Welcome to HyperCAM Delta

User Guide

Essentials

Last updated 05/05/2026

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Introduction

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Notes

3Brain does not provide any warranties or guarantees regarding the suitability of this equipment for any specific purpose. The company assumes no responsibility or liability, including indirect or consequential damages, for any use of the equipment by the purchaser or for any resulting adverse circumstances.

Operate the HyperCAM Delta following the instructions indicated in this manual. If the equipment is used in a way not specified by the manufacturer, its protective features may be compromised.

The HyperCAM Delta is intended for research use only. Not for use in clinical or diagnostic procedures.

Please read and thoroughly study the entire document before operating the HyperCAM Delta. Pay special attention to the sections on Safety Information and Operating Conditions, as they contain essential handling instructions to ensure safe operation and prevent potential damage. Always keep a copy of this user guide readily available while using the system.

Users are permitted to carry out the procedures described in this user guide to replace consumable or troubleshoot the HyperCAM Delta. However, any attempt to open, modify, or repair the system beyond the scope of the documented instructions will void the warranty. For any issues, please refer to the Identifying and Solving Issues section. If the issue cannot be resolved, contact 3Brain's customer support (see Support).

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Declaration of Conformity

We, 3Brain AG, located in Huobstrasse 16, 8808 Pfäffikon SZ, Switzerland, herewith declare under our sole responsibility that the product identified as:

Product Type: Laboratory instrument for in vitro cell analysis
Model: HyperCAM Delta

Is in conformity with the following European Directives:

- Directive 2014/35/EU Low Voltage (Safety).
- Directive 2014/30/EU Electromagnetic Compatibility.
- Directive 2011/65/EU RoHS and its amendment directive 2015/863/EU.

Is in conformity with the relevant U.K. legislation:

- Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic.
- Equipment Regulations 2012 Electromagnetic Compatibility Regulations 2016.
- Electrical Equipment (Safety) Regulations 2016.

The following Harmonized standard have been applied:

- IEC 63000:2018.
- IEC 61326-1:2020.
- IEC 61010-1:2010/AMD1:2016.
- IEC 61010-2-010:2019.

Is in conformity with the USA following FCC standard, class A:

- CFR 47 Part 15 - B:2020: Code of Federal Regulations - Title 47 - Telecommunication, Part 15, Subpart B: "Unintentional Radiators”.
- CFR 47 Part 15 - C:2020: Code of Federal Regulations - Title 47 - Telecommunication, Part 15, Subpart C: “Intentional Radiators”.
- Is in conformity with the following Canada standard, class A:
- ICES-003:2019: Information Technology Equipment (Including Digital Apparatus) - Limits and Methods of Measurement.

Welcome to the HyperCAM Delta Platform

The HyperCAM Delta platform represents the pinnacle of functional cell-based assays using non-invasive label-free bio-signal processing microelectronics. The platform utilizes CorePlate™ 24W, our revolutionary multiwell technology specifically designed to integrate high-density cell-electronic interfaces and real-time signal processing in a 24-well plate format.

The HyperCAM Delta has been developed to deliver high-content functional imaging data by simultaneously monitoring all wells in a plate. Its ability to handle, analyze, and compress data in real time enhances overall data reliability and output, accelerates time-to-results, and reduces data storage requirements. This improves experimental outcomes and provides a superior user experience.

> "A cutting-edge technology that combines high-speed parallel monitoring with high-content, label-free functional imaging going beyond traditional optical and MEA approaches."

This manual will guide you through the setup process and help you understand the fundamental features of your HyperCAM Delta.

Table of Warnings

This manual uses the following symbols to highlight important information that could prevent harm to you and help prevent damage to your HyperCAM Delta. Pay close attention to these symbols (Table 1).

Symbol	Warning
	Indicates the possibility of loss of life, severe personal injury, damage to the device if the instructions are not followed. Consult the product documention.
	Indicates the possibility of severe personal injury due to pinching points. Consult the product documentation.
	Indicates a potential presence of biologically hazardous material. Laboratory safety precautions must be observed.
	Indicates an Electrostatic Sensitive Discharge (ESD) area. Consult the product documentation.
	Indicates a heavy item that requires two people for lifting and moving.

TABLE 1. SYMBOLS OF WARNINGS.

For important details that users should remember for the proper use or handling of the system, please pay attention to the symbol below (Table 2).

Symbol	Meaning
	Indicates important information to be remembered for the proper handling or use of the system.

TABLE 2. SYMBOL OF IMPORTANT INFORMATION.

Table of Symbols

This manual uses the following symbols to indicate regulatory compliance, manufacturing information, and conformity markings associated with the HyperCAM Delta. These symbols help you identify important details about the product's origin, certification, and applicable standards (Table 3).

Symbol	Meaning
	The instrument manufacturer
	The date the instrument was manufactured
	Serial number
	European conformity marking
	United Kingdom conformity assessment mark

Symbol	Meaning
	China RoHS symbol
	FCC conformity marking
	Consult the instructions for use
	WEEE Symbol

TABLE 3. SYMBOLS USED IN THE MANUAL AND ON THE DEVICE.

Environmental and handling requirements

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Safety Information

This section outlines essential safety guidelines and precautions to ensure the safe and correct use of the HyperCAM Delta. Adhering strictly to the following instructions is vital to avoid injuries and prevent damage to the instrument.

General precautions:

- All users must be trained in general laboratory safety procedures and the specific operating procedures for this instrument. Only trained and authorized personnel that have read and followed all warnings, precautions and instructions indicated in this manual should operate or interact with the device.
- The device must be installed in a clean, dry and stable environment with appropriate humidity and temperature controls as indicated in Operating Conditions.
- Inspect the instrument for visible damage, loose connections, or signs of wear. Do not operate if any abnormality is detected.
- Always wear gloves to operate the system and do not touch any exposed electronic components or attempt to open the device while it is powered on.

Doing so may result in electric shock, injury, or permanent damage to the instrument.

- Always operate the instrument with care, caution, and awareness of the surroundings.

Using the system in a non-standard environment or in a manner not specified by the manufacturer may compromise its safety protections and pose a risk to the user. In case the device gets damaged or otherwise seizes functionality, unplug the device and store it safely. Do not try to open the device, do not interact with the electronics and do not handle it in any inappropriate way.

Access to hazardous parts using a tool is only permitted after the equipment has been placed in a safe condition, such as disconnecting it from all power sources.

Contact a customer service professional at 3Brain for further instructions (please check Support).

Operating Conditions

The HyperCAM Delta is an electric stand-alone tabletop device that must be installed and operated in standard laboratory conditions. Specifically, follow the instructions listed below:

- Place the device on a dry, clean, and stable surface, free from other equipment that may cause mechanical vibrations (e.g., centrifuges, spinners, etc..).
- Do not place the device near heat sources or in direct sunlight.
- Maintain a minimum clearance of 10 cm (4 in) around the ventilation openings. This ensures proper airflow for the heating/cooling system to function effectively.
- Maintain at least 1.5 m distance from strong electromagnetic noise sources, such as refrigerators or incubators.
- Keep the ambient temperature between 20°C (68°F) and 25°C (77°F) with a humidity between 30% and 60 % as mentioned in Technical Specifications.

If you are using an external CO_2 supply connected to the HyperCAM Delta, ensure that the device is kept in a well-ventilated room, as a small amount of CO_2 may be released from the device while operating.

Carbon dioxide is a colorless, odorless gas that can displace oxygen in enclosed spaces. Accumulation may lead to dizziness, unconsciousness, or asphyxiation. Always monitor CO_2 levels and avoid use in confined or poorly ventilated areas.

Generally, the HyperCAM Delta does not require any heavy maintenance. For instructions on cleaning the HyperCAM Delta or addressing a liquid spill out in the Environmental chamber, please refer to Inserting and Removing the CorePlate™ 24W and Cleaning and Maintenance.

Before leaving the instrument unattended, ensure the following:

1. Turn off the instrument by pressing the Power Button and wait until the Status LED switches off (see Front and Top View).
2. Make sure the Door is fully closed to prevent dust from settling inside the Environmental chamber.
3. If an external CO_2 supply is connected to the HyperCAM Delta, close the CO_2 line upstream of the system.

Transport and Handlings

The HyperCAM Delta is a heavy instrument, weighing 23 kg (50.7 lb) and must be handled and moved with care by two people to prevent physical injury or damage to the instrument itself.

To remove the HyperCAM Delta from its shipping box, follow the instructions in section Unpacking. If the instrument needs to be moved or shipped back to 3Brain, it must be packed in its original packaging (follow the instructions in section Packing).

Damages caused by improper handling or transportation of the HyperCAM Delta are not covered by the warranty.

Storage Conditions

For prolonged periods of inactivity, follow these steps to ensure proper storage:

1. Turn off the Master switch on the system's rear panel (see Rear View).
2. Store the HyperCAM Delta at an ambient temperature between 15°C (59 °F) and 30°C (86 °F), and at a relative humidity between 30% and 60%, non-condensing, in a clean, dust-free environment.
3. Do not store the device near heat sources or in direct sunlight.

Setup

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Overview

The HyperCAM Delta enables high-quality measurements through its integrated CorePlate™ technology. It utilizes CorePlate™ 24W and provides incubator-like conditions for extended cell culture. This is achieved through an Environmental chamber that regulates temperature, CO_2 levels, and monitors humidity.

Developed through close collaboration between our engineers and scientists, the HyperCAM Delta is designed to meet the needs of researchers working with a wide range of biological models including neuronal cultures, human stem cell–derived preparations, cardiac cells, brain organoids, and spheroids. Its optimized electronics enable highly sensitive detection of functional activity across all these models.

Additionally, the platform can deliver targeted electrical stimulation from each electrode, facilitating the development, use, and analysis of evoked activity assays.

Unpacking-packing the Instrument

The HyperCAM Delta is a heavy instrument, weighing 23 kg (50.7 lb). At least two people should be present to lift and move the instrument while unpacking/packing, or once it is out of its shipping box.

Keep the box, protective foams and the cardboard extractor for future transportation of the instrument, or in case the HyperCAM Delta must be shipped back to 3Brain. The warranty will be void if the instrument is damaged due to improper transport.

Never attempt single-person lifting/moving for 23 kg / 50.7 lbs, always use two people, ensure no obstacles are in the path before lifting/moving.

Before unpacking the instrument, carefully inspect the external box. If you notice any signs of damage, stop unpacking immediately and contact the 3Brain customer success team (see Support).

Unpacking

Follow the stepwise procedure shown in the table below for proper unpacking:

Step	Description	Image
Preparation	• Prepare a clean and spacious workbench where the device will be placed. • Ensure that the floor space near the workbench is non-slippery to prevent accidents, and leave enough room to accommodate at least two boxes of the same size as the device's packaging, placed one in front of the other. • Place the box at one end of this prepared floor space, leaving the free area in front of it clear for positioning the device once it is extracted. • Ensure the box remains stable and does not tilt or move during unpacking.	

Step	Description	Image
	• Both operators should wear protective gloves for grip and hand safety.	
Initial Access	• Unlock and open the latches completely to avoid obstruction. • Open the lid fully and carefully to prevent it from slamming shut.	
Extraction	• Identify the cut-out handles or grip points on the cardboard extractor. • One person should stand on each side of the case. • Hold the cardboard extractor by the designated handholds. • Both operators should pull upward simultaneously, ensuring a smooth and even lift. Maintain a straight back posture and use leg strength to avoid strain. • Temporarily place the device on the prepared floor space in front of the box, then remove the empty box.	
Placing the Device	• Leave the cardboard extractor on the floor beneath the device. Both operators should then hold the device using the hand-grip slots located on each side. • Lift the device again, maintaining a straight back posture and using leg strength to prevent strain. • Gently place the device onto the workbench. • Check the device for any visible damage, in which case contact immediately the 3Brain	

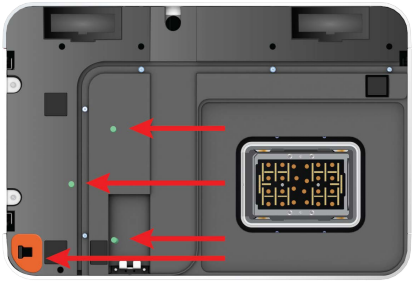
Step	Description	Image
	customer success team (see Support)	
Remove the transportation safety features Do not throw away the pins and skim! They must be put back in place if the device has to be returned or moved.	• Open the top metal plate by inserting 2 mm diameter screwdriver (one is provided in the accessory box) at a specific spot under the plate (Fig. A). You can also use any other straight, rigid object with diameter of 2 mm to trigger the latch to open. • Remove the three green-colored pins and the orange shipping lid support shim (Fig. B). Once removed, the Sliding Door will be unlocked and can move freely by the motor.	 Fig. A. Latch position to open the top cover  Fig. B. Safety plastic pins and shipping lid support shim to be removed
Post-Unpacking Steps	Check the device for any visible damage. In case contact immediately the 3Brain customer success team (see Support). • Store properly the foam inserts, cardboard extractor, case, pins and shim inside the original box in case re-packing will be necessary. • Remove the transportation safety features (check Removing Transportation Safety)	

TABLE 4. UNPACKING PROCEDURE FOR THE HYPERCAM DELTA.

Packing

To ensure safe, damage-free transport, securely pack the device following the stepwise procedure described in the table below, using the original transportation materials.

Step	Description	Image
Preparation	• Ensure the system is turned off and properly shut down. • Disconnect all cables and accessories. • Reposition any transportation safety features (see Removing Transportation Safety Features).	
Placing the Device	• Both operators should put on protective gloves to ensure a secure grip and protect their hands. • Carefully remove the cardboard extractor from the shipping box and set aside the HyperCAM Delta. • Place the device into the cardboard extractor. • With one operator on each side, use the cut-out handles of the cardboard extractor to simultaneously and smoothly lower the device into the shipping box. • Crucially, ensure the device is perfectly aligned with the internal foam inserts for a snug, immobile fit. • Throughout these steps, keep your back straight and use your leg strength to prevent strain.	
Closing the Case	• Close the lid carefully. • Engage all latches fully to lock the case. • Use handle to roll the case.	

TABLE 5. PACKING PROCEDURE FOR THE HYPERCAM DELTA.

HyperCAM Delta at a Glance

The HyperCAM Delta utilizes CorePlate™ 24W to conduct electrophysiological measurements. Its compact design incorporates all of the necessary electronics, real-time hardware processing, and logic to handle the microchips incorporated in CorePlate™ 24W. This, in turn, is controlled by a host PC running BrainWave software. The HyperCAM Delta acquires and pre-processes large volumes of electrophysiological data from CorePlate™ 24W before transmitting it to the host PC. In addition, the system is also equipped with a mass flow controller that regulates gas concentrations in the Environmental chamber and a heating/cooling system to maintain optimal physiological cell culture conditions in the CorePlate™ 24W.

Front and Top View

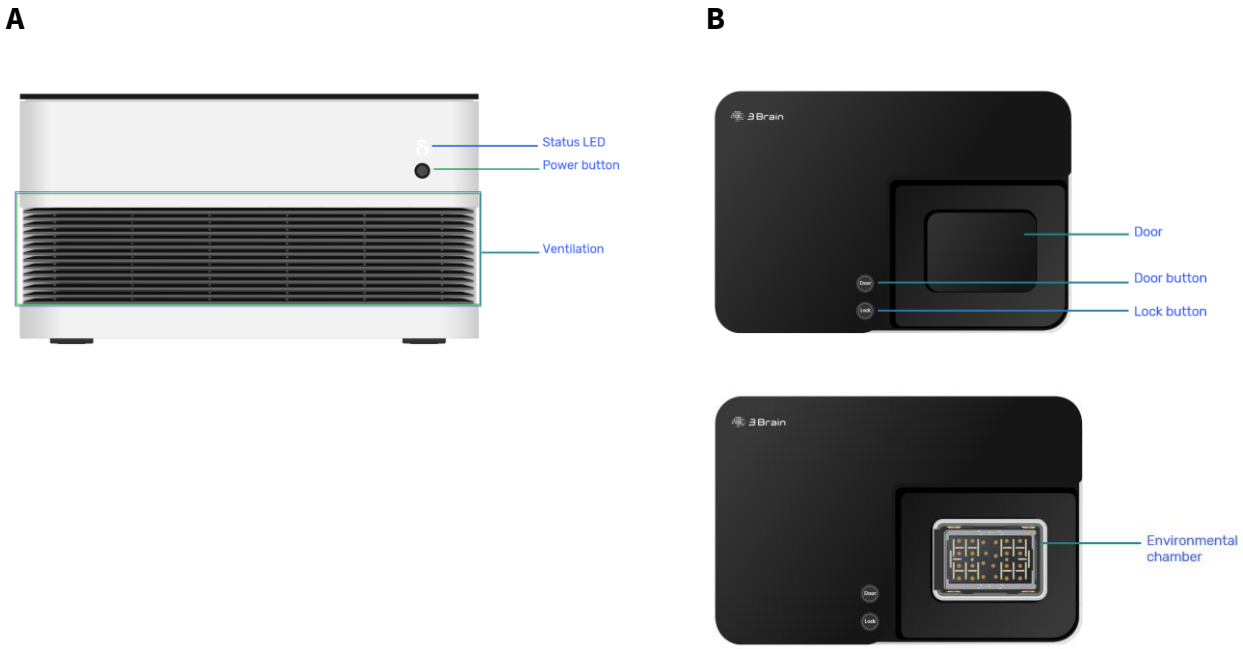


FIG. 1.A. FRONT AND B. TOP VIEW OF THE HYPERCAM DELTA.

As shown in figure 1A:

- **Power button**: Located on the front of the HyperCAM Delta. Push the button to power the HyperCAM Delta ON or OFF. Ensure that the instrument is connected to a power source with the supplied power cord on the rear of the system, and that the Master switch is set to the ON position. For reference see Rear View.
- **Status LED**: A multi-color LED displaying different states of the instrument through various colors. For reference see Status LED and Button Light Indicators.
- **Ventilation grid**: Covers the cooling fans of the instrument allowing efficient airflow while preventing dust and debris from entering the system.

Do not insert fingers or objects into the ventilation grid.

As shown in figure 1B:

- **Door**: After inserting CorePlate™ 24W, the door to the environmental chamber can be closed, ensuring controlled temperature and stable CO_2 and humidity levels. If your experiment does not require CO_2 and humidity control, the Sliding Door can be left open for easy access to the CorePlate™ 24W. The Door can be operated using the Door button located on the top of the instrument, or directly through BrainWave software.

Do not insert fingers or objects into the moving parts while operating the Door.

- **Door button**: Located on the top cover of the device. Touch the button to open or close the Sliding Door.
- **Lock button**: Located on the top cover of the device. Touch the button to lock or unlock the CorePlate™ 24W inserted in the Environmental chamber. If the CorePlate™ 24W is locked and the Door closed, touching the button will unlock the CorePlate™ 24W and the Door will open.
- **Environmental chamber**: Located under the Door, it is designed to fit the CorePlate™ 24W and insertion is only possible in one orientation to prevent user errors. The chamber is waterproof to protect the underlying electronics from accidental spills. In the event of a spill, please follow the procedure outlined in Inserting and Removing the CorePlate™ 24W. The bottom of the chamber is equipped with a heating/cooling system that regulates the temperature, which is monitored by on-chip sensors on the CorePlate™ 24W. A set of gas inlets distributed evenly around the chamber are connected to an internal mass flow controller, enabling adjustments to airflow with the desired CO_2 concentration.

Environmental chamber

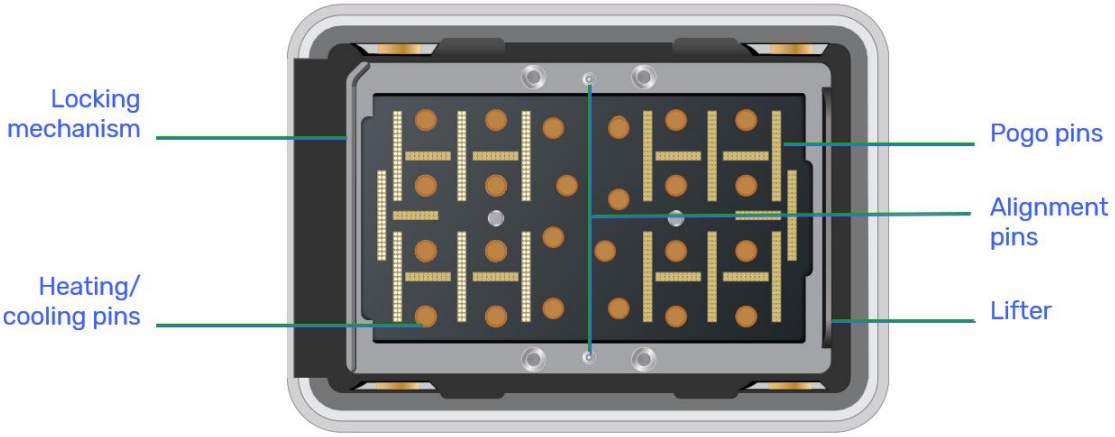


FIG. 2. CLOSE UP OF THE ENVIRONMENTAL CHAMBER.

As shown in figure 2:

- **Pogo pins**: These gold spring connectors on the HyperCAM Delta guarantee a uniform contact with the gold pads on the back of the CorePlate™ 24W. Rigorously tested in over 5,000 cycles without showing signs of wear or tear, these connectors maintain stable contact and ensure long-term usability.

The contact pads of the CorePlate™ 24W require proper cleaning before connecting to the HyperCAM Delta for optimal working conditions.

Do not touch these sensitive areas as there is a high risk of damaging the device. For a correct cleaning follow the instructions in this manual.

- **Lifter**: A metal frame that moves vertically to hold the CorePlate™ 24W, equipped with Alignment pins. The Lifter has three main positions:

As shown in figure 3A:

  - **Lower Position**: The Lifter is inside the Environmental chamber.

FIG. 3A. LOWER POSITION OF THE LIFTER.

As shown in figure 3B:

- **Middle Position**: The Lifter is above the Environmental chamber, allowing an operator to add or remove a CorePlate™ 24W.

FIG. 3B. MIDDLE POSITION OF THE LIFTER.

As shown in figure 3C:

- **Upper Position**: The Lifter is positioned higher above the Environmental chamber than the Middle Position, enabling an automated robotic arm to add or remove a CorePlate™ 24W.

FIG. 3C. UPPER POSITION OF THE LIFTER.

- **Alignment pins**: Paired with the holes on the back of the CorePlate™ 24W, these guides will allow a perfect alignment of the Pogo pins with the contact pads of the CorePlate™ 24W.
- **Locking mechanism**: Four rotating metallic wings will lock and push down the CorePlate™ 24W to the base of the Environmental chamber. This uniform push has been set to guarantee enough pressure to contact all the Pogo pins simultaneously. The Locking mechanism can be operated either using the Lock button located on the top of the device, or directly through BrainWave software.

Do not insert fingers or objects into the moving parts while operating the Sliding Door and the locking mechanism.

- **Heating/cooling pins**: These copper heat exchange pads regulate the temperature of all the wells of the CorePlate™ 24W to maintain physiological cell culture conditions. The temperature is monitored by sensors on the CorePlate™ 24W.

Rear View

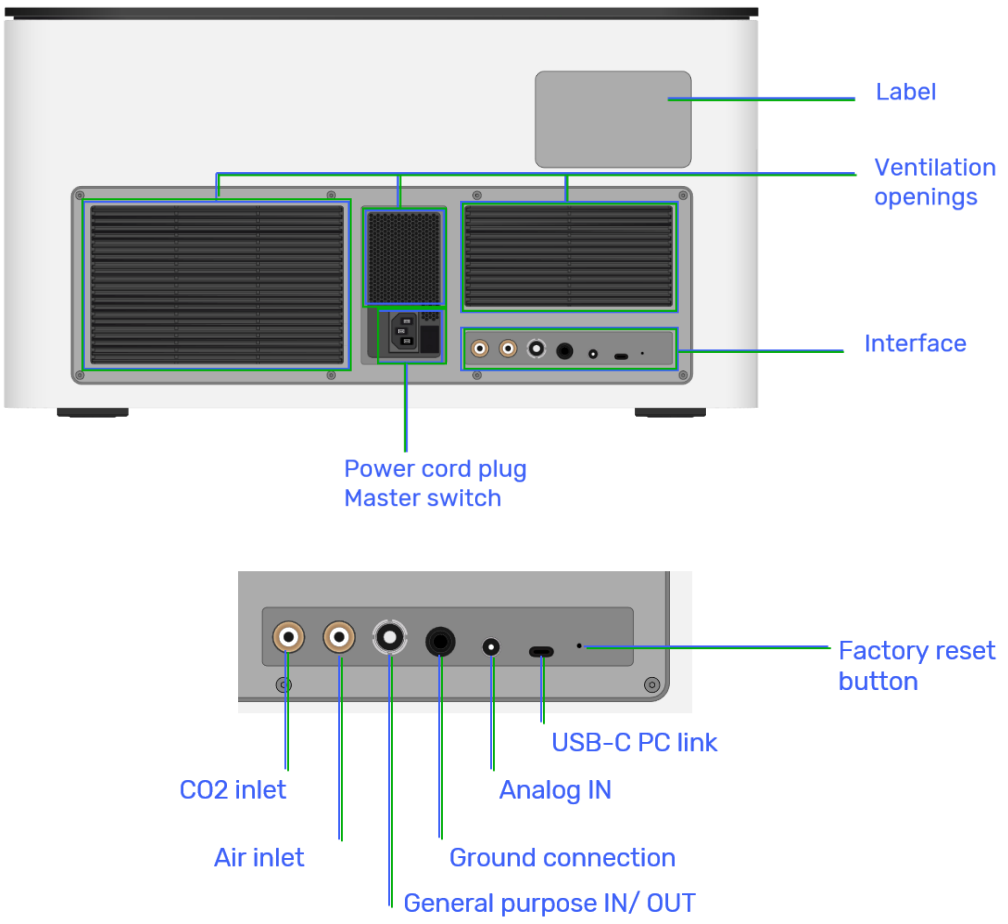


FIG 4. REAR VIEW OF THE HYPERCAM DELTA.

As shown in figure 4:

- **Ventilation openings**: They cover the cooling fans of the instrument allowing efficient airflow while preventing dust and debris from entering the system.

Do not insert fingers or objects into the Ventilation grids.

- **Label panel**: This panel includes all the necessary symbols and marks that identify the product and indicate its conformity with relevant standards (see Table of symbols).
- **USB-C PC Link**: The USB-C port serves two functions: it streams electrophysiological data from the HyperCAM Delta to the host computer and enables communication with BrainWave software. BrainWave software uses this connection to send settings commands, perform firmware updates, and access information from the CorePlate™ 24W.

Use only USB 3.1 (or higher version) cables supporting at least 10 Gbps.

- **Power inlet**: Plug for the power supply cable.
- **Master switch**: The main switch to power ON/OFF all the electronic and mechanical components of the HyperCAM Delta.
- **General purpose IN/OUT (GPIO)**: Provides connection for general input output applications.
- **Analog IN**: Input channel to inject an external analog signal into the HyperCAM Delta within the range of -5V to 5V.
- **Factory reset button**: To factory reset the device. Press and hold the button with a paper clip, with the button still pressed turn on the device. Release the button 3 seconds after turning on the device. Following this the device should be in factory reset mode. After reset, the HyperCAM Delta must be connected to BrainWave software to install the firmware.

Do not turn off the device during factory resetting!

- **CO_2/Air Inlets**: These tube connectors allow you to attach two lines (4 mm Ø), one for air (right) and one for CO_2 (left). The CO_2 line requires a gas supply pressure between 0.8 bar and 1.5 bar relative to atmospheric pressure.

It is crucial not to exceed 3 bar above atmospheric pressure for the CO_2 line to prevent damage to the internal mass flow controller of the HyperCAM Delta. For the air line, atmospheric pressure is sufficient. However, if you use a pressurized air source the maximum pressure cannot exceed 0.5 bar relative to atmospheric pressure.

The ingoing air is internally filtered by an HEPA filter, so there is no need to connect anything to the Air inlet. However, if the air in the lab is polluted, an external air supply can be connected to the Air inlet with a tube (4mm Ø, max pressure 0.5 bar relative to atmospheric pressure).

Always use a regulator approved for the specific gas, with high- and low-pressure gauges.

Installing the HyperCAM Delta

The HyperCAM Delta electronic and mechanical components are encapsulated in a plastic case with a solid metallic core that makes the system robust to mechanical and vibrational noise. Although normally recommended for electrophysiological systems, setting up the HyperCAM Delta on an anti-vibration table is not mandatory.

Further to this, the instrument has been designed to be shielded from external electrical environmental noise.

To guarantee optimal recording performances, these simple precautions should be followed:

1. Position the HyperCAM Delta far from potential strong electromagnetic noise sources, such as fridges, incubators, pumps etc.
2. Connect the HyperCAM Delta and the host PC to adequate power lines (100V to 240V) with low noise levels. It is recommended to plug the system, the PC case and the PC monitor into a single multi plug adapter, which is then plugged into a wall socket (100V to 240V).
3. Ensure the electrical cables connected to the HyperCAM Delta (in particular, the one for the power supply and for the USB-C PC Link) do not pass near power supply cables used for other instruments.
4. Check that the cable connectors are well inserted into both the HyperCAM Delta and the host PC before operating the platform.

To avoid potential short circuits, turn off the Master switch on the rear side of the system whenever you need to plug in or unplug the power cord of the HyperCAM Delta.

Leave adequate space around the system to guarantee good ventilation, in particular next to the ventilation openings on the rear, more than 10 cm (4 in) are required. Position the system on a flat rigid table to provide airflow at the bottom of the system.

Do not keep the HyperCAM Delta close to other instruments that can generate heat; the system cannot work properly with an environmental temperature higher than 25°C (77°F).

Removing Transportation Safety Features

To prevent the Sliding Door from moving uncontrollably during transportation and shipping, three plastic pins are installed under the top metal cover to secure it. After positioning the device in its working place, and before connecting it, it is important to remove these pins by following these steps:

1. Open the top metal plate by inserting a 2 mm diameter Allen key at a specific spot under the plate (Fig. 5A). You can also use any other rigid object to trigger the latch to open.
2. Remove the three colored pins (Fig. 5B). Once removed, the Sliding Door will be unlocked and can move freely by the motor.

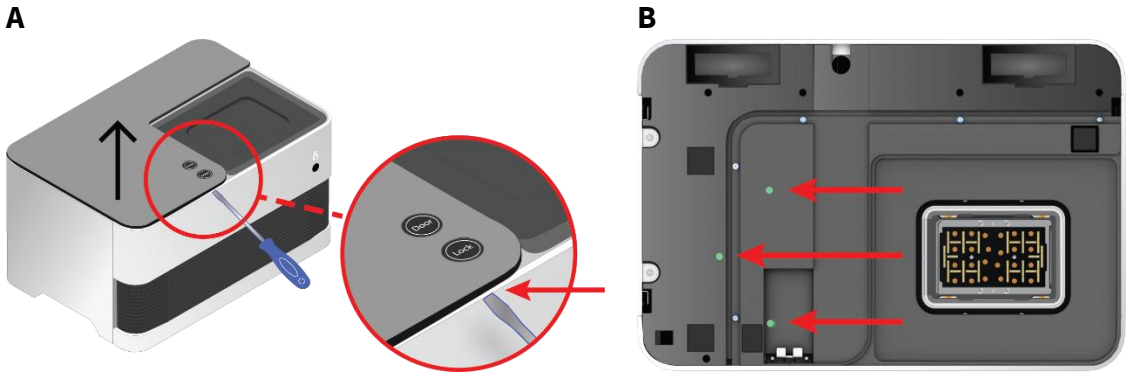


FIG. 5A. LATCH POSITION TO OPEN THE TOP COVER, B. SAFETY PLASTIC PINS TO BE REMOVED.

Do not throw away the pins! They must be put back in place if the device has to be returned or moved (see Unpacking-packing the Instrument).

Wiring and Tubing Setup

To complete the installation of the HyperCAM Delta, follow these steps:

1. Connect a CO_2 line to the quick tube fitting on the left (tube 4 mm Ø), positioned on the back of the HyperCAM Delta. When operating the HyperCAM Delta switch on the CO_2 line regulating the pressure between 0.8-1.5 bar.

Carbon dioxide is a colorless, odorless gas that can displace oxygen in enclosed spaces. Accumulation may lead to dizziness, unconsciousness, or asphyxiation. Always monitor CO_2 levels and avoid use in confined or poorly ventilated areas.

Please make sure to not exceed 3 bar for incoming gas pressure to avoid damaging the internal mass flow controller of the HyperCAM Delta.

When the HyperCAM Delta is not in use, keep the CO_2 line closed.

The ingoing air is internally filtered by an HEPA filter, so there is no need to connect anything to the Air inlet. However, if the air in the lab is polluted, an external air supply can be connected to the Air inlet with a tube (4mm Ø, max pressure 0.5 bar relative to atmospheric pressure).

2. Connect the power cord supply cable to the Power cord plug located at the rear of the HyperCAM Delta. Then, plug the power cord into an electrical outlet. Locate the Master switch beside the Power cord plug and turn it ON.
3. Use the USB Type-C (v.3.1) cable provided with the platform to connect the USB Type-C port on the back of the HyperCAM Delta with one of the USB Type-C ports of the computer.

Use only USB 3.1 (or higher version) cables supporting at least 10 Gbps.

Getting started

4

Status LED and Button Light Indicators

The color and behavior of the Status LED indicate the HyperCAM Delta's ongoing operations and its connectivity status with BrainWave software, as indicated in the table below.

Status LED color	Status LED behavior	HyperCAM Delta status	BrainWave software status
Off	-	The device is switched Off.	-
White 	Blinks slow	The device is turning On or Off.	**Not connected**
	On	The device is on, the Lifter can be moving or be in any position except Upper Position.	
	Pulses fast	The device is On and the Lifter is in the Upper Position.	
Green 	On	The device is On and the Lifter is not in the Upper Position.	**Connected**
	Pulses fast	The device is On and the Lifter is in the Upper Position.	
Blue 	On	The Lifter is in the Lower Position, a CorePlate™ 24W is detected and locked, and data from the CorePlate™ 24W is currently streaming from the HyperCAM Delta to the software.	**Data is streaming**
Magenta 	On	The Lifter is in the Lower Position or moving, a CorePlate™ 24W is detected and locked and data from the CorePlate™ 24W is currently streaming from the HyperCAM Delta to the software.	**An automated project is running**
	Pulses fast	The Lifter is either in the Middle Position (operator) or in the Upper Position (robot), waiting for the next CorePlate™ 24W.	

TABLE 6. STATUS LED COLORS AND BEHAVIORS DURING STANDARD HYPERCAM DELTA AND BRAINWAVE SOFTWARE OPERATIONS.

The Door button light behavior indicates the status of the Door, while the Lock button light behavior shows the status of the Locking mechanism, as indicated in the table below.

Button	State	Status of the associated user-activated mechanism
Lock	Off	The Lifter is in the Middle Position.
	On	The Lifter is in the Lower Position and a CorePlate™ 24W is detected.
	Pulses slow	The Lifter is in the Lower Position and no CorePlate™ 24W is detected.
	Blinks slow	The Lifter is moving.
	Pulses fast	The Lifter is in the Upper Position.
Door	Off	The Door is open.
	On	The Door is closed.
	Blinks slow	The Door is moving.
	Pulses fast	The Door is in Upper Position.

TABLE 7. STATES OF THE LOCK AND DOOR BUTTONS.

The combination of the Status LED, Door button and Lock button colors and behaviors identify warnings and system errors, as indicated in the table below.

LED state	Description
Status LED: On Yellow. Door/Lock buttons: Usual behavior.	Either the HyperCAM Delta is in factory reset mode or the current firmware detected a problem and needs to be updated. BrainWave software needs to be connected to initialize the firmware update (check BrainWave software manual).
Status LED: Pulses slow Yellow. Door/Lock buttons: Off and non-responsive.	Firmware update is in progress. The device is performing an update via BrainWave software.
Status LED: Blinks fast Yellow. Door/Lock buttons: blink fast.	Reboot required. The HyperCAM Delta should be turned off and then back on.
Status LED: Blinks fast Yellow for 3 seconds and afterwards pulse fast. Door/Lock buttons: Blinks fast for 3 seconds and afterwards pulse fast.	Motor movement failed. During a movement of any of the user-activated mechanisms, a problem occurred (e.g., something obstructed the Lock or

LED state	Description
	the Door or the motors stopped working) and therefore the motors have stopped. During the 3 seconds fast blinking buttons are non-responsive. Subsequently, while LEDs pulse rapidly, the user, after removing any obstacles from the motors, can click again the buttons and the action that was previously interrupted is retried. In case of new failure LEDs blink fast again. Motor movement failures are counted and summed up. After 3 consecutive failures, at the fourth attempt, the status is considered to be a permanent failure (see next item).
Status LED: Blinks fast Red. Door/Lock buttons: Blink fast.	Motor movement failed repeatedly. If the movement of any of the user-activated mechanisms fail more than 3 times, a Red blinking signals the user that the motor error is unrecoverable.
Status LED: Pulses fast Red. Door/Lock buttons: Blink fast.	Factory reset required. The reset button on the rear panel should be pressed to factory reset the HyperCAM Delta. After reset, the HyperCAM Delta needs to be connected to BrainWave software to install the firmware.
Status LED: On Red. Door/Lock buttons: Off and non-responsive.	Unrecoverable error status. The HyperCAM Delta is in error status. Try to switch it Off and then back On. If the error persists, contact the customer success team (see Support).

TABLE 8. WARNING AND ERRORS INDICATED BY THE STATUS LED AND BY THE DOOR/LOCK BUTTONS.

Power ON the HyperCAM Delta

Start by powering on the host PC and launching BrainWave software by clicking on its corresponding icon. If there are any pending updates, BrainWave will notify you, and it is recommended to install them before proceeding to ensure optimal performance.

To power on the HyperCAM Delta, press the Power button on the front of the device to initiate the boot-up sequence:

- At startup, the Sliding Door and Lifter are in their default closed and lowered position.
- During the initialization process, the Status LED will blink white signaling that the system is powering up.
- The Sliding Door opens and the Lifter move to the Middle Position.
- The Status LED remains solid white, indicating that the device is ready for operation. To confirm that the HyperCAM Delta is functioning correctly, verify that it is recognized by the BrainWave software (please refer to the BrainWave user manual).

Inserting and Removing the CorePlate™ 24W

The CorePlate™ 24W connects to the HyperCAM Delta via the locking system integrated into the Environmental chamber. This system employs four rotating metal wings that press the plate onto the metal Pogo pins, ensuring a stable electrical connection. The HyperCAM Delta can operate the CorePlate™ 24W with the Sliding Door in either the open or closed position, depending on the user's needs.

How to use CorePlate™ 24W with the HyperCAM Delta:

1. Carefully insert the CorePlate™ 24W into the Lifter rising from the Environmental chamber. The two metal Alignment pins guide the plate insertion, while the Lifter's design ensures that the plate can only be inserted in the proper orientation. Ensure that the plate is horizontal and parallel to the bottom of the Lifter to guarantee a precise fit.
2. Touch the Lock button on the top of the HyperCAM Delta, the Lifter will retract into the Environmental chamber and the four metallic wings will hook the sides of the plate and push it downwards. If the CorePlate™ 24W is properly locked and recognized, its unique serial number can be read by BrainWave software (please refer to the BrainWave user manual).
3. Touch the Door button to move the Sliding Door in the closed position. To enable mass flow control for regulating CO_2 concentration, refer to the BrainWave software user manual.

The mass flow controller stops when the Sliding Door opens. Every time the Sliding Door closes the mass flow controller must be activated.

Once the CorePlate™ 24W is positioned on the Lifter, pressing the Door button will close the Sliding Door and secure the plate.

Do not insert fingers or objects into the moving parts while operating the Locking mechanism and the Sliding Door.

4. To start data acquisition please refer to BrainWave user manual.

To remove a CorePlate™ 24W from the HyperCAM Delta follow these steps:

1. Touch the Door button to move the Sliding Door in the open position.
2. Touch the Lock button, the four metallic wings will release the CorePlate™ 24W. The Lifter will lift up, then the plate can be removed.

If a CorePlate™ 24W is locked in the HyperCAM Delta and the Sliding Door is closed, touching the Lock button will unlock the plate and open the Sliding Door.

Do not insert fingers or objects into the moving parts while operating the Locking mechanism and the Sliding Door.

Handling Liquid Spills

Liquid spills of solutions such as media should be strictly avoided while inserting and removing a CorePlate™ 24W in the HyperCAM Delta. The Environmental chamber was designed to be waterproof to prevent liquids from entering into contact with the internal electronics, however when the instrument is powered on, liquids can still oxidize the gold Pogo pins and the Heating/Cooling pins, and form residues.

If there is a liquid spill into the chamber, please proceed with the following steps:

1. Immediately unlock and remove the CorePlate™ 24W, then turn OFF the Master switch positioned on the back of the HyperCAM Delta.
2. Wipe the HyperCAM Delta's environmental chamber with isopropanol (IPA) >99.5% and let it dry completely. Pay special attention to the Pogo pins, as you'll need to remove any saline residue or oxidation. To clean the pins, soak a lint-free wipe with IPA and gently push down the pins from the top. Be careful to avoid any side-to-side movement that could bend or break them.

3. Use the same procedure to clean the contact pads on the back of the CorePlate™ 24W. Make sure that all the external surfaces of the plate are well dried and clean before inserting it again in the HyperCAM Delta.
4. After cleaning and drying, the instrument is ready to be used again. However, if there are doubts that some liquid might have penetrated into the HyperCAM Delta, and not just remained in the Environmental chamber, keep the system OFF for at least one day, allowing the liquid to dry completely, preventing internal circuitry from potential oxidative and short-circuit effects.

Power OFF the HyperCAM Delta

Before shutting down the HyperCAM Delta, ensure that all ongoing data acquisition processes are properly stopped within the BrainWave software (please refer to the BrainWave user manual). To power off the HyperCAM Delta press the Power button on the front of the device. If the Sliding Door is in the open position, it will automatically close. The Status LED will turn off once the device has completely power down.

If the device is not used for an extended period, it is advisable to turn off the Master switch on the back of the HyperCAM Delta and unplug the power cord cable as an added safety measure.

Cleaning and Maintenance

Read and follow the instructions listed below before performing any cleaning or maintenance of the device:

Turn off the Master switch and unplug the power supply.

Avoid spraying the device with liquid or using a cloth that is soaking wet. Ensure no water or cleaning solution enters the device. If this occurs, do not turn on the device and reach out to customer support.

In the event of device contamination, always wear protective gloves when handling contaminated instruments. Treat gloved hands as contaminated at all times. If you have any doubts about the compatibility of decontamination or cleaning agents, please consult customer support.

To maintain accurate recordings, it is recommended to clean the device regularly, ensuring it is free from dust and particulates that may interfere with the system and decrease performance. For proper cleaning follow these steps:

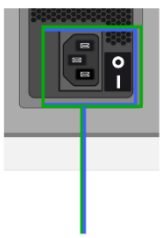
1. Turn off the Master switch and unplug the power supply.
2. Dampen a clean microfiber cloth with water or a mixture of water and mild detergent. Be sure to wring out the cloth thoroughly to prevent excess liquid from dripping.
3. Gently wipe down the exposed surfaces of the device.

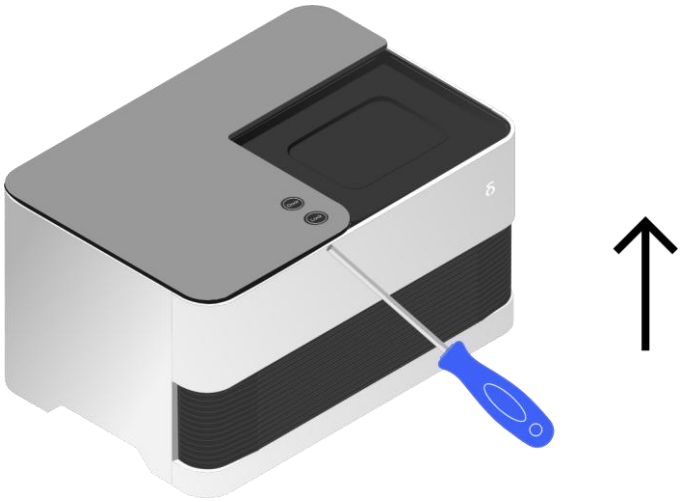
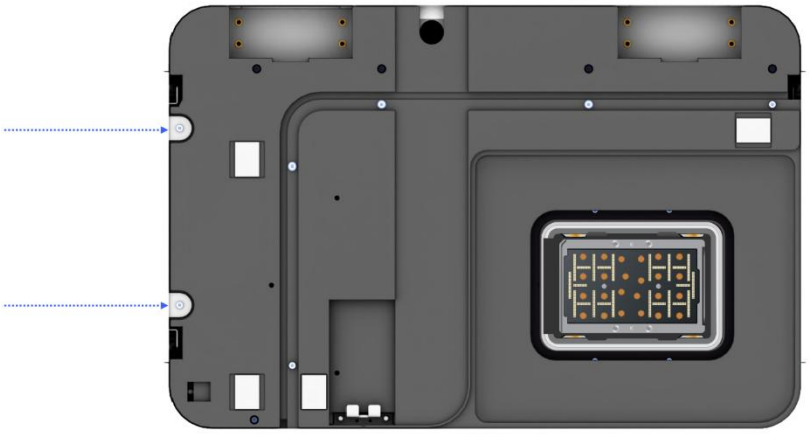
Do not wipe the electrical contacts located at the bottom of the Environmental chamber. This could ruin the contact performance of the probes.

4. If detergent was used, follow up by wiping all surfaces with a cloth dampened with water.
5. Use a clean, dry, lint-free cloth to thoroughly dry all wet surfaces.

HEPA Filter Replacement

The Air line within the system is equipped with an internal HEPA filter to ensure clean and decontaminated airflow inside the Environmental chamber. This HEPA filter can be replaced by following the steps outlined in the table below.

Step	Image
Turn off the Master switch on the back of the HyperCAM Delta and unplug the power supply.	

Step	Image
Open the top metal cover with a 2 mm diameter Allen key.	
Unscrew the two screws on the left side, with a 2 mm Allen key.	
Slide the side plate out to access the bay with the filter.	

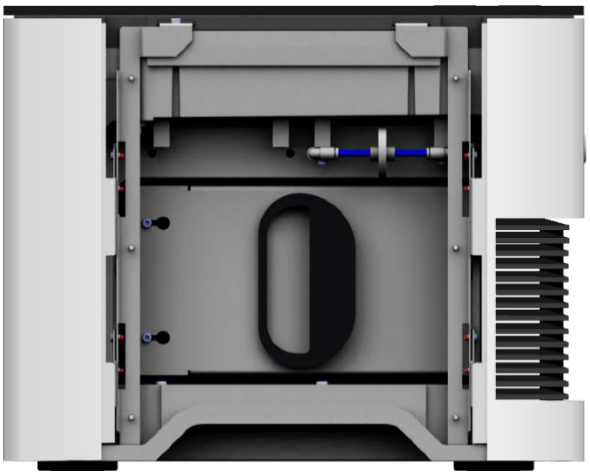
Step	Image
HEPA filter is located on the top area and can be easily removed by unlocking the quick tube fittings.	

TABLE 9. PROCEDURE TO ACCESS THE HEPA FILTER IN THE HYPERCAM DELTA.

HEPA filter should be replaced with the same type (Sartorius: S6596-FMOSK) or equivalent model. Replacement parts can be purchased from 3Brain or directly from Sartorius.

Service

The HyperCAM Delta is a cutting-edge tool in the field of multiwell systems for high-content functional imaging. To maintain peak performance and avoid interruptions due to inefficiency from wear and tear, it is recommended to subscribe to a service maintenance plan.

For more information, contact us (see Support).

Technical data and troubleshooting

5

Identifying and Solving Issues

Case 1.

- Device does not power on.

Possible Causes:

- Power cord not plugged into the wall socket.
- Power cord not plugged in properly.
- Master switch on the back of the HyperCAM Delta is set to the OFF (O) position.
- Front Power button not properly pressed.
- Socket has no power.

Possible Solutions:

- Check if the power cord is plugged in the wall socket and the device all the way in.
- Ensure the wall socket is powered by plugging in any other device.
- Set the Master switch on the back of the HyperCAM Delta into the ON (I) position and push the Power button.

If the device does not power ON after the mentioned steps, there is an internal power supply failure, which cannot be fixed by the customer without contacting 3Brain's customer support (see Support).

Do not try to fix the device yourself! Opening the device can lead to severe injuries and loss of life!

Case 2.

- Device starts up but is not recognized by BrainWave software.
- Device is getting recognized, but the data transfer is not reliable/ with interruptions.

Possible Causes:

- USB-C cable not plugged into the PC properly.
- USB-C cable is damaged.
- Driver issue on the Host-PC side.
- Firmware issue on the Device side.

Possible solutions:

- Check if the USB-C cable is inserted all the way in on both ends.
- Check if the USB-C cable is visually damaged somewhere, if yes, replace the cable.
- Unplug the USB-C cable and rotate the plug by 180° on one side.
- Ensure the receptable and plug are free from dust, corrosion, or dirt.
- Check in the host computer's "device manager" (WINDOWS + X, Device Manager) if the device is getting detected by Windows (Fig.6). If there is an issue, refer to BrainWave software manual.

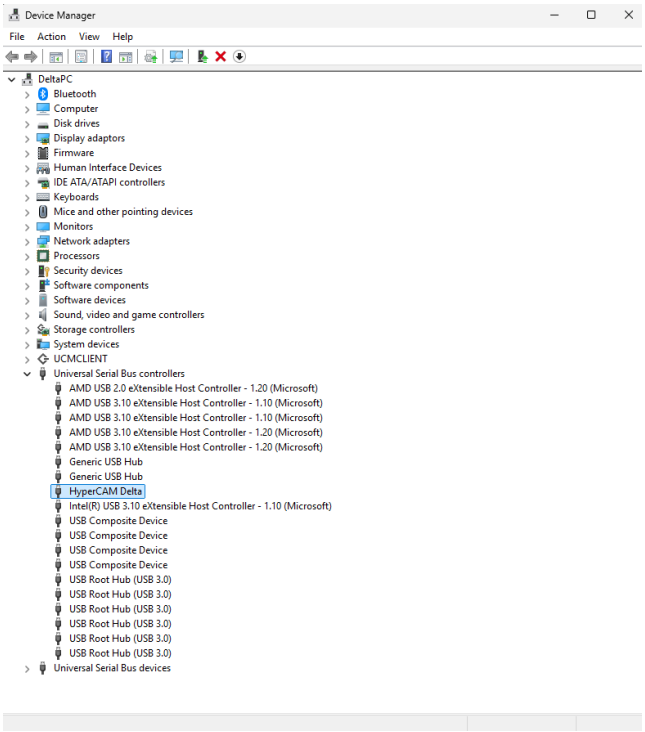


FIG 6. WINDOWS' DEVICE MANAGER PANEL RECOGNIZING THE HYPERCAM DELTA.

- Replace the USB-C cable.
- Reboot the host PC and the HyperCAM Delta.

- As a last resort, reset the device to the factory settings by pushing the Factory reset button while booting the device. The button must be pressed before turning on the device and can be released shortly (3s) after the device started up. The device is now in factory reset mode. After reset, the HyperCAM Delta must be connected to BrainWave software to install the firmware.

If nothing helps, there might be an issue with the device or the PC, contact 3Brain's customer support (see Support).

Note: If you replace the original USB-C cable, order it from your 3Brain sales representative or buy USB 3.1 (or higher version) cables supporting at least 10 Gbps.

Case 3.

- CorePlate™ 24W can’t be locked.
- Device tries to lock the CorePlate™ 24W but fails.

Possible causes:

- Faulty CorePlate™ 24W.
- Not a CorePlate™ 24W compatible plate.
- Obstacle inside the chamber.

Possible solutions:

- Remove the CorePlate™ 24W and put it back inside the device.
- Ensure the CorePlate™ 24W is placed in correctly.
- Check inside the chamber for any obstacles.

If the problem persists, contact 3Brain’s customer support (see Support).

Case 4.

- CorePlate™ 24W is locked but cannot be unlocked.
- CorePlate™ 24W gets stuck during locking/unlocking.

Possible causes:

- System crashes while CorePlate™ 24W is inside.
- Mechanical wear out (old devices).
- Locking mechanism system crash.

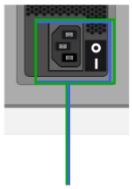
Possible solutions:

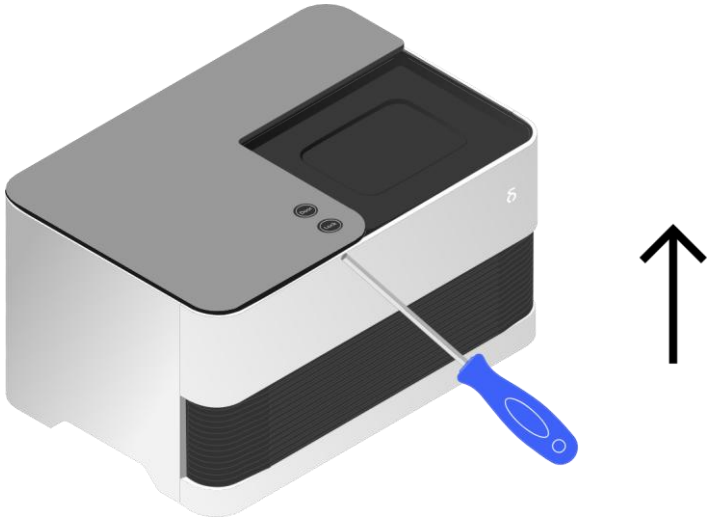
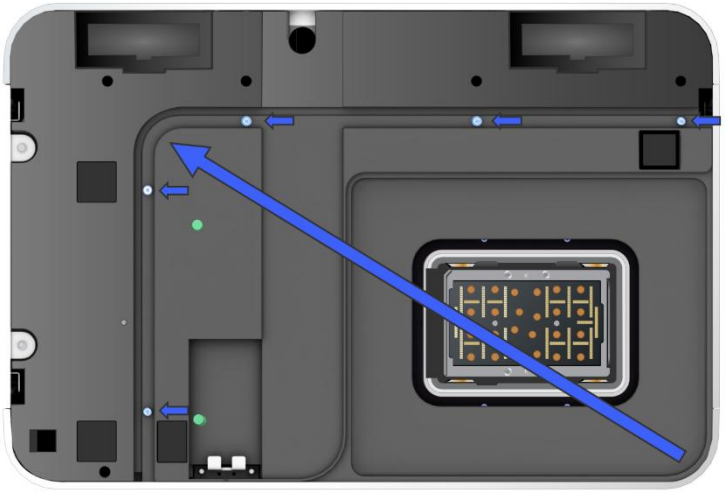
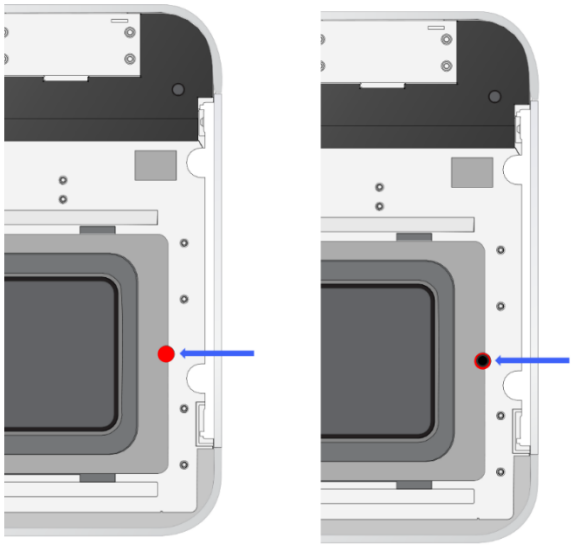
- Restart the HyperCAM Delta.

If restarting the device doesn't help, contact 3Brain's customer support (see Support). In case the HyperCAM Delta has to be shipped back, manually remove the stuck CorePlate™ 24W beforehand.

Do not ship the HyperCAM Delta with a locked CorePlate™ 24W containing liquid! This can damage the entire device!

To manually remove the CorePlate™ 24W follow the instructions in the table below.

Step	Image
Turn off the Master switch on the back of the HyperCAM Delta and unplug the power supply.	 Power cord plug Main switch

Step	Image
Open the top metal cover with a 2 mm diameter Allen key.	
Remove the plastic cover on the right with a 2 mm Allen key, slide the cover to the side, lift it and put it aside together with the screws. Don't lose the screws.	
Remove the protection cap on the right side of the Environmental chamber.	

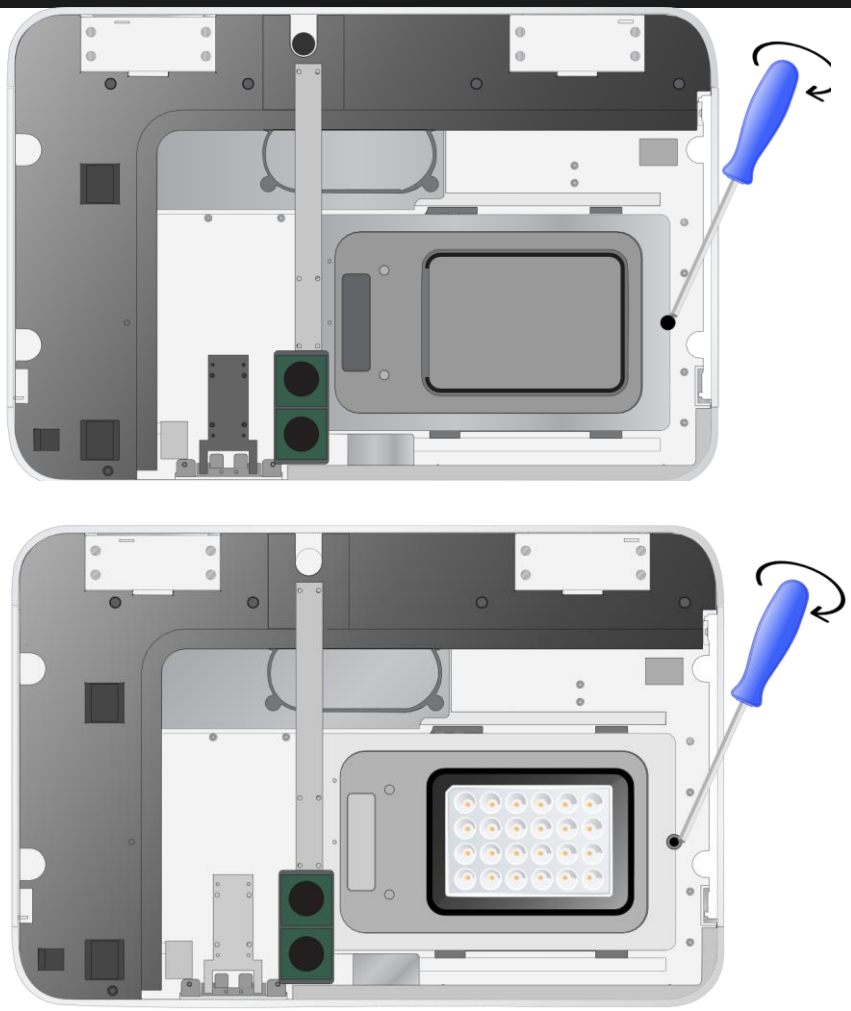
Step	Image
Take a 4.0 mm Allen key and unlock the mechanism by turning the screwdriver clockwise. ⚠ **Do not overturn the mechanism! Stop as soon as the CorePlate™ 24W can be taken out!**	
Remove CorePlate™ 24W. After the plate has been successfully extracted, follow the previous steps in reverse to put the device back together and contact customer support for further steps.	

TABLE 10. PROCEDURE TO MANUALLY REMOVE A COREPLATE™ 24W STUCK INTO THE HYPERCAM DELTA.

Case 5.

- Sliding Door is not working.
- Sliding Door is blocked.

Possible cause:

- The transport protection pins have not been removed.
- There is an obstacle in the path of the Door.
- Sliding Door system crash.

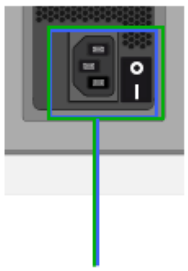
Possible solutions:

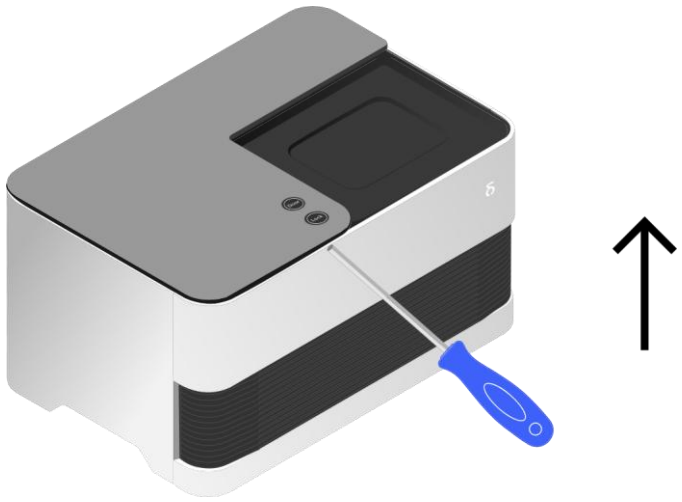
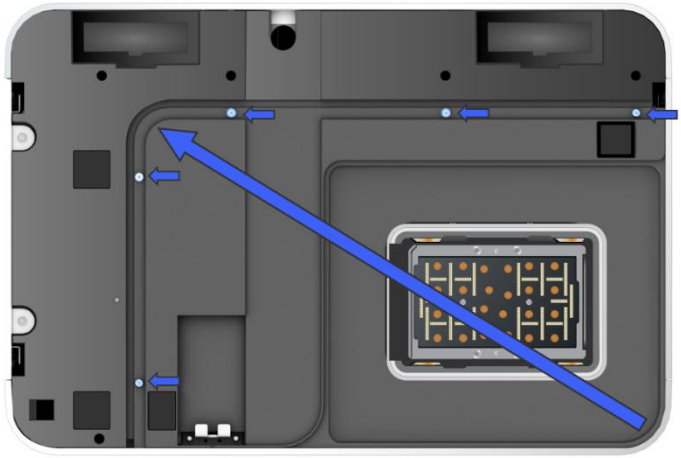
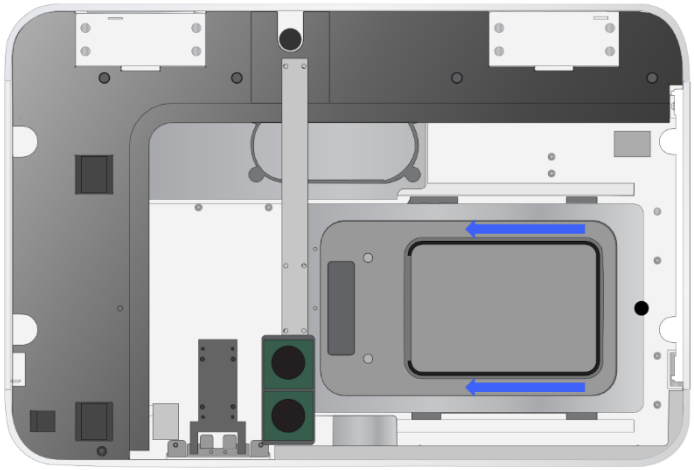
- Make sure that the steps in Removing Transportation Safety have been followed.
- Check if there is an obstacle in the path of the Door.
- Restart the device.

If the problem persists, contact 3Brain's customer support (see Support). If a CorePlate™ 24W containing liquid is inside the Environmental chamber, it has to be removed before moving or being shipping back.

Do not ship the HyperCAM Delta with a CorePlate™ 24W containing liquid! This can damage the entire device!

Follow these steps, to unlock the Sliding Door:

Step	Image
Verify on BrainWave software if a CorePlate™ 24W is locked, touch the Lock button to unlock it (see BrainWave user manual). Turn off the Master switch on the back of the HyperCAM Delta and unplug the power supply.	 Power cord plug Main switch

Step	Image
Open the top metal cover with a 2 mm diameter Allen key.	
Remove the plastic cover on the right with a 2 mm Allen key 1), slide the cover to the side (2), lift it and put it aside together with the screws. Don't lose the screws.	
Slide the Door to the left, by the black part on top of the Door.	
Follow the previous steps in reverse to put the device back together and	

Step	Image
contact the support for further steps.	

TABLE 11. PROCEDURE TO MANUALLY OPEN THE SLIDING DOOR OF THE HYPERCAM DELTA.

Case 6.

- Status LED is red colored.

Possible causes:

- The HyperCAM Delta has entered an error state.

Possible solutions:

- Check Table 6 in Status LED and Button Light Indicators to identify the error and solve the issue.

If nothing helps, contact 3Brain's customer support (see Support).

Technical Specifications

Main controller						
Computational core	5x Intel® Arria® 10 SoC					
HD-MEA compatibility	CorePlate™ 24W					
Plate reader	RFID-based					
Recording configuration	Mode	No. recorded wells	No. recorded electrodes per well	Recording area [mm^2]	Frame rate (kHz)	Bit res
24-well	Continuous centred	24	256	0.8 x 0.8	12.5	11
	Continuous distributed	24	256	0.8 X 0.8	12.5	11
	Noise blanking	24	1024	1.6 x 1.6	10	11
System compatibility	Multiwell plate automation systems					
Data interface compatibility	USB 3.1 Type-C					
Control software compatibility	BrainWave 6 or higher version					
Supply unit	100-240 VAC ± 10%, 2 A, 50/60 Hz					
Connectors	USB 3.1 Type-C, ground connector, analog input, general purpose input/output					
Gas connectors	1 CO_2 (working pressure 0.8-1.5 bar - max pressure 3 bar) – 1 Air (max pressure 0.5 bar)					

Environmental chamber	
CO_2 control	Active control 5 % accuracy ±1 % on the measured value
Temperature	Active control accuracy ±1 °C
Humidity	Active monitoring

Integrated stimulator	
Modality	Current
Stimulus type	Biphasic
Stimulus frequency range	5.5 x 10^{-4}Hz - 100Hz

Integrated stimulator	
Maximum amplitude	±0.25 mA
Amplitude resolution	1 µA
Time resolution	10 µs
Stimulation endpoints/sites	Any of the 1024 electrode per well

Physical specs	
Body material	Plastic
Locking mechanism	Motorized CorePlate™ 24W locking system (V2.0)
Protection from liquid spill over	Chamber protected against dripping water
Dimensions (W x D x H)	53 x 29 x 35 cm 20.9 x 11.4 x 13.8 in
Weight	23 kg (50.7 lb)

Operating conditions	
Environment	Indoor use only
Rear clearance	10 cm (4 in)
Ambient operating temperature	18 – 25 °C
Altitude restrictions	Up to 2000 m (6562 ft)
Ambient humidity restrictions	30 – 60 % (non-condensing)
IP	20
Installation category	II
Class protection	I
Pollution degree	2

Support

For any further questions or assistance, please don't hesitate to contact us at the following link:

https://www.3brain.com/contact

For urgent matters, please contact:

Phone: +41 81 322 70 86
Email: cs@3brain.com

Disposal

6

Disposal

This product is marked with the crossed-out wheeled bin symbol in accordance with standard DIN EN 50419. This symbol indicates that the product must not be disposed of with regular household waste and should be collected separately.
Customers are advised to follow local regulations and guidelines regarding the disposal, recycling, or return of electrical and electronic equipment.
Additional national obligations may apply in certain countries.

Dieses Produkt unterliegt der deutschen ElektroG-Verordnung.
Der Käufer verpflichtet sich, die Entsorgungsverpflichtungen gemäß WEEE-Richtlinie einzuhalten und seine Endnutzer entsprechend zu informieren.
Das Produkt ist mit dem Symbol der durchgestrichenen Mülltonne (DIN EN 50419) gekennzeichnet.