

Press  and  to browse and select media files.

Press  to confirm the selection and preview media file. Press  to preview the previous file. Press  to preview the next file. Press  to playback video. Press  to enter the play setting.

- Delete: Delete media files.
- Slide Show: 3sec/5sec/10sec. To set interval time of the slide shows.
- Protection: To protect important media files.
- Thumbnail: Browse 9 media files per page.
- File List: Browse 3 media files per page.
- LCD: LCD brightness.

## 4. Playing Movie

 Pause/Play movie,  Stop play movie,  Rewind,  Forward, you can press  to set speed rate of rewind/forward.

## 5. SETUP

Press  to enter the preferences of Record/Playback. Press  enters Setup menu.

The following items are in the setup menu.

- Format: format SD card.
- LCD: LCD brightness.
- Language: English, German, French, Spanish, Italian, Chinese, Japanese, Russian, Portuguese.
- Sys. Reset: Reset all setting.
- Light frequency, 50Hz/60Hz, specifying your ambient light frequency.
- TV output: PAL/NTSC.
- Date input: To set date and time.

# [ USER MANUAL ]

## At the Job Site

1. Always wear rubber gloves to operate the camera for health and safety reasons. Properly positioning the cable reel will save time and strength to push out and in the cable, and minimize the rate of equipment damage.
  - When pushing, the end of your stroke should be as close to the entry as possible. Standing too far back with an excess of cable between your hands and the entry may cause the cable to fold on itself outside the entry and damage the cable.
  - Try to keep the push cable away from sharp edge of a pipe entry because this may cause damage. If the camera does not seem to go any farther, **DO NOT FORCE TO PUSH THE CAMERA!** Try another entry if possible.

**NOTE! Hands should be close to the line opening. DONOT catch the cable on the edge of an entry and continue to push.**

2. Always try to run water down the pipe under going inspection. This will keep the system much cleaner, and allow you to push noticeably farther with less friction. If the water is preventing you from seeing an area of importance, temporarily turn it off.
3. When push the push cable through the pipeline by steady and slowly, a short distance entry per time, keeps the hands at the entrance, so that can control the push cable and prevent it stuck, bent or scratch.
4. When inspecting a pipe, most of the time a slow steady push through the system works the best. At changes in direction such as P-traps, Tee's, Y's, Elbows, etc. It is usually necessary to give a little extra push in the bends. Back the camera head approximately 8" (20cm) from the bend, if necessary, and give it a quick push, "popping" the camera through a turn, using the least amount of force required. Try to be as gentle as possible, and do not hammer or snap the camera head through corners. After some practice, you may learn that the best way to inspect a section of pipe is to push the camera through quickly. Then draw the camera back home slowly and evenly.
5. Make sure the sapphire window is clean prior to entry. Some users claim that a slight film of detergent on the lens minimizes the possibility of grease sticking to the port. If necessary, take advantage of any standing water in the pipe to wash the front of the camera by jiggling it in the water.
6. When you place the camera head into the pipe remember, as the materials of pipe vary, it will be necessary to adjust the lighting settings to maximize picture quality.
7. The system can travel through multiple 45 and 90 degree bends and wyes. Do not, however, try to force it through a P-trap or tee if there is a large amount of resistance.

**NOTE! Do not try to use the camera head to clear obstructions. This System is a diagnostic tool, not a drain cleaner. Using the camera head to clear obstructions could damage the camera head or cause it to be caught in the obstruction.**

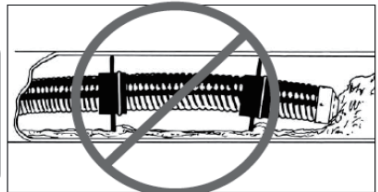


Figure 12. Improper operation

8. Do not attempt to remove or stores push cable on the reel solely by turning the reel itse If. You can manually push or pull cable from the reel and wind or unwind it.
9. If the camera sits in a pipe, or an enclosed environment, heat will build-up. This may lead to the camera head overheating which will cause fuzzy lines to appear on the monitor. In the event, this happens, turn off the system, remove the camera from the pipe (or enclosed environment) and let the camera head cool for 10 to 15 minutes. Running water into the line will also help cool the camera head. Always use the minimum illumination required to maximize picture quality and to avoid excessive heat build-up.

**NOTE! The camera head can get HOT! When finished with your inspection, or if taking a prolonged break in the middle of the inspection, turn off the system.**

## Retrieving the push cable

1. Once the inspection has been completed, pull the push cable back with slow, steady force. Do not force the push cable or exert excessive force. This could damage the camera or push cable. The push cable may get hung up while being retrieved, and may need to be manipulated as did during insertion.

2. Once the inspection has been completed, pull the push cable back with slow, steady force. Do not force the push cable or exert excessive force. This could damage the camera or push cable. The push cable may get hung up while being retrieved, and may need to be manipulated as did during insertion.

**Note! NEVER USE SOLVENTS to clean any part of the system. Substances like acetone and other harsh chemicals can cause cracking of the camera ring, which could affect waterproofing.**

3. Storing the push cable into the cable reel. One hand holds the push cable, the other hand close to the cable wheel. Slowly and gently push the push cable slide via the hook of the handle, cable reel will rotate and store the push cable inside.

**Note! The hands should be close to the cable wheel when storing the push cable. Push the push cable a small piece every try. Push a long distance can cause the push cable bend or broken.**

## **[BATTERY SAFETY AND USING GUIDE]**

### ***Using safety***

Read the following battery precautions before using the battery and charger, to reduce the risk of electrical shock.

1. Recharge batteries with accessory charging units.
2. Check the power units and battery every time before using the equipment, be sure no problem, use of unauthorized parts may result in electrical shock, fire and/or serious personal injury or damage other instruments and system.
3. Never connects the car charger to any 24 volt cigarette lighter slot. It will harm the battery and DVR.
4. Do not short circuit, it may cause fire, electrical shock.
5. Do not charge the battery under rain or wet conditions. Water entering the charger will increase the risk of electrical shock.
6. If the charger and battery are damaged, do not use or stop to charge. It may cause electrical shock.
7. Don't disassemble the case, only qualified repair person can repair and maintenance.
8. Properly dispose of the battery. Exposure to high temperatures can cause the battery to explode. So do not dispose of in a fire. Some countries have regulations concerning battery disposal. Please follow all applicable regulations.
9. Do not touch anything which out from battery, which would burn or damage the skin, once touches please flush with water. If in eyes, immediately get medical help fast.

### ***Using Guide***

Follow the steps as below to reduce the injury of the electric shock.

It needs about 8 hours to charge the battery fully. The battery can charge online, charging and supplying of work will not increase charging times.

### ***Tips***

User can use a power adaptor or car charger to charge the battery. Also can directly supply the system without battery.

If no use in a long term, take a recharge per 6 month, to ensure the battery in normal working status.

## [OTHERS]

### ***Troubleshooting***

Problem	Probable fault location	Solution
Meters allowed	Knurled wheel slip	Fit glassfiber cable into the guide slot and hook.
	not set to zero	Press reset button to set zero.
No image	Cable connection faulty or loosely	Check cable connection, clean and reconnect if necessary
	Camera connector soiled	Clean the camera connector
	Wrong SD memory card	Turu off power and replace SD card
	Wrong setting	Enter the setup menu and select reset

### ***FCC Statement***

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation. Any changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the device.

### ***CE***

This product complies with standards including Low Voltage Device Directive 73/23/EEC;

### ***EMC***

Directive 89/336/EEC. It passed the subject tests by the authority concerned and is authorized to bear CE mark.

## Part Number List

No.	Part Number	Part Name	Specifications	Picture
1	1-312	Camera Head	Sony CCD 480TVL, $\Phi 38 \times 81$ mm, 125° View Angle Self-Leveling	
2	1-323	Camera Head	Sony CCD 480TVL $\Phi 38 \times 81$ mm, 125° View Angle Self-Leveling With 512Hz Transmitter	
3	2-312	Adaptor	DC 12V 1.5A Adaptor	
4	2-323	Car Charger	DC 12V 2A Car Charger	
5	3-412	Remote Control	13 Key Remote Control	
6	3-423	Text Writer	20Key Text Writer	
7	5-623	DVR	7-Inch Video Recorder, 14Key Built-In Battery With Aviation Socket	
8	8-934	72 Roller Skid	Suitable For 3 “-4” Pipes	
9	8-945	120 Universal Skid	Suitable For 5 “-12” Pipes	
10	9-412	Handle	$\varnothing 22 \times 281 \times 242$	
11	9-423	Bracket	Standard	