



GETTING STARTED WITH UHPC

Safety Precautions

These safety precautions must be read and understood before using any of the products described herein.

Regardless of whether this equipment is to be used to generate and measure non-hazardous voltages, stored energy may be present in battery cells and other hazardous conditions may be present.

Ensure that all users of this system are qualified professionals, trained to recognize shock hazards and familiar with the risks and precautions necessary when working with chemical and electrical energy.

Use this hardware in the manner specified only.

Follow all installation and operation information provided.

Do not exceed the maximum signals specified. Refer to the product-specific specifications sheets where necessary.

Do not defeat or otherwise circumvent built-in hardware or software safety limits (see Safety Limits).

Use all equipment as delivered. Do not use 3rd party software or firmware to control NOVONIX-supplied equipment.

Regardless of operating environment, it is a good safety practice to assume that all unknown cells contain hazardous levels of stored energy prior to measuring.

Observe the specific power supply requirements for each UHPC Channel Module. Note that the 10A and 20A Channel Module must be powered via a NOVONIX-supplied Power Module only and not directly connected to building-supplied power.

Where fuses are present, replace with the same type and rating only. Do not attempt to replace a damaged breaker or power switch.

Keep Thermal Chamber doors closed while power is applied, or testing is underway.

Do not physically disconnect cell holders without first ensuring there is no test is running.

If using stripped wire connectors, alligator clip connectors or otherwise “floating” connectors, ensure that unused connectors are electrically isolated to eliminate the risk of a short circuit developing.

This equipment is intended to be used in a location having equipotential bonding (such as a telecommunication centre, a dedicated computer room or a restricted access area) and has installation instructions that require verification of the protective earthing connection of the socket-outlet by a skilled person.



Where this symbol is present, connect that point to earth ground directly using the appropriate wire.



The symbol in the documentation indicates that a surface may be hot.



The symbol indicates a safety warning specific for its context in the documentation



The symbol indicates a NOVONIX recommendation or tip to help ensure the best practice when using the equipment

Acronyms

AC	Alternating Current
BS	British Standards
CEE	Consortium for Energy Efficiency
CE	Coulombic Efficiency
DC	Direct Current
I/O	Input / Output
IEC	International Electrotechnical Commission
LED	Light Emitting Diode
NEMA	National Electrical Manufacturers Association
PCC	Peltier Cooled Chamber
ppm	Parts per million
RTD	Resistance Temperature Detector
UHPC	Ultra High Precision Coulometry
UPS	Uninterruptible Power Supply
VA	Volt-Amps
VAC	Volts Alternating Current
VDC	Volts Direct Current
WRC	Wide Range Chamber



Getting started with UHPC: *Uncrating and power on*

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Getting Started

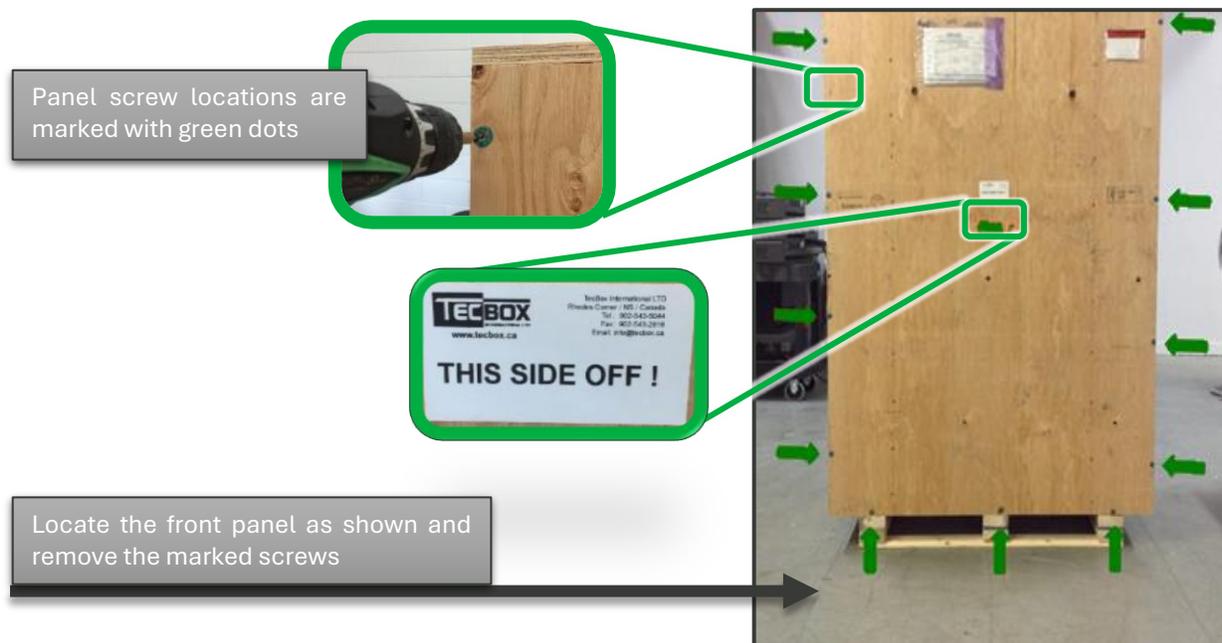
A new NOVONIX shipment arrives on a pallet, crated, with all accessories and peripherals conveniently stored in the rack.

Locate the packing slip and set aside; this contains a list of everything loaded in the crate, including details of all the peripherals (tools, cable clips etc) that are shipped with a new installation.

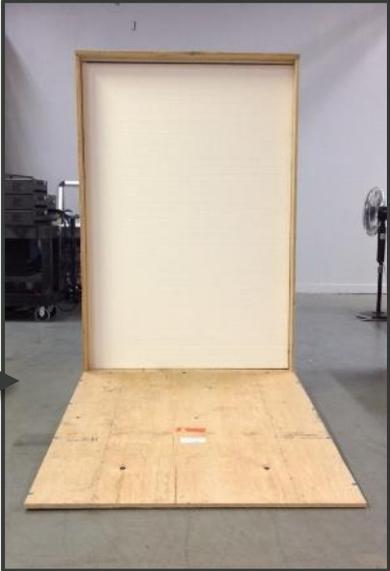
Read these instructions before setup and operation and comply with all requirements and specifications described to ensure that the system operates properly and safely as intended by NOVONIX.

Once initial setup is complete, and prior to plugging in your UPS, complete the 5.4: Setup Complete Checklist, sign & date, and store with the document package.

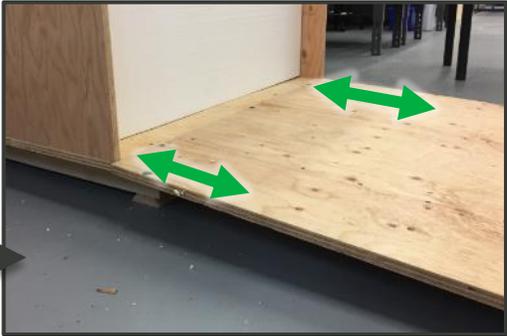
1.1 Uncrating and Initial Setup



Remove and flip the front panel, laying it to serve as a ramp



Ensure that the edge of the ramp is level with the inner floor of the crate as shown

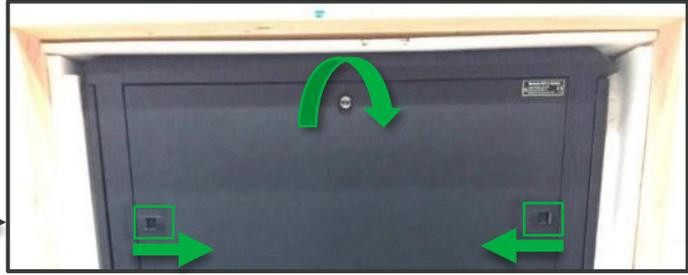


Remove the front panel packing material and cut the plastic wrap away



Retrieve the panel key, taped to the chassis near the base

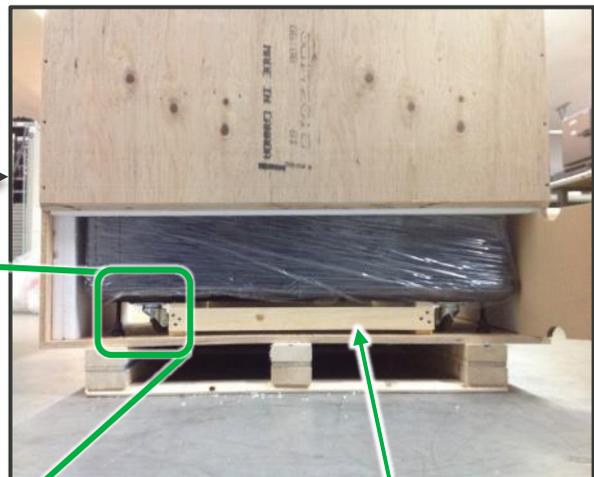
Unlock the panel and squeeze the release tabs to lift the panel free



Locate the lower panel on the crate and remove the screws, exposing the base of the rack



Locate the four (4) leveling feet at the base of the rack. Using a 3/4" wrench, adjust their height until the rack is sitting on them, lifted clear of the wooden shipping bracket



Wooden shipping bracket

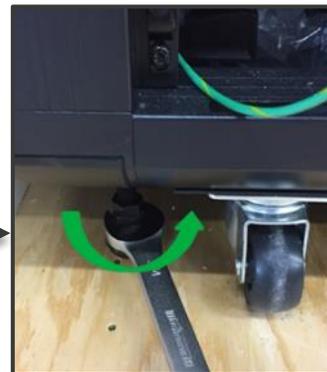
Remove and discard the wooden shipping bracket



Wooden shipping bracket



Raise all four leveling feet clear until the rack is again supported entirely by its casters



 NOTE: Casters are meant only for maneuvering a rack into position *only*. They are not designed to support the full load of a rack once equipment is installed, and leveling feet should be lowered once in position.

ATTENTION!
NOVONIX recommends at least two people for this maneuver. The rack may be heavy and can have a high center of gravity.

With leveling feet raised clear, the rack can be maneuvered down the ramp and moved into position

Take extra care when transferring the rack from the ramp to the laboratory floor, as the casters provide no shock damping. The transfer should be conducted slowly, by two or more people.

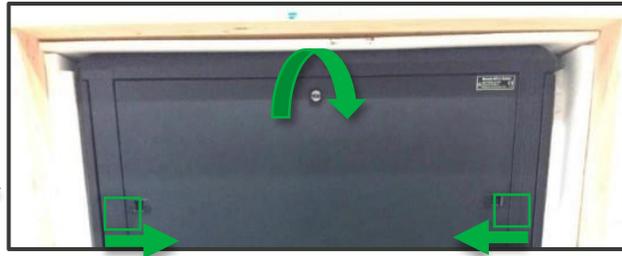


 Position your new NOVONIX system in a cool, clean area free of airborne dust and particulate, and out of direct sunlight.
This mimics the environment your equipment was built and qualified in, and will help to ensure reliable, high precision measurements from your new system.



Once the rack is in its final position, lower the leveling feet to bear the full weight of the rack.

Unlock the second side panel and squeeze the release tabs to lift the panel



Open the front and back doors by pressing the handle release button, popping the handle free and twisting to open



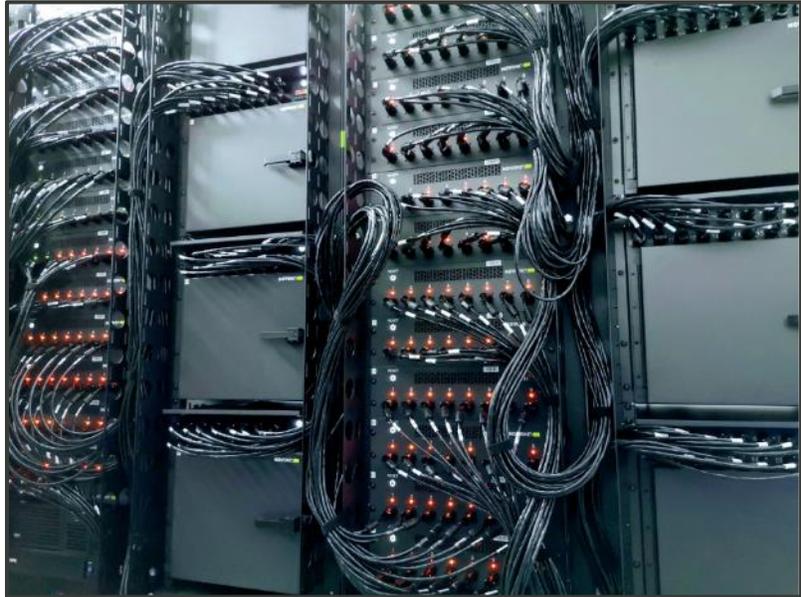
Remove packaging and all computer and accessories from the server assembly. Note that your rack contents may differ.



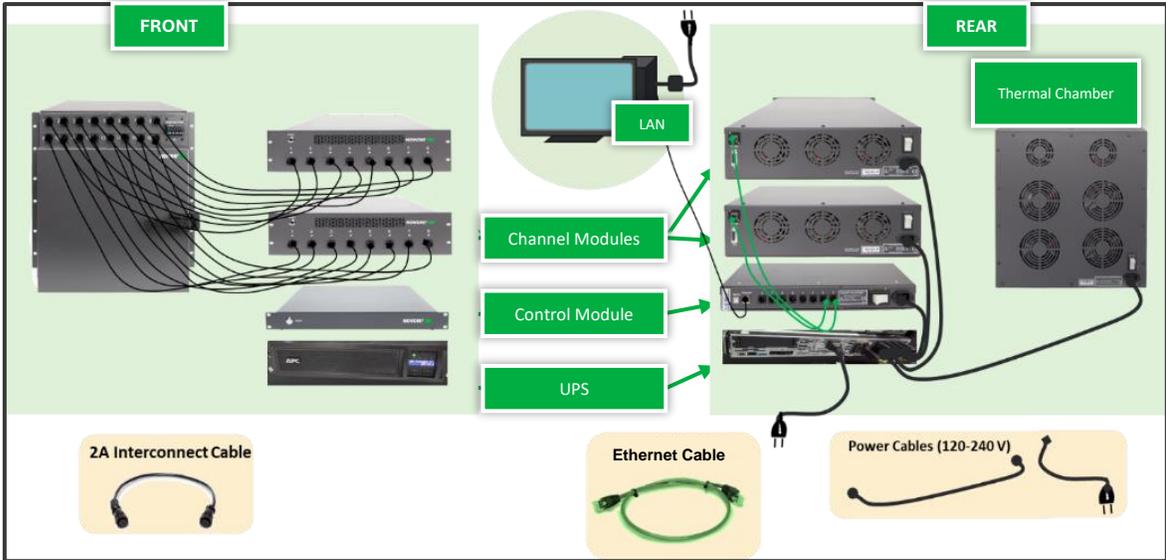
1.2 Hardware Installation

NOVONIX UHPC systems are designed to be modular, with up to 8 Channel Modules per Controller Module for a maximum of 64 channels for 2A or 10A systems, and 32 channels on a 20A.

All necessary power and comms cables, UPS, and PC and software (pre-installed) are included out of the box



NOVONIX UHPC System Configuration



Plug each Control Module, Channel Module and Thermal Chamber into the UPS



Front



Rear

Each device requiring power uses either a standard IEC C13/C14 "Kettle Cord" or C19/C20 plug, included in the box.



Front



Rear

Note: 10A and 20A channel modules receive power directly from the power module and have no AC power supply requirement.

Power Module



Front

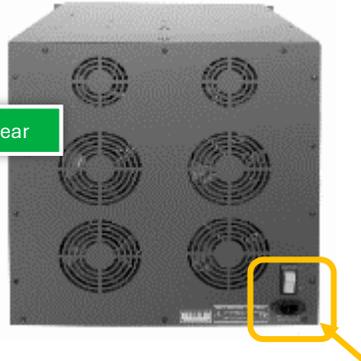


Rear

Control Module



Front



Rear

Thermal Chamber



Front



Rear

UPS

Connect each Channel module to the Control module using Ethernet cables. For your convenience, NOVONIX supplies these as green cables, in the box.

 **Note:** Use only standard, straight through Cat 6(shielded) Ethernet cables. For your convenience, NOVONIX supplies these as green cables, cut to a custom length for your system.



2A Channel Module, rear



10A Channel Module, rear



20A Channel Module, rear

Control Module



Connect the Control module to the supplied NOVONIX PC. This connection uses a standard Cat 6 Ethernet cable, supplied in the box.



Note:

Ethernet Ports: Each Mini PC has two ethernet ports; one must be dedicated to the Master Controller.

 **Single Chamber Use:** If you have one chamber, you can use the second port for that chamber.

Multiple Chambers: For more than one chamber, a network switch (provided by NOVONIX) is required.

Internet Connection: If you prefer a wired internet connection, you can connect it to the network switch as well.



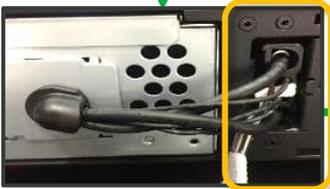
To allow doors to close, feed cables through the passthrough located at the bottom of the rack.



Uncoil the grounding wire, located near the rear bottom of the rack, and connect to the building's electrical ground. Ensure that connections are tightly fastened.



Install the UPS battery by removing the thumbscrews holding the metal cover in place. Attach the plastic UPS face to the front side of the UPS.



 UPS installation may vary slightly depending on the UPS model. Every model comes with a plastic bag of papers, cables and peripherals – **do not lose this!** Store this bag safely in [or on top of] the rack to ensure nothing goes missing.

Connect the Channel modules to the Thermal Chambers using the supplied interconnect cables.

2A Channel Module, front



10A Channel Module, front



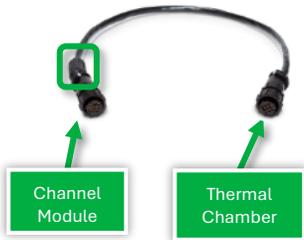
20A Channel Module, front



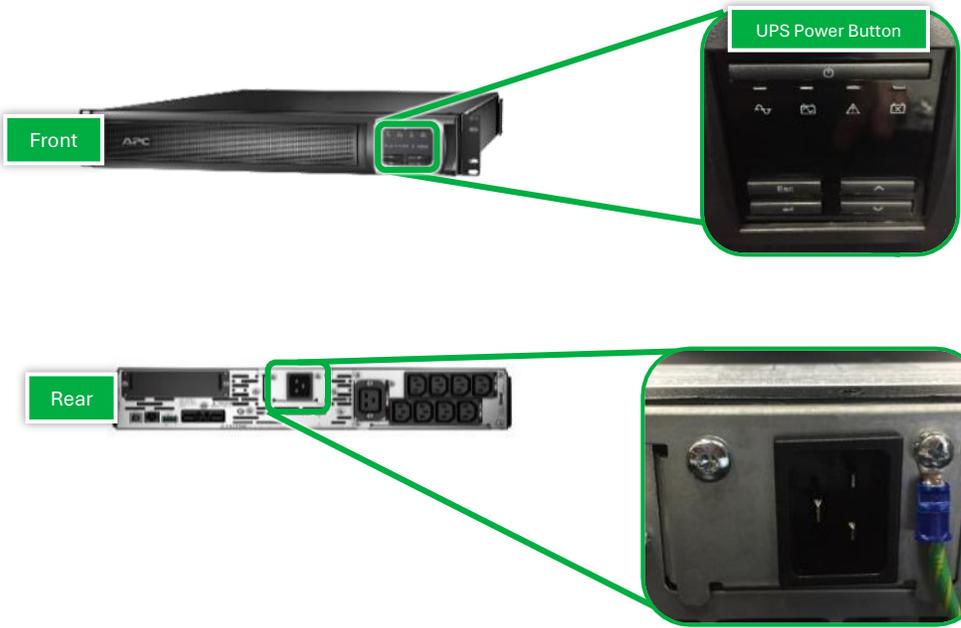
Thermal Chamber, front



 On interconnect cables, quickly identify Channel module ends by looking for additional RF shielding on the collar.

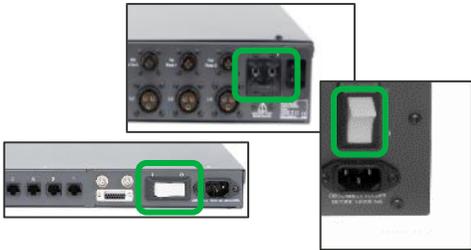


Using the appropriate cable, plug the UPS power supply in. If the UPS does not boot automatically, locate the power button on the front panel interface and power on.



With the UPS power output on, turn on the individual Control and Channel modules using the power switch or breaker located at the back of each module

Note: The Control module takes approximately 30s to initialize upon powerup. Please allow this time before connecting to a Channel module via UHPC-Control



Note: General UPS models and their socket types are listed in the table below. A socket adapter may be required to power UPS devices in your local area.

<i>UPS Model #</i>	<i>UK</i>	<i>Rest of Europe</i>	<i>North America (Low Voltage)</i>	<i>North America (High Voltage)</i>
<u>SMT3000RM2UC</u>			NEMA L5-30P	
<u>SMX3000RMHV2U</u>	BS 1363A	CEE 7/7		IEC 60320 C20
<u>SRT5KRMXLT-IEC</u>				NEMA L6-30

Replace the rack side panels and lock them in place. Additional keys are located inside the rack and on the door grille. Note that some racks are delivered, by request, with no doors.



NOVONIX recommends keeping the doors shut, if applicable, while tests are running, or the system is not in use. Always keep the door-swing area clear.

1.3 Setup Complete Checklist

- Rack is positioned in a climate-controlled location, with 300mm/12” of clearance on each side and rear panels accessible.
- Ambient temperature is stable, between 18° and 28°C.
- Leveling feet are supporting the load of the rack, and equipment is level
- All units on the rack are mounted with at least 4 front mounting screws to the 19” rack brackets
- Thermal Chambers, Channel Modules and the UPS are supported with a rear bracket on the 19” rack
- All mounting screws have been re-tightened (screws can loosen during shipping or movement)
- All power connections are made and snugly seated
- All communications cables are attached between all Control Modules and Channel Modules.
- PC is connected via Ethernet to the Control Module using a standard CAT6 shielded cable.
- Grounding line is attached from the rear lower corner of the rack to an earth ground point in the facility.

I certify that all instructions have been understood and followed. The checklist is complete.

Name (print)

Signature

Date (dd-mmm-yyyy)

 Congratulations! You're fully charged and ready to start your UHPC journey! 



Getting started with UHPC: *Running your first tests*

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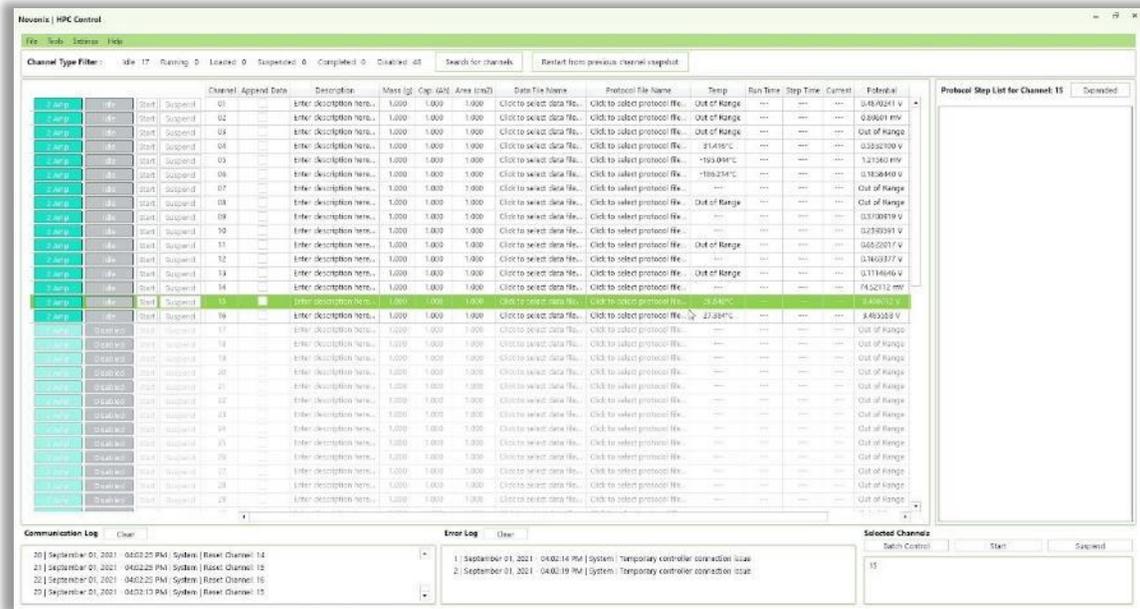
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Running Your First UHPC Test

1.1 Software Initialization

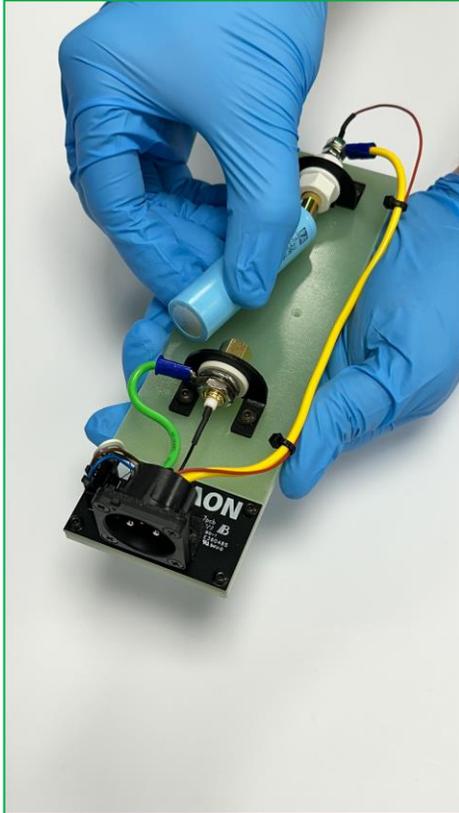
Open UHPC-Control and verify that all the testing channels expected are available. Allow up to 30s for channels to connect and initialise.



If there are channels that are expected, but are missing or have failed to initialise, refer to Troubleshooting. If the problem persists, contact NOVONIX customer support at BTS-Support@novonixgroup.com

1.2 Installing a Cell and loading to Thermal Chamber

Load a test cell to a cell holder appropriate for its form-factor. On cylindrical and coin cell holders, cells are held in position by spring loaded pogo pins.



Note: After inserting the cell holder, if the voltage and temperature readings do not appear, apply slight pressure to the rear of the cell holder to ensure individual voltage and temperature contacts are mated properly.

Set the Thermal Chamber temperature as desired using the buttons on the Watlow controller; refer to the software manual for remote temperature control options.



For best results, allow the temperature of the thermal chamber to stabilize before starting any tests.

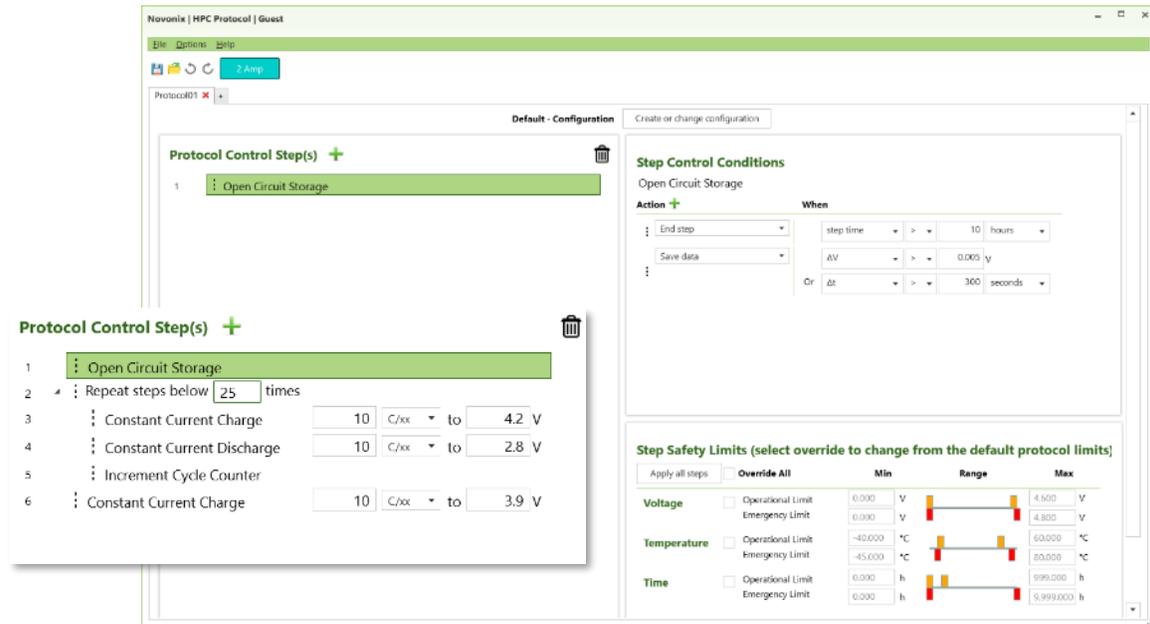


NOTE: NOVONIX standard thermal chambers are designed to reach temperatures up to 60°C, prioritizing temperature stability, accuracy, and product longevity. These chambers are not intended for rapid temperature ramping, as it would compromise stability and accuracy, both critical for reliable UHPC measurements.

The chambers use thermoelectric Peltier coolers, which are protected by a thermal reset switch to prevent them from operating at temperatures above ~40°C. If a test involves a setpoint higher than 40°C and the next step requires cooling, the chamber will cool passively until the internal temperature drops below 40°C, at which point the coolers will reactivate.

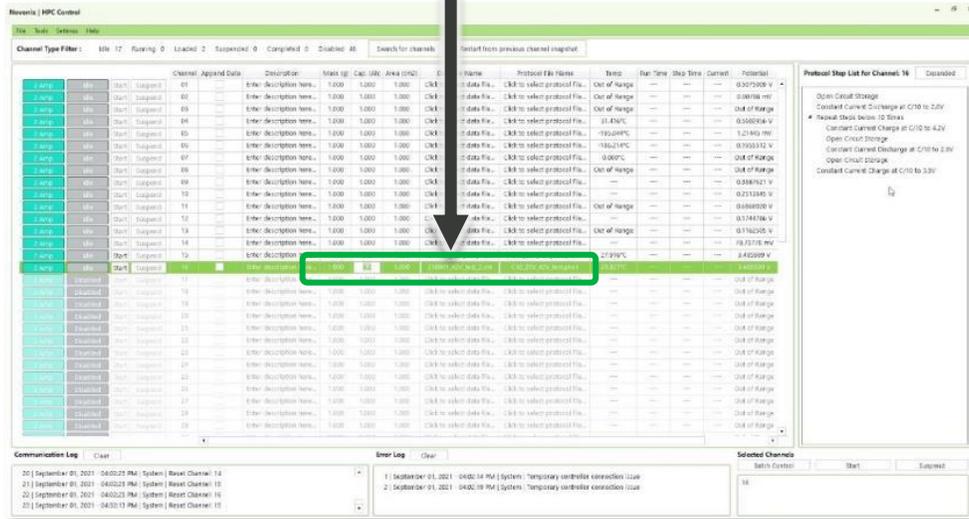
1.3 Prepare, Load and Start Test Protocol

UHPC-Protocol is used to write a sequence of steps, or *protocol*, for your test. Detailed information on writing a protocol can be found in the Software Manual in the [NOVONIX UHPC Software](#)

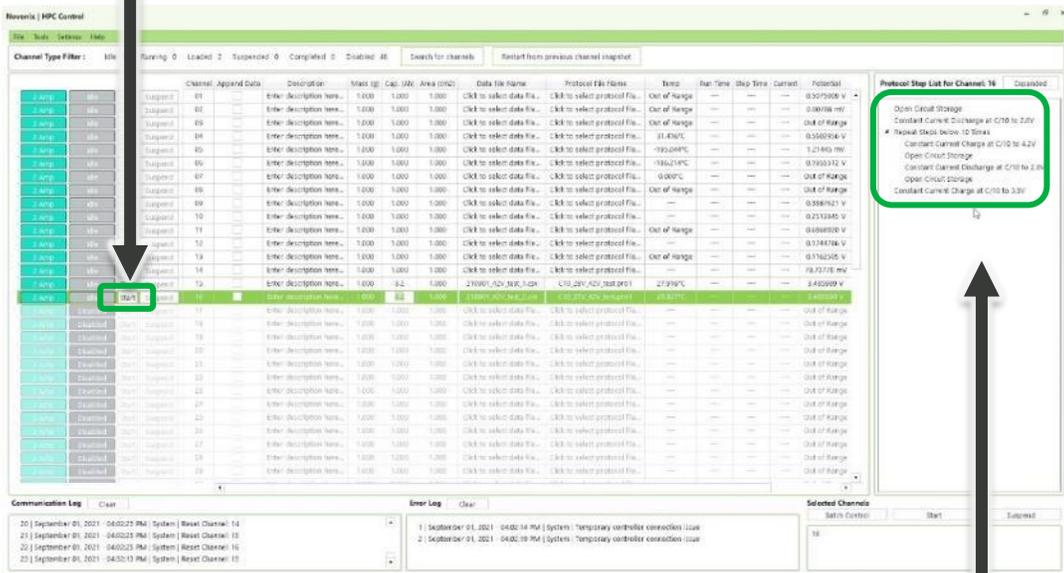


Open UHPC-Control and load the protocol by double clicking the “Protocol File Name” cell for the channel hosting the sample we prepared in the last step.

Update the information in other fields for your cell; enter the cell capacity in Ah, the mass and the specify the file for the output data to be saved to



Click “Start” on the chosen channel to start the test.



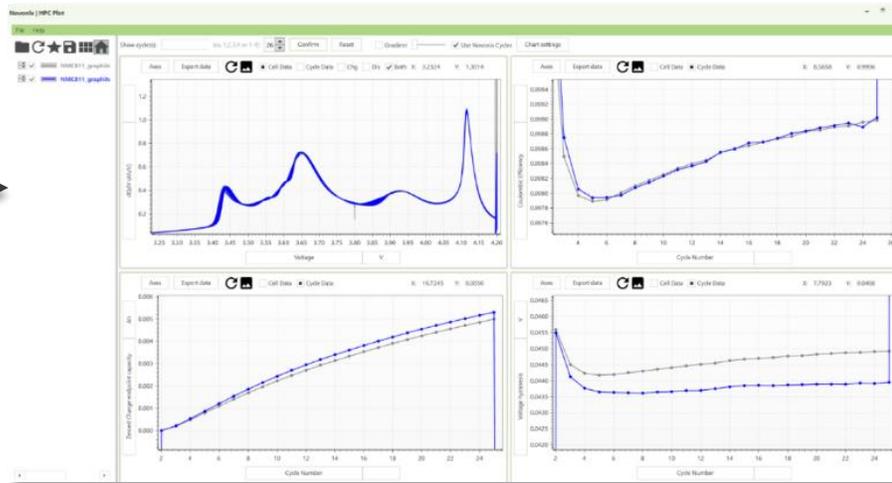
Often, protocols will begin with an Open Circuit Storage step – with the channel selected, the loaded protocol is previewed in the right-hand pane. You can skip a step by right-clicking on the step you’d like to jump to and selecting “Jump to...” from the context menu.

Allow the test to run as long as you’d like. Upon completion, testing will automatically stop or stop the test at any time using the controls available.

1.4 View and Export Testing Data

UHPC-Plot allows the user to analyze data generated by the UHPC-Control. After opening UHPC-Plot, find the datafile generated during the previous step and load it.

UHPC-Plot GUI allows viewing test data



The screenshot shows the 'Export data' dialog box in the UHPC-Plot software. It features a 'Saved data output units:' dropdown set to 'mAh' and a 'Reference cycle number:' dropdown set to '2'. Below these are sections for selecting data to export, categorized by file type: 'One multi-call file will be written for each of the checked options', 'One file will be written per call for each of the checked options', 'One multi-call file will be written for each of the checked options', and 'One multi-column file will be written per call for each of the checked options'. Each section contains a list of data series with checkboxes, such as 'Charge capacity vs. cycle number', 'Discharge capacity vs. Time', 'Coulombic efficiency vs. Time', etc. A 'Generate Data' button is visible at the top right of the dialog.

Export data and metrics for further analysis



Need Assistance?

Go to our Customer Area



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