KRI PWS Control

Operation Manual

Software control GUI for KRI / Kaufman & Robinson
RS-232 / RS-485 power-supply controllers

Software version	V 1.028 (datalogging build)
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Document control

Revision	Date	Description	Author
1.0	17 June 2026	Initial release of the Operation Manual for software V 0.974.	BeamTec GmbH
1.1	18 June 2026	Added the log-file review (section 13.3); updated for software V 0.977.	BeamTec GmbH
1.2	18 June 2026	Added recording playback onto the panel (section 13.4) with the verbund beam fix; updated for software V 0.984.	BeamTec GmbH
1.3	22 July 2026	Rewrote chapter 9 (SIM / LIVE / RS232 ACTIVE, first connection and COM-port selection); plot chapter updated for the four rastered axes and the trailing stop; figures renewed from a real recorded run.	BeamTec GmbH
1.4	23 July 2026	Adaptive CSV logging (deadband / burst / heartbeat, pre-roll), setpoint recipes with export/import, plot state markers and poll-health readout.	BeamTec GmbH
1.5	24 July 2026	Beam / discharge / emission “good” signals (RS-232 BEAM?/DIS?/EMISSION? criteria) and a stricter Process-Good — plot markers (including their “not good” transitions) and CSV columns; the Accel-mAmp-Limit warning now lights live; SIM discharge-strike ignition; new figures from real process runs; plus a start-up safety disclaimer and Direct USB preselected when served over the web. Updated for software V 1.028.	BeamTec GmbH

This manual describes the **KRI-PWS-Control-log.html** application (the variant with data logging and live plotting). The software version is shown in the application header and is recorded in the file **CHANGELOG.md**. Most screenshots were produced in the built-in simulation (SIM) mode; the cover, the plot figures and the log-review figures show a real KSC1202 run recorded with this software.

Disclaimer and conditions of use

Please read this notice before using the software. The software is provided “as is”, without warranty of any kind. It controls real high-voltage power-supply equipment and writes configuration data to connected units over a serial line.

- **Use at your own risk.** The operator is responsible for the safe state of the equipment, the vacuum system and all interlocks before any output is enabled. Remote operation removes the operator from the machine.
- **Data may be corrupted.** Reading, writing, backing up or restoring a device configuration over RS-232 / RS-485 can fail or be interrupted — for example by a lost connection, a wrong remote mode, a rejected command or a power event. This can leave the controller with an incomplete or incorrect parameter set. Always verify the values on the unit after a restore, and keep a known-good backup file (.kri) of every machine.
- **Verify before you rely on it.** Displayed values reflect what the software last read or sent; confirm critical setpoints on the physical unit before running a process.
- **No liability.** BeamTec GmbH accepts no liability for any direct or indirect damage, loss of data, process downtime or injury arising from the use or misuse of this software.
- **Simulation.** The SIM mode does not drive hardware and is intended for training and configuration only.

By installing or using the software you accept these conditions.

Table of contents

1 Introduction

1.1 About this manual

This Operation Manual explains how to install, start and operate the KRI PWS Control software — a single-file browser application that reproduces the front panel of KRI / Kaufman & Robinson ion-source and filament/discharge power-supply controllers and drives them over a serial line (RS-232 / RS-485).

It is intended for process engineers, equipment technicians and service staff who set up, monitor or remotely operate these controllers.

1.2 What the software does

KRI PWS Control turns a PC into a software replica of the controller front panel. It lets you:

- view and change the device setpoints (gas flows, beam, accelerator, discharge, emission, neutralizer …) on a faithful on-screen panel;
- read live values back from a connected unit over RS-232/RS-485;
- save and restore the complete device configuration as a portable backup file (.kri);
- log measured values to CSV and watch them on a live strip-chart;
- exercise everything offline, with no hardware, in a built-in simulation (SIM) mode.

1.3 Operating principle

SIM vs. LIVE. The application runs in one of two transport modes. In **SIM** it simulates a virtual controller — ideal for training and for preparing configurations without hardware. In **LIVE** it talks to a real unit over a serial port. The on-screen panel, the LCD and the indicators behave the same way in both modes; only the data source differs.

The GUI is the remote. In LIVE mode the software acts as the RS-232 remote of the unit. Setpoints can be written only when the unit is switched to remote control (see chapter 10). Reading values and monitoring is always possible.

Figure 1. Main window (SIM): device panel on the left, control rail on the right. Example: the KSC-LFN_INC RS-485 rack.

2 Safety and intended use

Warning — high voltage. These controllers drive ion-source and filament/discharge power supplies that generate dangerous voltages and currents. The software can switch outputs on and change setpoints on a live machine. Only trained personnel who understand the process and the equipment hazards may operate it.

- Make sure the connected hardware, vacuum system and interlocks are in a safe state before enabling any output.
- Remote operation over a serial line removes the operator from the equipment — confirm that no one is working on the source before you enable Beam or Discharge.
- The simulation (SIM) mode is for training and configuration only and never drives hardware.
- Use the backup/restore feature to keep a known-good configuration of every machine.

3 System requirements

The application is a single, self-contained HTML file. No installation and no internet connection are required for the user interface itself.

Item	Requirement
Browser (HTML variant)	Google Chrome or Microsoft Edge (Chromium). Required for the direct serial connection (Web Serial). Firefox / Safari cannot drive the serial port directly.
Operating system	Windows 10/11 (also macOS / Linux for SIM and for the Web-Serial connection in Chrome/Edge).
Serial interface	A free COM port — USB-to-RS-232/RS-485 adapter to the controller.
Locked EXE (optional)	No browser or Python needed — the EXE bundles its own engine; just unzip and run.
Python (optional)	Only required for the WebSocket bridge fallback, i.e. when the browser has no Web Serial.

4 Installation and start

4.1 Single HTML file

Copy **KRI-PWS-Control-log.html** to the PC and open it in Chrome or Edge (double-click). SIM mode works immediately. For LIVE operation, see chapter 9.

4.2 Locked Windows EXE

For customer hand-over a locked Windows application is available. Unzip the delivered folder and start KRI-PWS-Control.exe. It contains its own browser engine and the embedded GUI, supports the direct serial connection, and needs no Python. Menus, DevTools and source view are disabled.

4.3 Python bridge (fallback)

If a browser without Web Serial must be used, a small Python bridge (kri_pws_bridge.py, started via start_bridge.bat) relays the serial port over a local WebSocket. In the Connection panel choose method “Python bridge”. This path is not needed with Chrome/Edge.

5 User-interface overview

The window has two zones. The large left zone is the device panel — a software replica of the controller front: the LCD, the operating buttons and (for source controllers) the seven-segment

value displays. The right zone is the control rail with collapsible cards: Connection, Device State, Faults, Data logging, Backup / Restore and the RS-232 Monitor.

The header shows, from left to right, the device selector, the unit type / part number, the **version pill** (e.g. V 1.028), the **SIM / LIVE** indicator and the **link** state.

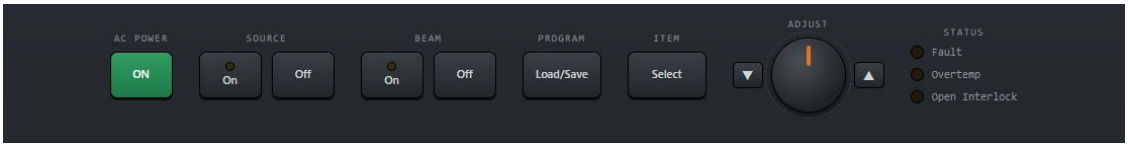

Figure 2. Operating controls: AC power, Source, Beam, Program (Load/Save), Item (Select), the Adjust knob and the status LEDs.

6 Selecting a controller

Open the device selector in the header. The controllers are grouped into three categories by source type:

Category	Controllers (examples)
End Hall	FC1200/FC1206 filament controller, DC25020 / DC3005 / DC30010 discharge controllers, eHF3005/30010, eH-HC3005/30010, V4-AC-HF, VE-AC-HC.
DC Gridded	KSC1202 / KSC1212, INC-KSC-LFN (integrated), KSC-LFN_INC (RS-485 rack).
RF ICP Gridded	INC-LRD-LFN-00, IOC1502-01 / IOC1510-01, IOC1502_LRD / IOC1510_LRD.

On selection the panel, the LCD layout, the available operating modes and the command protocol all switch to match the chosen unit. Power variants of the same class share one panel.

7 The control panel

7.1 The LCD display

The LCD mirrors the unit display. The left half shows the active program number, the control mode (MDE), the remote source and the selected display screen, plus the four gas channels. The right half shows the beam timer and the live readouts (voltage / current), e.g. the LFN sections.

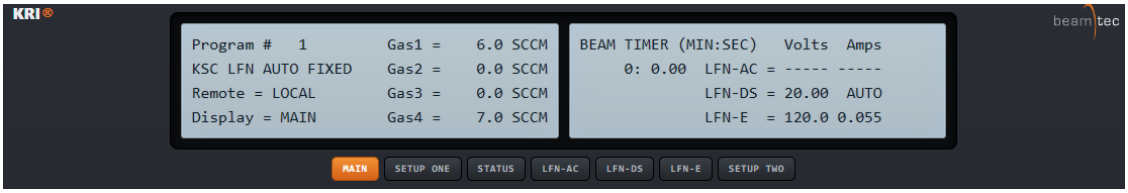

Figure 3. LCD: program number, control mode, remote source, display screen, gas channels and the right-hand readouts.

7.2 Operating controls

Below the LCD are the operating controls (Figure 2): **AC Power**, **Source On/Off**, **Beam On/Off**, **Program Load/Save**, **Item Select**, the **Adjust** knob (▼/▲) and the status LEDs (Fault, Overtemp, Open Interlock). Click a field on the LCD to select it, then turn Adjust to change its value.

7.3 Source / Kaufman controller panel

Source controllers add a seven-segment panel below the LCD with the main supplies: Cathode (Volts/Amps), Discharge (Volts/Amps), Beam (Volts / mAmps), Accelerator (Volts / mAmps),

Emission and Neutralizer. Each section has Enable/Standby, the control source (Local/Remote) and the regulation mode (Auto/Manual). In standby a cathode/neutralizer shows the start indicator “Str”.

Figure 4. Kaufman source controller panel: Cathode, Discharge, Beam, Accelerator, Emission and Neutralizer with their Enable/Standby, Local/Remote and Auto/Manual selectors.

Start current versus run current. The cathode and the neutralizer each have two current setpoints: a higher START current used to strike, and the RUN current held afterwards. While the output is in Standby the corresponding window shows and edits the START value — for the cathode via its START/RUN selector, for the neutralizer automatically. Once the output is on, the same window shows and edits the run current. So a value typed into Neutralizer Amps in Standby sets the start current, which is what the unit needs at that moment.

7.4 RS-485 rack (master / slave)

Combined units such as **KSC-LFN_INC** consist of an INC-KSC-LFN master and a KSC1202 slave connected over RS-485. The interconnect bar shows the link state; when bridged, the master drives the slave and the slave’s local input is disabled.

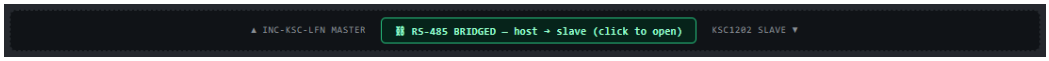

Figure 5. RS-485 interconnect bar between the stacked master and slave (bridged).

8 Operating modes (MDE)

Gridded DC source controllers (KSC-LFN family) provide eight operating modes. The active mode determines which parameters are shown and editable. Switching the mode loads that mode’s stored setpoints.

MDE	Mode
0	GAS ONLY
1	LFN ONLY
2	KSC FIL MANUAL
3	KSC FIL AUTO FIXED
4	KSC FIL AUTO LEARN
5	KSC LFN MANUAL
6	KSC LFN AUTO FIXED
7	KSC LFN AUTO LEARN

Note. On this rack programs P1–P4 are shared across all modes — the mode only changes which parameters are exposed. A value edited in one mode therefore applies to the others as well.

9 Connection: SIM, LIVE and RS232 ACTIVE

The software knows three states. They differ in where the displayed values come from and whether the software may write to the unit. Keeping them apart is the single most important thing when working with a real source.

State	What it does	Setpoints	Precondition
SIM	Simulated device. No hardware involved.	Edited in the simulation only	none
LIVE (RS-232)	Reads a real unit: readbacks, output state, faults. Monitoring only.	NOT sent to the unit	COM port open
RS232 ACTIVE	The software controls the unit; setpoints are written as P: commands.	Sent to the unit	Unit in Standby AND front-panel Control = RS232

Monitoring is unobtrusive. All queries are answered whether or not RS-232 remote is enabled, so LIVE never takes control away from the operator at the front panel. Logging and plotting a running process is therefore always safe.

9.1 Simulation (SIM)

SIM is selected by default and is fully usable with no hardware. Use it to learn the interface and to prepare and test configurations (including Backup / Restore against the virtual device).

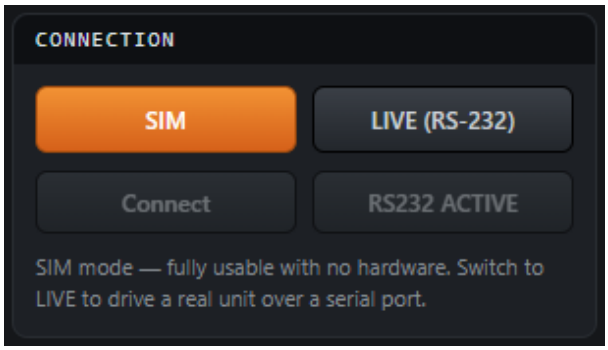

Figure 6. Connection card in SIM mode.

9.2 Connecting to a unit for the first time

Connect the USB / RS-232 adapter first, then follow these steps. **Chrome or Edge** is required for the direct method; any other browser needs the Python bridge.

- **1. Method.** Choose **Direct USB / RS-232 (no bridge)**. The browser then talks to the port itself — no helper program is needed.

Served from the web. When the software is opened from a web address (for example the BeamTec site) rather than a local file, Direct USB / RS-232 is already preselected — a browser served over HTTPS can drive the serial port directly, whereas the WebSocket bridge would be blocked as mixed content. A short safety disclaimer is shown on start and must be acknowledged before use.

- **2. Baud rate.** Set the rate the unit is configured for. The KSC1202 ships at **115200**; the value is shown in the unit's SETUP menu.

- **3. Connect.** Press **Connect**. The browser opens its own port picker — this window belongs to the browser, not to the software, so it looks the same in every application.

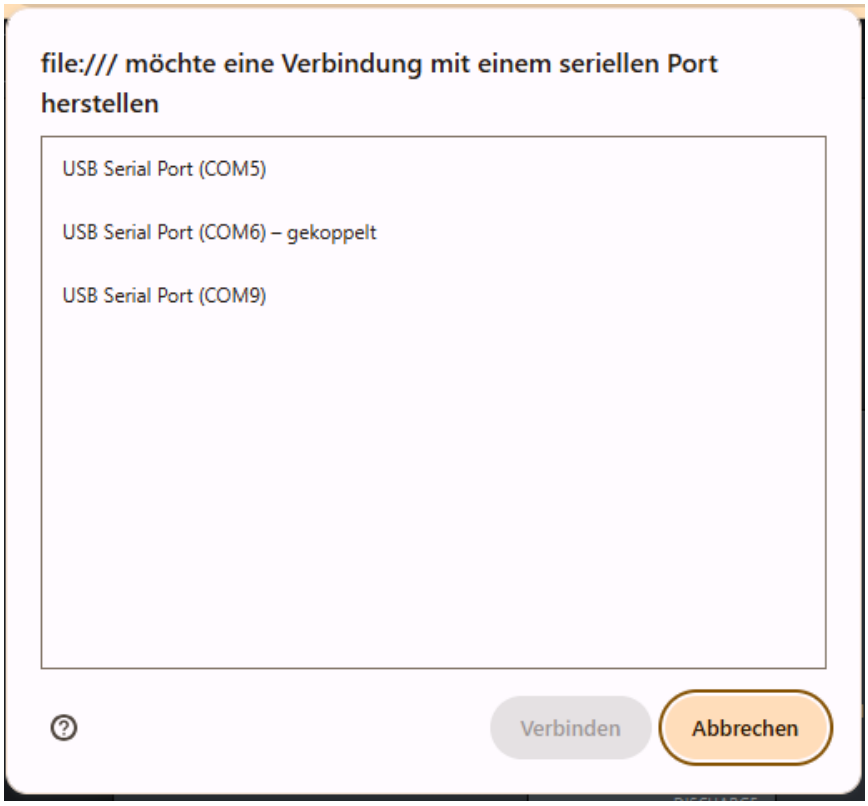

Figure 7. The browser's serial-port picker after pressing Connect. Select the adapter, then confirm.

- **4. Choosing the right port.** If several ports are listed and the label does not identify the unit, simply try one: on connect the software sends `*IDN?` and shows the reply in the header (for example `Type: KSC1202 · FW 05/08/2023`). A wrong port stays silent — disconnect and try the next one.
- **5. Confirmation.** The header pill switches to **LINKED** and the readbacks start updating. At this point the software is only listening.

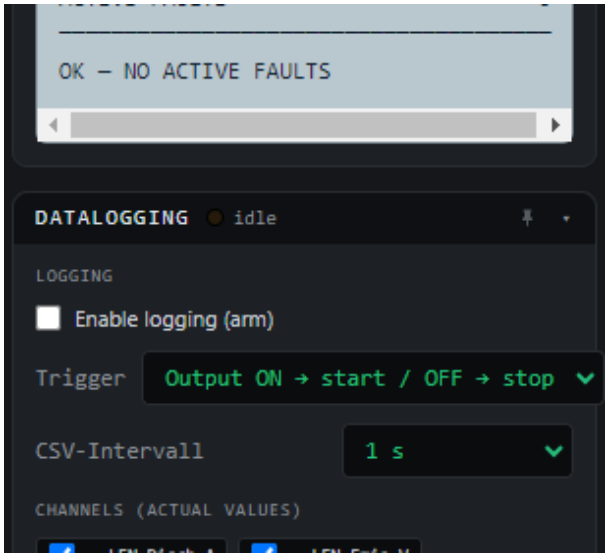

Figure 8. Connection card in LIVE mode with method, port and baud settings.

> **Port numbers move.** Windows may assign a different COM number after re-plugging the adapter or a driver update. If a previously working port no longer answers, re-open the picker and check the list rather than assuming the old number.

9.3 Taking control: RS232 ACTIVE

Press **RS232 ACTIVE** to hand control to the software. This sends `COM:1`. The unit accepts that command **only when it is in Standby and its front-panel Control switch is set to RS232** — otherwise it answers with a plain-text refusal, which the software shows verbatim.

> **A running source cannot be taken over.** Because COM:1 requires Standby, remote control must be established BEFORE the source is started, and kept. If remote control is lost while the source runs, the unit will refuse both COM:1 and any output command; the source can then only be shut down at the front panel, via the interlock, or by removing mains power. The same rule applies to COM:0, which also requires Standby.

Once active, the hint under the connection card reads **RS232 ACTIVE — remote setpoints enabled**, and setpoint fields become editable. Setpoints are only accepted while the outputs are in Standby: the unit refuses P: writes on a running source.

> **The Control indicator reflects what can be proven.** The front-panel Local/Remote switch itself has no RS-232 query on these units. What IS read back is whether RS-232 remote is enabled (COM?): while that is true the indicator shows Remote, otherwise neither lamp is lit — the software does not guess a position it cannot read. The CONTROL group is therefore a flat, read-only panel rather than a switch, and the same COM? state drives the RS232 ACTIVE button and the log's Control column.

Under the connection buttons a **poll-health** line reports the live data rate: cycle time, resulting rate, whether the fast collective readback (R:ALL) is in use or the software has fallen back to per-channel queries, and a serial timeout counter — for example "poll 120 ms · ~5.0 Hz · R:ALL · 0 timeouts". A rising timeout count or a cycle time far above the target is the first sign that the link, not the software, is the limit.

10 Remote control and setpoints

10.1 Remote modes

The "Remote =" field of the unit selects where setpoints come from:

Remote mode	Meaning
LOCAL	Front-panel control. RS-232 setpoints are not accepted.
ENABLE DB37	The stored program is used; the DB37 connector only provides the enable signal.
ALL DB37	All setpoints come from the analog DB37 connector (external). The stored program is not applied; the LCD shows "DB37 RMT".
RS232	RS-232 selected, but the host is not yet active (standby).
RS232 ACTIVE	The host (this software) has taken active control and may write setpoints.

10.2 Sending setpoints in LIVE

To write a setpoint to a real unit the unit must be in **Remote = RS232** and **Standby**, and you must press **RS232 ACTIVE** (this sends COM:1). The software verifies the reply: if the unit is still under local control it stays inactive and shows a warning, so a setpoint is never silently dropped. While active, each change you make on the panel is sent straight to the unit; the readback poll keeps the displayed values in sync.

Hint. A persistent note under the Connect buttons always shows the real remote state — for example "Unit is in LOCAL — RS232 ACTIVE not possible" — so you can see at a glance whether remote setpoints are accepted.

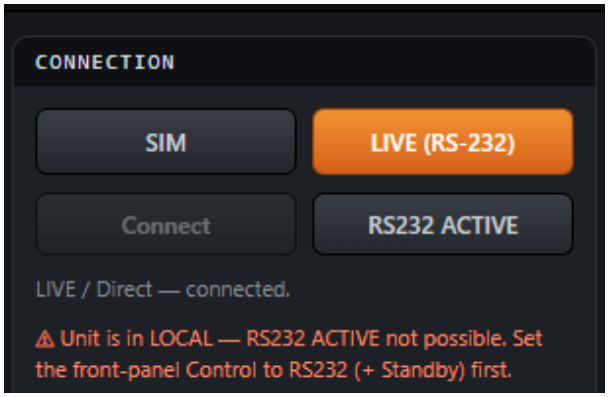

Figure 9. LIVE connection with the unit in LOCAL: a warning explains that RS232 ACTIVE is not possible until the front-panel control is set to RS232 + Standby.

10.3 Analog (ALL DB37) mode

In **ALL DB37** the gas, beam and accelerator setpoints come from the analog DB37 input, not from the stored program. The program field then reads **DB37 RMT** and the analog-controlled values are shown as 0 (matching the unit); cathode and discharge stay local. The software does not present the stored program as live in this mode.

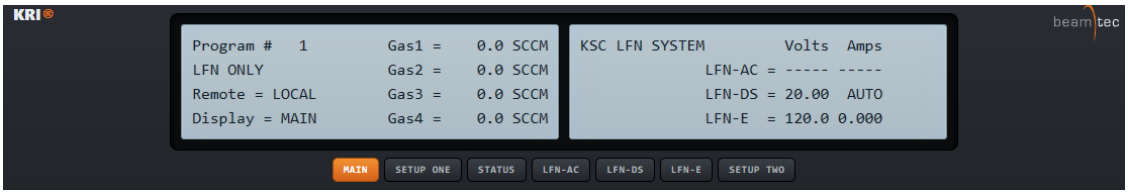

Figure 10. LCD in ALL DB37 mode: the program field shows “DB37 RMT” and the analog-controlled values read 0.

11 Device state and faults

The Device State card summarizes the live status: remote mode, control mode, active program, output bits (OUT?), beam-good flag and the active fault.

Figure 11. Device State card.

11.1 Beam, discharge, emission and process “good”

The controller reports three “good” signals over RS-232, each true when a stable operating point is reached: **BEAM?** (beam current within 50 % of setpoint), **DIS?** (discharge current within 50 %) and **EMISSION?** (emission current within 50 %). The software derives them from the measured currents, so the indicator matches the documented criterion even where a unit’s BEAM? merely echoes the beam-enable.

In addition the software forms **Process Good** — a tighter composite flag, true only when the beam voltage, beam current and emission current are **all within ±10 %** of setpoint, i.e. the source is genuinely on target rather than merely past the 50 % threshold. All four flags are written to the log as their own CSV columns and can be shown as plot markers (section 13.3).

Accel mAmp Limit. The “Accel mAmp Limit” warning lights when the beam is on and the measured accelerator (grid impingement) current exceeds the programmed limit — the Accelerator mAmps setpoint. A rising accel current points to grid wear or misalignment.

The **STATUS** screen of the unit reads the sink and PCB temperatures and the line / bus voltages over RS-232; line frequency and gate-drive voltage have no RS-232 query and show “----” in LIVE.

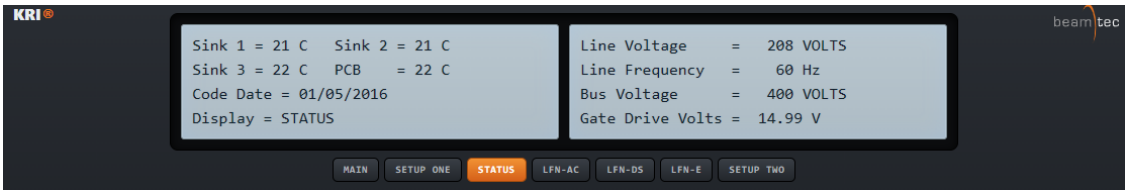

Figure 12. STATUS screen: sink/PCB temperatures, line and bus voltages, gate-drive voltage.

The **Faults** card reads the self-test (*TST?) and lists any active faults with a short help text. Press **Read faults** to refresh.

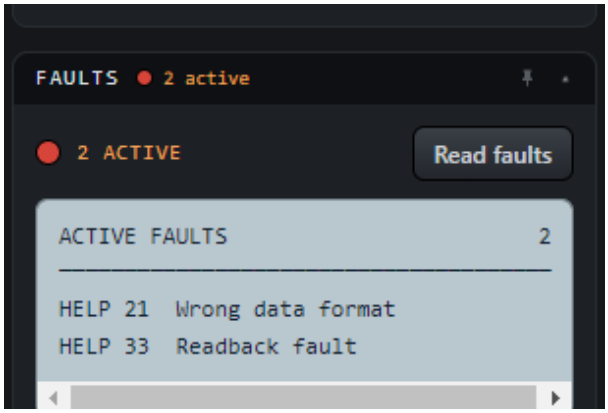

Figure 13. Faults card with two active faults and their help texts.

12 Backup, restore and setpoint recipes

12.1 Device backup and restore

Read device → build backup queries the unit (program data, mode, limits) into the GUI and builds a text dump. **Build Dump** builds the dump from the values currently shown. **Save .kri** writes the dump to a portable backup file; **Open File…** loads one back (view-only until you restore). **Restore to device** replays the stored commands to the unit (requires RS232 ACTIVE + Standby).

Restore is sent command-by-command and verified; if the unit rejects a write the restore stops and reports it. After a restore the software re-reads the mode (MDE?) and confirms the unit ended in the saved mode. Maximums / limits are reference only — they are set on the front-panel SETUP/LIMITS screen and are not RS-232-writable.

Figure 14. Backup / Restore card with a built dump.

12.2 Setpoint recipes

A backup captures the whole unit; a **recipe** captures just the setpoints of the active program under a name, so a recurring process condition can be recalled in one step. Type a name and press **Save** to store the setpoints currently shown; select a recipe and press **Apply** to write them back. **Delete** removes the selected entry. Recipes are kept per controller type, so a KSC1202 recipe is never offered for a different unit.

> **Applying a recipe follows the same rule as a manual setpoint edit.** In LIVE the unit must be in RS232 ACTIVE and Standby — a running source is never reprogrammed underneath. If that condition is not met the attempt is refused and nothing is written. Before writing, LIVE asks for confirmation, every value is clamped to the unit's own front-panel maximum, and only setpoints are sent: the output state (Discharge / Beam) is never part of a recipe.

Recipes are stored in the browser, not in the HTML file and not on the unit. A locally opened copy and the copy served from a web address therefore keep **separate** libraries, and clearing the browser's site data removes them. Use **Export…** to write the whole library to a small .json file and **Import…** to merge it back — this is how a recipe set is backed up or carried to another PC. On import only numeric setpoints are accepted, and entries of the same name are reported and confirmed before they are overwritten.

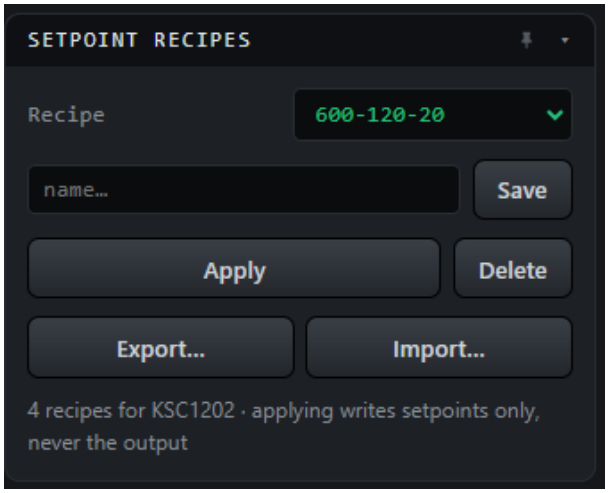

Figure 15. The Setpoint Recipes card: a saved recipe selected, with Save / Apply / Delete and Export… / Import… for moving the library between machines.

13 Data logging and live plot

13.1 Logging

In the Data logging card choose the channels to record and a trigger (output-controlled or manual). By default the recording rate is **adaptive** (section 13.2); switching that off exposes the fixed CSV interval instead. The file name is generated automatically (Model_Log_date_time.csv), and values are written with at most two decimals. On Chrome/Edge the data streams directly to disk; otherwise it is offered as a download when you stop.

When the trigger is output-controlled, recording starts as the output comes on and continues for the **Post-run** time after it goes off (5 s by default) — the decay of cathode, discharge and emission happens right after the switch-off and is the part most often needed. Recording is otherwise independent of the plot.

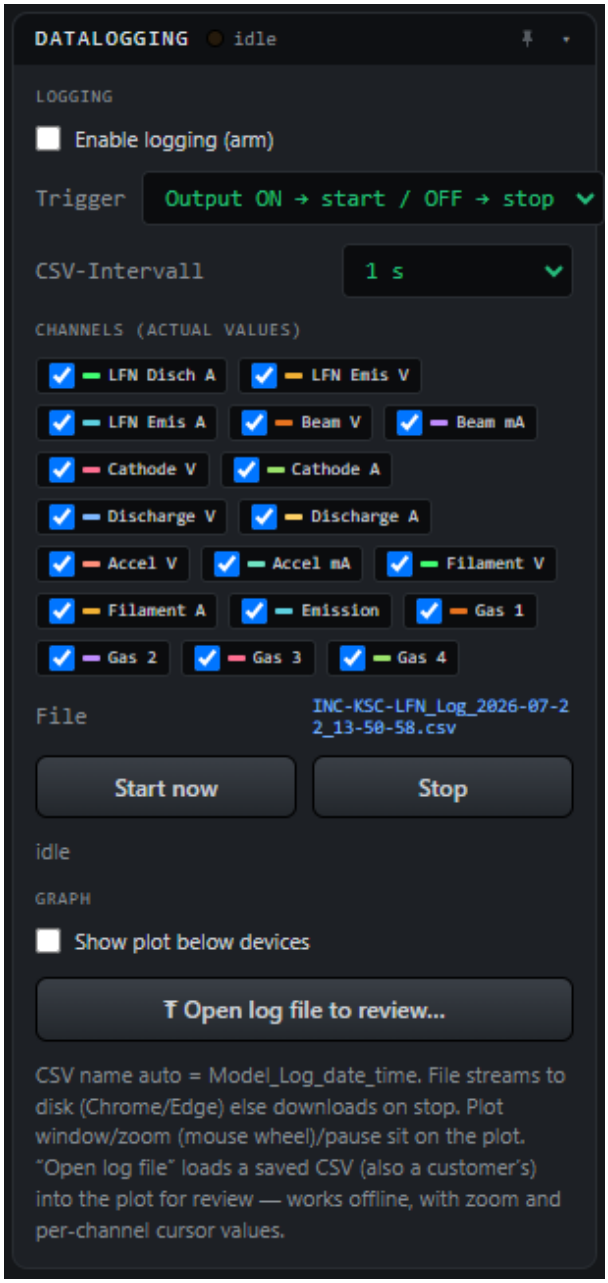

Figure 16. Data logging card.

13.2 Adaptive recording rate

A fixed interval either wastes rows while nothing moves or misses a transient. With **Adaptive CSV** enabled (the default) the software decides per sample whether it is worth a row, so the file stays small without losing the interesting parts. Four values control it:

Setting	Default	Meaning
Deadband	0.1 %	A row is written as soon as any channel moves by more than this share of its full scale.
Start burst	10 s	Full-rate recording after recording starts and whenever the output switches on — the strike and ramp are captured densely.
on change	2 s	Full-rate recording after each detected change, so a transition is resolved and not just marked by two points.

Setting	Default	Meaning
Heartbeat	10 s	While nothing changes, at least one timestamped row is still written, proving the recording continued.

The result is a recording that is dense where something happens and sparse where nothing does. Because every row carries its real timestamp and the plot is drawn against time — not against sample number — an uneven cadence replays correctly in review. **The live plot is not affected**: it always records at the full poll rate and stays smooth. Switching Adaptive off restores the classic fixed CSV interval.

Pre-roll: the run is captured from before the trigger. A log triggered by the output would otherwise begin at the moment the edge is detected — by then the discharge has already ramped part-way, and the start of the process is missing. The software therefore keeps the last few seconds of samples while monitoring but not yet recording, and prepends them when recording starts. Elapsed time 0.00 is the earliest buffered sample, so the ramp-in is included and all timestamps stay correct.

What rate is actually achievable? The limit is the serial link, not the display. Every value in plot and log comes from a poll cycle, and on the KSC the software fetches all measured values in one collective readback (R:ALL) rather than eleven single queries. While the plot is open or logging is armed the poll runs at roughly 5 Hz; otherwise it idles. Logging faster than the poll only duplicates values — the poll-health line (section 9) shows the rate actually reached.

13.3 Live plot

Enable “Show plot below devices” to open the strip-chart. The legend sits inside the plot, top-left, and lists every selected logging channel with its live value. Use the span selector, **auto-Y**, **Pause** and **Clear**. A **paused OR stopped** plot can be examined the same way: drag to pan the time window, Shift-drag a box to zoom into a region, the wheel to zoom around the cursor, move the cursor to read values, double-click to reset. The span selector also offers 120 s and auto (fit the whole run).

Channels are spread over four axes chosen by magnitude, so a 600 V beam does not flatten a 7 V cathode reading:

Side	Axis	Channels
left	beam / accel voltage	Scaled to the higher of the two setpoints, so the axis stays put while the source ramps
left	0–1 A	Discharge, beam, accel and emission current
right	0–100 V	Cathode, discharge and neutralizer voltage
right	0–25 A	Cathode and neutralizer heater current

Ranges snap to round steps (0–100 V, 0–250 mA, 0–12.5 A …) with five divisions plus half a division of headroom, so gridlines are readable values rather than arbitrary ones. Beam and emission current are drawn **×10** — both sit near 0.02 A and would otherwise hug the baseline; the legend marks those traces and still shows the true measured value.

The figure below is a real KSC1202 run recorded through this software under RS232 ACTIVE: the cathode heats and the discharge strikes (81 V falling to the 40 V setpoint as the plasma forms), then beam and accelerator are enabled and ramp to 600 V / 19.9 mA at 20 mA emission, and finally the beam is switched back to Standby. The whole sequence takes 18 s at a 1 s logging interval.

The **marks** button overlays the state changes the log already records, as dashed vertical lines: where the discharge and the beam switch on and off, where each “good” signal is reached — **DIS good**, **EMISS good**, **BEAM good** and **PROCESS good** — and where any of them is lost again (**… not good**, **process lost**), as well as a fault, over-temperature, interlock or accel-limit event. A run can then be read at a glance: discharge on, the currents entering their good bands, the process settling on target, and everything dropping at switch-off. The markers work identically

on a reviewed log file, where the columns are recognised by their header, so an older log without the newer columns simply omits those marks.

Figure 17. A real KSC1202 process under RS232 ACTIVE with marks on: the panel above; below, the discharge strike (cyan, settling to the 40 V setpoint), the beam ramp to 600 V / 20 mA at 20 mA emission, and the DIS / EMISS / BEAM / PROCESS "good" markers, with "not good" and "process lost" at switch-off.

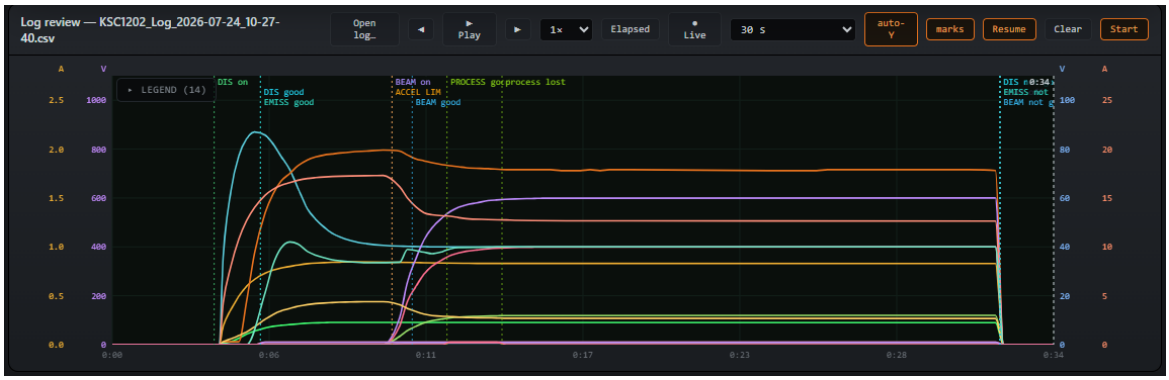

Figure 18. The same kind of run shown over its whole length with every marker, including an ACCEL LIM event: the discharge strike and DIS / EMISS good early, BEAM good and PROCESS good once the beam is on target, then the "not good" transitions as the source is switched off.

13.4 Log-file review

A saved CSV recording — including one from a customer — can be loaded into the plot for offline review (no device required). Use **Open log file to review…** on the Data logging card, or **Open log…** in the plot header. The application reads its own Model_Log_*.csv and generic CSVs, auto-detecting the delimiter (comma, semicolon or tab) and the decimal mark (dot or comma, e.g. German-Excel exports); each column is mapped to the V / A / sccm axis by the unit in its header.

The whole recording is shown with full zoom and pan, and the in-plot legend reads each channel's value at the cursor. Click a legend entry to **show or hide** that channel — hidden channels drop out of the axis auto-fit, so large and small channels (for example Beam V vs Cathode V, or A vs mA) can be separated for a readable view. The X-axis toggles between **elapsed time** and **clock time** (from the timestamp column). ● **Live** — or Clear / Start — returns to live plotting.

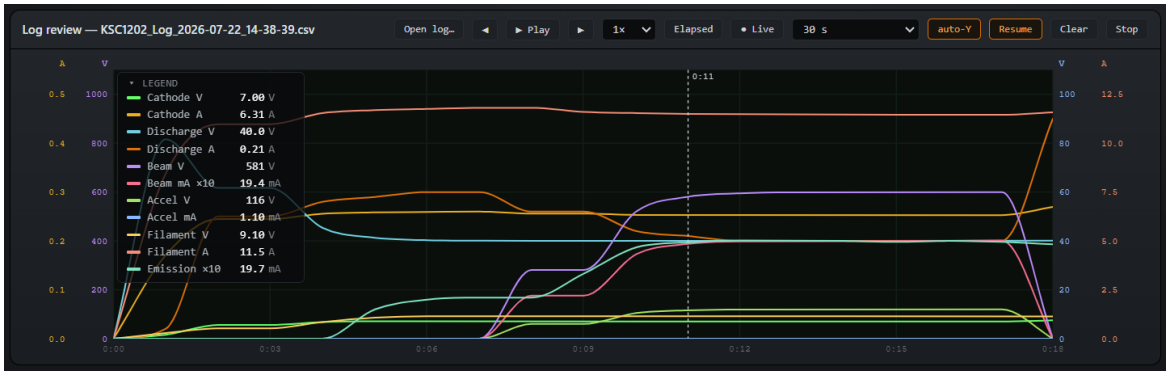

Figure 19. Log review with the cursor parked inside the run (dashed line): the legend reads every channel at THAT instant of the recording, not the live value. Same recording as Figure 16.

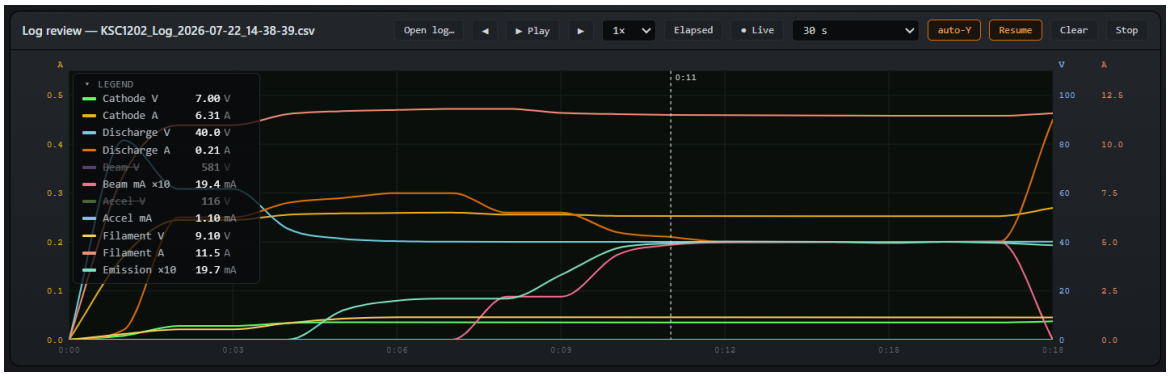

Figure 20. The same view with Beam V and Accel V switched off by clicking their legend entries (struck through). They drop out of the axis scaling — the left high-voltage axis disappears entirely and the remaining traces spread out over the freed height.

13.5 Replaying a recording onto the panel

A loaded recording does not only feed the plot — it also drives the control panel, so the LCD, the 7-segment displays and the indicators show the device exactly as it was at the cursor position. Drag the cursor (or step through the samples) and every logged value is written back onto the panel; on a combined RS-485 rack the slave panel is driven too, including its **Beam Volts** and **Beam mAmps**. Channels that are not present in the file stay blank rather than showing stale values.

Figure 21. Replaying a recording onto a combined (RS-485 verbund) device: the cursor sample is written back onto the KSC1202 slave panel — note Beam Volts and Beam mAmps driven from the log.

Beyond the logged readings, the playback also restores the device **state**: the Discharge / Beam enables and the Beam-good indicator, the active **fault code** (shown in the Faults card and as the Over-Temp / Open-Interlock / Accel-limit LEDs), the operating **Mode** (MDE), **Remote**, **Control** (Local / Remote), **Regulation** (Auto / Manual) and the active **Program** — each as plain text in the log so the file stays readable.

Use ▶ **Play** to advance in real time from the cursor; the original sampling interval is honoured, and the **speed** selector (1×…20×) and the ◀ ▶ frame-step buttons let you move faster or one sample at a time. **Clear**, **Stop** or ● **Live** end the review and return to live capture.

14 RS-232 monitor and manual commands

The RS-232 Monitor logs every command (TX) and reply (RX). Below it you can type a raw command (UPPERCASE ASCII, e.g. ***IDN?**, **MDE?**, **R:DSV**) and send it; the reply appears in the green field, separate from the scrolling log. The KRI controllers use an ASCII line protocol (commands in upper case, CR-terminated, replies OK / ERROR n); the DC25020 uses an SCPI-like protocol.

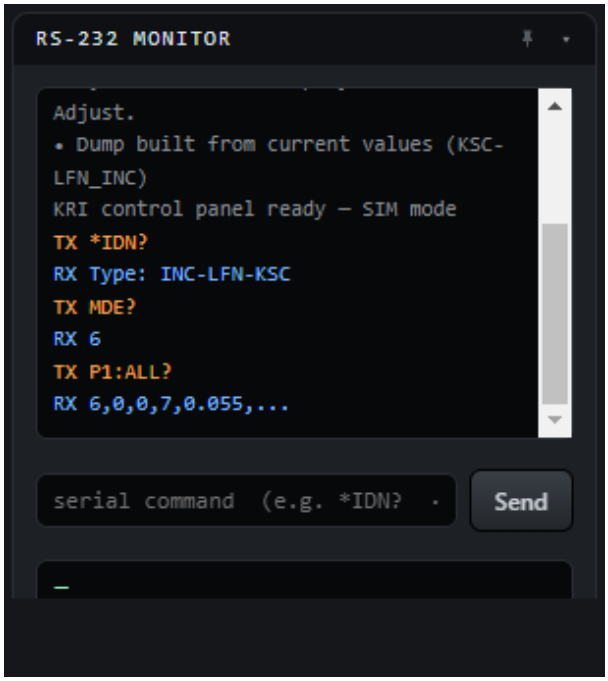

Figure 22. RS-232 Monitor with the command input and reply field.

15 Supported-controller gallery

The following examples show other controller classes in SIM. The panel, the displays and the protocol adapt automatically to the selected unit.

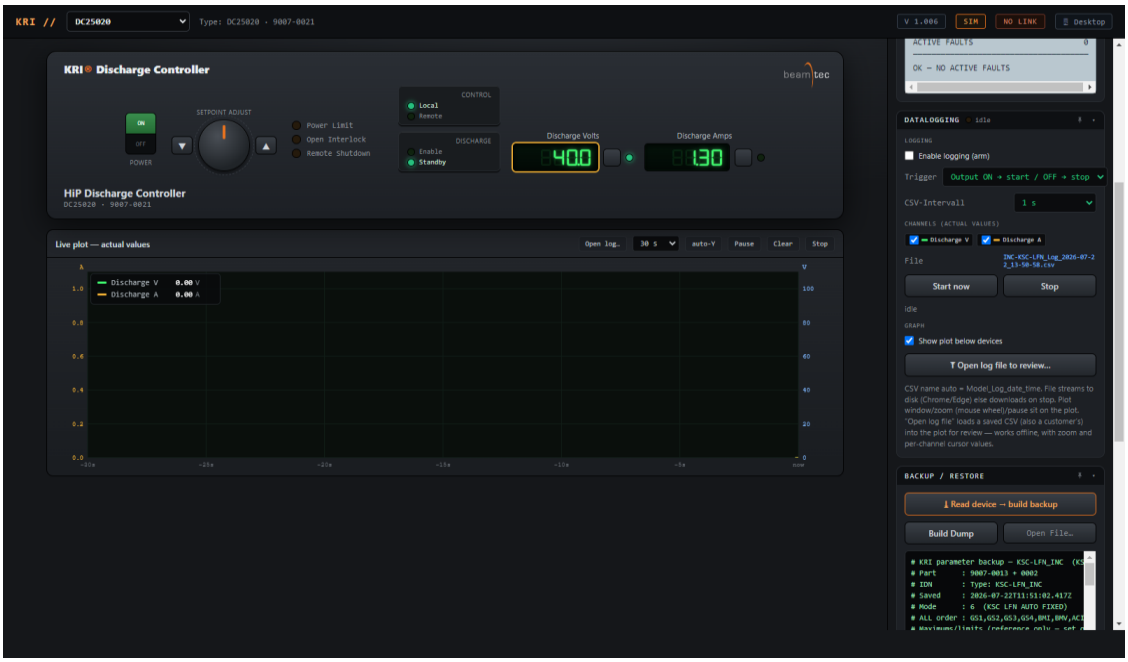

Figure 23. DC25020 HiP discharge controller (SCPI-like protocol).

Figure 24. FC1200 filament controller (cathode + emission, auto filament regulation).

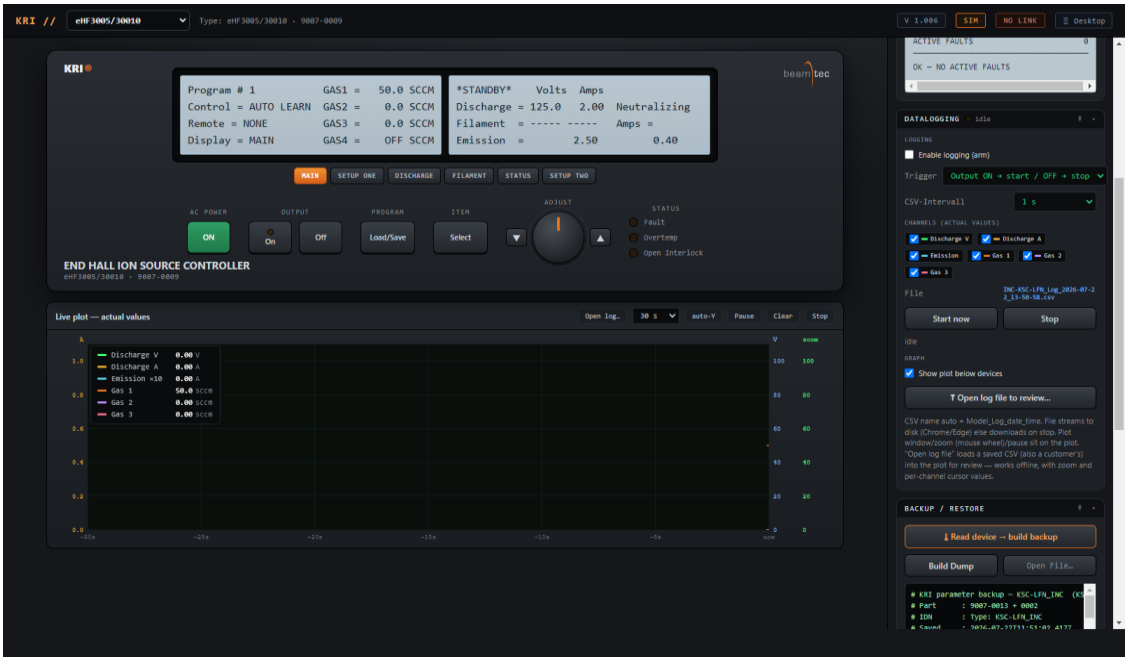

Figure 25. End-Hall source controller (eHF3005/30010).

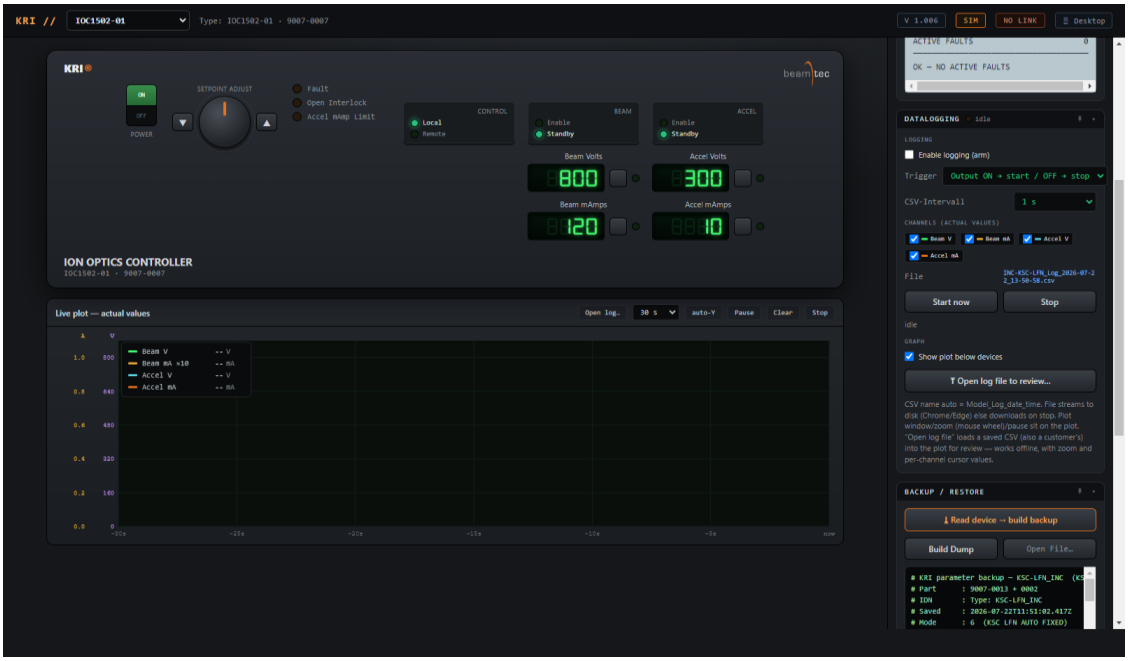

Figure 26. RF ICP gridded source controller (IOC1502).

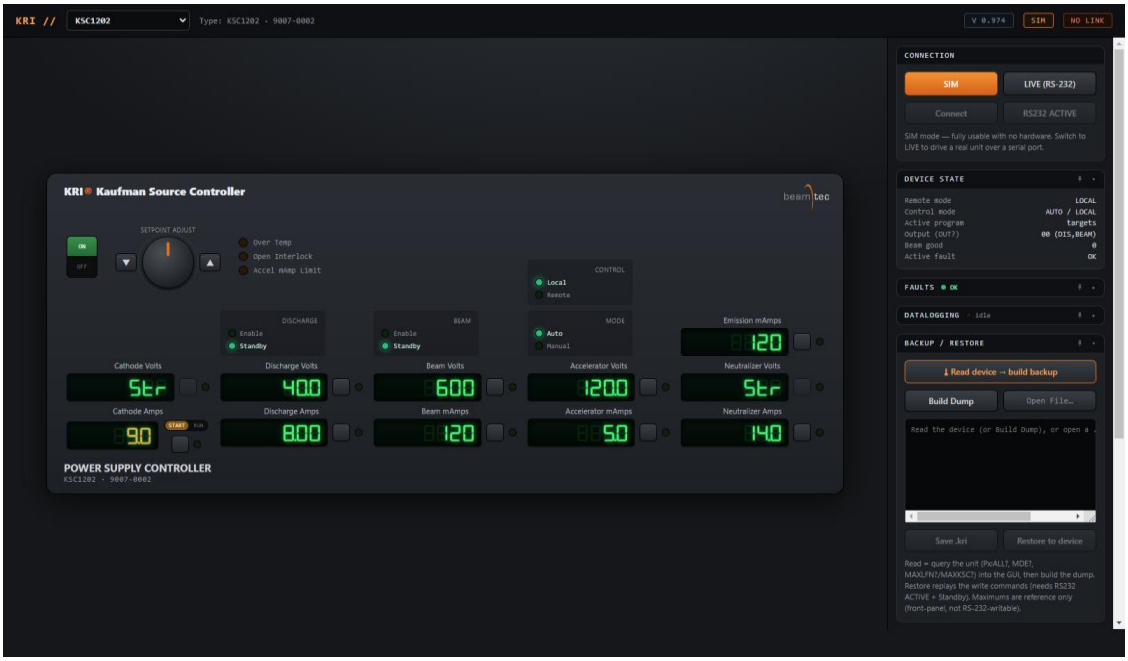

Figure 27. KSC1202 stand-alone DC gridded controller.

Figure 28. eH-HC hollow-cathode End-Hall controller.

Figure 29. V4-AC-HF combination controller (automated HF rack).

Figure 30. VE-AC-HC combination controller.

Note. Power variants of the same class (for example DC3005 / DC30010, FC1200 / FC1206, KSC1202 / KSC1212, IOC1502 / IOC1510) share one panel and are not shown separately; only the rated limits differ.

16 Troubleshooting

Symptom	Cause / remedy
“Connect” / RS232 ACTIVE not possible	Unit is in LOCAL or not in Standby. Set the front-panel control to Remote = RS232 and Standby, then retry. The hint under the Connect buttons shows the real state.
Setpoint appears to send but has no effect	The unit rejected the write (it is not really in RS232 ACTIVE). The software now warns and re-reads the real remote mode.
Browser cannot open the COM port	Use Chrome or Edge (Web Serial). Firefox/Safari are not supported for the direct connection — use the EXE or the Python bridge.
Port picker does not appear from a local file	A browser policy may block Web Serial on file://. Use the locked EXE, or serve the page from http://localhost.
Unit starts in mode 0 after restore	Some racks reset the MDE on each RS-232 session. After restore the software reports the real mode; re-select the mode if it must persist.
Values shown are 0 in ALL DB37	Correct — in ALL DB37 the analog inputs drive the unit (see section 10.3), not the stored program.
Gap in the log / plot around a switching event	Check the poll-health line (section 9). A jump in cycle time with a rising timeout count means the unit stopped answering briefly; the recording resumes by itself. Nothing is lost that the unit actually reported.
Recipe cannot be applied	The unit must be in RS232 ACTIVE and Standby, exactly as for a manual setpoint entry. The attempt is refused and nothing is written (section 12.2).

Symptom	Cause / remedy
Recipes missing after opening from a different place	Recipes live in the browser, so a local file and a web-served copy keep separate libraries. Move them with Export… / Import… (section 12.2).

17 Appendix

17.1 Selected commands

Command	Function
*IDN?	Identify (type / firmware).
*TST?	Self-test / active faults.
MDE? / MDE:n	Read / set the operating mode.
Pn:ALL? / Pn:ALL …	Read / write all parameters of program n.
R:KEY	Read a live value (e.g. R:DSV).
COM? / COM:1 / COM:0	Read remote state / take / release active RS-232 control.
OUT? / BEAM?	Output bits / beam-good flag.

17.2 Version

This manual documents software version **V 1.028**. The complete change history is maintained in **CHANGELOG.md** alongside the application. The application version is always shown in the header pill.