

Operating instructions

NOZZCAM™



USB DÜSEN
GmbH



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General

1 General

1.1 Information about this manual

This manual provides information on safe and efficient handling of the unit. This manual is part of the unit and must remain in the immediate vicinity of the unit and accessible to personnel at all times.

The personnel must have read this manual carefully and understood it before beginning any work. Complying with all safety and handling instructions in this manual is a basic prerequisite for safe work.

Local accident prevention regulations and general safety guidelines for the field of application of the unit also apply.

The figures in this manual are intended to assist in basic understanding; the design of the actual unit may differ somewhat.

1.2 Explanation of symbols

Safety instructions The safety instructions in this manual are identified by symbols. The safety instructions are preceded by signal words that express the severity of the hazard.

To prevent accidents, personal injuries and property damage, always heed the safety instructions and work cautiously.



DANGER!

This combination of symbol and signal word identifies an imminently dangerous situation that will result in severe or fatal injury if it is not avoided.



WARNING!

This combination of symbol and signal word identifies a potentially dangerous situation that can result in severe or fatal injury if it is not avoided.



CAUTION!

This combination of symbol and signal word identifies a potentially dangerous situation that can result in minor or slight injury if it is not avoided.



ATTENTION!

This combination of symbol and signal word identifies a potentially dangerous situation that can cause property damage and damage to the environment if it is not avoided.

Tips and recommendations



The symbol identifies useful tips and recommendations as well as information for efficient and trouble-free operation.

Special safety instructions

To bring attention to specific hazards, the following symbols are used in safety instructions:







DANGER!

This combination of simple and signal word identifies electrical hazards. Failure to heed the safety instructions poses the risk of severe or fatal injuries.

Signs used in this manual

The following signs are used in this manual to identify handling instructions, describe results, lists, cross-references and other elements:

| Sign | Explanation |
|---|---|
|  | Identifies step-by-step handling instructions. |
|  | Identifies a condition or automatic consequence resulting from performing a step. |
|  | Identifies cross references to sections in this manual and to related documents. |
|  | Identifies lists and entries in lists without a specific order. |
| [Taste] | Identifies designations of pushbuttons, on-screen buttons and other control elements. |

1.3 Copyright protection

This manual is copyrighted and intended solely for internal purposes.

Providing this manual to third parties, reproduction in any manner or form, including excerpts, as well as use and/or conveyance of its contents except for internal purposes are not allowed without written approval.

The user shall be held liable for damages arising from contravention.
The right to make further claims is reserved.

1.4 Warranty terms

The warranty terms are contained in the General Terms and Conditions of Business of the manufacturer.

1.5 Customer service

For technical information, contact **USB DÜSEN** GmbH. For contact data, see p. 2.

Please also note that our employees are always interested in receiving new information and hearing about your experience with our products that can contribute to improving these products.

2 Safety

This section provides an overview of all important safety aspects for optimal protection of personnel as well as safe and trouble-free operation.

Failure to follow the handling instructions and heed the safety information in this manual can result in serious hazards.

2.1 Intended use

The unit has been designed and built solely for the intended use described here.

The color, pipe and sewer inspection camera serves strictly for visual inspection of wastewater sewer lines, wastewater tanks, heating and cooling channels, ventilation shafts, electrical installation shafts, chimneys, wells, wastewater drop pipes and in-ground wastewater lines when used with accessories provided by the manufacturer in areas that do not contain potentially explosive atmospheres.

Complying with all information in this manual is also considered an aspect of the intended use. Every use beyond or differing from the intended use constitutes misuse.

Misuse



WARNING!

Danger resulting from misuse!

Misuse of the color, pipe and sewer inspection camera can result in hazardous situations.

- Never use the unit in pipe runs with non-return flaps.
- Never use the unit in areas with potentially explosive atmospheres.
- Never operate the unit in close proximity to combustible liquids and/or gases.
- Never use the unit with accessories from anyone but the manufacturer.
- Never use the unit without a PE protective conductor.
- Never expose the unit to precipitation.
- Never operate the unit outdoors or under similar conditions without a 30-mA residual-current-operated device at the power source.
- Never operate the unit in a moist environment and/or place it in water or other liquids.
- Never connect the unit to a receptacle without a protective ground contact.

Claims of any kind resulting from misuse will not be honored.

2.2 Responsibility of the operator

Operator

The operator is the entity or person who operates the unit for commercial or business purposes themselves or provides it to a third party for use/application and during the operation of which bears the statutory product responsibility for protection of the user, personnel or third party.

Obligations of the operator

The unit is used for commercial purposes.

The operator of the unit is thus subject to the statutory obligations for safety in the workplace.

In addition to observance of the safety information in this manual, compliance with the applicable safety, accident prevention and environmental protection regulations for the field of application of the unit is required.

The following applies in particular:

- The operator must become familiar with applicable workplace safety regulations and identify through a risk assessment the additional hazards that arise because of the special work conditions at the place of use of the unit. They must be incorporated in the form of operating instructions for use of the unit.
- During the entire service life of the unit, the operator must review whether the operating instructions prepared comply with all current regulations and, if necessary, update the operating instructions.
- The operator must regulate and specify clearly the responsibilities for installation, operation, troubleshooting, maintenance and cleaning.
- The operator must ensure that all employees who handle the unit have read and understood this manual. In addition, the operator must train the personnel at regular intervals and inform them of the hazards.
- The operator must provide the personnel with the required protective equipment and mandate that the required protective equipment be worn.

In addition, it is the responsibility of the operator to ensure that the unit is always in technically perfect condition.

Accordingly, the following applies:

- The operator must ensure that the maintenance intervals described in this manual are observed.
- The operator must have all safety devices checked regularly for proper operation and completeness.

2.3 Personnel requirements



WARNING!

Risk of injury in case of inadequate qualifications of personnel!

If unqualified personnel carry out work on the unit or linger in the danger zone of the unit, there is a risk of severe injury and significant property damage.

- Allow only qualified personnel to work on the unit.
- Keep unqualified personnel away from danger zones.

These operating instructions list the qualifications required by personnel for the various activities:

Electrical technician/electrician

On the basis of their technical training, knowledge and experience as well as familiarity with applicable standards and regulations, electrical technicians/electricians have the ability to perform work on electrical systems independently and avoid possible hazards.

The electrical technician/electrician has been specially trained for their work environment and knows the relevant standards and regulations.

The electrical technician/electrician must comply with the applicable regulations regarding accident prevention.

Technical personnel

On the basis of their technical training, knowledge and experience as well as familiarity with applicable standards and regulations, technical personnel has the ability to perform the assigned work independently and avoid possible hazards.

Manufacturer

Certain work may only be performed by our technical personnel. Other personnel is not authorized to perform this work. To have the necessary work performed, contact our service department (address on p. 2).

Only individuals who can be expected to perform their work professionally are acceptable as personnel. Individuals whose ability to respond is compromised, e. g. by drugs, alcohol or medications, are not acceptable.

Comply with applicable age- and profession-specific regulations when selecting personnel for the worksite.

Safety

2.4 Personal protective equipment

Personal protective equipment protects the personnel from dangers that can adversely affect their health and safety when working.

Personnel must wear personal protective equipment when carrying out various tasks on and with the unit. This equipment is pointed out separately in the individual sections of this manual. The personal protective equipment is explained in the following:

- Before beginning the respective task, always put on the personal protective equipment required in the various sections of this manual.
- Follow the instructions regarding personal protective equipment posted in the work area.

Description of personal protective equipment



Chemical-resistant protective gloves

Chemical-resistant protective gloves are used to protect the hands from exposure to aggressive chemicals.



Protective goggles

Safety goggles are used to protect the eyes from flying objects and sprayed liquids.

2.5 Basic hazards

The following section lists residual risks that may be posed by the unit and which have been identified through a risk assessment.

To reduce health hazards and avoid dangerous situations, observe the safety instructions presented here as well as the safety instructions in additional sections of these operating instructions.

2.5.1 General hazards at the workplace

Open access to pipe



WARNING!

Risk of falling into open access to pipe!

When introducing the camera, it is necessary to open the access to the pipe. If the work area around the open access to the pipe is not blocked and/or insufficiently marked, this can result in a life-threatening fall into the open access to the pipe.

Severe to fatal injuries can be the consequence.

- Block off the work area around the open access to the pipe and mark it visually (e. g. with signal tape, flexible barriers and/or pylons).
- Make sure that no unauthorized individuals can enter the work area and danger zone.
- Properly close access to the pipe once all work has been completed.

Microbiological pollution



WARNING!

Risk of illness from exposure to microbiologically contaminated deposits!

During work in sewers, the unit, accessories, personal protective equipment and/or cleaning utensils come into contact with microbiologically contaminated deposits that can cause extremely severe to fatal illnesses.

- Make sure that no unauthorized individuals can enter the work area and danger zone.
- Always wear chemical-resistant protective gloves.
- Do not eat, drink and/or smoke while working.
- Thoroughly clean the unit, the accessories and the personal protective equipment after each use.
- Clean and/or properly dispose of cleaning utensils that are no longer needed in an environmentally responsible manner.

Safety

Dirt and objects lying around



CAUTION!

Risk of injury from dirt and objects lying around!

Dirt and objects lying around present slipping and tripping hazards. A fall can result in injuries.

- Always keep the work area clean.
- Remove no longer needed objects from the work area, especially from the floor.
- Always ensure adequate lighting at work area.
- Always comply with official regulations for working in shafts/sewers. You are obliged to carry a gas warning device when entering a shaft and an air supply system for a sewer.

2.5.2 Electrical hazards

Electricity



DANGER!

Life-threatening electrical hazard!

Contact with live components presents an immediate life-threatening hazard from electrocution. Damaged insulation or individual components can be life-threatening.

- During all work on the electrical connection and on electrical cables, switch off the unit and ensure that no voltage is present.
- Allow only electrical technicians/electricians to work on electrical equipment.
- Connect the unit only to a receptacle with a VDE protective contact.
- In the event of damage to the power cable, immediately disconnect power by pulling the power plug out of the receptacle and initiate repairs.
- Use only tested, undamaged power cables.
- Always grasp the power plug when pulling, never the power cable.
- Keep the cable length in mind; consider use of a strain relief.
- Keep moisture away from live components. Exposure to moisture could result in short-circuits.
- Never operate the unit in a moist environment and/or place it in water or other liquids.
- Never operate the unit outdoors or under similar conditions without a 30-mA residual-current-operated device at the power source.
- Never bypass fuses or disable them. When replacing fuses, always use the correct amperage rating.
- Pull the power plug when performing all maintenance work.
- If the insulation is damaged, immediately disconnect the power source and initiate repairs.

Rechargeable batteries ⁽¹⁾



WARNING!

Risk of injury from incorrect handling of rechargeable batteries!

Rechargeable batteries that are handled improperly may explode or leak harmful fluid. The liquid can cause chemical burns on the skins, severe poisoning if swallowed and blindness if it comes into contact with the eyes.

- Use only an appropriate charger to charge such batteries. Always place the batteries in the charger with the poles (+/-) in the correct orientation. If the battery does not fit properly, never use force when attempting to insert it.
- Never short-circuit the contacts (plus and minus poles) of the battery.
- Never expose the battery to wetness or moisture (rain, salt water, liquids).
A moist or wet battery must not be used or charged under any circumstances.
- Never use, charge or store the battery in areas where a potentially explosive atmosphere exists or where high temperatures can occur.

⁽¹⁾ optional accessory

2.5.3 Mechanical hazards

Crushing hazard when using the advancing reel



WARNING!

Risk of fingers being crushed in the cable guide!

There is a risk of fingers being crushed in the cable guide on the advancing reel when retracting and extending the pushing cable. The result may be broken bones and bruised fingers.

- Retract and extend the advancing cable slowly.
- Always wear protective gloves.
- Keep fingers away from the cable guide when retracting and extending the cable.
- When retracting and extending the pushing cable, always hold the advancing reel securely by the handle.

Safety

Rotating advancing reel



WARNING!

Risk of injury during use with rotating advancing reel!

The advancing reel rotates while the pushing cable is advanced and retracted. Reaching into the rotating advancing reel can cause severe injuries.

- Always wear protective gloves.
- When retracting and extending the pushing cable, always hold the advancing reel securely by the handle.
- Retract and extend the advancing cable slowly.
- Always use the quick-clamp lever to stop/brake the rotating advancing reel. Never reach directly into the advancing reel with your hands.

Use in pipe runs with non-return flaps



ATTENTION!

Improper use in pipe runs with non-return flaps!

Non-return flaps in pipe runs automatically drop closed after the camera head has been inserted, preventing retraction of the camera head. This results in blockage of the pipe, time-consuming and expensive repair work on the pipe, including severe damage and possibly even destruction of the unit.

- Never use the unit in pipe runs with non-return flaps.
- As soon as a non-return flap is recognized on the display of the LCD monitor, interrupt the visual inspection immediately and retract the camera head from the pipe run.

Broken glass on camera objective



ATTENTION!

Risk of glass breakage from objects in the object being inspected!

If the camera head encounters an obstruction during the visual inspection, this can result in serious damage and/or breakage of the protective glass on the camera objective.

- Move the camera head slowly and cautiously through the object being inspected.
- As soon as an obstruction is recognized on the display of the LCD monitor, interrupt the visual inspection and remove the obstruction from the object being inspected so that the camera's advance can proceed without difficulty.

3 Technical data NOZZCAM™

3.1 General information

Color camera

| Item | Value | Unit |
|-------------------------|-----------------|------|
| Weight | 0.5 | kg |
| Ø NOZZCAM™ | 43 | mm |
| Camera housing material | Stainless steel | |

- Dual-power lighting
 - 10 Ultra-white light LED
 - 5 SMD-LED
- Automatic white balance
- Light sensitivity approx. 0.01 Lux
- Objective: Wide angle 87° with nano coating
- 2 x front jet nozzles, 2 x steering nozzles 45 °, 5 x rear nozzle inserts
- Color camera chip CCD Sony - 480 TV lines
 - Resolution: 752 x 582 pixels

Drum

| Item | Value | Unit |
|-----------------------------|-------|------|
| Weight (with camera) | 9.5 | kg |
| Length | 60 | m |
| Ø outside | 6 | mm |
| Ø inside | 5 | mm |
| Wall thickness | 1 | mm |
| High-temperature resistance | 100 | °C |
| Low-temperature resistance | -20 | °C |
| Height | 34 | cm |
| Width | 31 | cm |
| Depth (with LCD monitor) | 26 | cm |

- Manual hand brake
- 6-pole slip ring
- Pushing cable plastic sheath material:
Polypropylene and polyethylene

Technical data

TFF monitor

| Item | Value | Unit |
|---------------------|-----------|-----------|
| Screen diagonal | 8 (20.32) | Inch (cm) |
| Screen aspect ratio | 4:3 | |
| Screen resolution | 960x234 | Pixels |
| Video input | 1 | Vp-p |
| Video output | 16/0.5 | Ω/W |

- Aluminum glare shield
- Aluminum housing
- Electronic meter inset in image with zeroing
- Color system: NTSC/PAL
- Contrast ratio: 350 CD/m²: 350:1
- Color: TFT-LCD (AU)
- Backlighting: Cathode filament

3.2 Connection values

Control box

| Item | Value | Unit |
|-------------------|-----------------------|------|
| Voltage | 230/12 ⁽¹⁾ | V |
| Frequency | 50 | Hz |
| Power consumption | 80 - 300 | W |

⁽¹⁾ Battery mode

LCD monitor

| Item | Value | Unit |
|-------------------|-------|------|
| Voltage | 12 | V |
| Frequency | 50 | Hz |
| Power consumption | 7 | W |

3.3 Performance values

| Item | Value | Unit |
|---|-------|------|
| Max. water tightness | 5 | bar |
| Max. operating pressure of the high-pressure pump | 200 | bar |

3.4 Operating conditions

| Item | Value | Unit |
|----------------------------|----------|------|
| Temperature range | 0 to +40 | °C |
| Relative humidity, maximum | 80 | % |

Duration

| Item | Value | Unit |
|-----------------------------------|-------|------|
| Maximum continuous operating time | 8.3 | h |
| Pause before next use | 5 | min |

3.5 Name plate

The name plate is located inside the housing on the electric motor and contains the following information:

- Manufacturer's address
- Machine designation+ number
- Shaft revolutions per minute
- CE mark
- Power rating
- IP protection rating
- Fusing
- Voltage and frequency
- Duty cycle

Overview

4 Overview

4.1 Scope of delivery - NOZZCAM™



Fig. 1: Overview

- | | | | |
|---|---|---|---|
| 1 | NOZZCAM™ Cleaning and camera unit with dual-power lighting (↪ section 7.4 "Advancing the camera" on p. 37) | 5 | 8" LCD monitor with color display and glare shield |
| 2 | Handle (↪ section 7.4 "Advancing the camera" on p. 37) | 6 | Control box with rechargeable battery (↪ section 4.3 "Control elements" on p. 20 ff.) |
| 3 | Cable drum (↪ section 7.4 "Advancing the camera" on p. 37) | 7 | Membrane keypad |
| 4 | 230-V power cable (↪ section 7.1 "Switching on the unit" on p. 29) | | |

4.2 Optionally available accessories

Membrane keypad for DVR

| Designation | Ordering number |
|-------------------------|-----------------|
| Membrane keypad for DVR | D.1000-FI |

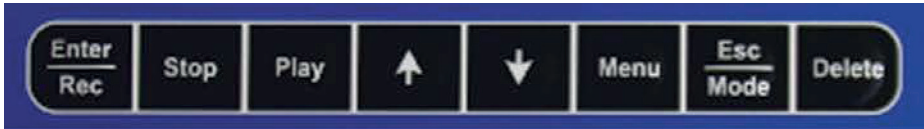


Fig. 2: Membrane keypad

12-V battery pack



Fig. 3: 12-V battery pack

| Designation | Ordering number |
|-------------------|-----------------------------|
| 12-V battery pack | R.1000 rechargeable battery |

Lithium ion rechargeable battery DC 12V
6800 mAh. Battery life approx. 2 1/2 hours.

Overview

4.3 Control elements

Control box front panel



| Item number | Designation | Function |
|-------------|--|---|
| 1 | [Light controller] (↪ section 7.5 "Controlling the light" on p. 41) | Regulating the LED for the dual-power lighting The light controller on the control box provides fully automatic white balance up to approx. 4 cm before the obstruction |
| 2 | Button [Zeroing] (↪ section 7.7 "Resetting the electronic meter measurement" on p. 42) | Pressing the button [zeroing] resets the electronic meter measurement for the number of meters already traveled by the camera head to zero |

Fig. 4: Control box, front of control box

Control box back panel



| Item number | Designation | Function |
|-------------|---|---|
| 1 | On/off switch [Power supply] (↪ section 7.1 "Switching on the unit" on p. 29) | Safely switches power for the unit on and off |

⁽¹⁾ only functions if optional "Cable position system" accessory is ordered.

Fig. 5: Control elements Control box back panel

Quick-clamp lever



| Item number | Designation | Function |
|-------------|-------------------|------------------------------|
| 1 | Quick-clamp lever | Cable drum secure or release |

Fig. 7: Quick-clamp lever

Overview

4.4 Connection points

Control box front panel

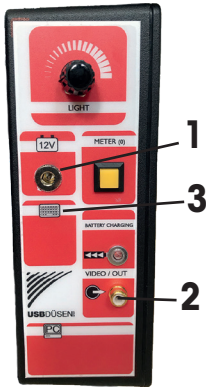


Fig. 8: Connection points, control box front panel

| Item number | Designation | Function |
|-------------|--|--|
| 1 | 12-V connection socket | For connecting the unit to a 12-V power source |
| 2 | Connection sockets Video output/input | For connecting a recording medium (e. g. television, video recorder, monitor) for transmitting the video signal sent by the camera |
| 3 | Keyboard connection for optional "Data input" accessory ⁽¹⁾ | For connecting a computer keyboard to the unit |

⁽¹⁾ only functions if the optional "Data input" accessory is ordered.

Control box back panel

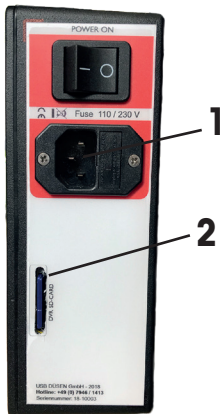


Fig. 9: Connection points, control box back panel

1 power connection socket
Slot for an SD memory card

| Item number | Designation | Function |
|-------------|-------------------------------|--|
| 1 | Power cable connection socket | For connecting to the mains (230 V) |
| 2 | Slot for an SD memory card | For insertion of an SD memory card to save the camera images |

4.5 Interfaces



1

| Item number | Designation | Function |
|-------------|--|---|
| 1 | Receiver for signals from the remote control of the digital video recorder | Receives the signals sent by the remote control of the digital video recorder |

Fig. 11: Receiver for signals from the remote control

Unpacking, transporting and storing

5 Unpacking, transporting and storing

5.1 Symbol on the packaging

The following symbols appear on the packaging. Always heed the symbols when transporting.

Up



The arrow tips in the symbol point to the top of the package. They must always point up, as otherwise the contents could be damaged.

Protect from moisture



Protect packages from exposure to moisture and keep them dry.

Fragile



Identifies packages with fragile or sensitive contents. Handle the package with care, do not drop and do not subject to impact.

5.2 Unpacking and checking the delivery

Regarding the packaging

In anticipation of the transport conditions, the unit is packaged in a carton filled with packaging chips. Only environmentally friendly materials have been used for the packaging. The packaging is intended to protect the unit from shipping damage, corrosion and other damage until it is commissioned.

Broken camera objective glass



CAUTION!
Risk of cuts from broken camera objective!

A camera objective that has broken during shipping can cause cuts on the hands during unpacking.

- Wear cut-resistant protective gloves when unpacking the unit.
- Always pull the unit out of the packaging by means of the handle on the advancing reel.

Unpacking, transporting and storing

Equipment damage due to broken glass



ATTENTION!

Equipment damage due to broken glass!

A camera objective that has broken during shipping renders the unit inoperable.

- Report the damage to the freight forwarder and note the extent of damage on the shipping papers or on the freight forward's delivery slip.
- Have the freight forwarder confirm the damage in writing and file a claim.
- Return the defective unit to the manufacturer.

Shipping inspection

Immediately check the shipment for completeness upon delivery (→ section 4.1 "Scope of delivery" on p. 18) and inspect for damage. In the event of external shipping damage, proceed as follows:

- Do not accept the shipment or accept it only conditionally.
- Note the extent of damage on the shipping papers or on the freight forwarder's delivery slip.
- File a claim.



File a claim for every damage as soon as it is found.

Damage claims can only be submitted within the applicable time period for such.

Unpacking, transporting and storing

5.3 Transporting and storing the unit

Transporting the unit



ATTENTION!

Equipment damage from swinging camera head!

If the unit's pushing cable is not rolled up completely to the camera head, the camera head can swing uncontrollably during shipment. Broken camera objective glass and physical damage to nearby objects can result.

- Prior to shipment, roll up the unit's pushing cable completely to the camera head.
- Make sure that the quick-clamp lever on the advancing reel is tightened securely.
- When transporting, hold the camera head securely with one hand to prevent uncontrolled swinging.

- Always transport the unit in a vertical position and secured against falling over or carry it by the carrying handle.
- Protect the camera head during transportation with a dust-free, non-scratching and cushioning material (e.g. g. bubble pack).

Storing the unit

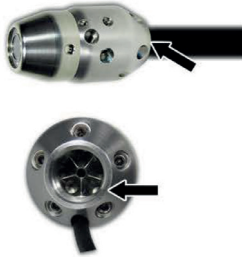
Store the unit under the following conditions:

- Do not store outdoors.
- Store in a dry and dust-free environment.
- Cushion the camera head (e.g. g. bubble pack).
- Place the unit on a level surface.
- Do not expose the unit to aggressive fluids.
- Protect the unit from direct sunlight.
- Avoid mechanical shaking.
- Storage temperature: -5 to 40 °C.
- Relative humidity: Max. 80 %.

Connecting the NOZZCAM™ / bending function

6 Connecting the NOZZCAM™ / bending function

1. → Connect the high-pressure hose of your cleaning unit to the connection on the **NOZZCAM™** (Fig. 1).



Attention!

Make sure the connection is tight when attaching the **NOZZCAM™**.

Fig. 1: **NOZZCAM™**

2. → To turn into a branch, rotate the high-pressure hose in the desired direction (Fig. 2 / Arrows) to steer the **NOZZCAM™** into the branch.



Fig. 2: Bending function

Operation

7 Operation

Electricity



DANGER!

Life-threatening electrical hazard!

Contact with live components presents an immediate life-threatening hazard from electrocution. Damaged insulation or individual components can be life-threatening.

- During all work on the electrical connection and on electrical cables, switch off the unit and ensure that no voltage is present.
- Allow only electrical technicians/electricians to work on electrical equipment.
- Connect the unit only to a receptacle with a VDE protective contact.
- In the event of damage to the power cable, immediately disconnect power by pulling the power plug out of the receptacle and initiate repairs.
- Use only tested, undamaged power cables.
- Always grasp the power plug when pulling, never the power cable.
- Keep the cable length in mind; consider use of a strain relief.
- Keep moisture away from live components.
Exposure to moisture could result in short-circuits.
- Never operate the unit in a moist environment and/or place it in water or other liquids.
- Never operate the unit outdoors or under similar conditions without a 30-mA residual-current-operated device at the power source.
- Never bypass fuses or disable them. When replacing fuses, always use the correct amperage rating.
- Pull the power plug when performing all maintenance work.
- If the insulation is damaged, immediately disconnect the power source and initiate repairs.

Rechargeable batteries ⁽¹⁾



WARNING! **Risk of injury from incorrect handling of rechargeable batteries!**

Rechargeable batteries that are handled improperly may explode or leak harmful fluid. The liquid can cause chemical burns on the skins, severe poisoning if swallowed and blindness if it comes into contact with the eyes.

- Use only an appropriate charger to charge the rechargeable batteries. Always place the batteries in the charger with the poles (+/-) in the correct orientation. If the battery does not fit properly, never use force in an attempt to insert it.
- Never short-circuit the contacts (plus and minus poles) of the battery.
- Never expose the battery to wetness or moisture (rain, salt water, liquids). A moist or wet battery must not be used or charged under any circumstances.
- Never use, charge or store the battery in areas where a potentially explosive atmosphere exists or where high temperatures can occur.

⁽¹⁾ optional accessory

7.1 Switching on the unit



There are two ways to power the unit:

- *by means of a 230-V connection cable plugged into a grounded receptacle*
- *by means of a 12-V power cable plugged into a grounded receptacle or 12-V output socket (e.g. battery, cigarette lighter, car battery)*

Operation

Establishing a 230-V power connection



Fig. 17: On/off switch of the power source

1. → Switch off the on/off switch for the power supply (Fig. 17/1) on the control box (Fig. 17/Arrow).
⇒ The switch is now in position 1.



Fig. 18: Attach the unit's power connector

2. → Attach the unit's power connector (Fig. 18/2) to the power cable socket on the control box (Fig. 18/1).
3. → Attach the power plug to a receptacle with a protective contact.

Establishing a 12-V power connection



Power cables with a 12-V adapter are not included in the scope of delivery.

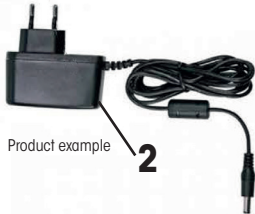


Fig. 19: 12-V power cable

1. → Select the 12-V power cable for connection to the power source (Fig. 19/1, 2), optionally available

| Item number | Designation |
|-------------|---|
| 1 | Power cable with 12-V adapter for cigarette lighter |
| 2 | Power cable with 12-V power supply unit for grounded receptacle |



Fig. 20: Switch off the on/off switch for the power source

2. → Switch off the on/off switch for the power supply (Fig. 20) on the control box (Fig. 20/Arrow).



Attention!

This does not function with the R. 1000-LI battery pack.

Operation

Switching the camera on/off - BATTERY mode

1. → To operate the camera in the battery mode, place the switch in position 1 (Fig. 21/1) and unplug the power plug (Fig. 22/2).



Fig. 21: Switch off the on/off switch of the power source

2. → To switch off the camera, place the switch in position 0 (Fig. 21 /1) and unplug the power plug (Fig. 22/2).



Fig. 22: Power plug

3. → To charge the rechargeable battery, attach the power plug (Fig. 22/1). Charging of the battery starts immediately, the switch (Fig. 21/1) can be in position 1 or 0.



Fig. 23: Charging LED

The battery is fully charged when the LED (Fig. 23/1) is no longer illuminated.

Switching on the LCD monitor

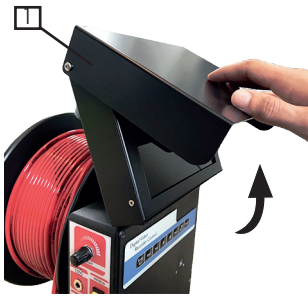


Fig. 23: Lift the glare shield

1. → Open the glare shield on the LCD monitor (Fig. 23/1) (Fig. 23/Arrow).
2. → Switch on the control box (↔ "Switching on the control box" on p. 37).



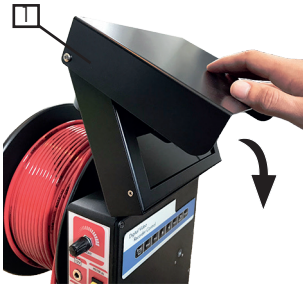
Fig. 24: On/off switch of the power source

2. → Switch off the on/off switch for the power supply (Fig. 24/1) on the control box (Fig. 24/Arrow). The switch is now in position 1.

Operation

7.2 Switching off the unit

Switching off the LCD monitor



1. → Open the glare shield on the LCD monitor (Fig. 26/1) (Fig. 26/Arrow).

Fig. 26: Close the glare shield

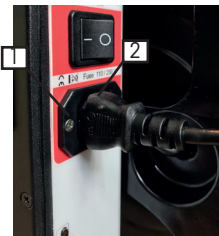
Switching off the control box



1. → Switch off the on/off switch for the power source (Fig. 27/1) on the control box (Fig. 27/Arrow).

Fig. 27: Switch off the on/off switch of the power source

Disconnecting the 230-V power supply



1. → Unplug the power plug from the grounded receptacle.
2. → Unplug the unit's 230-V power plug (Fig. 28/2) from the power socket (Fig. 28/1) on the control box.

Fig. 28: Unplug the unit's power connector

Disconnecting the 12-V power supply



Fig. 29: Switch off the on/off switch of the power source

1. → Switch off the on/off switch for the power supply (Fig. 29/1) at the control box (Fig. 29/Arrow).
2. → Unplug the connector from the grounded receptacle or from the 12-V output socket (e.g. battery, cigarette lighter, car battery).

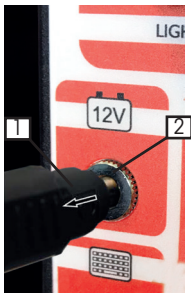


Fig. 30: 12-V power connection

3. → Unplug the unit's 12-V power connector (Fig. 30/1) from the 12-V connection socket (Fig. 30/2) on the control box (Fig. 30/Arrow).



Attention!

This does not function with the R.1000-LI battery pack.

Operation

7.3 Operating the digital video recorder by means of the membrane keypad

Digital Video Recorder Control



A digital video recorder can be integrated into the control box as an option to record the camera's travel.

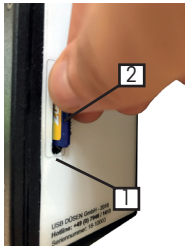


Fig. 31: Inserting the SD memory card into the slot

Personnel: ■ Technical personnel:

7.3.1 Starting the recording

1. ➤ Insert the SD memory card (Fig. 31/2) into the slot (Fig. 31/1).
2. ➤ Press the *[Record]* button (Fig. 32/1) on the membrane keypad

⇒ The digital video recorder records the camera's travel.

7.3.2 Ending the recording

1. ➤ Press the *(Stop)* button. (REC symbol on the screen disappears)

7.3.3 Viewing the last video recorded

1. ➤ Press the *[ESC-MODE]* button.
2. ➤ Press the *[PLAY]* button. Starts playback.
3. ➤ Press the *[STOP]* button. Playback is stopped.

7.3.4 Returning to the live image

1. ➤ Press the *[ESC-MODE]* button. A list of recorded videos appears.
2. ➤ Press the *[ESC-MODE]* button again. The SET-UP menu appears.
3. ➤ Use the arrow buttons to select EXIT (highlighted in blue when selected).
4. ➤ Press the *[ENTER/REC]* button. A live image appears.

7.3.5 Deleting videos

1. ➤ Return to the live image
2. ➤ Press the *[MENUE]* button. The SET UP menu appears.
3. ➤ Use the arrow buttons to select PLAYBACK and confirm by pressing the *[ENTER]* button. A list of all videos appears. Use the arrow buttons to select the video to be deleted.
4. ➤ Press the *[DELETE]* button. A prompt appears asking whether the video should really be deleted. Select YES and confirm by pressing the *[ENTER]* button, the video is then deleted. Select NO and confirm by press the *[ENTER]* button, the video is retained.



Fig. 32: Membrane keypad

Returning to the live image, see item 7.3.4 point 2ff.

7.4 Advancing the camera

Open access to pipe



WARNING!
Risk of falling into open access to pipe!

When introducing the camera, it is necessary to open the access to the pipe. If the work area around the open access to the pipe is not blocked and/or insufficiently marked, this can result in a life-threatening fall into the open access to pipe. Severe to fatal injuries can be the consequence.

- Block off the work area around the open access to the pipe and mark it visually (e. g. with signal tape, flexible barriers and/or pylons).
- Make sure that no unauthorized individuals can enter the work area and danger zone.
- Properly close access to the pipe once all work has been completed.

Microbiological pollution



WARNING!
Risk of illness from exposure to microbiologically contaminated deposits!

During work in sewers, the unit, accessories, personal protective equipment and/or cleaning utensils come into contact with microbiologically contaminated deposits that can cause extremely severe to fatal illnesses.

- Make sure that no unauthorized individuals can enter the work area and danger zone.
- Always wear chemical-resistant protective gloves.
- Do not eat, drink and/or smoke while working.
- Thoroughly clean the unit, the accessories and the personal protective equipment after each use.
- Clean and/or properly dispose of cleaning utensils that are no longer needed in an environmentally responsible manner.

Operation

Rotating advancing reel



WARNING! **Risk of injury from rotating advancing reel!**

The advancing reel rotates while the pushing cable is advanced and retracted. Reaching into the rotating advancing reel can cause severe injuries.

- Always wear protective gloves.
- When retracting and extending the pushing cable, always hold the advancing reel securely by the handle.
- Retract and extend the advancing cable slowly.
- Always use the quick-clamp lever to stop/brake the rotating advancing reel. Never reach directly into the advancing reel with your hands.

Use in pipe runs with non-return flaps



ATTENTION! **Improper use in pipe runs with non-return flaps!**

Non-return flaps in pipe runs automatically drop closed after the camera head has been inserted, preventing retraction of the camera head. This results in blockage of the pipe, time-consuming and expensive repair work on the pipe, including severe damage and possibly even destruction of the unit.

- Never use the unit in pipe runs with non-return flaps.
- As soon as a non-return flap is recognized on the display of the LCD monitor, interrupt the visual inspection immediately and retract the camera head from the pipe run.

Broken glass on camera objective



ATTENTION! **Risk of glass breakage from objects in the object being inspected!**

If the camera head encounters an obstruction during the visual inspection, this can result in serious damage and/or breakage of the protective glass on the camera objective.

- Move the camera head slowly and cautiously through the object being inspected.
- As soon as an obstruction is recognized on the display of the LCD monitor, interrupt the visual inspection and remove the obstruction from the object being inspected so that the camera's advance can proceed without difficulty.

Preparation



Fig. 33: Cover, sludge trap, protective grate

Personnel: ■ Technical personnel
Protective equipment: ■ Chemical-resistant protective gloves

1. ➤ Block off the work area and visually mark the danger zone (e. g. with signal tape, flexible barriers and/or pylons).
2. ➤ Remove the cover over the access to the pipe (Fig. 33).
3. ➤ If necessary remove protective grate and/or sludge trap from the pipe access opening (Fig. 33).
4. ➤ Place the cover, protective grate and/or sludge trap removed from the pipe access opening so that they do not poses a tripping hazard.
5. ➤ Place the unit on a stable, flat surface in the work area.
6. ➤ Inspect all cables on the unit for absence of damage.
If damage is found, do not operate the unit, have it repaired.

Inserting the camera



When using the **NOZZCAM™** in pipe runs, always observe the relevant and well-known requirements regarding careful handling and use of camera equipment/ electronics.

The **NOZZCAM™** may only be used by technical personnel familiar with the use of electronic equipment in water-conveying pipes and special camera equipment.

Operation

Moving the camera in the pipe run.

1. → Use the light controller to adjust the dual-power lighting to the light conditions in the object being inspected (↪ section 7.5 "Controlling the light" on p. 41).
2. → Adjust the video and audio values of the LCD monitor to the light and audio conditions in the object being inspected.
3. → Slowly and cautiously guide the **NOZZCAM™** through the pipe with the aid of a high-pressure device (max. operating pressure of the high-pressure pump \leq 200 bar). In this way, any possible obstructions and damage are recognized quickly.
4. → As soon as an obstruction is recognized on the display of the LCD monitor, interrupt the visual inspection and remove the obstruction from the object being inspected so that the camera's advance can proceed without difficulty.



WARNING!

Risk of illness from exposure to microbiologically contaminated deposits!

During work in sewers, the unit, accessories, personal protective equipment and/or

cleaning utensils come into contact with microbiologically contaminated deposits

that can cause extremely severe to fatal illnesses.

- Make sure that no unauthorized individuals can enter the work area and danger zone.
- Always wear chemical-resistant protective gloves.
- Do not eat, drink and/or smoke while working.
- Thoroughly clean the unit, the accessories and the personal protective equipment after each use.
- Clean and/or properly dispose of cleaning utensils that are no longer needed in an environmentally responsible manner.

7.5 Controlling the light



Fig. 36: Increasing the illumination level with the light controller



Fig. 37: Reducing the illumination level with the light controller



When using a 12-volt power source, light control is not possible. The light output is approx. 80 %.

1. → Switch on the unit (↪ section 7.1 "Switching on the unit" on p. 29).
2. → Turn the light controller (Fig. 36) in the clockwise direction (Fig. 36/Arrow).

⇒ The illumination level increases up to 100 %. The fully automatic white balance (up to approx. 4 cm before the obstruction at 100 %) adjusts the lighting conditions for display on the LCD monitor

3. → Turn the light controller (Fig. 37/1) in the counterclockwise direction (Fig. 37/Arrow).

⇒ The illumination level decreases down to 0 %. The fully automatic white balance (up to approx. 4 cm before the obstruction at 100 %) adjusts the lighting conditions for display on the LCD monitor.

Operation

7.7 Resetting the electronic meter measurement



This function permits measurement of specific distance segments in the object being inspected.

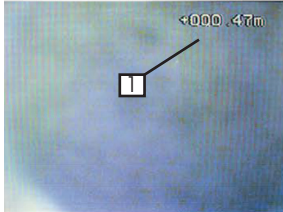


Fig. 45: Value of the distance covered

1. Specify the starting point of the measurement in the object being inspected.
2. Advance the camera head to the starting point in the object being inspected.

⇒ The electronic meter inset on the display (Fig. 45/1) shows the value of the distance covered.



Fig. 46: Pressing the [Zero position] button

3. Press the [Zero position] (Fig. 46/1) button.
⇒ The value on the electronic meter inset is reset to "+000.00 m".
4. Move the camera head to the destination point in the object being inspected.
⇒ The electronic meter inset on the display shows the value of distance covered.

Cleaning, care and maintenance

8 Cleaning, care and maintenance

8.1 Safety instructions for maintenance

Electricity



DANGER!

Life-threatening electrical hazard!

Contact with live components always poses a life-threatening hazard. Electrically actuated components can execute uncontrolled movements and cause extremely severe injuries.

- Unplug the power plug from the receptacle before beginning to work.
- Make sure that the power plug cannot be plugged back into the receptacle.

Rotating advancing reel



WARNING!

Risk of injury from rotating advancing reel!

The advancing reel rotates while the pushing cable is advanced and retracted. Reaching into the rotating advancing reel can cause severe injuries.

- Always wear protective gloves.
- When retracting and extending the pushing cable, always hold the advancing reel securely by the handle.
- Retract and extend the advancing cable slowly.
- Always use the quick-clamp lever to stop/brake the rotating advancing reel. Never reach directly into the advancing reel with your hands.

8.2 Maintenance schedule

The maintenance work required for optimal and trouble-free operation of the unit is described in the following sections. If increased wear is noted during regular inspections, shorten the required maintenance intervals on the basis of the actual signs of wear. If you have questions about the maintenance work and maintenance intervals, contact the manufacturer: see the contact data on p. 2.

| Interval | Maintenance work | Personnel |
|-----------------|---|---------------------|
| After every use | Inspect the connection cable and pushing cable (↪ section 8.4 "Servicing the unit, accessories and camera head" on p. 55). | Technical personnel |
| | Inspect the camera head (↪ section 8.4 "Servicing the unit, accessories and camera head" on p. 55). | Technical personnel |
| | Clean the camera head (↪ section 8.3 "Cleaning the unit, accessories and camera head" on p. 54). | Technical personnel |
| | Remove dirt from the outside of the unit with a moist cloth (↪ section 8.3 "Cleaning the unit, accessories and camera head" on p. 54). | Technical personnel |
| | Inspect the nozzle inserts for clogging (visual inspection). | Technical personnel |

Cleaning, care and maintenance

8.3 Cleaning the unit, accessories and camera head

Cleaning the unit and accessories



ATTENTION! **Risk of equipment damage from improper cleaning!**

Improper cleaning of the unit can result in significant physical damage, and possibly even total failure of the unit.

- Do not use sharp cleaning utensils.
- Wipe off the unit with a cloth moistened with dishwashing liquid and water.
- Keep moisture away from the control box and LCD monitor.
- When cleaning, always hold the unit securely by means of the handle of the advancing reel.
- Clean the camera head separately.
- Do not use compressed air.
- Do not use a stream of water.

Personnel: ■ Technical personnel
Protective equipment: ■ Chemical-resistant protective gloves

1. ➤ Switch off the unit and disconnect it from the power source (↪ section 7.2 "Switching off the unit" on p. 34ff).
2. ➤ Wipe off all components of the unit except for the camera head with a moist cloth.
3. ➤ Use a hand brush with plastic bristles to remove stubborn dirt.
4. ➤ Use a rubber care product to clean all plastic parts and the pushing cable.

Cleaning the camera head

Personnel: ■ Technical personnel
Protective equipment: ■ Chemical-resistant protective gloves

- Wipe off the protective glass of the camera head with a dry, soft and lint-free cloth to prevent scratches.

8.4 Servicing the unit, accessories and camera head

Servicing the unit and accessories



ATTENTION!

Risk of equipment damage from attempting to repair on your own!

Repairs performed without authorization from the manufacturer can result in severe equipment damage and make the unit unusable.

- Only allow the manufacturer to make repairs.

Personnel: ■ Technical personnel

Protective equipment: ■ Chemical-resistant protective gloves

1. ➤ Inspect the power cable for damage after every use; if necessary, replace a damaged power cable.
2. ➤ After every use, inspect the following components of the unit for damage:
 - advancing reel
 - pushing cable
 - housing of the control box
 - LCD monitor
 - camera head
 - LED of the dual-power lighting
 - roller sled
 - camera head
3. ➤ If damage is found, contact the manufacturer (for manufacturer contact information, see p. 2) and initiate repair.

Cleaning, care and maintenance

8.4.1 Servicing the camera head

Personnel: ■ Technical personnel
Protective equipment: ■ Protective goggles



Fig. 49: Servicing the camera head

1. → Switch off the unit and disconnect it from the power source (↪ section 7.2 "Switching off the unit" on p. 34ff).
2. → When work is finished, rinse off the camera head with water to remove dirt.

9 Troubleshooting

The following table lists possible causes of problems and describes the actions to rectify them. If problems occur repeatedly, shorten the maintenance intervals on the basis of the actual usage. For problems that cannot be rectified by the following actions or which do not appear in table below, contact the manufacturer; see contact data on p. 2.

| Description of fault | Cause | Remedy | Personnel |
|--|-----------------------------------|--|---------------------------------------|
| Unit cannot be switched on. | Power interrupted. | Check that the power connector is inserted into the receptacle (↪ section 7.1 "Switching on the unit" on p. 29ff). | Technical personnel |
| | Power supply faulty. | Check the power source. | Electrical technician/ electrician |
| LCD monitor does not display any image. | LCD monitor switched off. | Switch on the LCD monitor (↪ section 7.1 "Switching on the unit" on p. 29ff) | Technical personnel |
| | Pushing cable defective. | Replace the pushing cable. | Manufacturer |
| | Camera head defective. | Replace the camera head. | Manufacturer |
| Image displayed on the LCD monitor is too dark or too light. | Light controller set incorrectly. | Use the light controller on the front of the control box to adjust the dual-power lighting (↪ section 7.5 "Controlling the light" on p. 41). | Technical personnel |
| | Image properties set incorrectly. | Use the buttons [M], [^] and [v] on the LCD monitor to adjust the image properties. | Technical personnel |
| Sound from the LCD monitor is too loud or too quiet. | Volume set incorrectly. | Use the buttons [^] and [v] on the LCD monitor to adjust the volume. | Technical personnel |

10 Disposal

Rechargeable batteries ⁽¹⁾

Once the unit has reached the end of its service life, dispose of the unit in an environmentally responsible manner.



WARNING!

Risk of injury from incorrect handling of rechargeable batteries!

Rechargeable batteries that are handled improperly may explode or leak harmful fluid. The liquid can cause chemical burns on the skins, severe poisoning if swallowed and blindness if it comes into contact with the eyes.

- Use only an appropriate charger to charge such batteries. Always place the batteries in the charger with the poles (+/-) in the correct orientation. If the battery does not fit properly, never use force in an attempt to insert it.
- Never short-circuit the contacts (plus and minus poles) of the battery.
- Never expose the battery to wetness or moisture (rain, salt water, liquids). A moist or wet battery must not be used or charged under any circumstances.
- Never use, charge or store the battery in areas where a potentially explosive atmosphere exists or where high temperatures can occur.

⁽¹⁾ optional accessory



ATTENTION!

Risk of environmental pollution as a consequence of improper disposal!

Improper disposal poses the risk of environmental pollution.

- Electrical scrap, electronic components, lubricants and other similar substances must be given to licensed specialists for disposal.
- In cases of doubt, contact the local community authority or disposal specialist for information on environmentally responsible disposal.

WEEE registration number

Manufacturer is a member of:

| | |
|--------------------------|-------------------------|
| Address | take-e-way GmbH Hamburg |
| Internet address | www.take-e-way.de |
| WEEE registration number | DE 11957000 |

Disposing of old and/or defective units

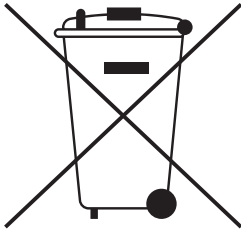


Fig. 50: Do not dispose of the unit with household waste.

1. ➤ Switch off the unit and disconnect it from the power source (↪ section 7.2 "Switching off the unit" on p. 34ff).
2. ➤ Clean the unit, the accessories and the camera head (↪ section 8.3 "Cleaning the unit, accessories and camera head" on p. 44).
3. ➤ Dismantle the unit into its components and sort by material characteristics.
4. ➤ Do not dispose of old and/or defective units with household waste.
5. ➤ If no return or disposal agreement has been made, take the dismantled components to a recycling center:
 - Scrap metal parts.
 - Submit the plastic components for recycling.
 - Dispose of the remaining component after sorting on the basis of material type.

Disposing of packaging

In compliance with the provisions of the packaging regulations, the manufacturer is a member of:

| | |
|------------------|--|
| Address | Landbell AG für Rückhol-Systeme, Rhein-straße 4 K - 4 L, D- 55116 Mainz |
| Internet address | www.landbell.de |
| Member number | 4102736 |

- Sort packaging material by material type and submit for recycling.

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Service address

USBDüsen GmbH
Im Eisenhütte 4
74626 Bretzfeld-Schwabbach

Telephone: 0049 7946 / 1413
Fax: 0049 7946 / 1734
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