



FIRST THING FIRST: READ THIS MANUAL

HYDROPTIC

**Zooscan V4
User Hardware Manual**

Version 2.4.1



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Abbreviations used on this manual (other than brand name):

CNRS: Centre National de la Recherche Scientifique (National Center for Scientific Research), a French government-funded research organization.

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INTRODUCTION

This manual is related to the hardware part of the Zooscan imaging device. This manual is intended to give the user all the information to:

- Setup the Zooscan from unpacking to connections
- Start using the Zooscan
- Carry out preventive maintenance and troubleshooting




Only the hardware part is covered on this manual as the final user can choose the software solution to be used together with the Zooscan. Consequently for software user manual the user has to refer to the dedicated literature.

For users using the Zooscan together with Zooprocess software, the software manual can be found at the CNRS Zooscan web pages: www.Zooscan.com







1. SAFETY INSTRUCTIONS:




BEFORE GOING ANYWHERE WITH THE USE OF THE ZOOSCAN, THE USER IS REQUIRED TO READ THE INSTRUCTIONS GIVEN HEREUNDER AND TO FOLLOW ALL SAFETY INSTRUCTIONS AND WARNINGS CONTAINED IN THIS MANUAL AND PLACED ON THE HARDWARE.

Special symbols are used throughout the text to earmark those sections where a reference is made to potential hazard.

SYMBOL	TYPE	MEANING
	DANGER	Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury. It may also be used to alert against unsafe practices causing material damage.
	DANGER	Indicates a danger of an electrical shock which, if not avoided, could result in death or serious injury.
	DANGER	Indicates the presence of a pitch point . The user must be careful on where to place his/her hands on the pointed areas

GENERAL SAFETY INSTRUCTIONS:

TYPE	INSTRUCTIONS
	<p>AC outlet required for the Zooscan: The Zooscan electrical box must be only plugged into a single and dedicated ground fault and surge protected AC outlet. Both the ground fault protection interrupter and the surge protection interrupter (which can be a single device) must comply with local electrical regulations. Moreover, the Zooscan must be plugged into an outlet that is properly installed and in a good shape, located close enough to the Zooscan so it can be easily unplugged. The Zooscan is compatible with all AC voltages (110 or 230 VAC).</p>
	<p>Power supply cord: Power supply cord must always be placed in a location so the cord is protected from any type of liquid, abrasion, cuts and crimping as it could result in electrical shock. Do not place any object on a top of the power cord or allow the cord to be stepped on or run over. In the even an extension cord is to be used with the Zooscan, the marked electrical rating of the extension cord should be at least as great as the electrical rating of the Zooscan, i.e. 2A . The extension cord must be a grounding type 3 wires cord and must be arranged so it will not drape over the counter top or tabletop where it can be tripped over unintentionally.</p>
	<p>Electrical box opening: High voltage is present inside the Zooscan electrical box. Always turn off the power and unplug the AC cable from the outlet before opening the box. This operation might be required to replace a fuse.</p>
	<p>Zooscan location: Do not place (or store) the Zooscan outdoors, on a unstable surface, near excessive dirt or dust, away from pressurized liquids, heats sources, or in a location subject to shocks, vibrations, high temperature or humidity, direct sunlight, strong light sources, or rapid changes in temperature and humidity.</p>
	<p>Pitch points: Always keep hands away from pitch points as it could result in serious injury. Always use both hands to lift the Zooscan parts.</p>
	<p>Light source: Always keep eyes away from the Zooscan upper lighting unit, as it could result in serious headache and minor vision troubles.</p>

TYPE	INSTRUCTIONS
	<p>Heavy equipment: Always take caution when moving the Zooscan such as during unpacking/packing operations as it could result in injuries. The Zooscan weights around 30 kg (60 pounds) and is fragile equipment. Therefore it is recommended to always move the Zooscan with two persons.</p>
	<p>Personal protective equipment required when handling chemicals: Always use the Zooscan with the appropriate personal protective equipment suitable for the sample to be handled. This can include gloves, closed shoes and facial mask according to the type of chemical handled.</p>
	<p>Trained personnel only: Never open the Zooscan as it could result in injury and material damage. In case of an equipment failure, contact Hydroptic Technologies first. For the same reason never attempt to disassemble, modify or repair the Zooscan.</p>

2. PRESENTATION

2.1. MAIN FEATURES:

Zooscan (manufactured under a CNRS - a French public research center - proprietary license) was developed primarily for enumeration, sizing and identification of liquid zooplankton samples. It is also suitable for other activities such as long term monitoring, research and education.

Domains of application: Ecological survey, fishery, aquaculture

Zooscan specific features:

- Designed to handle liquid samples for safe recovery
- High resolution, optimized for objects bigger than 200 µm equivalent spherical diameter
- Waterproof. complies with international safety regulations
- Bottom illumination to facilitate sample dispersion
- Specific lighting system to enhance image quality and contrast
- Supplied with transparent frames to achieve good quality image on borders and to facilitate software processing

Specifications:

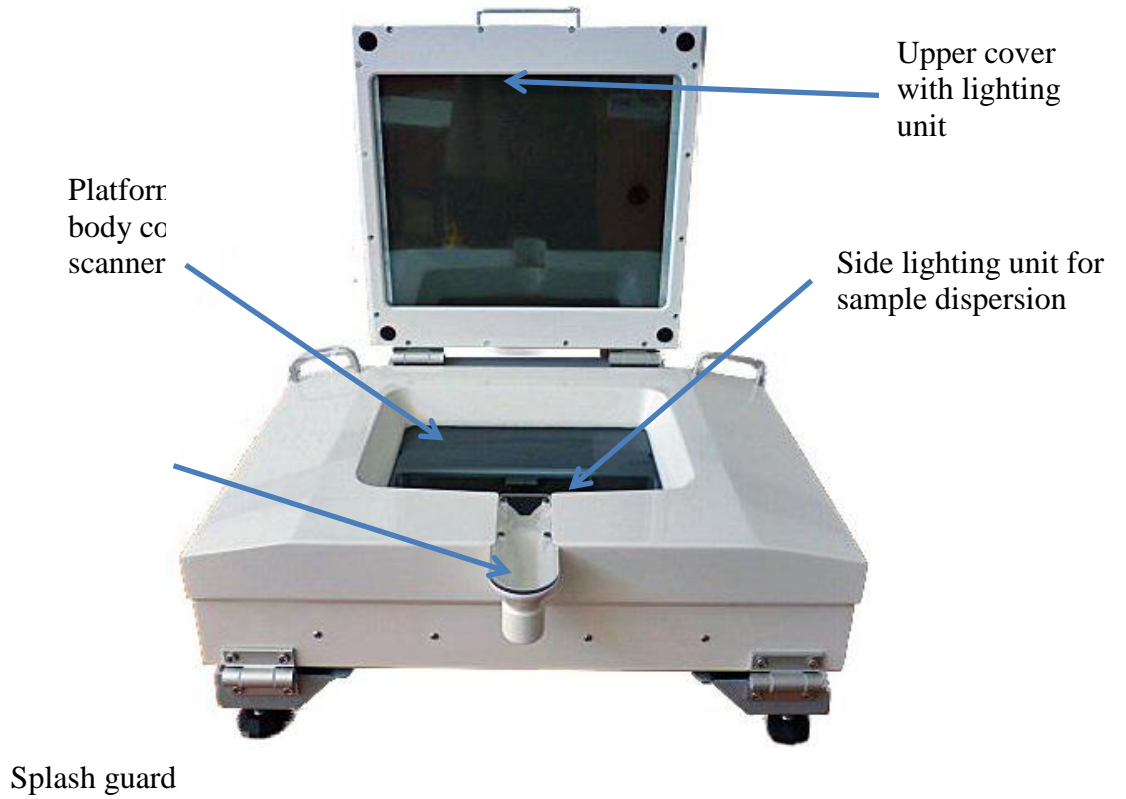
- Non-destructive testing
- Resistant to salt water, formaldehyde and ethanol
- Sample volume: 0.2 to 1.5 liter
- Image resolution: up to 2100 dpi (dot per inch)
- Dimensions (LxWxH): 53 x 60 x 36 cm
- Weight: 30 Kg
- Input voltage : 110 to 230 VAC, 50 to 60 Hz
- Interface: USB 2.0

Software:

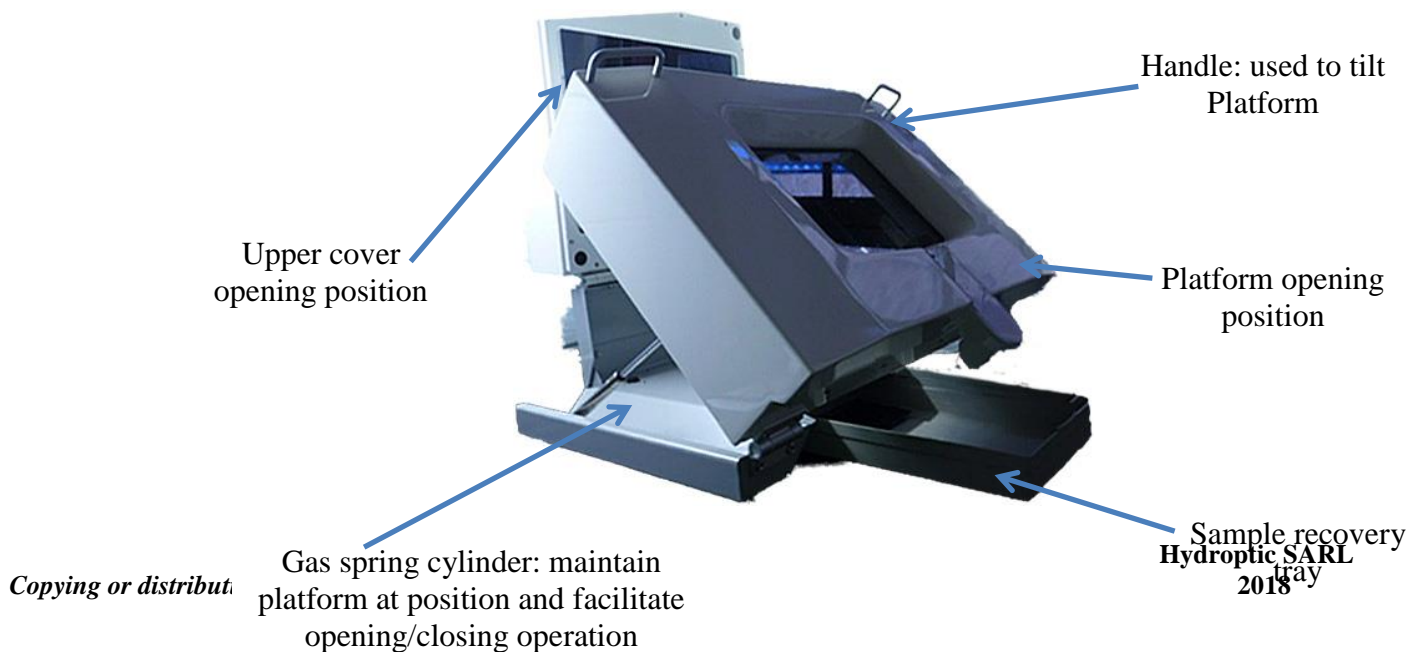
- Compatible with any scanning software solution
- Supplied with EPSON Scan and Vuescan scanning software.
- Recommended software: Zooprocess, a freeware solution for images processing. Available at www.Zooscan.com
- Recommended computer configuration :
 - PC with Intel core I5 processor or above.
 - 8 GB RAM for processing images up to 2100 dpi.(16GB is better)
 - 1280 x 1024 dpi minimum monitor resolution
 - Operating System: Microsoft Windows® 7 or 8 and 10 pro 64Bits

2.2.DESIGN AND TERMINOLOGY:

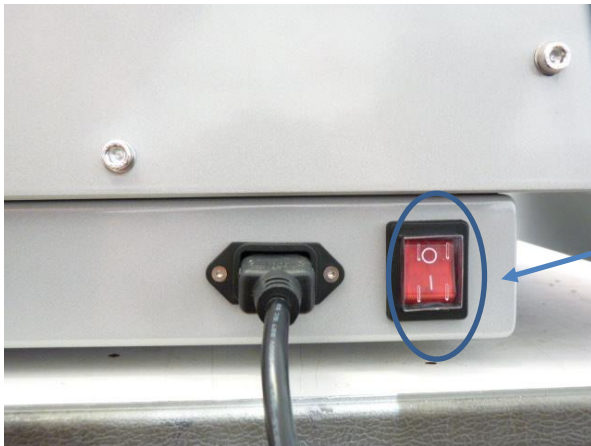
General description:



Opening positions:

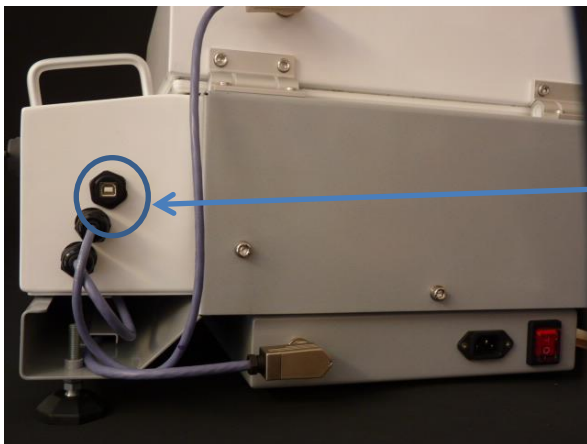


Buttons description:

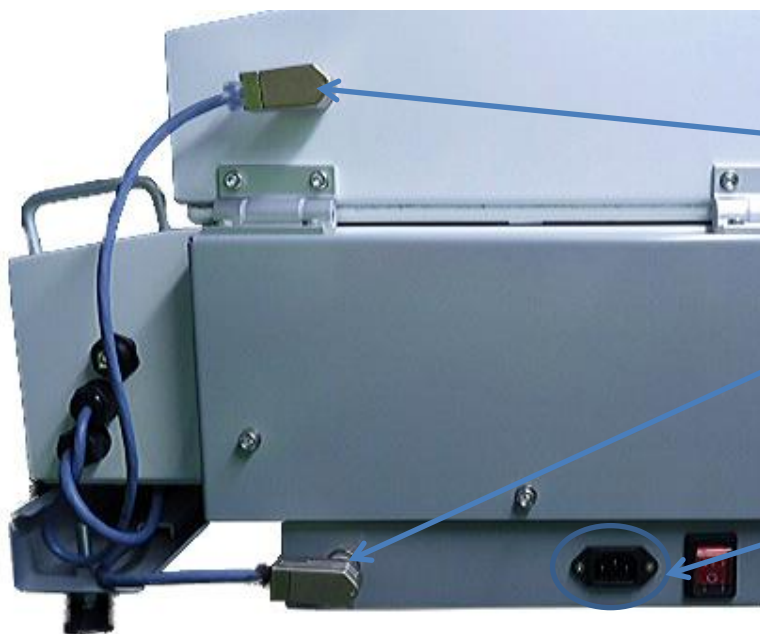


MASTER SWITCH:
To turn ON and OFF the Zooscan
Red light ON = Zooscan ON

Connections description:



USB Socket to
external PC



Four contacts connector for top light
power and tilt sensor for display light.

A seven contacts connector for main
power supply (3 * 24 V).

Main power supply connector
(110V/230V)

Installation:

2.3. WHERE TO INSTALL THE ZOOSCAN?

In order to properly use the Zooscan and to take all the advantages of it, it is highly recommended to install the Zooscan as directed hereunder:

- Install the Zooscan inside a room under normal conditions of temperature (10 to 30°C i.e. 50 to 86°F) and humidity (30 to 80%). Excessive heat or cold environment can compromise the scanning and reduce the Zooscan performances.
- Install the Zooscan on a location so it is not exposed to direct sunlight, strong light and heat sources, as this could result in warming the sample up.
- Avoid placing the Zooscan below a fan or a cooling/heating unit.
- Install the Zooscan away from dirt, dust and any type of fine particles which can damage the Zooscan or can compromise images quality or can damage the sample.
- Install the Zooscan away from damp locations such as in a wet basement, near open water tanks or in an environment where water drops or water is coming from all directions. The Zooscan is designed to handle water and specific chemicals but not in excess and nor under pressure conditions.
- Place the Zooscan on a stable tabletop, workbench or counter top and always away from shocks and vibrations, as this will directly affect images quality.
- Better to place Zooscan in a concrete floor lab if possible.
- Install the Zooscan at a proper height so the user feels comfortable. In all cases, the user must be able to rest he/her arms onto the Zooscan without stretching he/her back.

2.4.UNPACKING:



DANGER:

**Always wear appropriate personal protective equipment for material handling.
Be careful to pitch points
Heavy equipment, two persons lift required**

The Zooscan is shipped in a wood crate so it prevents transportation shocks and it is easy to open and is accessible for custom inspection.

The crate is locked and stickers are placed on each side in order to ensure that the transport was made without the container being damaged or turned upside down.

The unpacking procedures can be undertaken as soon as the transport documents have been filled in and if no severe damage has been noticed upon reception. The procedures require 2 persons as it is heavy equipment (around 27 kg).

The unpacking procedure is to be carried out in an environment as clean as possible to avoid dust or dirt going inside the Zooscan. The step by step procedure is detailed hereafter:

- Cut and remove the ties wrap attached onto each crate lockers.
- Unfastened each lockers using a flat blade screwdriver if required
- Remove the top cover from the box, and open the door.
Remove the Zooscan.

NEVER LIFT THE INSTRUMENT BY USING THE SPLASH GARD!



- Remove the documents and carry them to a safe place so as not to lose them.
- Remove the individually packed parts from the box.

The contents of the Zooscan crate are the following:

- Zooscan
- AC Power cord
- Large transparency frame (for scanning up to 2100 dpi)

- Narrow transparency frame (for scanning up to 21000 dpi)
- USB key which contains the Zooscan calibration files and Vuescan license
- Two non-abrasive needles for sample dispersion
- Hardware manual
- Warranty certificate

2.5. SCANNER UNLOCKING:

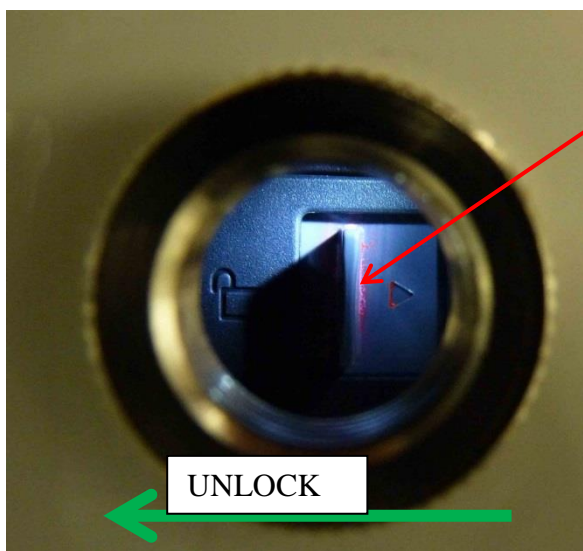
The scanner trolley is locked in home position for shipping, this in order to avoid any damages on the scanner mechanics.

Before using the scanner, it is necessary to unlock the scanner as described hereunder:

- Manually loose and remove the screw.



- Engage a pen or a stick inside the hole to reach the scanner locking device.

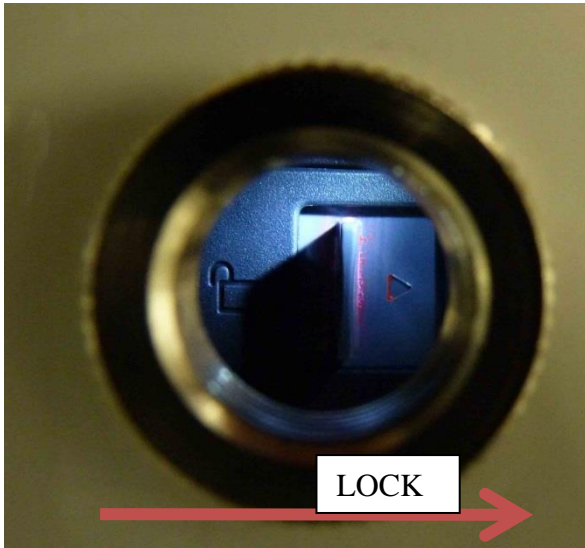


- Unlock the scanner by pushing the lock to the left. You will hear a clamp sound like once the carriage unit is totally unlock
- Place the scanner locking screw back

2.6. SCANNER LOCKING

Whenever the Zooscan has to be moved to a different location, make sure to lock the scanner prior handling the Zooscan as this will prevent any damage on the scanner.

The procedure is pretty much the same as the one described previously except, a push on the right is necessary to lock the scanner.

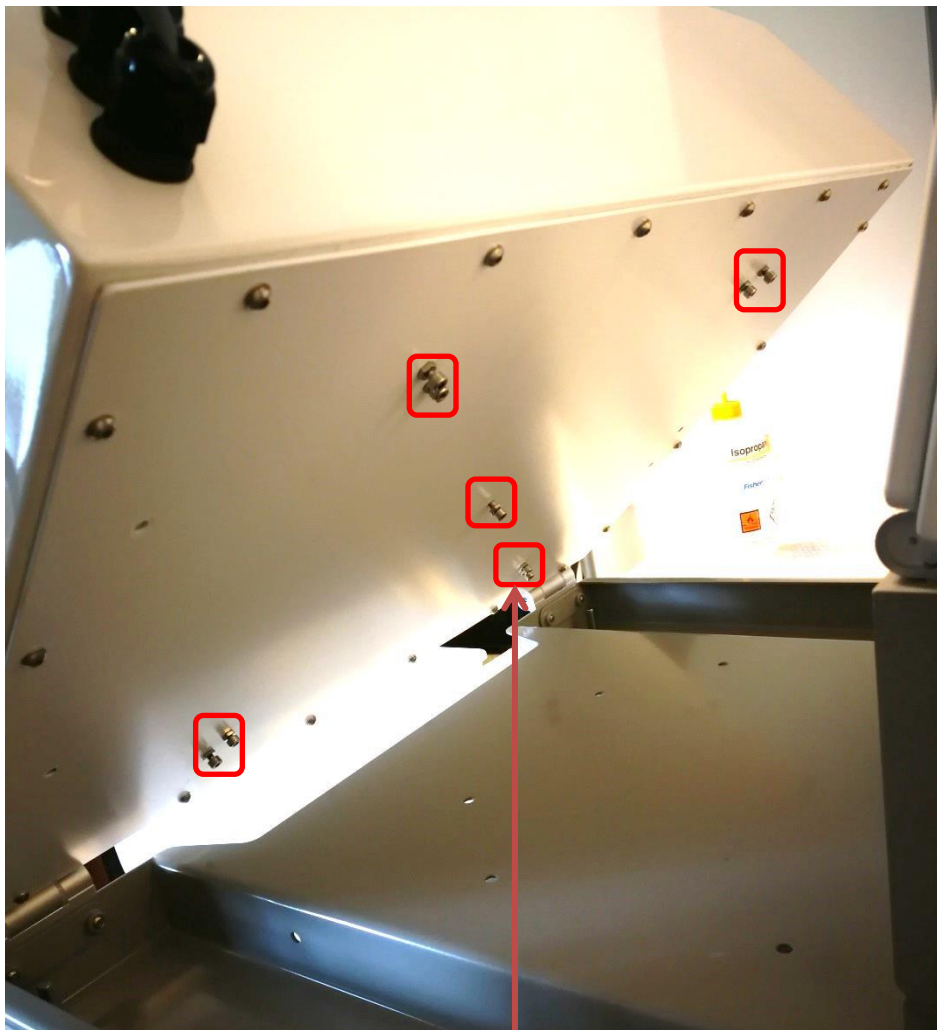


2.7.LEVELING THE ZOOSCAN

2.7.1. IMPORTANT WARNING BEFORE LEVELING:

- ⚠ Located under the scanner bed, holding and adjustment screws are easily accessible.
- ⚠ But these screws are critical for the scanner to work correctly. So in any case, do not touch them!

▶ Starting Zooscan SN110



Do not change screws alignment, otherwise Zooscan will have to be back to Hydroptic premises for calibration!!

2.7.2. LEVELING:

The Zooscan is supplied with a cross test level. The Zooscan has to be leveled from the four resting feet before it can be used. The procedure to adjust the Zooscan level is the following:

- Place the Zooscan on a stable tabletop, workbench or counter top and always away from shocks and vibrations
- Place the container to be used for sample recovery under the Zooscan

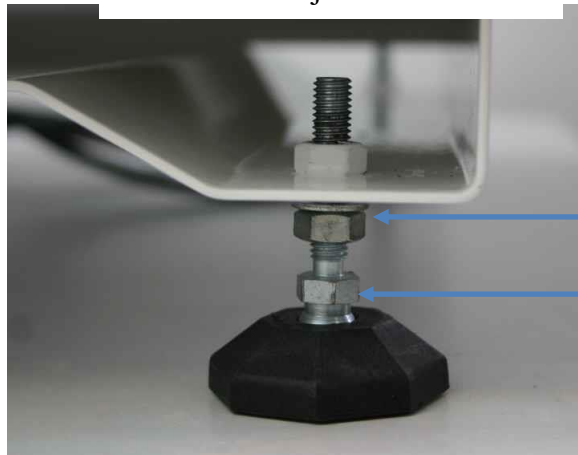


- Open the Zooscan upper cover
- Place the cross test level in the center of the window as shown hereunder



- Adjust the Zooscan level from the four feet using a 12mm open wrench:
 - Backward to forward first
 - Then left to right
 - To increase the height, loosen the feet making a clockwise rotation of each foot

Details of the ajustable feet



Locking nut

Adjustment location

- Check the leveling
- Readjust the Zooscan level if necessary. This operation may requires two persons
- Make sure the container stills fit under the Zooscan and readjust height and level if required
- Tighten the attachment nuts located on each foot using a 12mm open wrench
- Close the Zooscan upper cover



Warning

When shipping the tool inside the crate, adjustable feet nuts must be tighten in upper position.

2.8. ELECTRICAL CONNECTIONS



DANGER: Electrical hazards.
Process with caution when connecting the main power source

Once the Zooscan is in place connections can be set as described hereunder:

- First connect the power cable. As shown in Fig. 18.1.
- Connect the USB cable between the Zooscan and the computer.

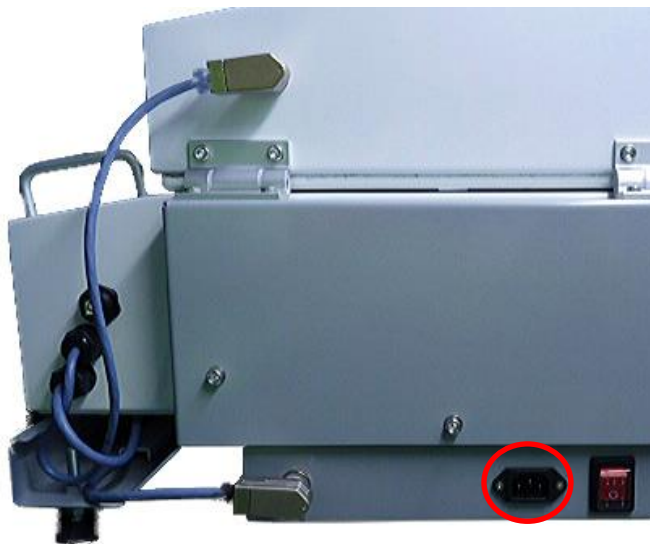


Fig 18.1

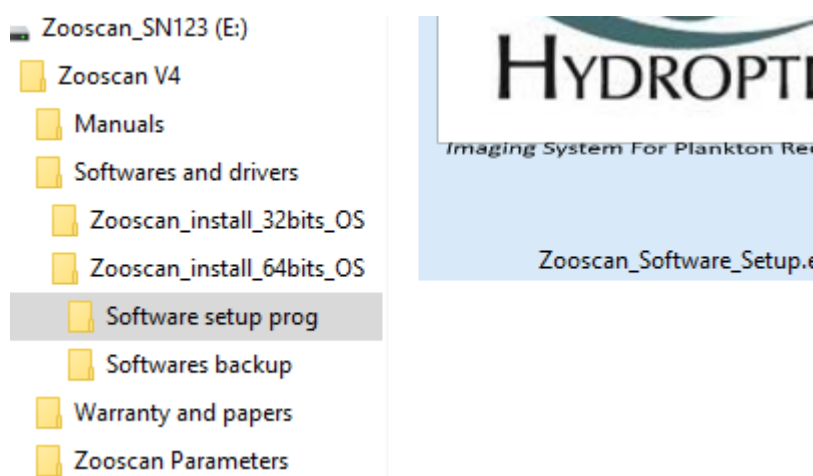
- The Zooscan electrical box must be only plugged into a single and dedicated ground fault and surge protected AC outlet. Both the ground fault protection interrupter and the surge protection interrupter (which can be a single device) must comply with local electrical regulations.
- The Zooscan must be plugged into an outlet that is properly installed and in a good shape, located close enough to the Zooscan so it can be easily unplugged.
- The Zooscan is compatible with all AC voltages (110 or 230 VAC).
- Power supply cord must always be placed in a location so the cord is protected from any type of liquid, abrasion, cuts and crimping as it could result in electrical shock.
- Do not place any object on a top of the power cord or allow the cord to be stepped on or run over.
- In the even an extension cord is to be used with the Zooscan, the marked electrical rating of the extension cord should be at least as great as the electrical rating of the Zooscan, i.e. 3A . The extension cord must be a grounding type 3 wires cord and must be arranged so it will not drape over the counter top or tabletop where it can be tripped over unintentionally.

2.9.DRIVER AND SOFTWARE INSTALLATION

The software executable program call “**Zooscan_Software_Setup.exe**” is in the USB key delivered with the Zooscan.

You’ll find the software executable program in the tree under:

ZooscanV4\Softwares and Drivers\ Zooscan_install_64bits_OS\Software setup prog



Launch the executable file and follow carefully the indication about the modifications that need to be done during the software’s installation.

Five necessary programs will be installed:

- 1) Scanner driver
- 2) Vuescan application
- 3) Java
- 4) ImageJ software
- 5) Zooprocess Macro.

For further details information read the *Zooprocess _setup_manual_727*.

3. SCANNING WITH THE ZOOSCAN:

The Zooscan is at this point ready to be used for imaging.

3.1. TURNING THE ZOOSCAN ON AND OFF:

The Zooscan is to be tuned ON and OFF from the electrical box red button. This action automatically turns ON and warms up the scanner. The Zooscan is now in an idle state.

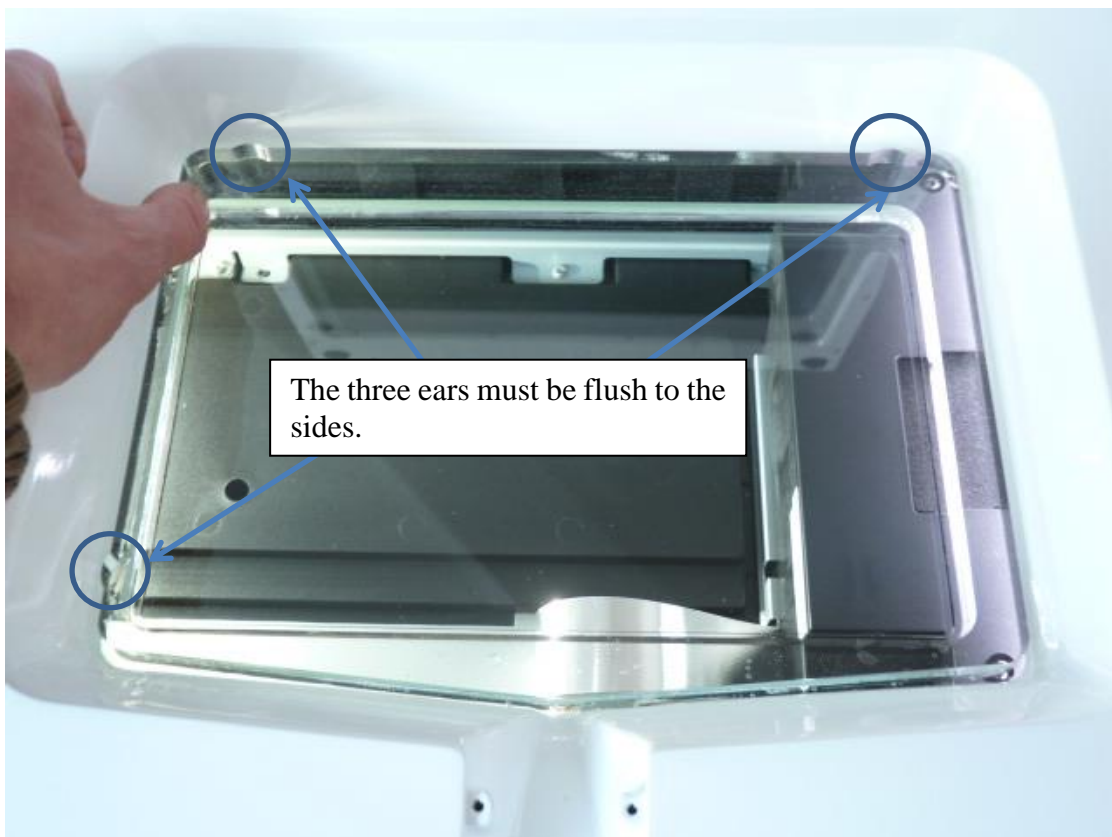
3.2. PLACING THE SAMPLE:

The Zooscan can be used in different ways according to the type of application:

- Sample directly poured inside the Zooscan (most of the applications)
- Sample poured inside a container first, then inside the Zooscan

3.2.1. FRAME POSITIONING ON TO THE ZOOSCAN GLASS:

When inserting the frame inside the Zooscan, make sure to push the frame by using the top left round corner as shown hereunder:



3.2.2. SAMPLE DIRECTLY POURED INTO THE ZOOSCAN:

Example:



Before pouring the sample into the Zooscan, it is necessary to first find out which frame is to be placed into the Zooscan. The user has to figure out which frame is the most appropriate of the operation.

It is possible to use the Zooscan without the supplied frame; however this solution is not appropriate to use the Zooscan with Zooprocess software solution.

- The smaller frame is to be used for standard sample volume and species (no more than 0.25 liters).
- The larger frame is to be used for large sample volume (no more than 0.35 liters) or sample with high density of species.

To pour the sample the procedure is as follows:

- Open the Zooscan, this automatically switch the lighting units from the inside.
- Place one of the transparency frames into the Zooscan.
- Pour the sample inside the frame
- Proceed on the sample dispersion. Use wood needles (such as cactus needles) or any non-scratching material to carry out this operation. The Zooscan left and right supports can be used to rest operator's arms and this operation can take long.
- Close the Zooscan.
- Proceed to the sample scanning from the computer.

3.2.3. SAMPLE POURED INSIDE A CONTAINER:

For this operation, the user must use a clear and clean container. The container must fit within the Zooscan height (around 40mm) so the upper cover can be closed properly.

The procedure is as follows:

- Open the Zooscan, this automatically switch the lighting units from the top to the inside one.
- Gently place container inside the Zooscan to avoid scratches onto the glass surface
- For a better and repeatable analysis it is also recommended to place the container in the middle of the scanning area and to locate accurately this position (using a ruler or the coordinates available from the scanning software) in case of multiple analysis.
- Proceed on the sample dispersion. Use wood needles (such as cactus needles) or any non-scratching material to carry out this operation. The Zooscan left and right supports can be used to rest operator's arms and this operation can take long.
- Close the Zooscan.
- Proceed to the sample scanning from the computer.

3.3.CARRYING OUT A FIRST SCAN:

Once the sample has been placed inside the Zooscan, the system is ready for scanning.

- Start the scanning from the software solution
- Refer to software solution manual for scanning details

3.4.RECOVERING THE SAMPLE:

Once all the scans have been completed, the used can proceed to the sample recovery as follows:



DANGER:

Always wear appropriate personal protective equipment for sample handling.

Be careful to pitch points

For samples not directly placed inside the Zooscan:

- Open the upper cover and remove the sample.
- Clean the upper cover glass first with a non-abrasive wipe and fresh water, this also removes the moisture resulting for vapor condensation.
- Clean the platform (inside and outside) with a non-abrasive wipe and fresh water.
- Close the upper cover
- The Zooscan is ready for the next sample
- In the event the Zooscan is not to be used within the next hour, turn off the Zooscan from the electrical box main switch

For samples placed directly inside the Zooscan, proceed as follows:

- Open the upper cover.
- Remove the frame and clean the frame with a non-abrasive wipe and fresh water
- Place either a bowl under the Zooscan or screw a plastic jar on the drain exit.



- Gently lift the Zooscan platform using both handles located on each side. This action transfers the sample from the Zooscan to the bowl.
- Using a squeezing bottle, carefully project fresh water inside the Zooscan especially inside the corners in order to recover the whole sample and to remove salt water or other product (such as formaldehyde). Do not hesitate to use more water than required in order to ensure proper cleaning.
- Remove the bowl and transfer the bowl content into an appropriate storing container.
- Clean the bowl with fresh water
- Gently push down the platform so it rest in a normal position
- Clean the outside of the platform with a non-abrasive wipe and fresh water.
- If necessary, clean the upper cover glass first with a non-abrasive wipe and fresh water, this also removes the moisture resulting for vapor condensation.
- Close the upper cover
- The Zooscan is ready for the next sample
- In the event the Zooscan is not to be used within the next hour, turn off the Zooscan from the electrical box main switch. Wipe down inside the Zooscan platform with a non-abrasive wipe and clean the upper cover glass first with a non-abrasive wipe and fresh water.

4. MAINTENANCE AND TROUBLESHOOTING:

This chapter is to give the user basic guideline on how to carry simple maintenance operations on the Zooscan hardware.



DANGER:

Be careful to pitch points

Electrical hazards always turn off the equipment and disconnect from power source before servicing

Hands tools and supplies required to perform all operations mentioned hereunder:

- A bag of non-abrasive wipe
- A set on metric Allen wrenches
- A set of metric open wrenches or a crescent wrench
- Fresh water and isopropanol alcohol

4.1. MONTHLY PREVENTIVE MAINTENANCE:

The monthly preventive maintenance consists in carrying out a weekly preventive maintenance and to check the Zooscan level described hereunder:

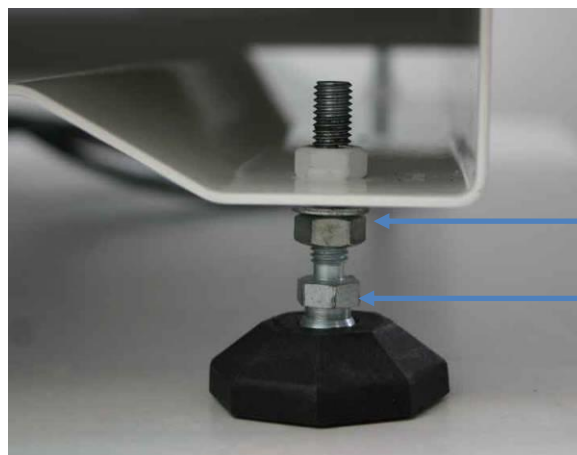
- Turn off the Zooscan from the electrical box main switch
- Carry out a Zooscan cleaning as described in the previous chapter
- Check the Zooscan leveling as stability as directed in chapter 3.3:

- Make sure the Zooscan sits on a stable tabletop, workbench or counter top and always away from shocks and vibrations
- Place the container to be used for sample recovery (such like a bowl) under the Zooscan
- Make sure container roughly fits



- Open the Zooscan upper cover
- Gently place the bubble level in the center of the window to avoid scratches on the glass
- Adjust the Zooscan level from the four feet using a 12mm open wrench:
- Backward to forward first
- Then left to right
- To increase the height, loosen the feet making a clockwise rotation of each foot

Details of the ajustables feet



Locking nut

Adjustment location

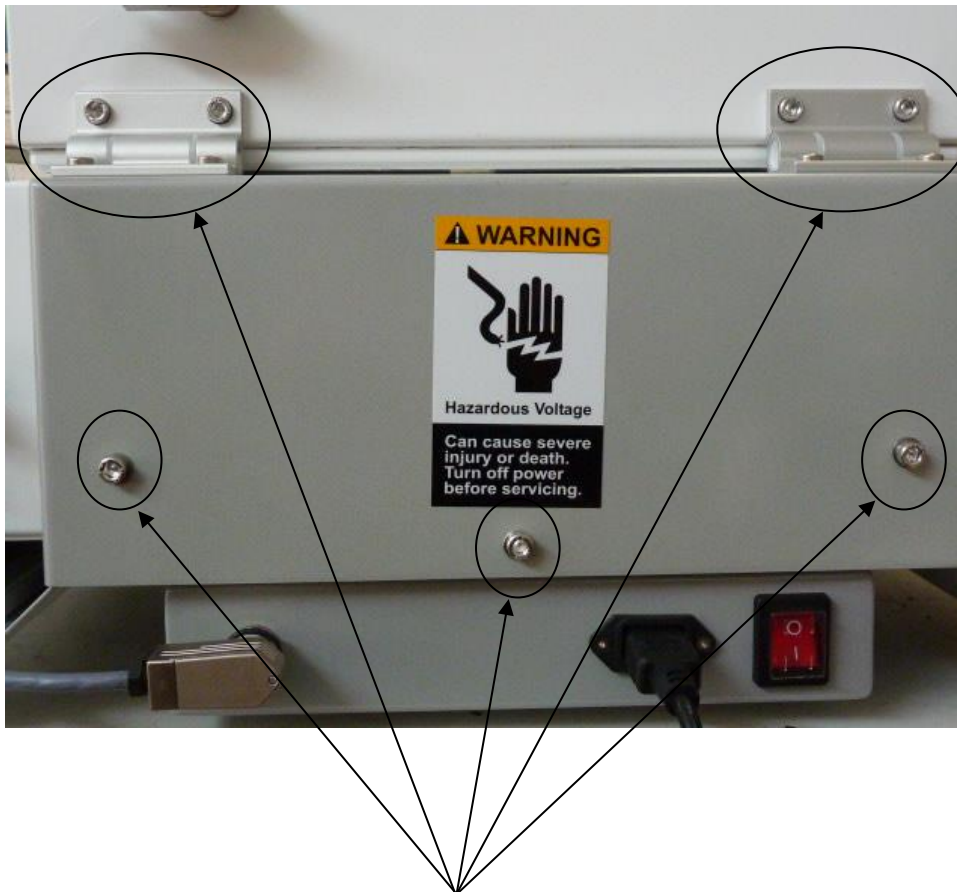
- Make sure the container stills fit under the Zooscan and readjust height and level if required
- Tighten the attachment nuts located on each foot using a 12mm open wrench
- Remove the bubble level
- Close the Zooscan upper cover

- Check cables location and make sure those are properly in place
- Turn the Zooscan back on
- Keep the working area around the Zooscan clean and as empty as possible

4.2.SEMI ANNUAL PREVENTIVE MAINTENANCE:

The semiannual preventive maintenance consists in carrying out a weekly and monthly preventive maintenance and to check the tightness of some elements of the Zooscan as described hereunder:

- Turn off the Zooscan from the electrical box main switch
- Carry out a Zooscan cleaning as described in the previous chapter
- Check the Zooscan leveling and stability as described in the previous chapter
- Open the upper cover
- Gently lift the Zooscan platform using both handles located on each side
- Using a 5 mm Allen wrench check the tightness of the upper cover attachment screws on both sides



Attachment screws to be checked

- Gently with both hands resting on each side, push down the platform so it rests in a normal position at the end
- Close the upper cover
- On the electrical box, manually check the tightness of both connections
- Check cables location and make sure those are properly in place
- Turn the Zooscan back on
- Keep the working area around the Zooscan clean and as empty as possible

4.3. TROUBLESHOOTING:

This section is intended to help the user to solve basic issues encountered with the use of the Zooscan. For mechanical/electronic issues always contact Hydroptic and for software concern email Marc Picheral at marc.picheral@obs-vlfr.fr

Always carry out all of the operations mentioned hereunder with the Zooscan being turned OFF and disconnected from power source.

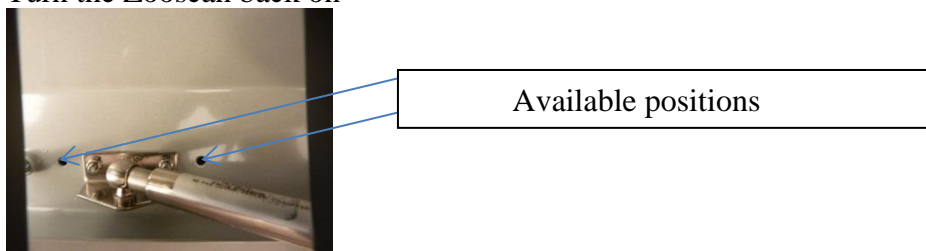
4.3.1. TROUBLESHOOTING TIPS:

ISSUE	TROUBLESHOOTING TIPS
POWER ISSUES:	
The red button light remains OFF when the switch is activated.	Make sure the power cord is properly connected and power is delivered to the cord.
The upper light remains OFF.	Presence Sensor in the scanner bed is faulty. Contact Hydroptic
The scanner does not start. The light units works properly	Scanner internal issue. Open the upper cover. Turn OFF and ON the Zooscan and make sure the scanner performs an initialization sequence.
IMAGES ISSUES:	
The scanner does not start when controlling the scanner from the imaging software solution	Make sure the Zooscan is connected to the computer from the USB cable. Make sure the Zooscan drivers are installed on the computer. Restart both the computer and the Zooscan starting by the Zooscan first.
ISSUE	TROUBLESHOOTING TIPS
UPPER LIGHTING UNIT ISSUES:	
The upper lighting unit do not turns off when the upper cover is fully open	Electronics switch issue. Refer to the dedicated procedure
PLATFORM ISSUES:	
Difficulties in opening or closing the platform	Gas spring cylinder issue. Make sure the gas spring cylinder is properly attached. Refer to the semi-annual preventive maintenance procedure. Adjust the gas spring cylinder position. Refer to the dedicated procedure.

4.3.2. GAS SPRING CYLINDER POSITION ADJUSTMENT PROCEDURE:

This following detailed procedure is related to the adjustment of the gas spring cylinder position. The position is preset in the factory to allow proper opening and closing of the platform. However, according to user convenience and the application, the gas spring position may be modified. Changing the gas spring position affect the way the opening and closing of the platform is carried out.

- Turn off the Zooscan from the electrical box main switch
- Open the upper cover
- Gently lift the Zooscan platform using both handles located on each side
- Using a 7mm open wrench and a 3mm Allen key loose and remove the gas spring cylinder attachment nut.
- Holding the platform in up position, carefully push the gas spring cylinder off of the original location.
- Place the gas spring cylinder attachment screw in another available location.
- Place and tighten the attachment nut.
- Gently with both hands resting on each side, push down the platform so it rests in a normal position at the end
- Gently lift the Zooscan platform using both handles located on each side and test the new gas spring cylinder position.
- If unsatisfactory, change the gas spring cylinder position as described here above
- Close the upper cover when done
- Turn the Zooscan back on



4.3.3. HINGES ADJUSTMENT PROCEDURE:

The Zooscan hinges have two functions:
One is to open and close the lids, the other one is to set the hardness while closing/opening the lids.
If the lid motion becomes too loose, few adjustments to the hinge will fix that.

- Using a 4mm Allen key tight the screw until the hardness is OK

