



Operator's Manual

SeaPower™

KPPS016 Charger Documentation

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1 Introduction

This manual provides instructions for operating the graphical user interface (GUI) of the **KPPS016**. It is intended for technically proficient users and assumes the charger is already physically installed, powered on, and commissioned according to the installation procedures referenced in the **KPPS016 Installation Manual**.

The GUI enables the operator to monitor system status, connect to SeaPower batteries, and perform charge, discharge, balancing, and maintenance functions. It also provides access to heater control, data logging, plotting, and error management features.

The content in this manual is targeted to:

- **System integrators** embedding or staging the charger in a host platform or facility
- **Field technicians** responsible for charger operation and battery connection
- **Engineering and QA personnel** performing commissioning validation, system monitoring, or troubleshooting

All procedures in this manual are specific to **SeaPower BM57V311** battery systems. Use with any other battery type is not supported and may result in unsafe conditions or equipment damage.

2 Commissioning the Charger (First Time Use Only)

Before using the KPPS016 Charger for the first time, it must be commissioned by configuring a set of controlled parameters in the GUI to safely initialize the system. This process should be completed **only once** during initial setup.

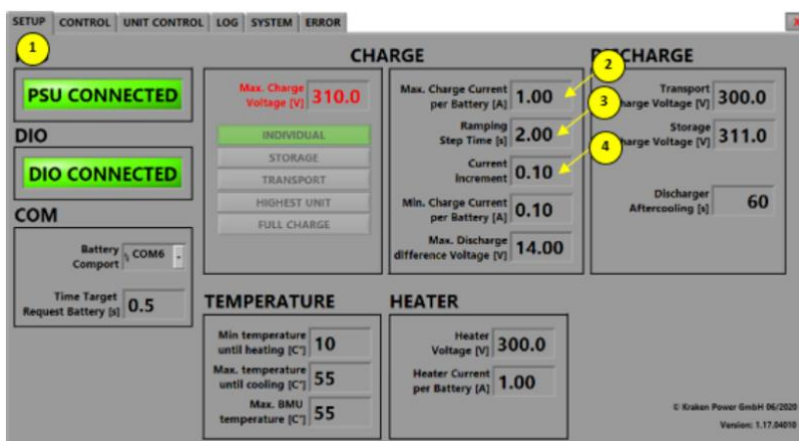
⚠ Commissioning should be performed only by qualified personnel. Improper values may result in incorrect behavior or failure to complete a safe charging cycle.

⚠ Ensure the batteries are properly cooled before and during charging or discharging. Please see corresponding battery ICD for operational limits.

2.1 Steps for Commissioning

Ensure the following:

- Fully installed and powered up.
- The Operation Selector is in **Standby (Position 0)**.
- The GUI software is running and responsive.



Follow these steps:

1. Open the **SETUP** tab from the main GUI screen.
2. Set **Maximum Charge Current per Battery** to **1.0 A**.
3. Set **Ramping Step Time** to **2 seconds**.
4. Set **Current Increment** to **0.1 A**.
5. Confirm that all values are correctly entered and saved.
6. Restart the GUI software to set all parameters back to default.

3 System Readiness

Before operating the KPPS016 Charger via the GUI, ensure the charger is correctly prepared and safe to use. This manual assumes the charger is already physically installed, powered on, and commissioned according to the installation procedures referenced in the **KPPS016 Installation Manual**.

The following conditions must be met:

3.1 Charger Power State

- The charger must be **powered ON** using the **Main Power Switch**.
- The **PSU Power Switch** must remain in the **ON** position at all times.
- The **Operation Selector** should be set to **Position 0: Standby** before and during all battery connection or disconnection operations.

3.2 Physical Connections

- Battery **power** and **communication** cables must be securely connected following the procedures in the installation manual.
- Ensure all connectors are:
 - Fully seated and latched.
 - Free of mechanical strain or sharp bends.
 - Dry and free from contamination.

3.3 GUI Startup

- Upon powering the charger, the GUI software will **start automatically** on the charger's integrated monitor.
- The GUI will open to the **SETUP** tab by default, displaying system status indicators for:
 - PSU connection
 - Digital I/O connection
 - COM port connection to batteries
- All indicators should show **green** before proceeding.

3.4 Safety Verification

- Confirm that the work area is clear of unauthorized personnel.
- Ensure battery cooling requirements are met (refer to battery ICD for operational limits).
- Verify that all emergency stop procedures are known to the operator.

Once these conditions are satisfied, the charger is ready for GUI-based operations such as battery connection, charging, discharging, or maintenance functions.

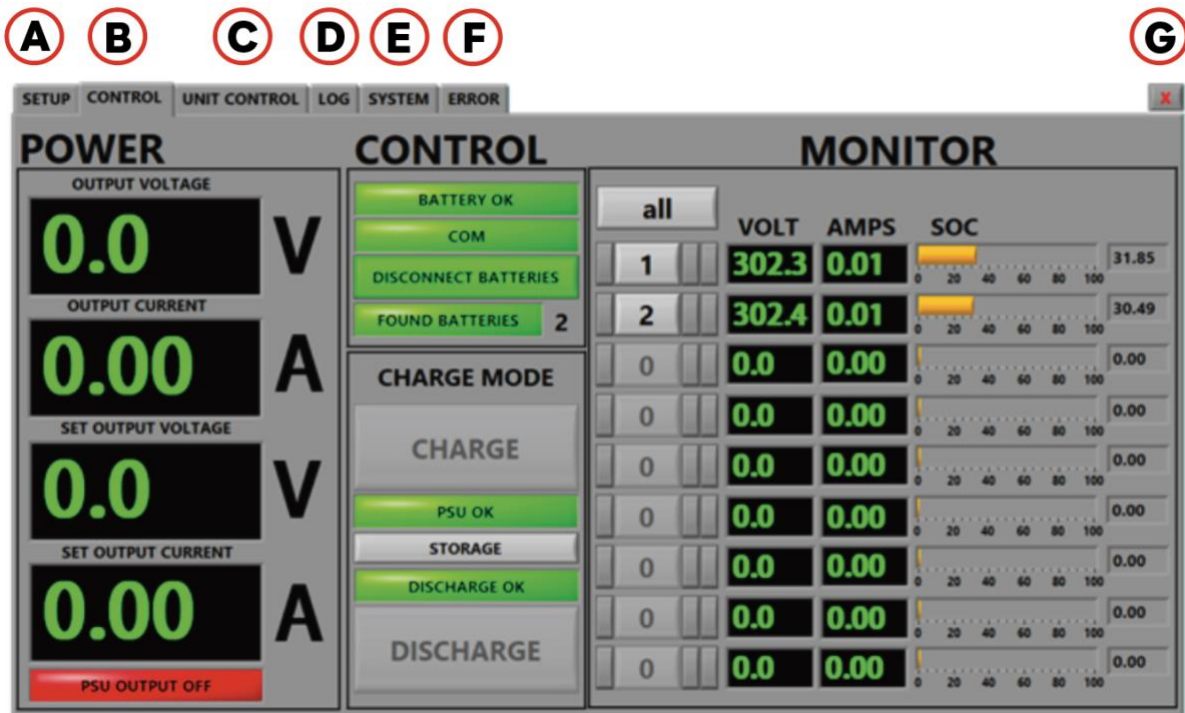
4 GUI Layout and Navigation

The KPPS016 Charger's graphical user interface (GUI) provides centralized access to all operational controls, monitoring functions, and maintenance tools. Operators can navigate between dedicated tabs to perform specific tasks such as connecting to batteries, starting charge or discharge processes, controlling heaters, balancing cells, and managing data logging.

4.1 GUI Access

- The GUI launches automatically when the charger is powered ON.
- It is displayed on the charger's integrated **monitor and keyboard** or operated via an external display/keyboard if configured.
- Interaction can be performed via:
 1. Touchscreen (if equipped)
 2. Trackpad/mouse
 3. Keyboard input

4.2 GUI Tabs Overview



The GUI is divided into six functional tabs:

	Section	Tab	Function
A	3.1	SETUP	Configure system parameters such as charge voltage, current limits, and temperature thresholds. View connection status indicators.
B	3.2	CONTROL	Connect to batteries, start and stop charging or discharging, and view basic battery status.
C	3.3	UNIT CONTROL	View detailed per-battery parameters, control heaters, and enable cell balancing.
D	3.4	LOG	Enable and configure real-time plotting and data logging of voltage, current, and temperature.
E	3.5	SYSTEM	View detailed BMS data for each connected battery.
F	3.6	ERROR	View and, when possible, clear system or battery errors.
G	3.7	EXIT	Click to exit the GUI application.

4.3 Navigation Conventions

- Tabs are accessed by clicking the tab label at the top of the GUI window.
- **Action buttons** within each tab change color to indicate state (e.g., **green** for active, **grey** for inactive, **yellow blinking** for in-process).
- **Status indicators** use consistent colors across all tabs:
 - **Green:** Normal operation
 - **Red:** Error detected
 - **Blue:** Condition preventing operation (e.g., battery temperature too low)

 These conventions ensure consistent navigation and quick recognition of system status across all operational tabs.

5 GUI Tab Overview

5.1 SETUP Tab

The **SETUP** tab provides system configuration controls and status indicators. It is used to verify connections, adjust operating limits, and set predefined voltage or current profiles.

Ref	Feature	Description
A	PSU Connection Status	Displays connection status of the charger's power supply unit.
B	Digital I/O Expander Status	Indicates status of the digital input/output module.
C	COM Port Connection Status	Shows communication status with battery units.
D	Status Update Interval	Configurable time period for status updates.
E	Maximum Charge Voltage	Configurable maximum voltage per charge cycle.
F	Voltage Presets	Quick selection for storage, transport, full charge, etc.
G	Minimum Charge Temperature	Temperature threshold to charge without heater.
H	Maximum Battery Operating Temperature	Configurable limit for battery operation.
I	Maximum BMU Operating Temperature	Configurable limit for BMU operation.
J	Maximum Charge Current per Battery	Configurable current limit per unit.
K	Ramping Step Time	Time between current increment steps.
L	Charge Current Increment Steps	Increment value for adjusting charge current.
M	Minimum Charge Current	Threshold below which charging will terminate.
N	Maximum Allowed Voltage Difference	Maximum cell-to-cell voltage variation allowed after charging.
O	Heater Voltage Setpoint	Control voltage supplied to battery heaters.
P	Heater Current Setpoint	Control current supplied to battery heaters.
Q	Discharge Cut-off Voltage (Transport)	Preset target voltage for transport discharge.
R	Discharge Cut-off Voltage (Storage)	Preset target voltage for storage discharge.
S	Discharge Unit Cooldown Time	Configurable time for discharge unit cooling.
T	Charger Firmware Version	Displays current charger firmware version.

5.2 CONTROL Tab

The **CONTROL** tab is the primary operational interface for starting and stopping charging and discharging processes. It allows the operator to select batteries for inclusion in an operation, set discharge targets, and monitor key status indicators such as voltage, current, state of charge, and error conditions.

Ref	Feature	Description
A	PSU Voltage (Actual)	Displays live PSU voltage output.
B	PSU Current (Actual)	Displays live PSU current output.
C	PSU Voltage Setpoint	Configured target voltage for charging.
D	PSU Current Setpoint	Configured target current for charging.
E	PSU Output State	Shows PSU output status (green = on, red = off).
F	Battery Error Status	Green = all OK, red = error detected.
G	Battery Communication Status	Communication health between charger and batteries.
H	Connect Batteries Button	Initiates handshake with battery BMS units.
I	Number of Batteries Found	Displays total detected units.
J	Charger State	Indicates charging, discharging, or standby mode.
K	Start Charging Button	Activates charging for selected batteries.
L	PSU Error Status	Green = PSU OK, red = PSU fault.
M	Discharge Voltage Level Selector	Choose storage or transport discharge voltage.
N	Discharge Readiness Indicator	Confirms discharge load bank is ready.
O	Start Discharge Button	Activates discharge for selected batteries.
P	Include All Batteries Button	Selects all detected batteries for operation.
Q	Discharge Level Indicator	Green = target discharge voltage reached.
R	Battery Selection Indicator	Toggle individual battery inclusion/exclusion.
S	Battery Error Indicator	Green = OK, red = fault.
T	Battery Temperature Range Indicator	Blue = too cold, red = too hot.
U	Battery Voltage Display	Voltage of each connected battery.
V	Battery Current Display	Current of each connected battery.
W	State of Charge (SOC) Bar	Visual SOC indicator.
X	SOC Value (Numeric)	Numeric SOC percentage.

5.3 UNIT CONTROL Tab

The **UNIT CONTROL** tab provides detailed monitoring and control for individual batteries within the connected system. Operators can view specific voltage, temperature, and BMS data for a selected battery, as well as enable or disable its heater and balancing functions.

Ref	Feature	Description
A	Battery System Voltage	Voltage measured at system level.
B	Battery Voltage	Voltage of the selected unit.
C	Battery Current	Current draw or charge of selected unit.
D	Switch Heater OFF	Deactivates internal battery heater.
E	Switch Heater ON	Activates internal battery heater.
F	Switch Balancer OFF	Deactivates internal battery balancer.
G	Switch Balancer ON	Activates internal battery balancer.
H	Heater Status	Indicates whether heater is active.
I	Balancer Status	Indicates whether balancer is active.
J	Selected Battery ID	Displays selected unit's ID.
K	Discharge Cut-off Voltage Status	Green = reached, otherwise ongoing.
L	Battery Selector	Choose battery to display in this tab.
M	Battery Error Indicator	Visual alert for battery faults.
N	Battery Temperature Indicator	Blue = too cold, red = too hot.
O	Maximum Cell Voltage Difference	Largest voltage variation between cells.
P	BMS Temperature	Temperature of the battery's BMS.
Q	Internal Battery Temperature	Internal temperature reading.
R	Active Balancing Indicator	Shows which cells are actively being balanced.
S	Battery Temperature Status	General battery temperature state.
T	BMS Status	Operational state of the BMS.
U	Individual Cell Voltages	Voltage for each cell in the battery.
V	Calculated Battery Voltage	Derived from individual cell voltages.

5.4 LOG Tab

The **LOG** tab is used for both real-time plotting and historical logging of battery data. Operators can visualize voltage, current, and temperature trends during operation, and record these parameters for later review, troubleshooting, or maintenance reporting.

Ref	Feature	Description
A	Start/Stop Logging	Enables or disables recording of operational data.
B	Open Voltage Chart	Displays battery voltage over time.
C	Plot Legend	Identifies data series on charts.
D	Graph Toolbar	Tools for zoom, scale, and navigation.
E	Open Current Chart	Displays charge/discharge current over time.
F	Open Temperature Chart	Displays temperature data over time.
G	Logging Interval	Sets frequency for recorded data points.
H	Data Status	Indicates if logging is active.
I	Plotting Chart Area	Displays selected real-time data.
J	Time Scrollbar	Scroll through chart data.
K	Communication Status	Displays logging communication link with batteries.
L	Start/Stop Plotting	Activates or stops real-time plotting of selected parameters.

5.5 SYSTEM Tab

The **SYSTEM** tab displays detailed BMS parameters for each connected battery. It allows operators to navigate through multiple units and review internal operating values that are not shown in higher-level control screens.

Ref	Feature	Description
A	BMS Parameters Display	Shows all reported BMS parameters for selected battery.
B	Previous Unit Button	Scrolls to previous battery unit.
C	Next Unit Button	Scrolls to next battery unit.
D	Parameter Scrollbar	Navigate through extended BMS data list.

5.6 ERROR Tab

The **ERROR** tab lists active and historical faults detected by the charger or connected batteries. From this tab, operators can review time-stamped error details, clear certain faults once conditions are resolved, and determine when maintenance or technical support is required.

Ref	Feature	Description
A	BMS Error List	Displays all errors reported by the battery BMS.
B	Clear Errors Button	Clears active errors when conditions are resolved.
C	Error Scrollbar	Navigate through full list of recorded errors.

6 Connecting to Batteries via GUI

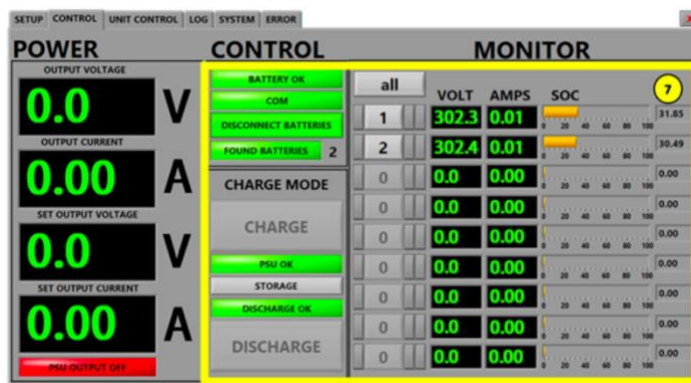
Once the charger is powered on and in **Standby (Position 0)**, the GUI can be used to establish communication with connected batteries. This step is required before any charging, discharging, balancing, or heater operations can be performed.

6.1 Preconditions

- Battery power and communication cables are securely connected following the installation manual.
- Operation Selector is set to **Standby (Position 0)**.
- After GUI startup, the **SETUP** tab shows green indicators for:
 - PSU connection
 - Digital I/O connection
 - COM port connection to batteries

6.2 Initiating Connection

1. Navigate to the **CONTROL** tab.
2. Click **CONNECT BATTERIES** to initiate the handshake between the charger and battery BMS units.
3. The **CONNECT BATTERIES** button will turn **green** once the handshake is successful.



6.3 Verifying Battery Detection

- The **Found Batteries** panel displays the number of detected units.
- Battery serial numbers will appear in the control list:
 - **Green highlight:** Battery is selected for inclusion in operations.
 - **Grey highlight:** Battery is detected but excluded from current operation.

6.4 Reviewing Initial Status

- Voltage, current, and State of Charge (SOC) bars are displayed for each connected battery.
- If the number of detected batteries does not match the physical system:
 - Click **CONNECT BATTERIES** again to retry.
 - Verify cable connections and connector condition if the issue persists.

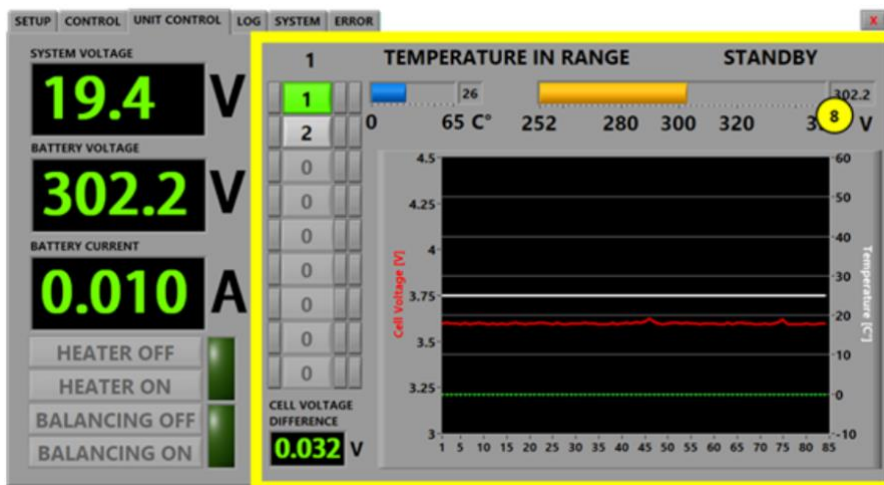
 The charger is only able to detect batteries that are communicating.

 Once battery communication is established and verified, the charger is ready for operational procedures such as charging, discharging, or maintenance functions.

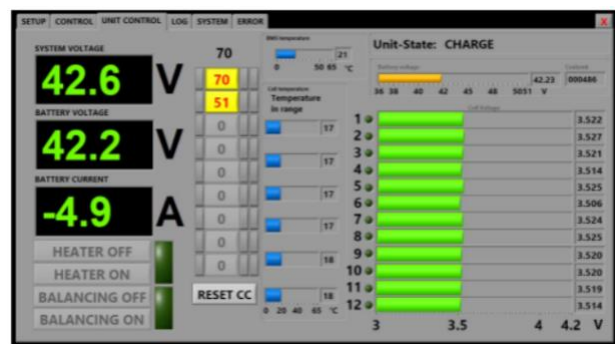
 **Before proceeding**, ensure all connector latches are fully engaged, cables are free of strain, battery parameters are within safe operating limits, and the work area is clear of obstructions.

6.5 Review Individual Battery Status

1. Navigate to the **UNIT CONTROL** tab.



2. To cycle monitoring between each battery, click on the desired unit serial number.
3. Review each battery's parameters to confirm operation within normal range.



7 Charging Procedure

The charging process is initiated and monitored through the GUI. Continuous monitoring through the GUI ensures early detection of any abnormalities, while built-in safety protections automatically halt the process if limits are exceeded. The charger will only allow charging if batteries are properly connected, the system is in Charge Mode, and all safety conditions are met.

7.1 Preconditions

- Battery communication and power cables securely connected.
- Battery handshake completed and verified in **CONTROL** tab.
- All battery parameters (temperature, voltage, SOC) are within safe operating limits.
- Operation Selector set to **Position 1: Charge**.

7.2 Selecting Batteries for Charging

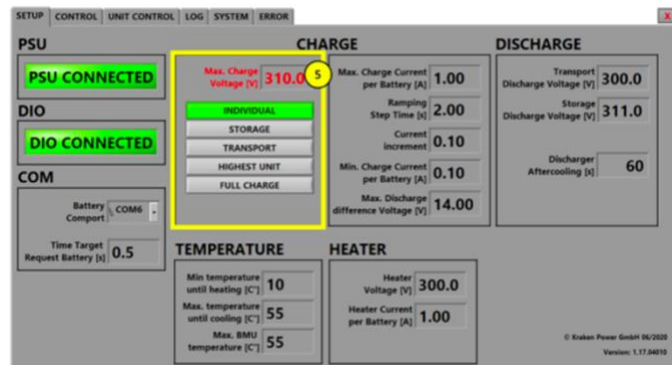
1. In the **CONTROL** tab, click the serial number of each battery to include it in the charge process.
 - **Green highlight:** Battery is included in the charge process.
 - **Grey highlight:** Battery is excluded from the charge process.
2. To select all connected batteries, click the **ALL** button.

 Batteries showing errors or out-of-limit conditions will be unavailable for selection until the issue is resolved.

7.3 Selecting Charge Voltage Profile

1. Navigate to the **SETUP** tab.
2. Choose a pre-set charge voltage profile:

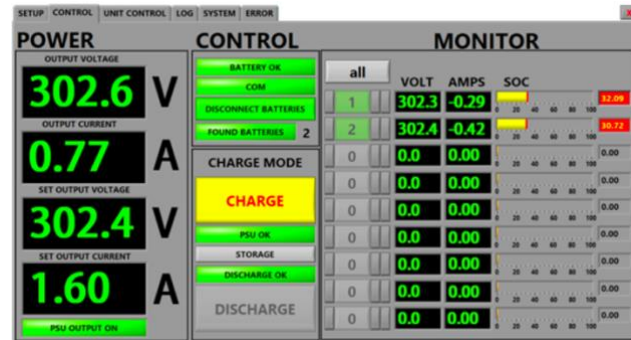
- **INDIVIDUAL:** Manually set a specific voltage.
- **STORAGE:** Preprogrammed storage voltage.
- **TRANSPORT:** Preprogrammed transport voltage.
- **HIGHEST UNIT:** Matches the highest battery voltage in the system.
- **FULL CHARGE:** Preprogrammed end-of-charge voltage.



7.4 Starting the Charge Process

The charging process is fully automated once initiated, with voltage, current, and temperature regulated according to the configured parameters.

1. Return to the **CONTROL** tab.
2. Click **CHARGE** to begin charging.
3. The **CHARGE** button will blink **yellow** while the process is active.
4. Status indicators:
 - **BATTERY OK:** Green when all selected batteries are charging normally.
 - **PSU OK:** Green when PSU is functioning normally.



- ⚠** During charging, the BMS switches the selected batteries to charge mode, the charger's relays close, and the PSU connects to the batteries. The PSU ramps the charge current to the setpoint and adjusts voltage and current automatically.

7.5 Monitoring and Stopping Charging

- Monitor SOC, voltage, and temperature in the **CONTROL** or **UNIT CONTROL** tabs.
- Charging stops automatically when:

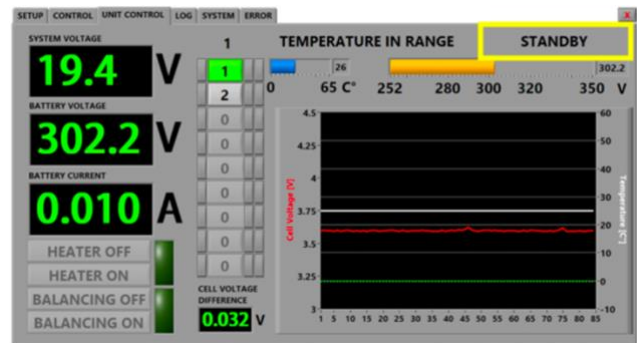
- The end-of-charge voltage is reached.
- The charge current drops to the minimum value set in the **SETUP** tab.
- To stop charging manually, click **CHARGE** again.

⚠ If there are any errors, the BMS and/or charger will interrupt the power and shut down the PSU.

7.6 Post-Charge Actions

- After charging completes, the charger automatically returns batteries to **Standby Mode**.
- Verify battery parameters before disconnecting or proceeding to another operation.

⚠ Successful completion is indicated by the charger returning to **Standby Mode**, confirming that all selected batteries have reached their intended charge state.



8 Discharging Procedure

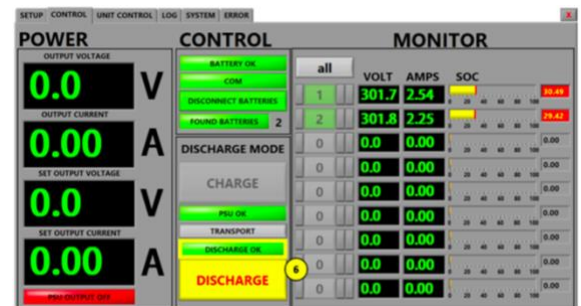
The discharging process is used to lower battery voltage to a specified transport or storage level, or to prepare batteries for maintenance. Discharging is managed entirely through the GUI and is only possible when all required safety and communication conditions are met.

8.1 Preconditions

- Battery communication and power cables securely connected.
- Battery handshake completed and verified in the **CONTROL** tab.
- All battery parameters (temperature, voltage, SOC) are within safe operational limits.
- Operation Selector set to **Position 2: Discharge**.

8.2 Selecting Batteries for Discharge

1. In the **CONTROL** tab, click the serial number of each battery to include it in the discharge process.
 - **Green highlight:** Battery is included in the discharge process.
 - **Grey highlight:** Battery is excluded from the discharge process.
2. To select all connected batteries, click the **ALL** button.
3. Batteries with active errors or out-of-limit conditions will be unavailable for selection until resolved.

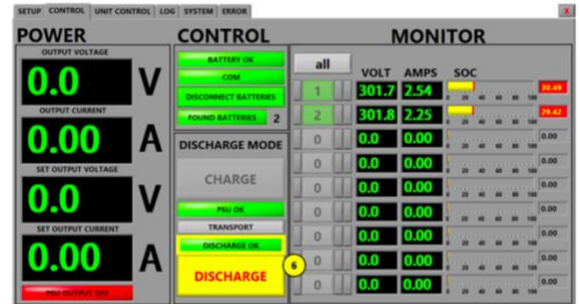


8.3 Selecting the Discharge Voltage Profile

1. In the **CONTROL** tab, choose the desired discharge target:
 - **STORAGE:** Preprogrammed storage voltage.
 - **TRANSPORT:** Preprogrammed transport voltage.

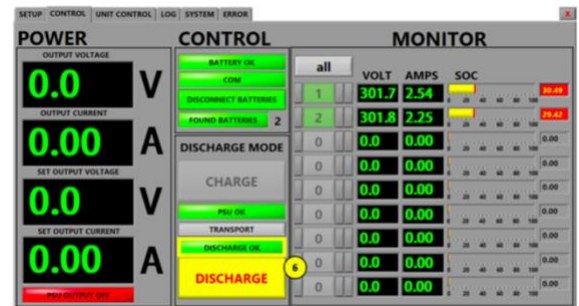
8.4 Starting the Discharge Process

1. With the desired batteries selected, click **DISCHARGE**.
2. The **DISCHARGE** button will blink **yellow** while the process is active.
3. Status indicators:
 - **BATTERY OK:** Green when all selected batteries are discharging normally.
 - **DISCHARGE OK:** Green when the resistive load is functioning correctly.



8.5 Monitoring and Stopping Discharging

- Monitor SOC, voltage, and temperature in the **CONTROL** or **UNIT CONTROL** tabs.
- To stop discharging manually, click **DISCHARGE** again.
- The discharge process stops automatically for a battery when its target voltage is reached or if the BMS detects a limit condition.



8.6 Post-Discharge Actions

- After all selected batteries have completed discharge, the charger automatically returns to **Standby Mode**.
 - Verify final battery voltages before disconnecting or proceeding to another operation.
-  System safety protections will interrupt the process if any operational limits are exceeded, and each battery's BMS can independently stop discharging when its threshold is reached.
-  Completion is confirmed when all selected batteries have met the target discharge voltage and the charger automatically returns to **Standby Mode**.

9 Cell Balancing

Cell balancing is a controlled maintenance function that ensures each cell within the battery maintains consistent voltage. This process is initiated through the GUI and monitored in real time, with automatic termination once voltage differences are resolved. Performing balancing when needed helps sustain battery capacity, improve cycle life, and maintain reliable performance.

The automatic balancing feature equalizes cell voltages within a battery and is typically required after extensive use.

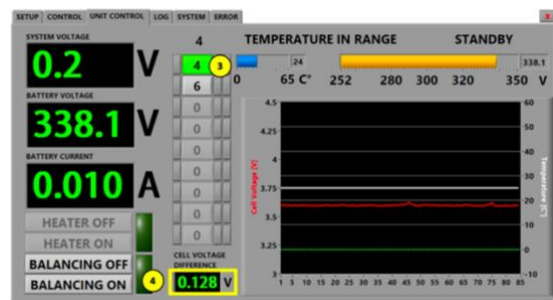
NOTE: Balancing can only be started for one battery at a time.

9.1 System Preconditions

- Battery communication and power cables securely connected.
- Battery handshake completed and verified in the **CONTROL** tab.
- Operation Selector set to **Position 0: Standby**.
- Battery is **not** actively charging or discharging.
- Any individual cell voltage is not below **3.6 V**.
- Any individual cell voltage is not above **4.1 V**.

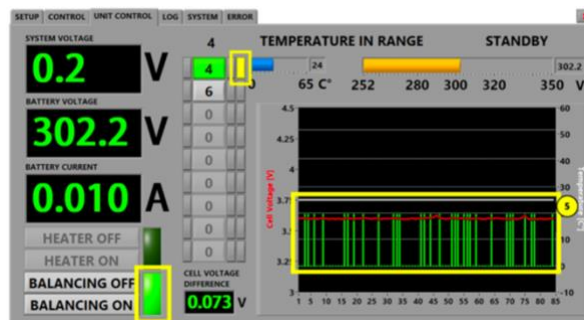
9.2 Selecting Batteries for Balancing

1. In the **UNIT CONTROL** tab, click the serial number of the battery to select it for balancing.
 - **Green highlight:** Battery is included.
 - **Grey highlight:** Battery is excluded.



9.3 Starting the Balancing Process

1. In the **UNIT CONTROL** tab, click **BALANCING ON**.
2. The GUI will show which cells are actively being balanced (vertical bars on specific cell indicators).
3. Monitor battery temperature to ensure it remains within operational limits.



9.4 Stopping the Balancing Process

- Balancing stops automatically when all cells reach the same voltage level.
- The balancing is controlled by the BMS. The process will stop automatically when all cells reach the same voltage level.
- To stop manually, click **BALANCING OFF** in the **UNIT CONTROL** tab.

9.5 Post-Balancing Actions

- Once balancing completes, review cell voltages in the **UNIT CONTROL** tab to confirm uniformity.
- Return the battery to normal standby operation or proceed with the next maintenance or operational task.

⚠ Note: Balancing a battery produces heat, requiring adequate cooling throughout the process. It is strongly recommended to perform balancing with the batteries placed in a water basin to maintain temperatures within operational limits. Refer to the corresponding battery ICD for specific temperature guidelines.

9.6 Heater Operation

The KPPS016 Charger can activate a connected battery's internal heater to raise its temperature when it is too cold for safe charging or discharging ($<10^{\circ}\text{C}$). Heater activation is controlled through the GUI and is managed by the battery's **BMS** to prevent overheating.

 This feature should only be used when no alternative heating method is available, as frequent use may reduce battery lifespan.

9.7 Preconditions

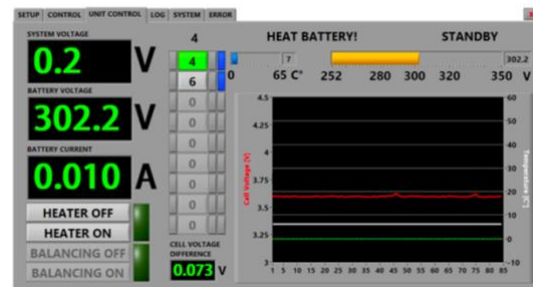
- Battery communication and power cables securely connected.
- Battery handshake completed and verified in the **CONTROL** tab.
- Battery temperature below the minimum charge/discharge threshold (indicator will appear **blue** in **CONTROL** and **UNIT CONTROL** tabs).
- Operation Selector set to **Position 1: Charge** (required for heater operation).

9.8 Selecting Batteries for Heating

1. Navigate to the **UNIT CONTROL** tab.
2. Click the serial number of the battery you wish to heat.
 - **Green highlight:** Battery selected.
 - **Grey highlight:** Battery excluded.

9.9 Starting the Heater

1. In the **UNIT CONTROL** tab, click **HEATER ON**.
2. The PSU will supply power to the heater circuit, and the battery's temperature indicator will blink to show heating is active.
3. Monitor battery temperature to ensure it is rising steadily.



9.10 Stopping the Heater

- The heater stops automatically when the battery temperature reaches **30 °C**.
- To stop manually, click **HEATER OFF** in the **UNIT CONTROL** tab.

9.11 Post-Heating Actions

- Once the battery reaches the desired temperature, verify that all indicators return to normal operating status.
- The battery is now ready for charging, discharging, or other operational tasks.

 The heater function provides controlled warming of a battery when ambient or internal temperature falls below operational limits. Managed by the BMS, this process stops automatically at safe temperature thresholds and should be used sparingly to minimize thermal stress on the battery and preserve service life.

10 Data Plotting

The data plotting function provides real-time graphical monitoring of battery voltage, current, and temperature during operation. Plots can be used to observe trends, verify charging or discharging behavior, and detect abnormal conditions.

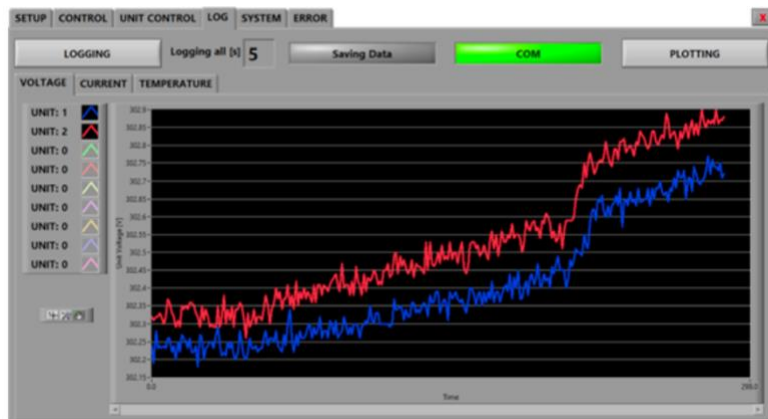
10.1 Preconditions

- At least one battery is connected and communicating with the charger.
- The charger is powered on and the GUI is active.
- Operation Selector may be in any mode, depending on the monitoring requirement.

10.2 Enabling Data Plotting

1. Navigate to the **LOG** tab.
2. Click the **PLOTTING** button to start real-time data plotting.
3. Select the desired data view:

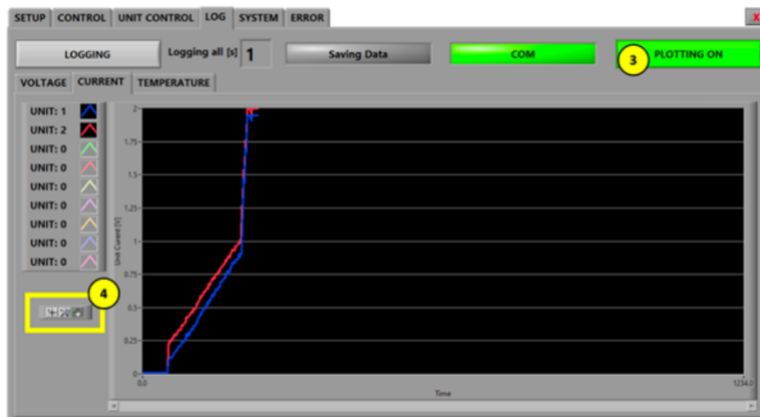
- **VOLTAGE:** Displays cell or pack voltage data over time.
- **CURRENT:** Displays charge or discharge current over time.
- **TEMPERATURE:** Displays battery temperature profile over time.



 The graph time axis is not defined. The update rate is roughly 1 Hz.

10.3 Using Chart Tools

- Use the chart scale controls to zoom in or out on the displayed data range.
- Scroll horizontally to review earlier data points during active plotting.
- Right-click on the chart for additional options such as clearing the chart or exporting the view.



10.4 Stopping Data Plotting

- Click **PLOTTING** again to stop real-time plotting.
- Data captured during plotting is not automatically saved; use the logging function (Section 10) to record data.

⚠ Data plotting provides the operator with a live visual representation of battery performance metrics, enabling quick trend analysis and operational verification. While valuable for monitoring, plotting does not retain historical data as logging must be enabled to preserve records for later review.

11 Data Logging

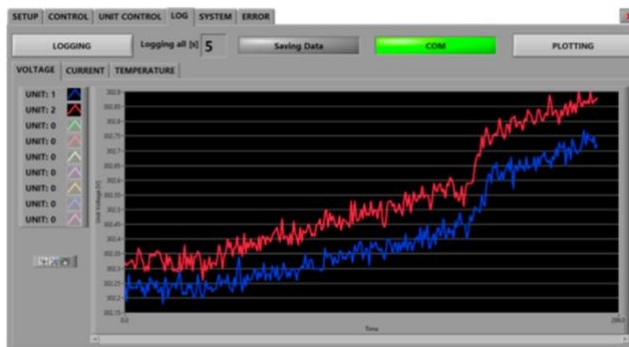
The data logging function records battery voltage, current, and temperature values to files on the charger's internal computer for later analysis. Logged data can be exported for reporting, diagnostics, or maintenance records.

11.1 Preconditions

- At least one battery is connected and communicating with the charger.
- The charger is powered on and the GUI is active.
- Operation Selector may be in any mode, depending on the monitoring requirement.

11.2 Enabling Data Logging

1. Navigate to the **LOG** tab.
2. Adjust the **Logging Interval** if needed to set the frequency of recorded measurements.
3. Click **LOGGING** to start recording data.
4. A **Saving Data** indicator will flash green while logging is active.



11.3 Accessing and Exporting Data

- Each logging session is stored in a new folder under:
C:\Charger Log\[Date and Time]
- Files are in text format and can be opened with spreadsheet software (e.g., Microsoft Excel) or a text editor.
- To export data, copy the log folder to a USB storage device connected to the charger's USB port.

11.4 Stopping Data Logging

- Click **LOGGING** again to stop recording data.
- Closing the charger GUI automatically ends any active logging session.

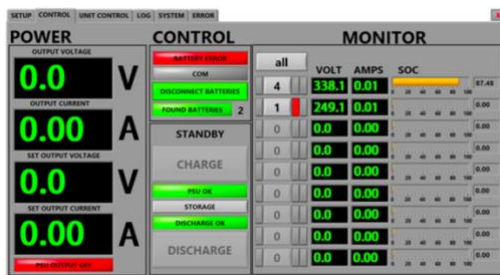
12 Error Management

The KPPS016 Charger continuously monitors both its internal systems and connected batteries for fault conditions. Detected errors are reported in real time through the GUI, allowing the operator to take corrective action before continuing operation.

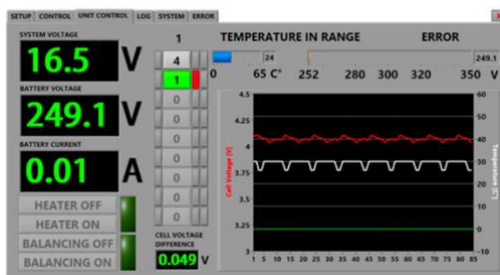
12.1 Error Indicators

Error status can be observed in multiple GUI locations:

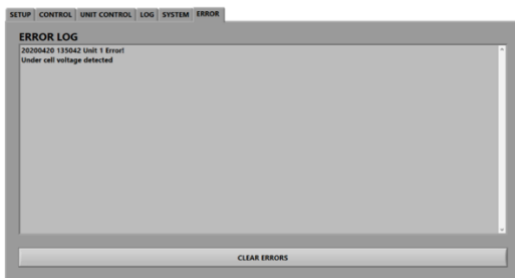
- **CONTROL tab:** Displays high-level battery and PSU status indicators.



- **UNIT CONTROL tab:** Shows battery-specific error icons and temperature alerts.



- **ERROR tab:** Lists detailed fault descriptions with time stamps.

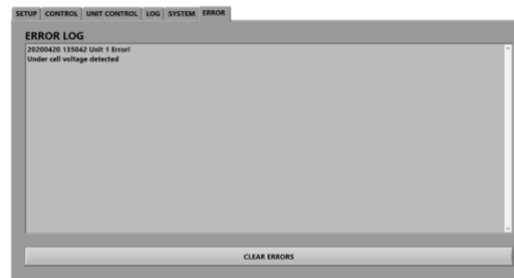


Indicator color codes:

- **Green:** No fault condition present.
- **Red:** Fault condition detected; operation is disabled until resolved.
- **Blue:** Non-fault condition preventing operation (e.g., temperature below limit).

12.2 Viewing Errors

1. Navigate to the **ERROR** tab for a complete list of active faults.
2. Review each entry for:
 - Fault source (BMS or PSU)
 - Error description
 - Time and date of occurrence



12.3 Clearing Errors

- To clear errors, click **CLEAR ERRORS** in the **ERROR** tab.

 Some errors can only be cleared after the underlying condition is resolved (e.g., temperature returns to acceptable range).

 Critical faults may require the battery to be disconnected or the charger restarted.

12.4 Common Firmware-BMS Triggered Errors

Examples of errors that may be reported by the battery's BMS include:

- Over-voltage or under-voltage on one or more cells
- Over-temperature or under-temperature during charge/discharge
- Over-current conditions
- Relay or sensor faults

 Automatic safety protections ensure that charging or discharging is halted if critical limits are exceeded.

12.5 Common Errors

Error	Description
Cell Undervoltage	One or more cells have dropped below the minimum allowed voltage.
High Temperature Battery Error	Battery temperature has exceeded the allowable limit during operation.
Discharge Error	Resistive load is overheated or switched off during discharge.
Current Sensor Not Responding	BMS cannot detect input from the current sensor.
Charge Relay Defect	BMS detects fault in the charge relay circuit.
Discharge Relay Defect	BMS detects fault in the discharge relay circuit.
Heater Relay Defect	BMS detects fault in the heater relay circuit.
Overcharge Current Detected	Charge current exceeded maximum safe value.
Over-discharge Current Detected	Discharge current exceeded maximum safe value.
Pre-charge Error	Fault during pre-charge sequence.
Dead Short Error	Detected short circuit condition on output terminals.
Over Cell Voltage Detected	One or more cells exceeded maximum voltage limit.
Under Cell Voltage Detected	One or more cells dropped below minimum voltage limit.
Over Discharge Temperature	Battery temperature above limit during discharge.
Under Discharge Temperature	Battery temperature below limit during discharge.
Over Charge Temperature	Battery temperature above limit during charge.
Under Charge Temperature	Battery temperature below limit during charge.
System Voltage Sensor 1 Not Responding	BMS cannot detect signal from system voltage sensor
System Voltage Sensor 2 Not Responding	BMS cannot detect signal from system voltage sensor
Battery Voltage Sensor Not Responding	BMS cannot detect signal from battery voltage sensor.

12.6 When to Contact Support

If an error persists after corrective actions are taken:

- Record the error details and log files.
- Disconnect the affected battery from the system.
- Contact Kraken technical support with the recorded information for further assistance.

Error management through the GUI enables quick detection, diagnosis, and resolution of both charger and battery faults. By monitoring indicators and reviewing error logs, operators can maintain safe operation and minimize downtime.

13 Charger Troubleshooting Table

Problem	Cause	Resolution
PSU not connected	• The PSU was not switched on before the GUI started. • The PSU IP setup has an incorrect IP address. • The hardware communication connection is loose or unstable.	• Switch the PSU on. • Set the PSU IP address to 10.10.10.129. • Check communication cable and connectors.
Batteries cannot communicate with charger	• The hardware communication connection is loose or unstable.	• Check communication cable and connectors.
Batteries won't charge	• Battery temperature is too high or too low. • Power cable to batteries is not connected or is loose. • The PSU is switched off.	• Heat or cool the batteries. • Check power cable and connectors. • Switch on the PSU.
Batteries won't discharge	• Battery voltage is too low. • Battery temperature is too high or too low. • Power cable to batteries is not connected or is loose. • Resistive load overheated.	• Charge the batteries. • Heat or cool the batteries. • Check power cable and connectors. • Cool down resistive load.

15 Charger Shutdown

To shut down the charger:

1. Click the **X** button in the top right corner to exit the GUI application.
2. Shut down Windows OS.
3. Turn the main power switch to **OFF** on the charger.

16 Legal Notices & Contact Information

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