ZooSCAN Hardware User Manual

Version 5.2

Hydroptic SAS

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Important Notice

READ THIS MANUAL COMPLETELY BEFORE OPERATING THE EQUIPMENT

This manual contains essential safety information and operational procedures. Failure to follow these instructions may result in equipment damage, personal injury, or compromised analytical results.

Table of Contents

1. Introduction
2. Safety Instructions
3. System Overview
4. Installation and Setup
5. Operating Procedures
6. Maintenance
7. Troubleshooting
8. Technical Specifications
9. Appendices

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1. Introduction

1.1 Purpose and Scope

This manual provides comprehensive hardware information for the ZooScan V5 imaging system. It covers installation, operation, maintenance, and troubleshooting procedures for the hardware components only.

- **For software operation and protocols, refer to:** - *Zooscan-Zooprocess user manual and procedures.pdf* and *Softwares_Setup_Manual-20241007.pdf* (both included on USB drive)

1.2 Document Conventions

Abbreviations: - **CNRS:** Centre National de la Recherche Scientifique (French National Center for Scientific Research) - **USB:** Universal Serial Bus - **AC:** Alternating Current - **VAC:** Volts Alternating Current

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2. Safety Instructions

2.1 Safety Symbol Definitions

Symbol	Type	Description
⚠	**DANGER**	Indicates potentially hazardous situations that may result in death or serious injury if not avoided. Also alerts to unsafe practices that may cause material damage.
⚡	**ELECTRICAL HAZARD**	Indicates danger of electrical shock that could result in death or serious injury if not avoided.
✋	**PINCH POINT**	Indicates presence of pinch points. Exercise caution when placing hands near indicated areas.

2.2 General Safety Requirements

Electrical Safety

- **Power Requirements:** Connect the ZooScan electrical box only to a dedicated, grounded AC outlet with both ground fault and surge protection meeting local electrical codes.
- **Power Cord Management:** Position power cords away from liquids, abrasion, cuts, and compression. Never place objects on cords or allow foot traffic over them.
- **Extension Cords:** If required, use only grounded 3-wire extension cords rated for minimum 2A capacity. Route cords to prevent tripping hazards.
- **High Voltage Warning:** High voltage is present inside the electrical box. Always disconnect power before opening the enclosure.

Physical Safety

- **Equipment Weight:** The ZooScan weighs approximately 30 kg (66 lbs). Always use two persons for lifting and moving operations.
- **Lifting Restrictions:** Never lift the instrument using the splash guard. Use designated lifting points only.
- **Pinch Points:** Keep hands away from all pinch points during operation. Use both hands when lifting ZooScan components.

- **Light Exposure:** Avoid direct eye contact with the upper lighting unit to prevent headaches and vision discomfort.

Chemical Safety

- **Personal Protective Equipment (PPE):** Always wear appropriate PPE when handling chemical samples, including gloves, closed-toe shoes, and face protection as required by the specific chemicals being processed.

Environmental Requirements

- **Installation Location:** Install only indoors, away from direct sunlight, heat sources, excessive dust, pressurized liquids, vibrations, and temperature/humidity extremes.
- **Qualified Personnel:** Only trained personnel should operate the ZooScan. Never attempt to disassemble, modify, or repair the unit. Contact Hydroptic Technologies for service requirements.

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3. System Overview

3.1 Applications and Features

The ZooScan V5, manufactured under CNRS proprietary license, is designed primarily for enumeration, sizing, and identification of liquid zooplankton samples. Applications include ecological surveys, fisheries research, aquaculture monitoring, and educational programs.

Key Features: - Liquid sample handling with safe recovery capabilities - High-resolution imaging optimized for objects ≥300 µm equivalent spherical diameter - Waterproof design compliant with international safety standards - Bottom illumination for enhanced sample distribution - Specialized lighting system for improved image quality and contrast - Transparent frames for border image quality and software processing optimization

3.2 System Components

Main Assembly

- **Platform/Main Body:** Contains the integrated scanner mechanism
- **Upper Cover:** Houses the primary lighting unit
- **Side Lighting Unit:** Provides sample dispersion illumination
- **Splash Guard:** Protects internal components
- **Sample Recovery Drain:** Enables sample collection
- **Shock Absorbers (2):** Ensure smooth platform return to horizontal position

Control Interface

- **Master Switch:** Primary power control with LED status indicator
- **USB Connection:** Data interface to external computer
- **Power Connector:** Main AC power input (110V/230V compatible)

3.3 Operating Positions

The ZooScan operates in two primary configurations: 1. **Scanning Position:** Platform horizontal, upper cover closed 2. **Sample Recovery Position:** Platform tilted, allowing sample drainage

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4. Installation and Setup

Tutorial: https://www.youtube.com/@Hydroptic-SAS

4.1 Site Requirements

Environmental Conditions

- **Temperature:** 10°C to 30°C (50°F to 86°F)
- **Humidity:** 30% to 80% relative humidity, non-condensing
- **Lighting:** Avoid direct sunlight and strong artificial light sources
- **Ventilation:** Avoid installation directly under HVAC vents
- **Cleanliness:** Install in dust-free environment away from particulate contamination
- **Moisture:** Avoid damp locations, open water sources, or high-pressure water environments

Physical Requirements

- **Surface:** Stable, vibration-free table, workbench, or countertop (concrete floor laboratory preferred)
- **Height:** Position for comfortable operation without operator back strain
- **Clearance:** Ensure adequate space for cover opening and sample recovery operations
- **Power Access:** Dedicated grounded outlet within cord reach

4.2 Unpacking Procedures

Personnel Required: Two persons minimum due to equipment weight and fragility.

PPE Required: Safety glasses, closed-toe shoes, lifting gloves.

Step-by-Step Unpacking

1. **Crate Inspection:** Verify transport stickers and check for shipping damage before opening. Tilt and chock sensors label are on the front side of the crate.
2. **Crate Opening:**
    - Cut and remove tie wraps from crate locks
    - Use flat-blade screwdriver if needed to unfasten the toggle latches
    - Remove top cover and open door
3. **Equipment Removal:**
    - **CRITICAL:** Never lift by splash guard

    - Use two-person to lift the Zooscan by supporting it from underneath
    - Remove to clean, dust-free area
4. **Component Inventory:**
    - ZooScan main unit
    - AC power cord
    - Large transparency frame (up to 2100 dpi)
    - USB drive (calibration files and VueScan license)
    - Two non-abrasive dispersion needles
    - Cross level
    - Hardware manual
    - Warranty certificate

4.3 Scanner Preparation

Unlocking Procedure

The scanner carriage is locked during shipping to prevent transport damage.

Before first use: 1. Locate the scanner lock mechanism 2. Turn clockwise ¼ turn toward "UNLOCK" position

Note: The scanner remains unlocked during normal operation. Lock only for transport.

Locking for Transport

Before moving the ZooScan: 1. Turn scanner lock counterclockwise ¼ turn toward "LOCK" position 2. Verify carriage is secured before lifting

4.4 Leveling Procedures

Proper leveling is essential for accurate sample distribution and image quality.

Tools Required: 13mm and 12mm open-end wrenches, bubble level (supplied)

Leveling Steps

1. **Initial Positioning:** Place ZooScan on stable surface, away from vibration sources
2. **Sample Container Placement:** Position recovery container under drain
3. **Access Preparation:** Open upper cover
4. **Level Placement:** Position bubble level at center of scanning window
5. **Adjustment Sequence:**
    - **First:** Adjust front-to-back level using rear feet
    - **Second:** Adjust left-to-right level using side feet
    - **Height Adjustment:** Loosen feet clockwise to increase height
6. **Container Clearance:** Verify sample container still fits; readjust if necessary
7. **Lock Down:** Tighten locking nuts (12mm wrench) on all four feet
8. **Final Check:** Remove bubble level and close upper cover

Transport Note: When shipping, adjustable feet must be tightened in upper position.

4.5 Electrical Connections

Connection Sequence

1. **Power Connection:** Connect AC power cord to ZooScan, then to dedicated outlet
2. **Data Connection:** Connect USB cable between ZooScan and computer

Electrical Safety Verification

- Confirm ground fault and surge protection at outlet
- Verify outlet condition and proximity for easy disconnection
- Check cord routing to prevent damage or tripping hazards
- Confirm voltage compatibility (110V or 230V AC automatic detection)

4.6 Software Installation

Installation Media: USB drive included with system

Required Components: 1. Scanner driver (Epson) 2. VueScan application 3. Java Runtime Environment 4. ImageJ software 5. ZooProcess macro

Installation Guide: Follow detailed instructions in "*Softwares_Setup_Manual.pdf*" located in software folder on USB drive.

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5. Operating Procedures

Tutorial: https://www.youtube.com/@Hydroptic-SAS

5.1 System Startup and Shutdown

Startup Procedure

1. **Power On:** Press red master switch on electrical box
2. **Status Verification:** Confirm red LED illuminates
3. **Scanner Initialization:** Allow automatic warm-up and initialization sequence
4. **Software Launch:** Start scanning software on connected computer

Shutdown Procedure

1. **Complete Operations:** Finish all scanning and sample recovery
2. **System Cleaning:** Clean platform and cover as per maintenance procedures
3. **Power Off:** Press master switch to OFF position

5.2 Pre-Operation Instrument Check

Power On: Switch on the instrument.

Initialization: Launch VueScan and start a preview to verify the scanner initializes correctly

Lighting Check: Ensure the bottom lights turn on when the lid is opened.

For the following steps, please consult: *Zooscan-Zooprocess user manual and procedures.pdf*_____

Frame Selection Guidelines

- **Large Frame:** Large sample volumes 0.35 liters or high species density
- **No Frame:** Possible but not recommended for ZooProcess software compatibility

Frame Installation

1. **Glass Protection:** Add 2mm water depth before frame insertion to prevent scratching. Water maintained at standard room temperature (approximately 20–25°C).
2. **Frame Positioning:** Insert the frame . Make sur to push the frame toward top-left round corner of the bed.
3. **Verification:** Ensure frame lies flat against scanning surface

Sample Loading

1. **Cover Opening:** Open upper cover (automatically activates lighting)
2. **Frame Placement:** Install transparency frame
3. **Sample Addition:** Pour sample into frame area
4. **Sample Distribution:** Use provided needles or non-scratching tools for dispersion
    - Rest arms on ZooScan supports during this operation
    - Ensure even distribution without overlapping specimens
5. **Final Preparation:** Close upper cover when distribution is complete

5.3 Scanning Operations

Pre-Scan Verification

- Confirm sample is properly distributed
- Verify frame positioning
- Check that upper cover is fully closed
- Ensure no air bubbles interfere with specimens

Scan Execution

1. **Software Activation:** Launch scanning application on computer
2. **Parameter Selection:** Choose appropriate resolution and settings
3. **Scan Initiation:** Start scan from software interface
4. **Monitoring:** Observe scan progress and quality

5.4 Sample Recovery

Method 1: Container-Based Samples

1. **Cover Opening:** Open upper cover

2. **Sample Removal:** Carefully remove sample container
3. **Cleaning Sequence:**
    - Clean upper cover glass with non-abrasive wipe and fresh water
    - Clean platform interior and exterior with non-abrasive wipe and fresh water
    - Remove moisture from vapor condensation
4. **System Reset:** Close upper cover; system ready for next sample

Method 2: Direct Pour Samples

1. **Frame Removal:** Open cover and remove transparency frame
2. **Frame Cleaning:** Clean frame with non-abrasive wipe and fresh water
3. **Collection Setup:** Place bowl under ZooScan or attach collection jar to drain
4. **Sample Recovery:**
    - Lift platform using both side handles simultaneously
    - Use squeeze bottle to rinse corners and recover all specimens
    - Use fresh water to remove salt water or preservatives (formaldehyde, etc.)
    - Use generous water volume to ensure complete recovery
5. **Sample Transfer:** Move collected sample to appropriate storage container
6. **System Cleaning:**
    - Clean collection bowl with fresh water
    - Lower platform to normal position
    - Clean platform exterior with non-abrasive wipe and fresh water
    - Clean upper cover glass if needed
    - Wipe interior platform surfaces
7. **System Reset:** Close upper cover; ready for next sample

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6. Maintenance

6.1 Required Tools and Supplies

- Non-abrasive cleaning wipes
- Metric Allen wrench set
- Metric open-end wrench set (or adjustable wrench)
- Fresh water
- Isopropanol alcohol (when needed)
- 13mm open-end wrench (for leveling)
- 12mm open-end wrench (for lock nuts)
- 5mm Allen wrench (for cover screws)
- 7mm open-end wrench (for gas spring)
- 2.5mm Allen wrench (for gas spring)
- 4mm Allen wrench (for hinges)

6.2 Monthly Preventive Maintenance

Safety Preparation

- Turn off ZooScan at master switch
- Disconnect from power source
- Allow lighting systems to cool

Maintenance Tasks

1. **General Cleaning:** Perform thorough cleaning per sample recovery procedures
2. **Leveling Verification:**
    - Verify stable mounting surface
    - Check bubble level accuracy
    - Adjust feet if necessary using 13mm wrench
    - Retighten locking nuts with 12mm wrench
3. **Cable Inspection:** Verify all cables are properly routed and connections secure
4. **Work Area:** Clean and organize area around ZooScan
5. **System Test:** Power on and verify normal operation

6.3 Semi-Annual Preventive Maintenance

Includes all monthly maintenance tasks plus:

Additional Inspections

1. **Upper Cover Attachment:**
    - Lift platform to access position
    - Check tightness of upper cover attachment screws (both sides) using 5mm Allen wrench
    - Lower platform carefully
2. **Electrical Connections:**
    - Manually verify tightness of electrical box connections
    - Inspect cord condition and routing
3. **Final Verification:** Complete operational test after maintenance

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7. Troubleshooting

For mechanical/electronic issues: Contact Hydroptic at services@hydroptic.com
For software concerns: Email PIQV platform at piqv@imev-mer.fr

SAFETY REMINDER: Perform all troubleshooting procedures with ZooScan powered OFF and disconnected from power source.

7.1 Power System Issues

Problem	Troubleshooting Steps
Red indicator remains OFF when switch activated	• Verify power cord connections• Check outlet power availability• Inspect fuse condition• Contact Hydroptic if problem persists
Upper light remains OFF	• Check presence sensor in scanner bed• Verify cover closure• Contact Hydroptic.
Scanner fails to initialize, lights work normally	• Open upper cover• Power cycle system• Verify scanner initialization sequence• Check for mechanical obstructions

7.2 Imaging System Issues

Problem	Troubleshooting Steps
Scanner unresponsive to software commands	• Verify USB cable connection• Computer USB port• Confirm driver installation• Restart computer first, then ZooScan• Check software compatibility
Upper lighting fails to turn off when cover opens	• Check electronic switch operation• Verify cover opening sensor• Contact Hydroptic for switch replacement

7.3 Platform Operation Issues

Problem	Troubleshooting Steps
Difficulty opening/closing platform	• Check gas spring cylinder attachment• Perform semi-annual maintenance• Adjust gas spring position (see Section 7.4)• Inspect hinge operation

7.4 Gas Spring Adjustment Procedure

Purpose: Adjust platform opening/closing effort and position control.

Tools Required: 7mm open-end wrench, 2.5mm Allen wrench

Adjustment Steps

1. **Safety Preparation:** Power OFF, upper cover open
2. **Platform Access:** Lift platform using both side handles
3. **Spring Removal:**
    - Use 7mm wrench and 2.5mm Allen key to loosen attachment nut
    - Carefully remove gas spring from current position while supporting platform
4. **Repositioning:**
    - Select alternative attachment point
    - Install and tighten attachment hardware
5. **Testing:**

    - Lower platform carefully
    - Test opening/closing effort and control
    - Readjust if necessary
6. **Completion:** Close upper cover and restore power

7.5 Hinge Adjustment Procedure

Purpose: Adjust lid opening/closing resistance and smooth operation.

Tool Required: 4mm Allen wrench

Adjustment Method

- Locate hinge adjustment screw
- Tighten clockwise using 4mm Allen wrench until desired resistance is achieved
- Test lid operation and readjust as needed

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8. Technical Specifications

8.1 System Specifications

Parameter	Specification
Application	Non-destructive liquid sample imaging
Sample Volume	0.2 to 1.5 liters
Resolution	Up to 2100 dpi (dots per inch)
Minimum Object Size	300 µm equivalent spherical diameter
Salt Water Compatibility	Yes, resistant to salt water
Dimensions (L×W×H)	53 × 60 × 34 cm
Weight	26 kg (57 lbs)
Input Voltage	110-230 VAC, 50-60 Hz (auto-detecting)
Power Consumption	2A maximum
Interface	USB 2.0
Environmental Rating	Indoor use only

8.2 Software Compatibility

Component	Specification
Scanning Software	Compatible with any scanning software solution
Included Software	VueScan
Recommended Processing	ZooProcess (freeware) - https://sites.google.com/view/piqv
Operating System	Microsoft Windows 10, or 11 Pro (64-bit)

Component	Specification
Minimum Computer Requirements	Intel Core i7 or equivalent, 16GB RAM (32GB recommended), 1280×1024 display resolution minimum

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9. Appendices

Appendix A: Warranty Information

Refer to warranty certificate included with system for complete terms and conditions.

Appendix B: Contact Information

Hydroptic SAS
33 Route de Segoufielle
32600 L'Isle Jourdain, France
Website: www.hydroptic.com

Technical Support: - Hardware Issues: Contact Hydroptic SAS - Software Support: PIQV

Appendix C: Regulatory Compliance

This equipment complies with applicable international safety standards for laboratory instrumentation. Specific certifications available upon request.

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