

MiniFlex2 manual



MiniFlex[®]
CamTronics

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1. Introduction

1.1 Scope

Suitable for inspecting pipes from \varnothing 32 mm to \varnothing 100 mm with the 19mm head, and from \varnothing 50 mm to \varnothing 200 mm with the 36mm head. Angled bends can be taken as early as \varnothing 32 mm.

Note: variations may occur due to type of material, color and contamination of the pipe.

1.2 The complete system

The system consists of the following components:

- Camera head with cable
- Case
- Charging adapter
- Accessory carrying case

1.3 Working with the system

All parts of the system are made of high-quality materials and assembled with great precision. In order for the system to be used optimally for a long time, some maintenance is required. In this manual you will find instructions and tips regarding:

- Safety
- Use
- Maintenance
- Service

2. Safety

Please read all safety warnings and instructions. Failure to follow the warnings and instructions could result in electric shock, fire and/or serious injury. When in doubt and/or questions contact your dealer or supplier

2.1 General safety rules

- **The device should only be used by a competent person.** Improper use increases the risk of serious injury.
- **Hold your workplace clean and well-lit.** Messy or dark workplaces invite accidents.
- **Do not use or place the equipment in an explosive environment, such as near combustible materials, liquids, gases or dust.** The equipment may create sparks that could ignite dust or vapors.
- **Keep children and others away while using the equipment.** Distractions can cause you to lose control
- **Avoid traffic.** Watch for moving vehicles when operating on or near roadways. Wear high-visibility clothing or reflective vests.
- **Continue to pay close attention, watch what you are doing and use common sense while using the equipment.** Do not use the equipment if you are tired or under the influence of drugs, alcohol or medicines. Any momentary lack of attention while using the equipment could result in serious injury.
- **Wear proper clothing.** Do not wear loose clothing or jewelry. Loose clothing, jewelry or long hair can get caught in moving parts.
- **Work hygienically.** Use warm soapy water to wash your hands and other body parts exposed to drain pipe contents after handling or using MiniFlex. To prevent contamination from toxic or infectious material, do not eat or smoke while handling and using MiniFlex.
- **Always use proper personal protective equipment while handling and using equipment in drain pipes.** Drains may contain chemicals, bacteria and other substances that can be toxic or infectious and cause burns or other problems. Proper personal protective equipment always includes safety glasses and may include a dust mask, helmet, hearing protection, drain pipe cleaning gloves or mittens, latex or rubber gloves, face shields, eye shields, safety glasses, protective clothing, respirators, and steel-toed non-slip footwear.
- **Unplug the adapter and make sure the unit is off before making adjustments, changing accessories, or before storing.** Such preventive safety measures reduce the risk of injury.
- **Store equipment you are not using out of the reach of children, and do not allow persons unfamiliar with the equipment or these instructions to use the equipment.** The equipment can be dangerous in the hands of inexperienced users.
- **Take good care of the equipment.** Check for misaligned parts, difficult moving parts, missing parts, broken parts or other conditions that may affect the operation of the equipment. Make sure the equipment is repaired prior to

use if it is damaged. Many accidents are caused by poorly maintained equipment.

- **Do not overstretch to grasp something.** Stand firmly and keep your balance. This will help you better handle equipment in unexpected situations.
- **Use the device and accessories in accordance with these instructions, taking into account the working conditions and the tasks to be performed.** Use of this device for purposes other than those intended may result in a hazardous situation.
- **Use only accessories recommended by your equipment manufacturer.** Accessories that may be suitable for a particular device may become dangerous when used with another device.
- **Keep the handle dry, clean and free of oil and grease.** A clean handle gives better control of the equipment.
- **Protect the LCD from impacts during use.** Bumps to the front of the LCD may cause glass to break and complete display failure.
- **Do not expose the equipment to mechanical shock.** Exposure to mechanical shock can damage the equipment and increases the risk of serious injury.
- **Carrying the device improperly can result in property damage and/or serious injury.** Always carry the device by the handle.
- **Liquid may leak from very damaged batteries; avoid contact.** Rinse with water if you come in contact with the liquid. Seek medical advice if eyes come in contact with this liquid. Battery fluid may cause irritation or burns.
- **Dispose of batteries appropriately.** Exposure to high temperatures can cause batteries to explode; so do not throw them in a fire. Some countries have regulations regarding the disposal of batteries. Follow all applicable regulations.

2.2 Electrical safety

- **Do not leave the device unattended while charging.**
- **A smoke detector should be present in the room where the device is charged.**
- **When the device is charged, remove the adapter from the outlet.** Leaving the adapter in the outlet unnecessarily increases the risk to a dangerous situation.
- **Avoid physical contact with grounded surfaces, such as pipes, radiators, furnaces and refrigerators.** There is an increased risk of electric shock if your body is grounded.
- **Do not expose the device to rain or humid conditions.** Water entering the device increases the risk of electric shock.

- **Keep all electrical connections dry and do not place them on the ground.** Touching the equipment or plugs with wet hands can increase the risk of electric shock.
- **Handle the adapter cord with care.** Never use the adapter cord to lift the tool, pull it or unplug the adapter with the adapter cord. Keep the adapter cord away from heat, oil, sharp corners or moving parts. Damaged or tangled cords increase the risk of electric shock.
- **If use of the unit in a damp location cannot be avoided, use a power supply protected by means of a ground fault circuit interrupter.** Use of an earth leakage circuit breaker reduces the risk of electric shock.
- **Charge only with the original adapter specified by the manufacturer.** An adapter suitable for a particular type of battery may result in a risk of fire if used with other batteries.
- **Do not cover the adapter during use.** Proper ventilation is required for proper use. Covering the adapter may result in a fire.
- **Use the device and adapter in dry places with proper temperature in accordance with the documentation.** Extreme temperatures and humidity may damage the batteries and result in leakage, electric shock, fire or burns.
- **The adapter is not waterproof and is intended for indoor use only.** To prevent electric shock, do not use the system outdoors or in wet conditions with an adapter.
- **Do not insert any conductive objects into the batteries.** Shorting between the terminals of the battery may cause sparks, burns, fire or electric shock.
- **The device is not designed to provide protection and insulation from high voltage.** Do not use if a high voltage contact hazard is present
- **The system operates on a voltage of 100-240V/50-60Hz and/or on the built-in battery.** Make sure the system is always in a dry environment and set up indoors. The camera head is obviously waterproof.
- **If you want to use a genset, make sure that the genset provides a stable supply voltage that is within the adapter's operating range.** If in doubt, do not use a genset. Using the wrong and/or unstable voltage will cause serious damage to the system and will void your warranty.

We recommend not using a generator.

- **If you are using an inverter (12V DC to 230V AC). The output voltage (230V AC) must be a pure sine wave.** Your dealer can help you select a proper inverter to suit your system. Using an inverter with too little power or with a non-pure sine wave as output signal can cause major damage to your system. This will void the warranty.

3. Use of the system

3.1 Before starting an inspection

To reduce the risk of serious injury from electrical shock or other causes and to prevent damage to your equipment, inspect all equipment and correct any problems before each use.

Before starting an inspection, the pipe should be properly cleaned.

1. Make sure the device is off.
2. Check all cables and connections for damage or irregularities.
3. Remove dirt, oil or other debris from your equipment so that it can be better inspected and to prevent it from slipping out of your hands during transport or use.
4. Inspect your equipment for defective, worn, missing, misaligned or stuck together parts, or other problems that prevent safe or normal operation.
5. Inspect all other equipment used according to instructions to ensure it is in good and serviceable condition.
6. Check the workplace for the following items:
 - a. Adequate lighting.
 - b. The presence of flammable liquids, vapors or dust that may ignite. Do not begin work in this area until these have been identified and removed. The equipment is not explosion-proof. Electrical connections may cause sparks.
 - c. A highly visible, horizontal, stable and dry place for the operator. Do not use the device while standing in water.
7. Examine the work to be performed and determine the right equipment for the task.
8. Observe the work area and, if necessary, place barriers to keep bystanders at bay.

Caution ! Never use the camera to unblock a pipe ! As soon as you notice that the camera is resisting and cannot go any further, carefully withdraw the camera and clean the pipe thoroughly first. Then you can continue the inspection again.

3.2 Connecting the system

- Open the display
- Turn the system on using the red on/off button on the front panel. (See section 3.5). The LED above the on/off key will light up green. (See section 3.15)
- The LCD display will automatically turn on and then you will see the MiniFlex logo on the screen.
- Once the system is fully booted up, you will see the camera image
- Adjust the lighting of the camera using the lighting buttons on the front panel. See section 3.5 for explanation of the buttons.

3.3 Greasing flex part

The rubber part that sits behind the camera head ensures, through its sophisticated shape, that the camera head can be pushed well through all kinds of bends. To make the bends, it is necessary to grease this part before use. Use acid-free petroleum jelly for this purpose.



3.4 storing camera head

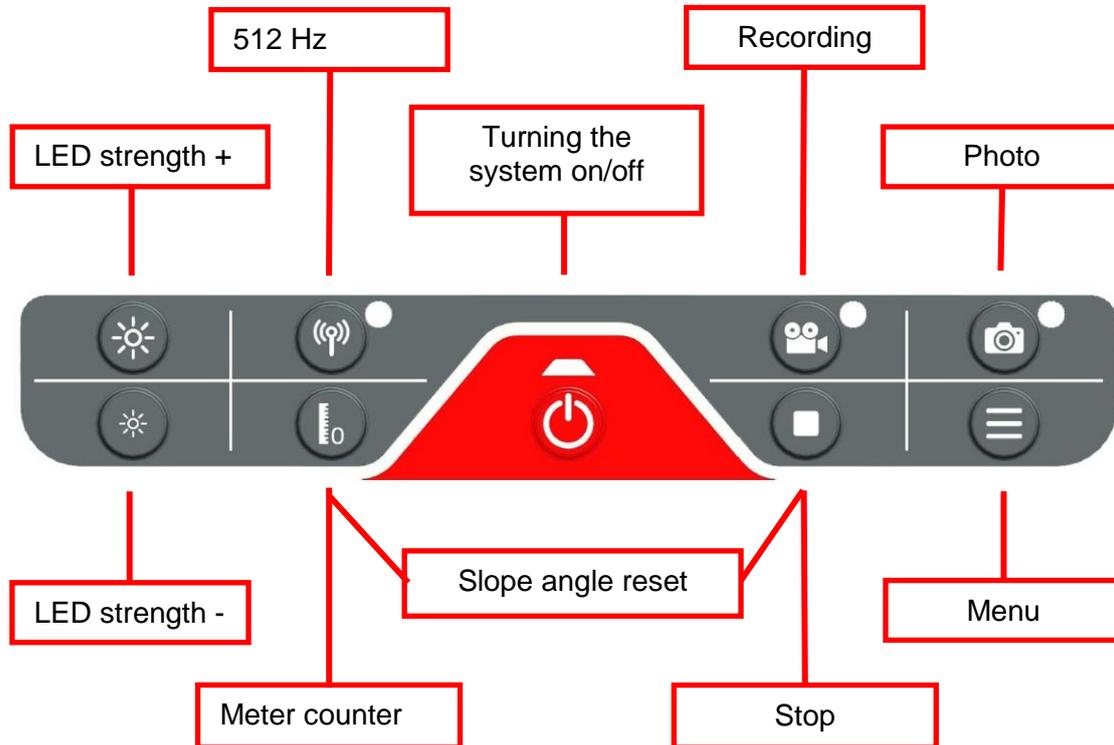
When the camera head is not in use, it is best to store it in the storage compartment provided for that purpose. This ensures that the flexible rubber part remains straight. Proceed as follows

- Make sure the push cable is stowed in the drum
- Snap the push cable into the auxiliary spring (1)
- Guide the push cable there so that it is behind point (2),(3),(4) and (5).
- Now push back the redundant push cable until rear side is flexible at point (6)
- Push the flexible rubber part into point (7)



3.5 Control panel

The control panel of the MiniFlex contains the following functions:



3.6 Using the transmitter

The camera head of the MiniFlex 19 and 36 is equipped with a 512 Hz transmitter. Using a receiver, the camera can be located without digging. During use of the transmitter the image will show stripes. These disappear again immediately after switching off the transmitter.

Switching on is easy, by pressing the button on the controller. While switching on, the lighting is dimmed or turned off. When the transmitter is on, the lighting cannot be adjusted.

Switching off is done by pressing the button again. When the transmitter is turned off, the lighting returns to the previously set brightness.

*Enabling the transmitter is not possible if recording is active.
When the transmitter is on, no recording or picture can be taken*

With the MiniFlex 19, there are 2 transmitter strengths

- 1- "Normal" 1 x press the control button
- 2- "High power" 1x press and hold the control button, picture turns black and an animation is shown.

3.7 Using the meter counter

Meter counter reset is done by pressing the "Meter Counter Reset" button on the control. The meter counter will jump to zero.

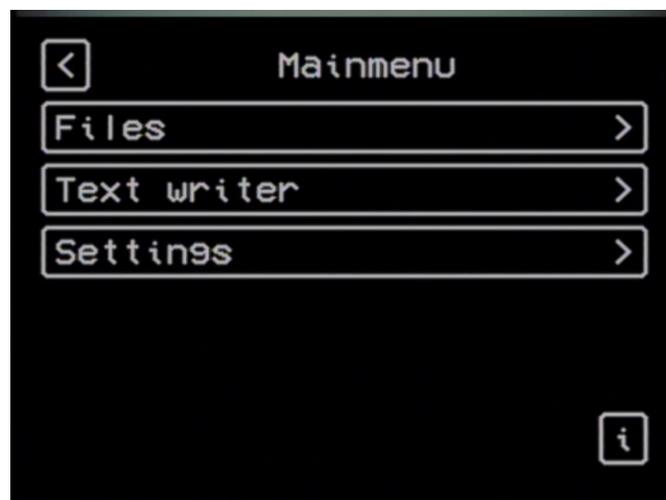
3.8 Use of slope angle

Slope angle reset is done by first pressing the "Stop" button and at the same time the "Meter Reset" button on the controller. The inclination indicator will jump to zero.

The inclination angle is not supported by all camera heads and only displayed correctly when the camera head is stationary for a moment, if the camera head moves then the inclination angle may indicate any value

3.9 User Menu

To activate the main menu by pressing the controller's  "menu" button.



Once the menu is activated, use the touchscreen to operate the menu

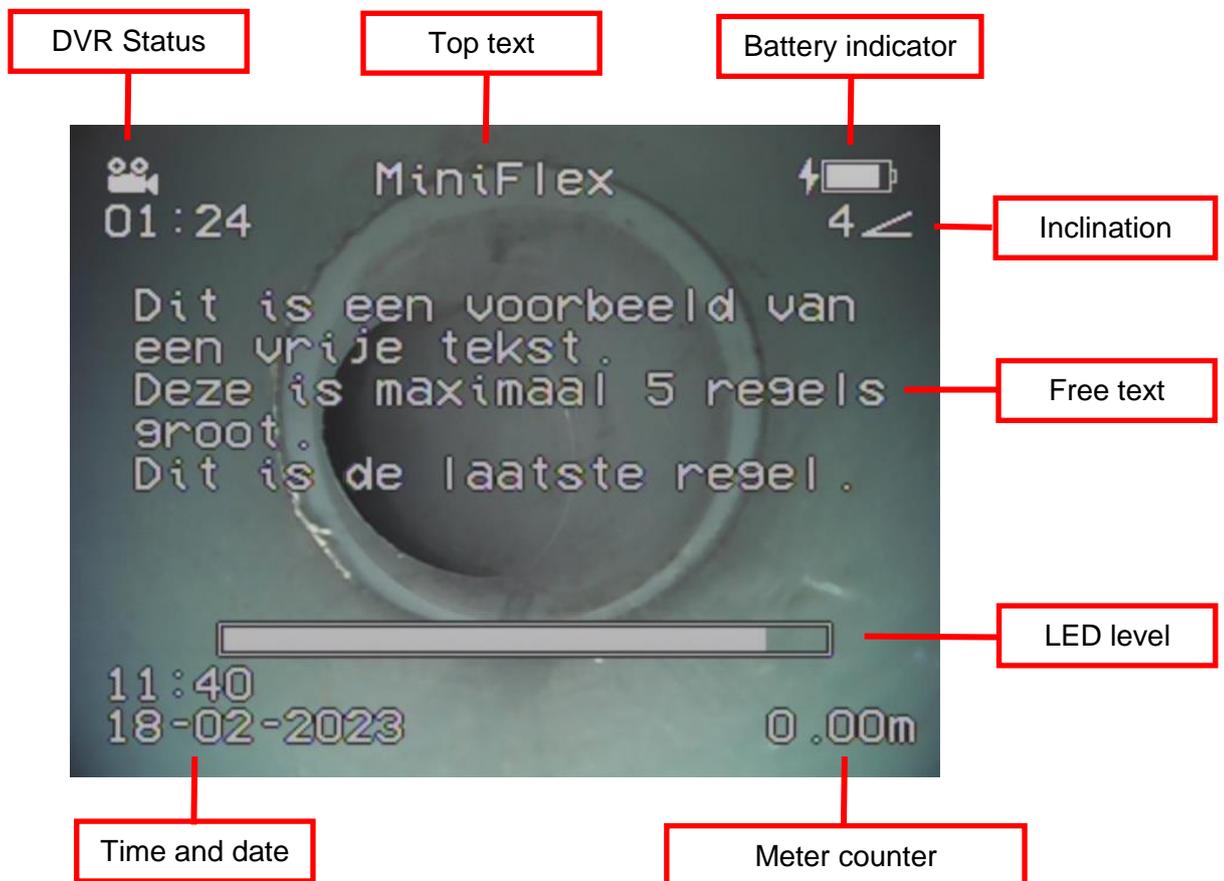
To exit menu again, select **on the touch screen**  or by pressing the "menu" button on the  control.

Through the menu, you have the following options

- 1- view and delete recordings and photos
- 2- enter texts
- 3- turn on/off items that come into view
- 4- change various settings
- 5- view information about the MiniFlex

3.10 Live screen

The live screen may show indicators or text below:



Battery indicator:

 the MiniFlex is battery operated.

 the battery is charged.

Status DVR:

 SD Card present, if it is flashing then an error or no SD card.

 A photograph is taken.

 A recording is made.
00:04

3.11 Quick menu

The MiniFlex features a quick menu that allows you to select a short text that you can move by selecting and dragging on the touch screen.

To activate this quick menu, make a swipe on the touchscreen from the top edge to the center of the screen.

Select 1 of the 4 short texts or select the "free text" editor to enter or change a text. The selected text changes color.

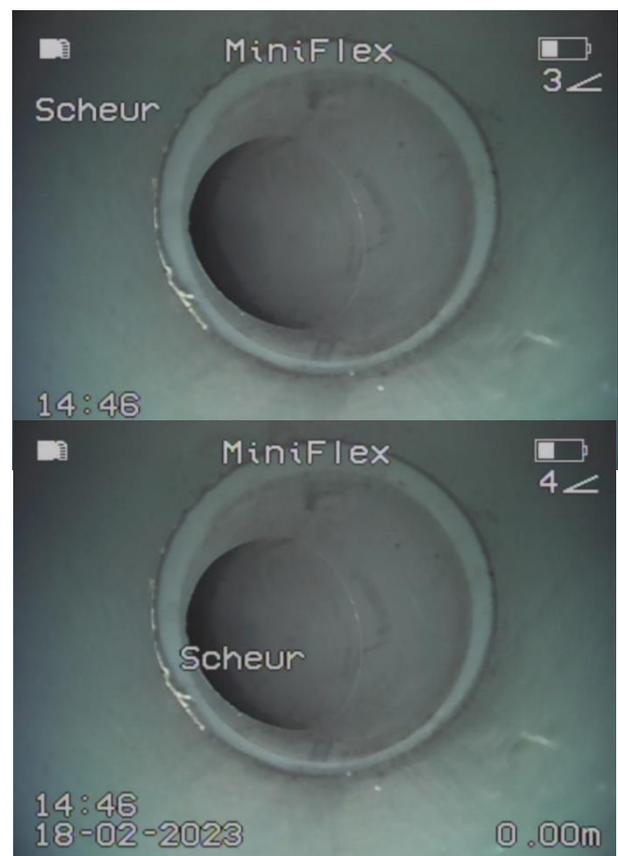
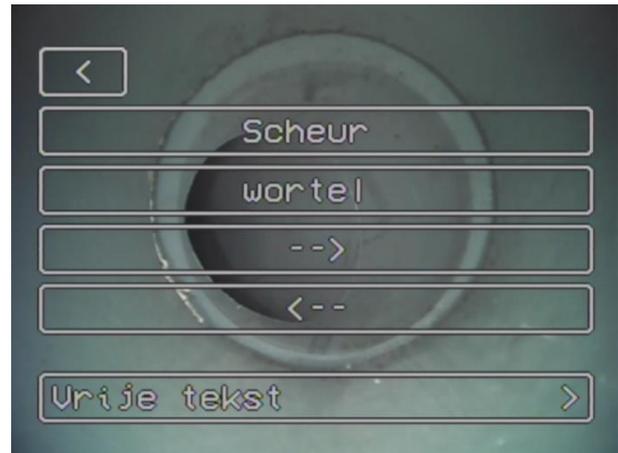
Then press the button  to show it in the live screen

The 4 short texts can be changed via the user menu see section 3.9

If a short text is selected, it will default to the left side of the screen.

It can be moved by selecting it and then dragging it on the screen.

To remove the short or free text again, make a swipe from the bottom of the screen to the center.



3.12 Screensaver

The MiniFlex features a screensaver. The LED lighting of the camera is reduced, the backlight of the LCD screen is reduced and on the live screen the screensaver becomes active

It is activated when for 5 minutes

- 1- no button on the control panel is pressed
- 2- the touch screen has not been touched
- 3- the meter counter detected no change

The screen saver is automatically deactivated and lighting is restored when

- 1- a button on the control panel is pressed
- 2- the touchscreen is touched
- 3- the meter counter detects a change



3.13 Using the adapter

One can work with the Miniflex for many hours on a full battery without recharging. However, one can also work and charge simultaneously with the included adapter. The third option is to charge while the system is off.

The adapter and connector are located behind the sliding cover on the right side.

Use only the original 18V, 24 W adapter. Use of any other adapter will damage the system. This will void the warranty.

Plug the connector of the adapter into the connector located behind the cover. This is on a cable several inches long. Then connect the adapter to a 230V outlet. After use, you can store the adapter with cable behind the cover.



Notice:

- **Do not put the system away with an empty battery.**
- **Charge the system at least once every 8 weeks**

3.14 Use of Connections

To get to the connections, open the connections space pulling open the rubber cap using the lip.



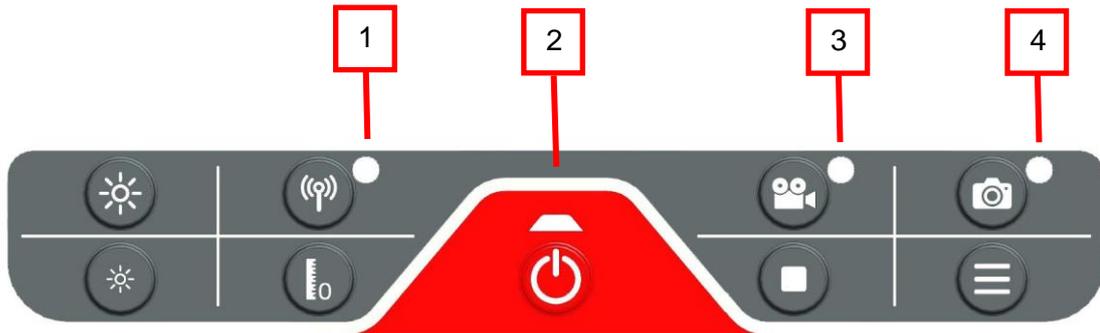
by

This space contains the following functions

- Reset button
- Serial usb port
- Headset connector
- SD card space
- Video out



3.15 Indication of the LEDs



LED 1:

- Off, 512Hz transmitter is off
- Yellow, 512Hz transmitter is on
- Yellow Flashing, 512Hz is on in "High power" mode (*not all camera heads support this mode*)

LED 2:

- Off MiniFlex is off
- Green, MiniFlex is on
- Orange flashing, MiniFlex is off and charging
- Orange, MiniFlex is off and the battery is fully charged

LED 3:

- Off, no recording or recording is stopped
- Red, recording active
- Flashing red, recording is paused

LED 4:

- 1- Off, inactive
- 2- Red, a picture is being taken

3.16 Use of the brake

The MiniFlex has a 1-way brake. This brake prevents the cable from coming out of the drum by itself. If over time the cable comes out of the drum too fast or too slow you can adjust it by turning the ribbed knob



3.17 Viewing and sending recordings

You can view, edit and or send the recorded photos and videos using an iPhone, iPad or Android phone/tablet.

Please refer to Appendix A for iPhone, iPad and Appendix B for Android phone/tablet

4. Maintenance

Maintenance is a very important aspect. If the system is properly maintained, there is less chance of malfunctions and/or breakdowns and the system will last longer.

A simple but very useful tip is to always clean and keep the system properly cleaned. This way, the chances of malfunctions are reduced. For example, make sure that no dirt or other residue is left on the camera head and moving parts. We recommend cleaning with a damp cloth or brush. The display should never be cleaned due to scratching.

The MiniFlex should **never be** hosed down with water or a pressure washer.



The system should be stored in a ventilated, non-humid room at room temperature.

When not in use, store the system in a dry and ventilated place. Do not store your system for long periods of time with an empty battery. This may shorten the life of your battery.

We recommend delivering the system to your dealer for service every year. During this inspection, the complete system is checked for function, possible wear and safety.

4.1 Replacing cable

1. Make sure the system is off.
2. Unscrew camera head from cable. See instructions "Replacing head"
3. Pull the entire cable out of the drum up to the slider

4. Unlock the slide on the back of the drum



5. Remove the cable as shown in the picture

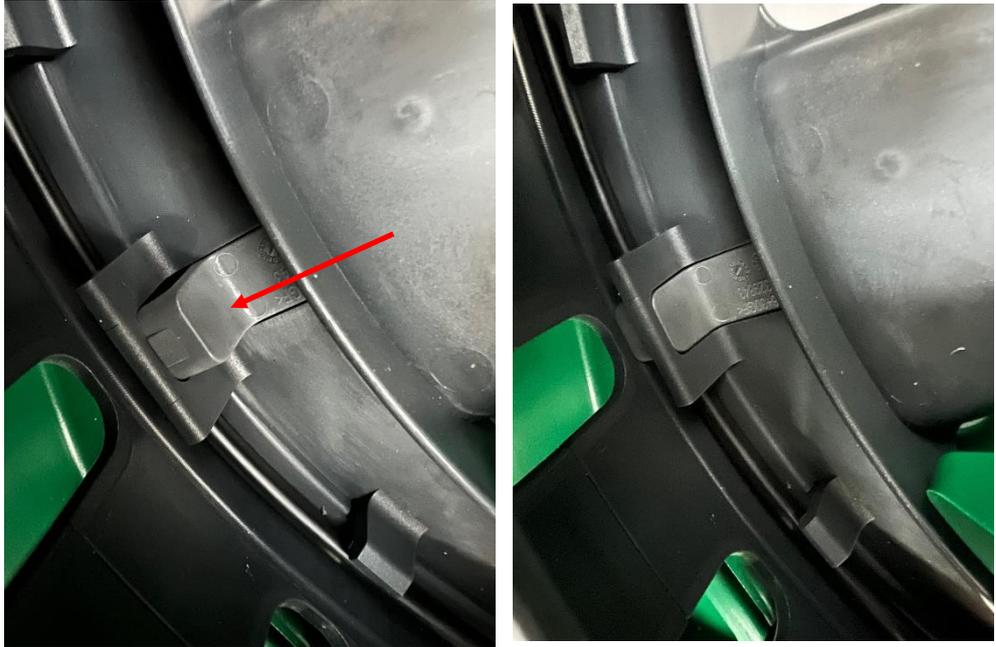


6. Unscrew the cable connector from the drum connector.
7. Screw the new cable to the drum connector.

8. Replace the connector connection and cable in the space provided.



9. Lock the slide (left slide open, right locked)



10. Roll the cable back into the drum.
11. Reattach the camera head to the cable.
12. Turn the system back on.

4.2 Replacing camera head

The camera head can be easily detached and reattached to the flexible cable.

Note: Make sure the system is off while disassembling and assembling the camera head. Also, perform these operations only in a clean and dry environment.

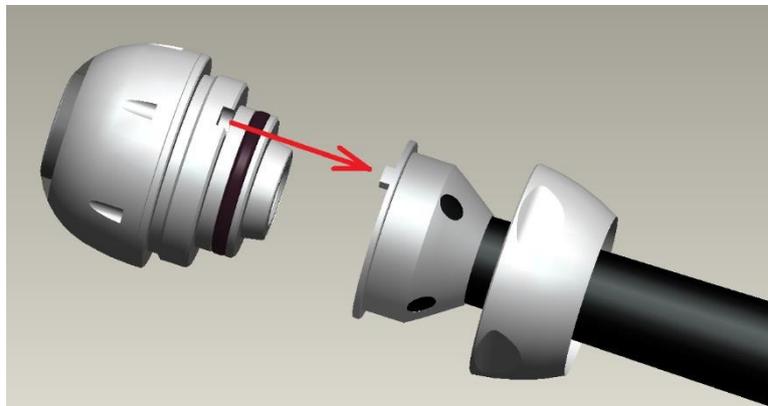
Disassemble

Hold the front part of the camera head and unscrew the rear ring.

Mount

Make sure the parts are clean and dry. Care should be taken when cleaning the spring-loaded contact pins in the rubber part.

Grasp the head and orient it so that the protruding cam on the rubber part matches the recess in the camera head. Push the camera head and rubber part together in this position and hold it in this position while fully tightening the ring. With proper execution, a gap between camera head and ring will hardly be visible. This can be up to 0.2 mm. Make sure that no moisture and/or dirt is trapped. The system can be turned back on.



5. Service & Warranty

For service on the system, always contact your dealer.

Service on the system may only be performed by, an authorized service technician designated by your dealer or by the manufacturer. If repairs and/or adjustments are made by a non-authorized technician, the system warranty is void.

Warranty terms/term apply according to your dealer's terms and conditions.

Warranty on the system is voided at:

- Short circuit / lightning strike
- Cable break
- Water damage
- Improper use and/or destruction
- Failure to act according to this manual, especially failure to perform maintenance (paragraph 4)

5.1 Troubleshooting

Stripes in the picture

Check that the transmitter is on and turn it off if necessary.

System does not turn on

Possibly the battery is dead. Connect the adapter.

Camera head does not go well through curves

Apply a small amount of acid-free petroleum jelly to the flex part behind the camera head.

System not responding

Press reset button (see section 3.14) After the system has been reset turn it on using the power button (see section 3.5) for verification.



6. Specifications

Camera 19mm

Housing material: stainless steel
Diameter: 19.5 mm (ball-shaped)
Length: 23 mm (assembled)
Viewing angle: Diagonal 105°
Objective: $f=2.1$ mm / F10.0
Focus: fixed
Glass: sapphire glass 1 mm
Camera: Color CMOS 400 TV lines
Illumination: 12 white high power LEDs
Transmitter: 512 Hz
Water resistance: 3 bar

Camera 36mm

Self leveling
Slope angle measurement
2 way communication
Housing material: stainless steel
Diameter: 36.0 mm (ball shape)
Length: 43.7 mm (assembled)
Viewing angle: 130° diagonal
Objective: $f=2.3$ mm / F2.8
Focus: fixed
Glass: sapphire glass 1.5 mm
Camera: Color CMOS 740 TV lines
Illumination: 6 white ultra high power LEDs
Transmitter: 512 Hz
Water resistance: 3 bar

System

Dimensions: 426 mm x 513 mm x 127 mm
Weight 9.6 kg
Battery operation time: 7 hours maximum
Power in: 100-240V 50-60Hz AC
Operating temperature *: -10°C to 45°C
Storage temperature: -10°C to 60°C
Relative humidity: 5 to 95%
Menu languages: Dutch / English / German / French / Spanish
Cable: Combination cable \varnothing 5.5 mm 15 m (optional other lengths available)

Screen dimensions: 8.0 inch color
Screen resolution: 1024x768 pixels
Recording resolution: 720x576 pixels
Storage: SD card (max 32GB)

* The adapter is suitable for 0°C to 40°C

The specifications, construction data, mode of operation and illustrations in this manual are not binding. We reserve the right to make changes without prior notice.

The MiniFlex® is a product of

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Internet: www.camtronics.nl



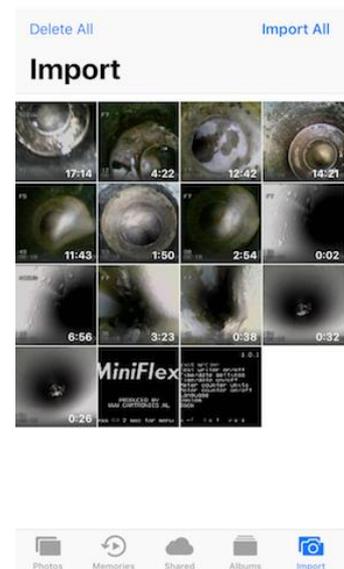
For iPhone

A.1 Transferring files and viewing

To transfer files from the SD card to an iPhone or iPad, use a "Lightning to SD card reader."



After plugging the adapter with SD card into your iPhone, the "Import" screen opens itself.



Select the desired files.

A blue check mark will appear next to selected files. (Green check mark means already imported.)

Press import.



Once the files have been imported, you can choose to delete them from the SD card.



The imported files can be found at "Last import" under albums.



Also, the files are in the "Camera Roll." (PLEASE NOTE not all imported files are in the timeline).

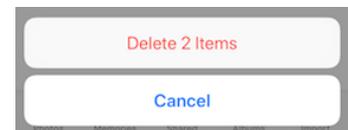


A.2 Delete files on Sd card

Connect adaptor with sd card. Select the desired files. Selected files will show a blue check mark. (Green check mark means already imported) After selecting, you can delete them.

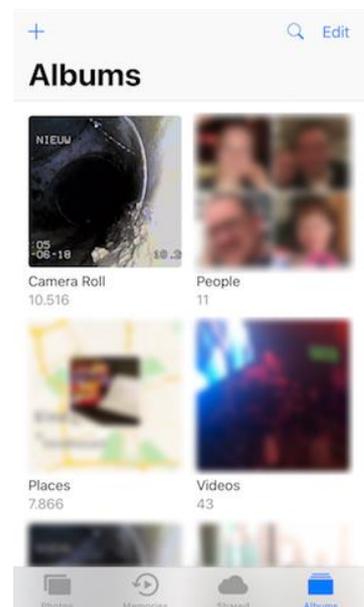


Confirm the deletion of the files.



A. 3 Sending via WhatsApp/Dropbox/We-transfer/email

Open the photo app, go to "albums," "Camera Roll"



Select the file you want to send.



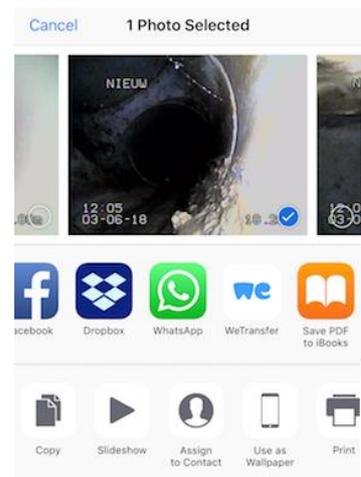
To send, tap the "send symbol."



Choose "WhatsApp" and select contact to whom you want to send the file.

Tap "Next."

If video file selected continue at "Video file".



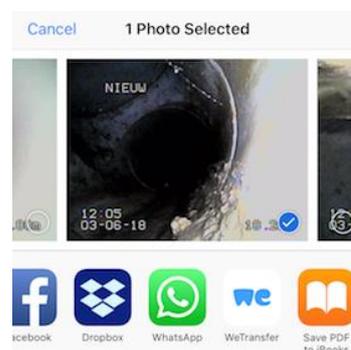
Take notes, crop and or rotate the photo.
(NOTE annotations only works if 1 file is selected)



"Video file" Select the part of the file you want to send using the yellow highlighted slider.
(NOTE there is a limitation of the maximum size you can send) Make notes, crop and or rotate the video.



For sending with "Dropbox", "We-transfer" or "email" choose the corresponding icon. And follow the instruction.



A.4 Advanced video editing

Annotate specific places in a video file for that you can use "Cute Cut Pro". (see sample picture)



Install "Cute Cut pro" through the app store.
(scan QR code for download link)



For Android devices

B.1 Transfer files and viewing

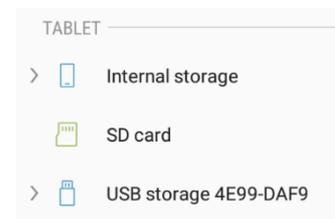
To transfer the files from the SD card to an Android device use an "OTG card reader". (NOTE your device must support OTG)



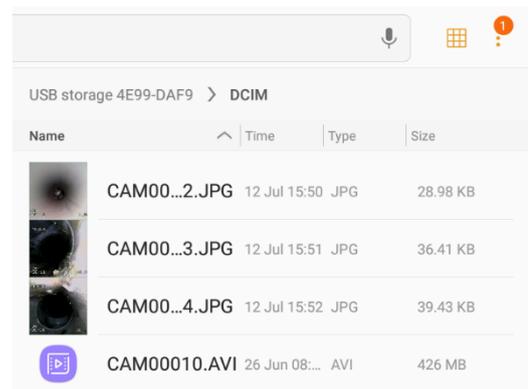
Plug in the adapter with SD card. Open the "MY FILES" app.



Select "usb storage."
Select the folder "DCIM"

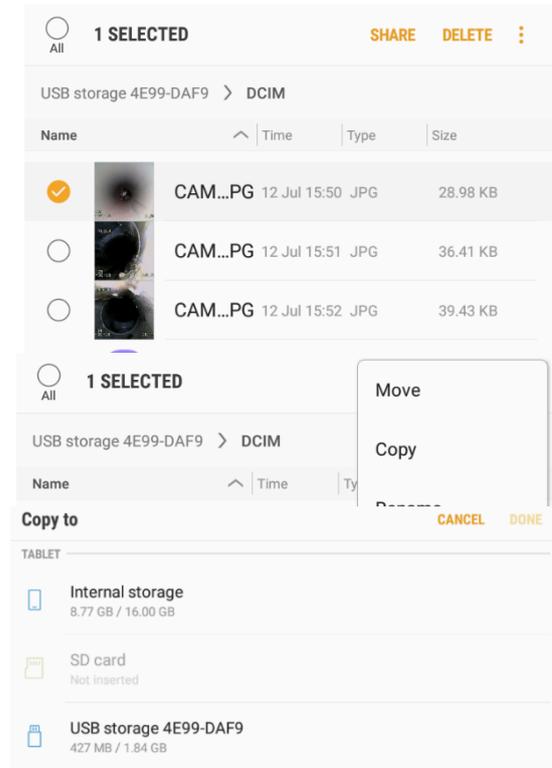


Select 1 file by tapping and holding.



Select multiple files if necessary.

To copy files to your device, tap the 3 dots at the top right of the screen and choose "Copy."



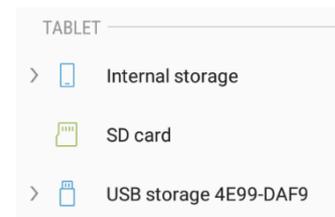
Copy the files to the "internal storage" or if present an "SD card".

B.2 Deleting files on SD card

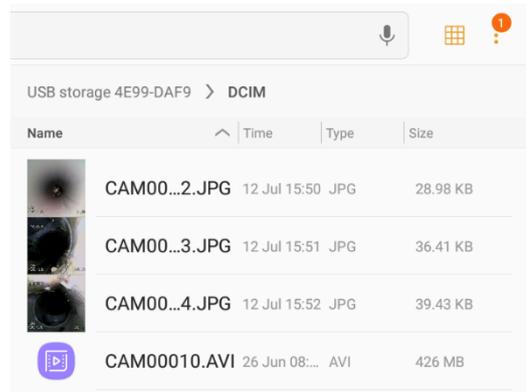
Plug in the adapter with SD card.
Open the "MY FILES" app.



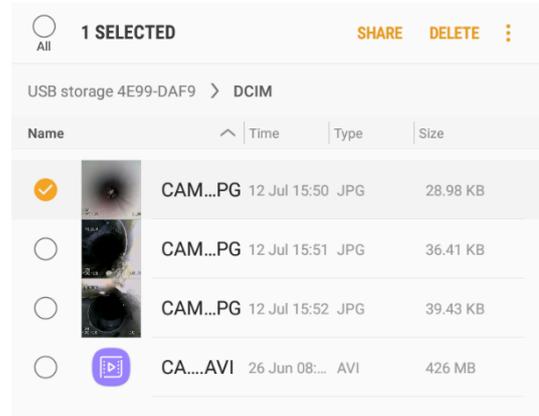
Select "usb storage."
Select the folder "DCIM"



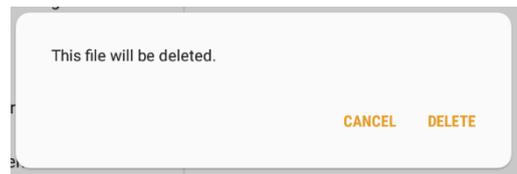
Select 1 file by tapping and holding.



Select multiple files, if necessary.
Tap "DELETE."



Confirm with "DELETE."

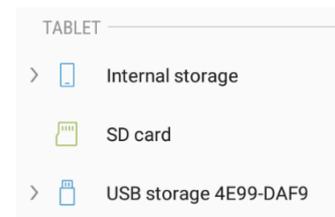


B.3 Sending via WhatsApp/Dropbox/We-transfer/email

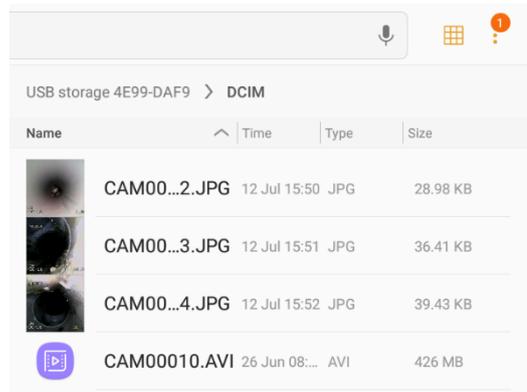
Plug in the adapter with SD card.
Open the "MY FILES" app.



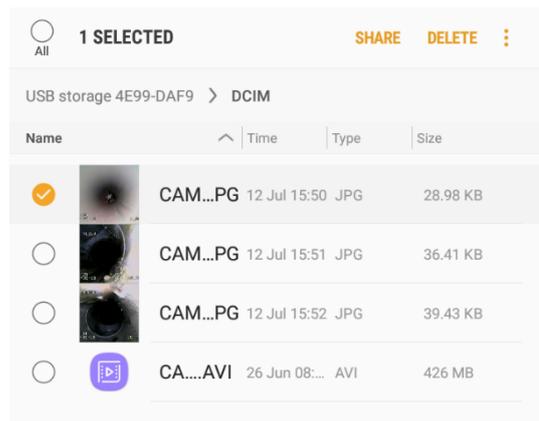
Select "usb storage."
Select the folder "DCIM"



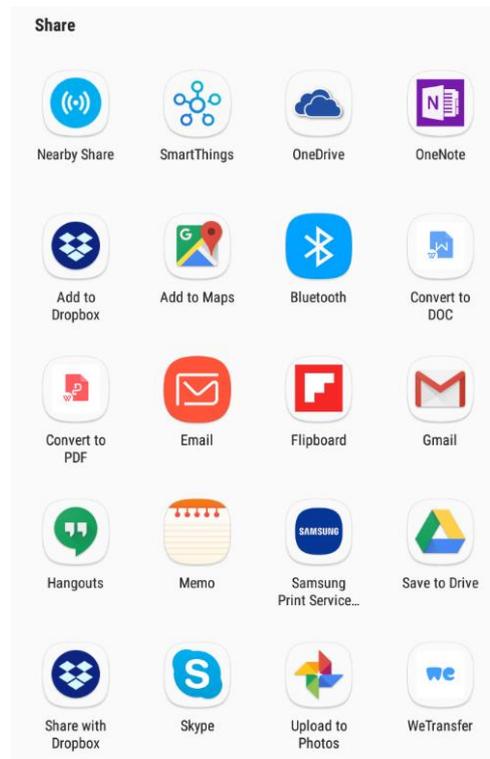
Select 1 file by tapping and holding.



Select multiple files if necessary.
Tap "SHARE."



Choose which program you want to use to send the file.
Follow the instructions.



B.4 Advanced video editing

Annotate specific places in a video file for that you can use "Cute Cut Pro"(see sample picture).



Install "Cute Cut pro" via the play store. Upgrade to the "Pro edition."
(scan QR code for download link)

