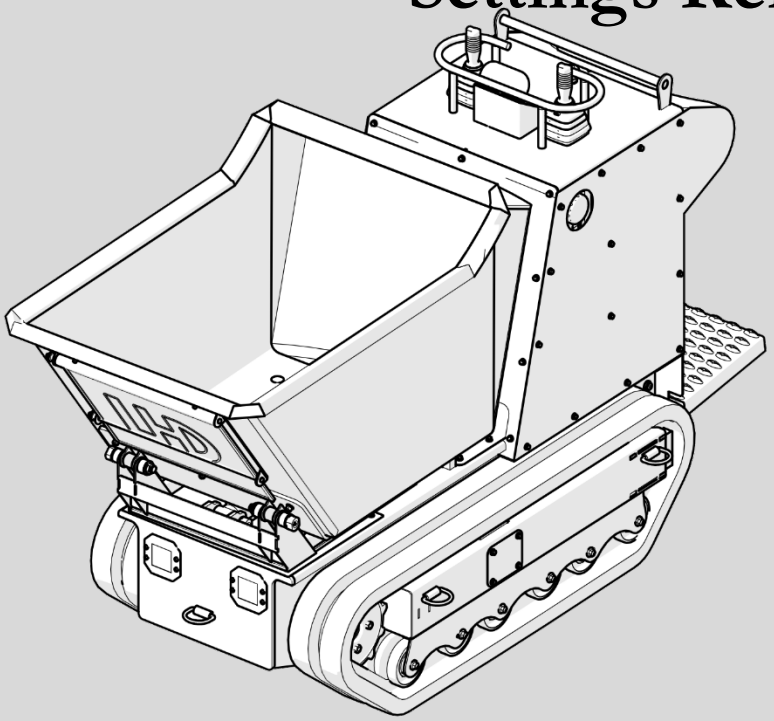
BETTER BUGGIES.

6500 ETB

ELECTRIC TRACKED BUGGY

SIDE DUMP

Service Software Guide
Settings Reference



This manual should be kept on hand at all times so that it can be immediately referenced. It should be saved for the entire life of the machine.

© 2026 - The entire or partial reproduction and/or divulging of this document is prohibited in any form without the written consent of the illustrations, and the paginations were completed by "LHD Machinery, LLC." The illustrations and technical data included in this manual are non binding: **the *manufacturer reserves the right to carry out eventual changes to its machine without notice.***

For trained LHD service staff. Companion to the Operator Software Guide.

For software v2026.10.23.1751 and later

Ed. 1 – 10/23/26

LHD Machinery, LLC
1-888-LHD-7472
LHDmachinery.com

Email / Faxes to:
info@lhdmachinery.com

Find the latest edition of this Owner's Manual at:
lhdmachinery.com/libr

Contents

1. About this guide
2. Access levels
3. How settings are kept
4. Service pages
5. IO points: detail, Hand mode and configuration
6. Operator settings (Settings tab)
7. Tools settings (Service login)
8. Charge settings (Charger tab, page 4)
9. Engineering settings (Service login; traction rows Admin)
10. Drive feel (Engineering > Drive feel)
11. Motor config (Motors tab, page 2 > Config; Admin)
12. Measure motor R and L (Admin)
13. Router setup (Service)
14. Commands
15. Read-only rows (Motor config)

1. About this guide

This guide lists every setting on the LHD 6500E display that is locked behind a Service or Admin login, what each one does, its range and default, who may change it, and how it is kept. It also covers the service pages and service procedures available from the display. The operator settings are repeated in section 6 for completeness.

> **Warning.** Many of these settings change how the machine drives, brakes, charges or stops. Wrong values can cause unexpected motion, loss of braking or battery damage. Change them only with a clear reason, one at a time, with the machine blocked and the E-stop within reach, and write down the old value first. Never disable or bypass a safety function. Drive tuning (speed loop, field weakening, current loop) is done with the drive tool, not from the display.

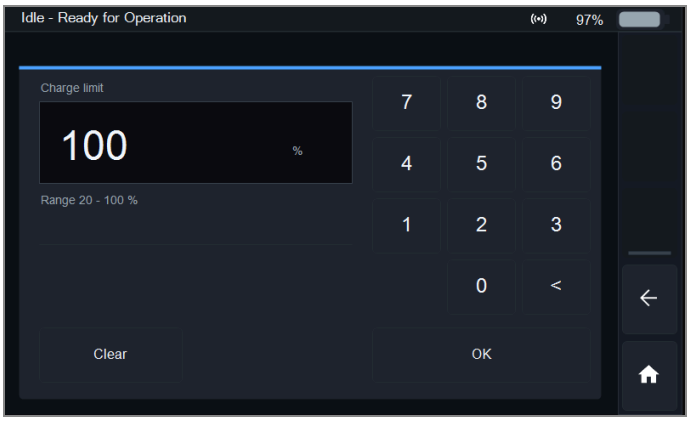
2. Access levels

Level	How	What it unlocks
Operator	No login	The Operator settings. Charge limit, AC input limit, Lockout enable and Speed limit are locked while Rental mode is on.
Rental	Hard-hat key; a rental code is set on entry	Locks Save, Revert, Charge limit, AC input limit, Lockout enable, Speed limit and WiFi changes. Leave with the rental code or a Service/Admin PIN.
Service	Login key (arrow-into-door) and the Service PIN	Tools and Engineering, the service pages, Hand/Off forcing of IO, the Service rows of Charge settings, Router setup and the service hotspot.
Admin	Login key and the Admin PIN	Everything Service can do, plus the rows marked Admin: traction and commissioning values, Motor config, motor R/L measurement, CAN transport, Save as defaults and the Admin PIN. The mode chip at the top of each list reads ADMIN.

> A session ends by itself after **Auto logout after** (delivered 10 minutes) or when you press Logout. Tools and Engineering disappear when the session ends. Access codes are set at commissioning and are not printed here.

Logging in and out

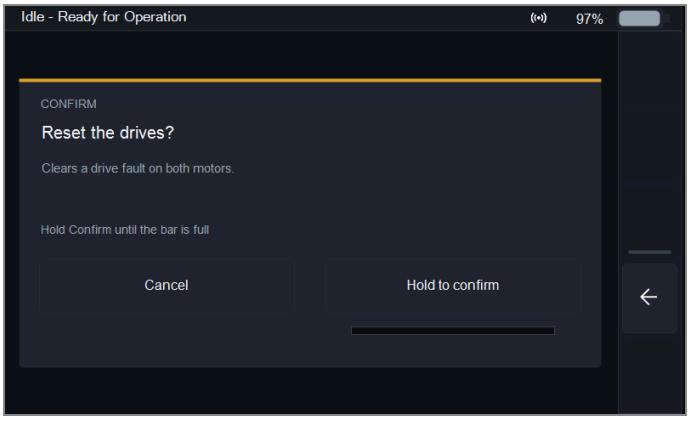
1. Open any of the Settings, Battery, IO, Charger, Motors or Router tabs.
2. Tap the **Login** key (arrow-into-door, third key on the side bar). The keypad opens.
3. Type the Service or Admin PIN; each digit shows as a star. Tap **OK**.
4. The access chip at the top of the list changes to SERVICE or ADMIN, the Login key shows a green bar, and Tools and Engineering appear at the end of the Settings list.
5. To log out, tap the same key again (it is now Logout). The session also ends by itself after the auto-logout time.



The keypad used for the PIN. The same keypad enters number settings (shown here entering Charge limit).

Confirming commands

Commands that change the machine (Reset drives, Revert to default, Save commissioning, Restore motor defaults, controller restarts) open a confirm box. Press and hold **Hold to confirm** until the bar under it fills; letting go early cancels. Cancel or Back leaves without doing anything. Save uses a simpler tap-to-confirm box.



Hold-to-confirm box (Reset drives)

3. How settings are kept

Kept	Meaning
Saved at once	Stored the moment it is changed. The display says "<name> saved".
Press Save	Used immediately but lost at power-off unless you press the **Save** key on the side bar (stores the process recipe; a tap-to-confirm box asks first).
Save commissioning	Stored by the Admin command **Save commissioning** (device recipe: node numbers, motor inverts, speed ceiling, brake times).

Until power-off	Not stored; back to its default at the next power-up (the CAN On/Off rows).

Stopped only in the "Who / when" column means the change is refused unless the machine is stopped. A row you may not change shows its value in grey and says why: "needs a Service login", "needs an Admin login", "locked in rental mode" or "stop the machine first".

Numbers are entered on the keypad and limited to the range shown. Some ranges follow other rows: Max speed cannot exceed Drive speed ceiling, Eco max speed cannot exceed Max speed, the SOC derate points must stay in order, and the E-stop stop limit must leave room for the ramp and the brake hold.

Defaults and Revert

Revert to default (Operator list, press-and-hold) restores the process recipe to the saved defaults and saves them; joystick flip, stick inversions and valve inversions are kept. **Save as defaults** (Tools, Admin) stores the values the machine has now as those defaults. **Restore motor defaults** (Motor config) resets current limits, DC sharing and drive ramps only. After commissioning a machine, use Save as defaults so Revert returns to the commissioned values.

4. Service pages

The service pages are opened from **Settings > Tools** during a Service or Admin login (Tools page 2 and 3). They show live information and let a technician test the machine; none of them stores a setting. Each page has Back and Home on the side bar; some add page up and down keys.

Page	Use	Section
Hydraulic stick override	Move the bucket functions from the touch screen.	4.1
Skid stick override	Drive the tracks from the touch screen.	4.2
Hydraulics	Valve requests and outputs, pump contactor, joystick source and invert settings.	4.3
Devices	Online state of every device on the CAN bus.	4.4
Drive event log	Faults and warnings reported by each traction drive.	4.5
Task timing	Timing of the control program and measured safety timings.	4.6
CAN trace	Record all CAN traffic to a file for LHD support.	4.7
Trace files	Manage the recorded trace files.	4.8
Release brakes (Motors tab, page 2)	Release both track brakes for towing.	4.9

4.1 Hydraulic stick override

Operates the four bucket functions from the touch screen instead of the hydraulic joystick, for example to lower a raised bucket when the joystick has failed, or to test a valve.



Hydraulic stick override (no login: override locked)

1. **Enable Override** toggle. Tap to request the override; it reads On while requested.
2. **Status message.** Says why the override is not live yet (see the table below). It is blank while the override is working.
3. **On-screen stick.** Touch the centre knob and drag. Up = dump forward, down = return, left and right = rotate. An angled drag runs two functions together. Your finger on the stick is the dead-man: lifting it stops all motion.
4. **Function icons.** The function being driven lights up.
5. **Back.** Leaving the page by any route (Back, Home, a tab) switches the override off.
6. **Home.**

The override is live only while **all** of these hold, and it can only start from Idle:

Condition	Status message when it is missing
Service or Admin login	Service login required
The display is updating (checked every 500 ms)	Display not responding
A finger is on the on-screen stick	Hold the dead-man
This page is on screen	Stick page not on screen
The machine was Idle when the override engaged	Machine must be idle to start

If any condition drops, motion stops at once and the override engages again only from Idle. As with the real joystick, the stick must return to neutral before a function moves again.

1. Log in as Service. Stop the machine (band reads Idle). Keep everyone clear of the bucket.
2. Open Settings > Tools > Hydraulic stick override and tap **Enable Override**.
3. Touch the centre of the stick and drag slowly in the direction of the function. Release to stop.
4. Tap Enable Override again, or leave the page, to finish.

> The on-screen stick moves the machine exactly like the real joystick. Use it only with a clear view of the bucket and nobody nearby.

4.2 Skid stick override

Drives the tracks from the touch screen instead of the traction joystick, for example to move a machine with a failed joystick onto a trailer. Same conditions and status messages as 4.1.



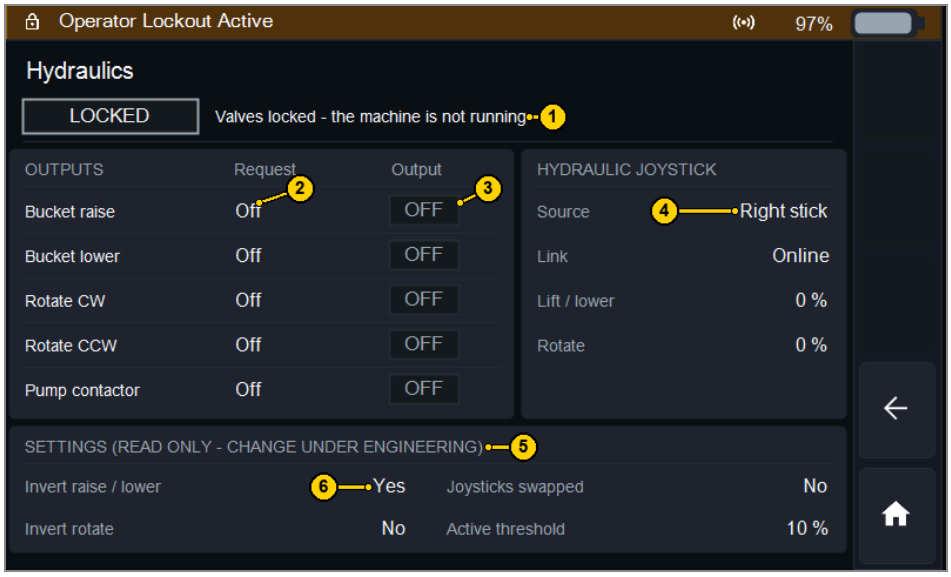
Skid stick override (no login: override locked)

1. **Enable Override** toggle.
2. **Status message,** as in 4.1.
3. **On-screen stick.** Up = forward, down = reverse, left and right = turn on the spot; an angled drag drives and turns. Lifting the finger stops the tracks.
4. **Left track bar,** -100 to +100 % of the override top speed.
5. **Right track bar.**
6. **Track rpm** under each bar.

Top speed on the override is limited by **Virtual stick speed** (Engineering > Drive feel, delivered 1000 rpm), well below normal driving speed.

4.3 Hydraulics

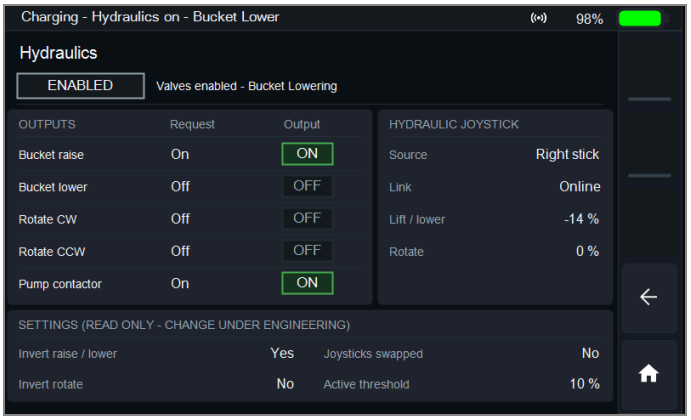
Shows what the control program asks of each hydraulic output, what the IO module actually drives, and the hydraulic joystick. Use it to find where a bucket fault is: joystick, program, output or hydraulics.



Hydraulics, machine not running

1. **Valve state.** LOCKED while the machine is not running (with the reason), otherwise live.
2. **Request** column: what the program asks of each valve and the pump contactor (On/Off).
3. **Output** column: what the IO module is driving.
4. **Hydraulic joystick:** which physical stick is the hydraulic stick (it changes with Flip joysticks), its link state, and its lift/lower and rotate positions in %.
5. **Settings in force** (read-only; change them under Engineering): Invert raise/lower, Invert rotate, Joysticks swapped, Active threshold.
6. **Invert raise / lower = Yes** (delivered setting).

> **Hydraulics page labels.** The Outputs table names the *valves*, not the motions. With *Invert raise / lower* = Yes (delivered setting), moving the stick to Bucket Lower drives the **Bucket raise** valve. This is correct; check the invert settings before suspecting a wiring fault.



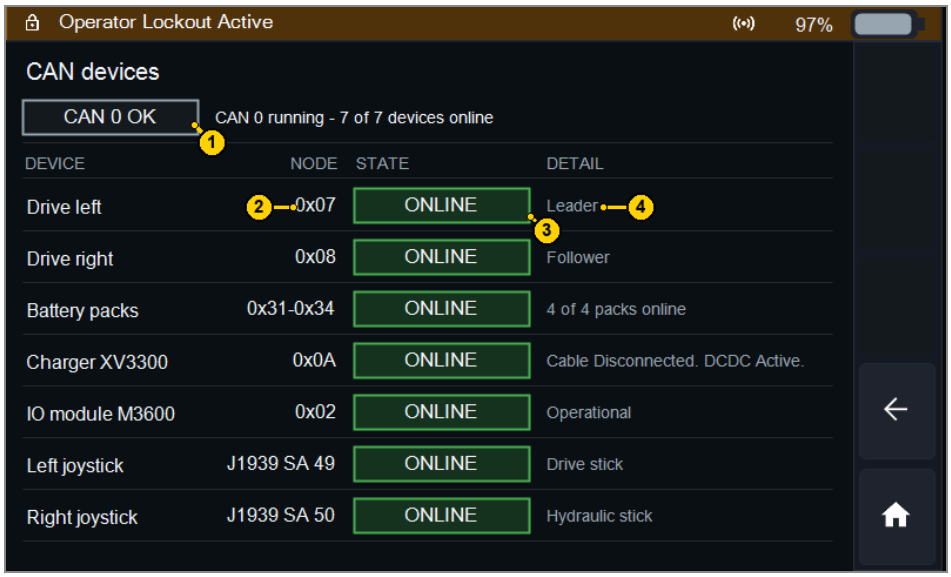
Hydraulics while the pump runs on charge: Bucket Lower requested, so the Bucket raise valve and the pump contactor are On

What you see when the stick is moved	Where to look
Joystick position stays at 0 %	The joystick or its CAN link (Link should read Online; see Devices, 4.4).
Position moves, Request stays Off	Below the Active threshold, valves locked (machine not running), or a machine fault or lockout.

Request On, Output Off	IO module output or its health (IO tab, point detail).
Output On, no movement	Valve coil, wiring, pump or hydraulics.

4.4 Devices

Lists every device on the machine's CAN bus with its address and whether it is talking. The first place to look when the machine will not start or shows a communication alarm.



CAN devices, all online

1. **Bus state** (CAN 0 OK, or a bus fault) and how many devices are online.
2. **Node:** the device's CANopen node number (hex) or J1939 source address.
3. **State:** ONLINE (green), OFFLINE or LOST.
4. **Detail** in words.

Device	Node	Detail shown
Drive left	0x07	Leader: the drive that also switches the main contactor.
Drive right	0x08	Follower.
Battery packs	0x31-0x34	How many of the 4 packs are online.
Charger XV3300	0x0A	Cable state and the 12 V DC-DC converter state.
IO module M3600	0x02	Its CANopen state (Operational in normal work).
Left joystick	J1939 SA 49	Its role: Drive stick, or Hydraulic stick when the joysticks are flipped.
Right joystick	J1939 SA 50	Hydraulic stick (Drive stick when flipped).

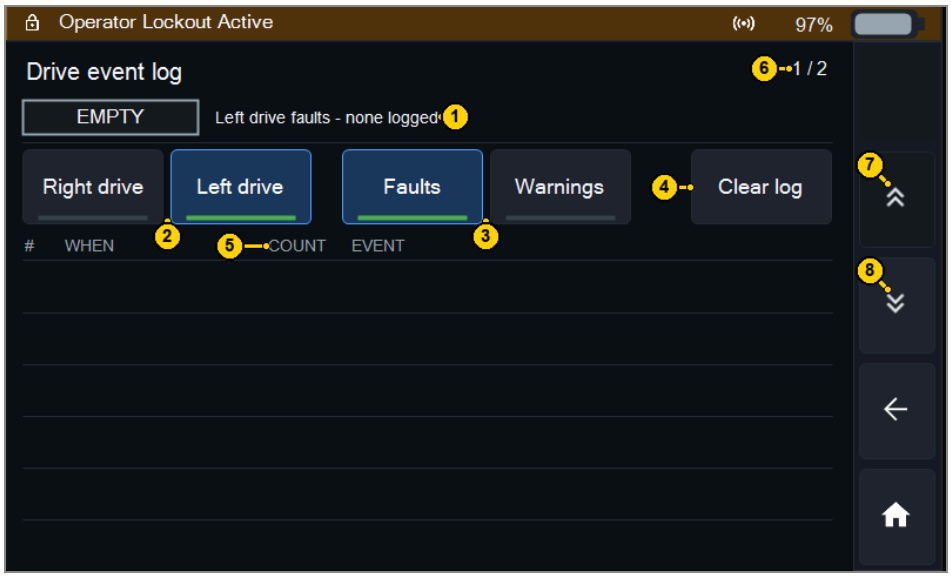
One device OFFLINE: check its power, fuse and CAN connector. Every device OFFLINE or a bus fault: check the CAN wiring and termination, then look for one device holding the bus down by unplugging them one at a time.

4.5 Drive event log

> Viewing the log without a login is available on software v2026.10.26.51 and later.

On v2026.10.26.51 and later anyone can open the log (Motors tab, page 2 > Event log) to view it; Clear log still needs a Service login.

The control program records the faults and warnings each traction drive reports, with when they last happened and how many times. The log is kept after power-off. Also opened from the Motors tab, page 2 > Event log.



Drive event log (left drive faults, none logged)

1. **Log state** (EMPTY, or the number of entries) and what is shown.
2. **Right drive / Left drive:** chooses the drive. The selected key is highlighted with a green bar.
3. **Faults / Warnings:** chooses the type of event.
4. **Clear log** (Service): empties the log of the selected drive after a hold-to-confirm.
5. **Columns:** #, When (date and time of the last occurrence), Count (how many times it happened) and Event (its name).
6. **Page** of the log: up to 10 events per drive and type, 5 per page.
7. **Page up.**
8. **Page down.**

Tap an event row to open its description page:



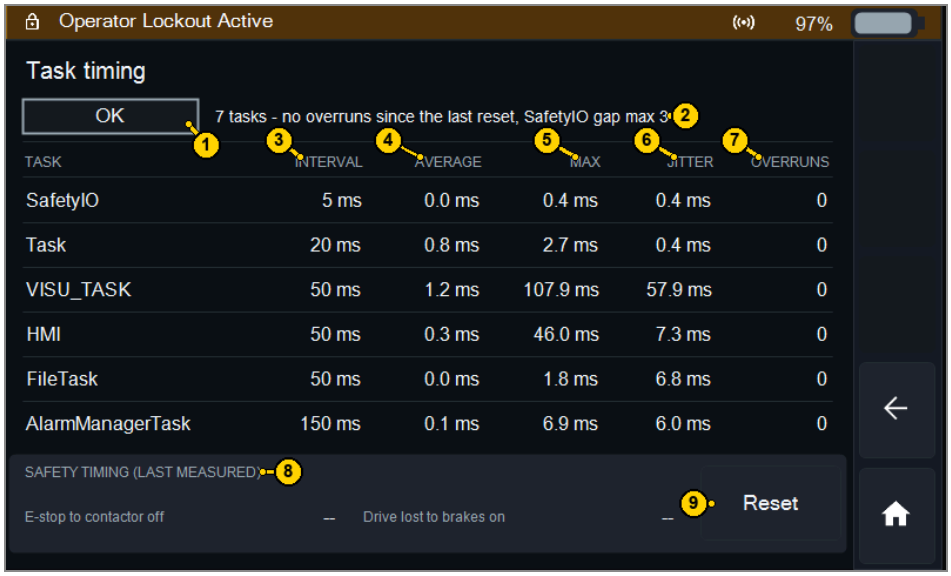
Event description (shown with an empty log)

1. **Event code and name.**
2. **Type** (Fault or Warning), with when it happened and its count.
3. **Description:** what the drive detected, how it is evaluated, related drive parameters and, for common events, the steps to fix it.

Clear the log after a repair so that new events stand out. Record the events (or photograph the page) before clearing.

4.6 Task timing

Shows how the control program's tasks are keeping time, and the last measured safety reaction times. Mainly for LHD support when diagnosing slow response or a "control stall".



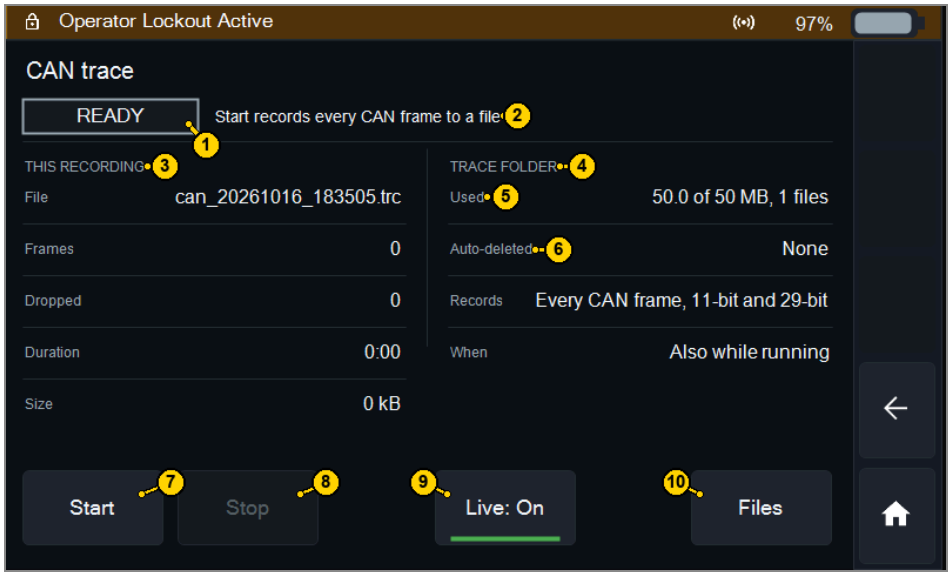
Task timing

1. **State:** OK, or a warning when a task has overrun.
2. **Summary:** number of tasks, overruns since the last reset, and the largest gap seen in the SafetyIO task.
3. **Interval:** how often each task is meant to run.
4. **Average:** average run time.
5. **Max:** longest run time since the last reset.
6. **Jitter:** largest variation in the start time.
7. **Overruns:** times the task did not finish within its interval. Should stay 0.
8. **Safety timing (last measured):** E-stop to contactor off, and drive lost to brakes on, from the last time each happened ("--" = not measured since start-up).
9. **Reset:** clears the maxima, jitter and overrun counts.

Task	Interval	Does
SafetyIO	5 ms	Reads and writes the IO module and the CAN bus; E-stop and safety supervision.
Task	20 ms	Machine control: joysticks, drives, hydraulics, charging.
VISU_TASK	50 ms	Draws the display. A high maximum and jitter here is normal.
HMI	50 ms	Display pages and settings logic.
FileTask	50 ms	Writes trace files and recipes.
AlarmManagerTask	150 ms	Alarm list and history.

4.7 CAN trace

Records every CAN frame on the machine's bus to a file on the controller, so LHD can analyse a fault that is hard to reproduce. The trace runs in the background while you use the machine.



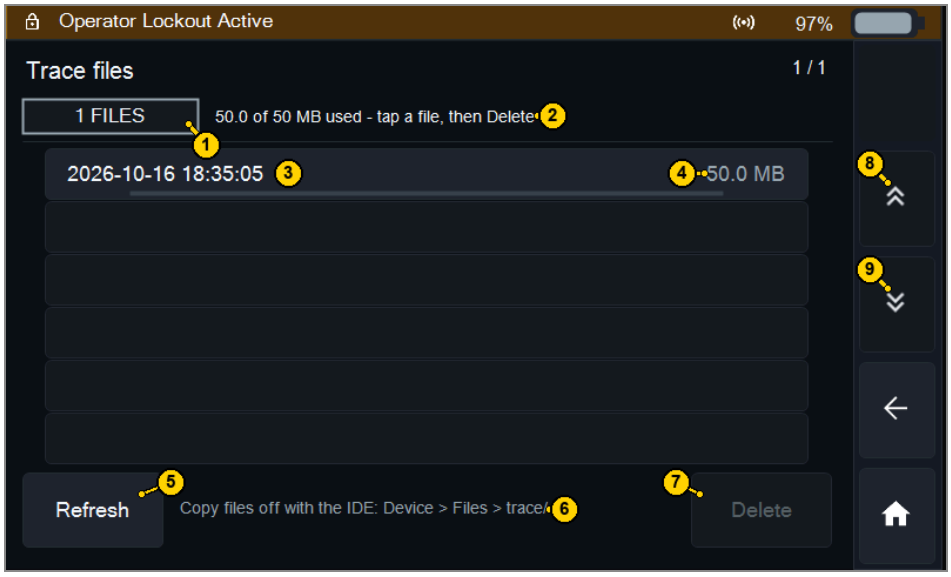
CAN trace, ready

1. **State:** READY, RECORDING, or a reason a recording cannot start.
2. **Hint** for the next step.
3. **This recording:** file name, frames recorded, frames dropped (should be 0), duration and size.
4. **Trace folder** on the controller.
5. **Used:** space used out of 50 MB, and number of files.
6. **Auto-deleted:** the folder is kept under 50 MB by deleting the oldest files; this shows how many and the last one.
7. **Start:** begins a new file.
8. **Stop:** ends and closes the file.
9. **Live:** On allows recording while the machine is running ("When: Also while running"). With Live Off, Start is refused unless the machine is idle.
10. **Files:** opens Trace files (4.8).

1. Log in as Service and open Settings > Tools > CAN trace.
2. Set **Live** to On if the fault happens while driving.
3. Tap **Start**, then make the fault happen. Note the time.
4. Tap **Stop**. Copy the file off (4.8) and send it to LHD with the time of the fault.

4.8 Trace files

Lists the trace files on the controller, newest first, and lets you delete them.



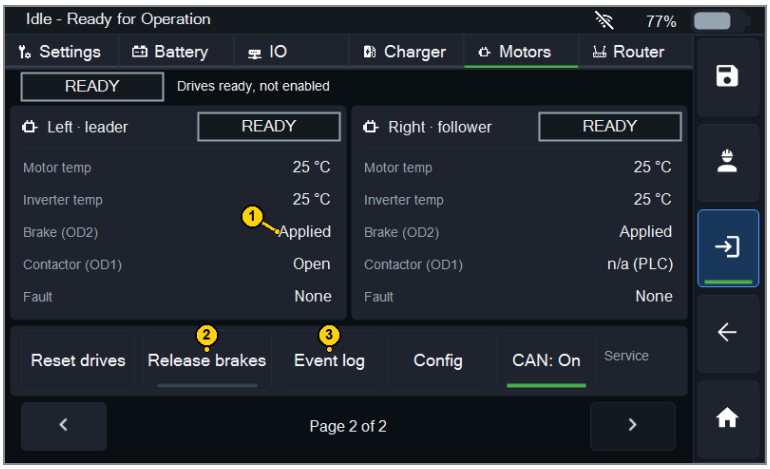
Trace files

1. **Number of files.**
2. **Status:** space used out of 50 MB and what to do.
3. **File:** named by the date and time the recording started. Tap a file to select it.
4. **Size** of the file.
5. **Refresh:** reads the folder again.
6. **How to copy files off:** connect the programming tool to the controller and open Device > Files > trace/. The files are text traces readable by common CAN tools.
7. **Delete** (Service): deletes the selected file after a hold-to-confirm.
8. **Page up.**
9. **Page down** (6 files per page).

4.9 Brake release for towing

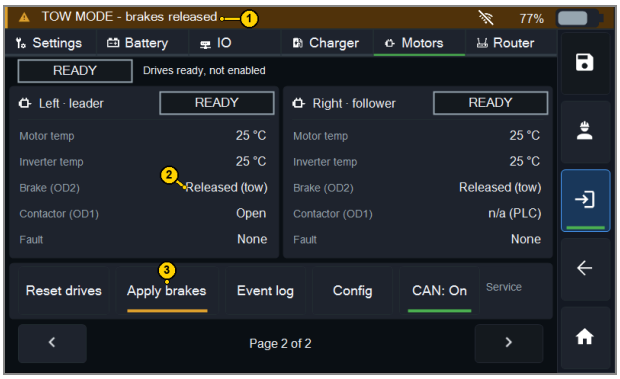
> This feature is available on software v2026.10.26.51 and later.

Releases both track brakes so a machine that cannot drive can be towed. Motors tab, page 2 > **Release brakes** (next to Reset drives).



Motors page 2 before release (Service login)

1. **Brake** rows: Applied.
2. **Release brakes:** live only when every condition below holds; otherwise grey, and a tap shows the reason in the band (for example "Refused - Needs a Service login").
3. **Event log.**

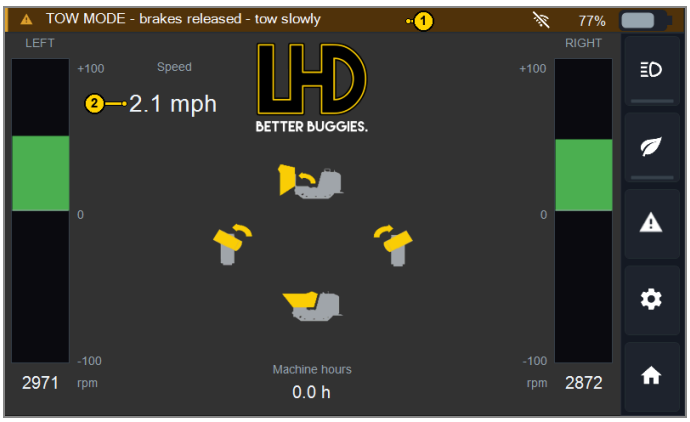


Tow mode active

1. **Band:** TOW MODE - brakes released.
2. **Brake** rows: Released (tow). The drives stay off.
3. The key now reads **Apply brakes** (amber bar).

Release is allowed only when all of these hold: Service or Admin login; machine stopped; E-stop released; both drives answering; charge cable not plugged in; both sticks centred; machine not locked by PIN to drive.

1. Attach the machine to the towing vehicle and chock it. Make sure the ground is level.
2. Log in as Service. Open the Motors tab, page 2.
3. Press **Release brakes**; the box "Release both brakes for towing?" opens. Hold Confirm until the bar fills (2 seconds).
4. Check the band reads TOW MODE - brakes released and both brake rows read Released (tow). Remove the chocks and tow slowly.
5. When done, tap **Apply brakes**.



Towing too fast

1. **- tow slowly** is added when either motor turns faster than the equivalent of 2 mph.
2. **Speed** while towing.

> Tow below 2 mph. Above about 2.5 mph the motors feed the battery uncontrolled. Never release the brakes on a slope or before the machine is attached.

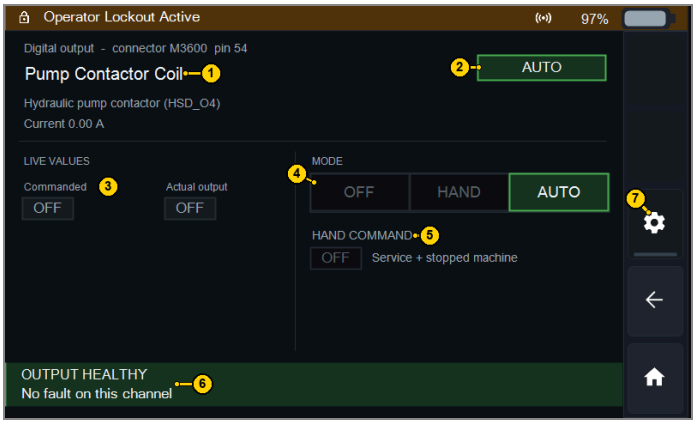
The brakes apply again at once on: Apply brakes; E-stop; key-off; any drive-stick movement or drive request; loss of drive communication; plugging in the charge cable; a drive put in Hand; a motor R/L measurement; or 30 minutes stopped in tow mode.

With the key off or both drives without power, the brakes cannot be released from the screen. Use the mechanical brake release.

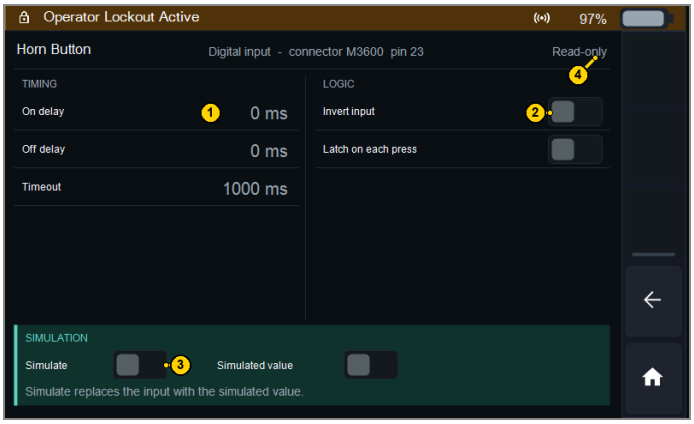
5. IO points: detail, Hand mode and configuration

Tap a point on the IO tab to open its detail page; the gear key (Service) opens its configuration. The machine has digital inputs and digital outputs (some outputs also report current); it has no analog points.

- **Mode Off / Hand / Auto.** Hand forces an output to the Hand command (or an input to the Hand value). Hand and Off need a Service login, the machine idle and the E-stop released, and end by themselves when any of these stops or when the IO pages are left.
- **The E-stop input is read-only**: always Auto, never forced.
- **Configuration**: on-delay, off-delay, time-out, invert, latch on each press (inputs) and simulate. Simulate replaces an input with the simulated value; on an output it does not bypass the coil driver. Fixed values are shown as "Fixed".
- **Health**: the bar at the bottom reports a fault on the channel (open load, short, and so on).



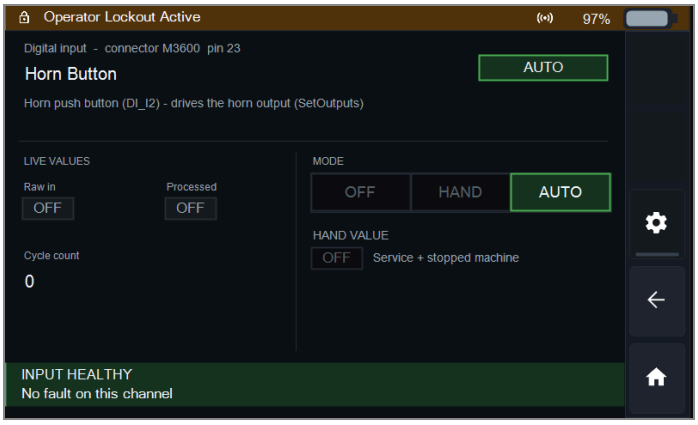
Output detail (Pump contactor)



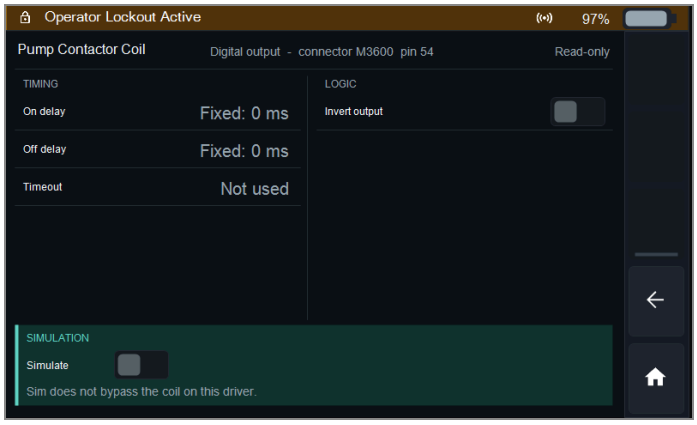
Input configuration (Horn button)

1. **Point:** name, type, IO module connector and pin, function and current.
2. **Mode chip:** AUTO, HAND or OFF.
3. **Live values:** what the program commands and what the output does.
4. **Mode keys** OFF / HAND / AUTO (Service, machine stopped).
5. **Hand command:** the state forced in Hand.
6. **Health** of the channel.
7. **Configuration** key (gear).

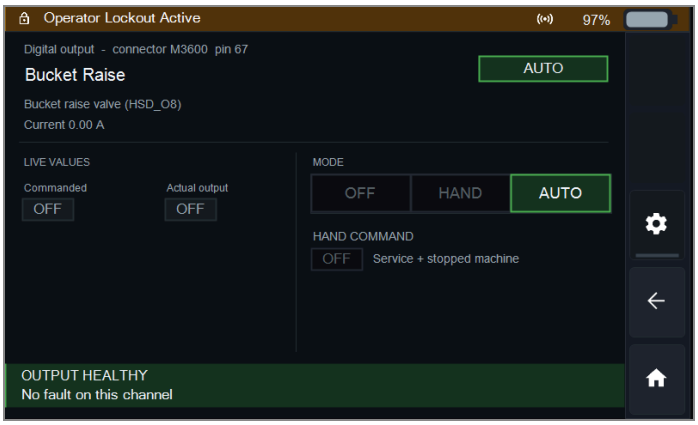
1. **Timing:** on-delay, off-delay, time-out.
2. **Logic:** invert input, latch on each press.
3. **Simulation:** replaces the input with the simulated value (for testing).
4. **Read-only** marker when the configuration cannot be changed.



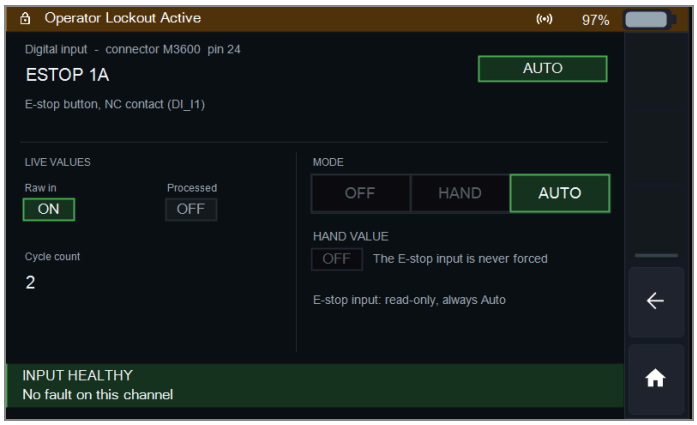
Digital input detail (Horn button)



Output configuration



Valve output (Bucket raise)



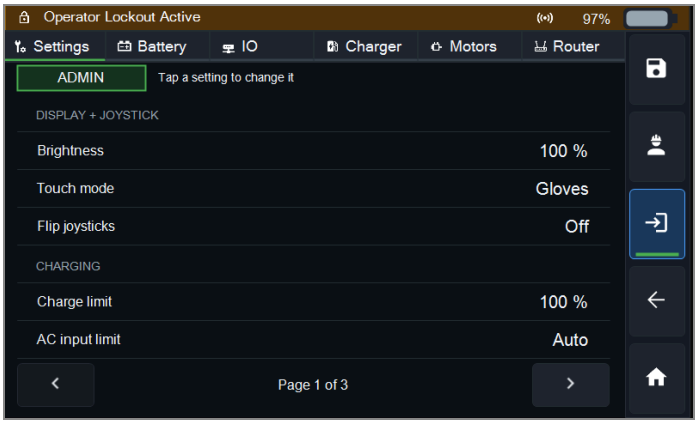
E-stop input: read-only

6. Operator settings (Settings tab)

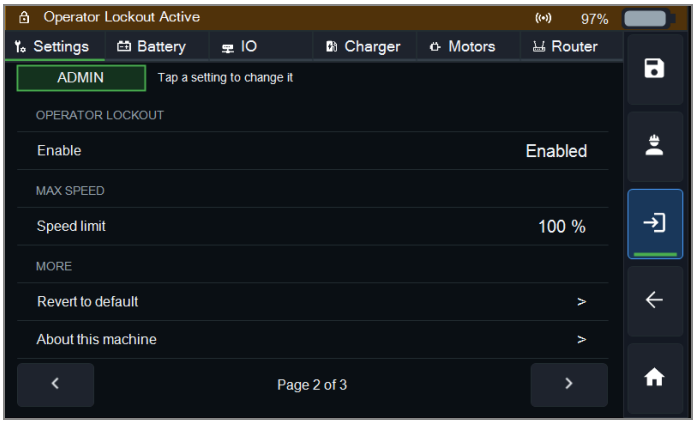
Visible to everyone. The same list is described in the Operator Software Guide. On v2026.10.26.51 and later, page 2 also has SECURITY > PIN to drive (anti-theft PIN at key-on; anyone except in Rental, machine stopped), described in the Operator Software Guide, section 6. Tools and Engineering appear at the end of the list only during a Service or Admin session.

Setting	Default	Range	Who / when	Kept	What it does
DISPLAY + JOYSTICK					
Brightness	100 %	10 to 100 %, step 5	Anyone	Saved at once	Backlight brightness of the display.
Touch mode	Gloves		Anyone	Saved at once	Touch-screen sensitivity profile: Normal, Wet (water on the screen) or Gloves. Applies at once.
Flip joysticks	Off	Off / On	Anyone, stopped only	Press Save	Swaps the functions of the left and right joystick (traction on the other stick). Refused unless the machine is stopped. Not changed by Revert to default.
CHARGING					
Charge limit	100 %	20 to 100 %, step 5	Anyone (locked in Rental)	Saved at once	Highest state of charge the batteries are charged to. 50 % for storage, 80 % normal, 100 % for extended work. Charge to 100 % at least once a month to calibrate the battery management system.
AC input limit	Auto	Auto (0), or 1 A up to the charging supply limit (max 40 A), step 1	Anyone (locked in Rental)	Saved at once	Cap on the AC current the charger draws from the supply. Auto (0) lets the charging supply (EVSE) decide. The keypad maximum is the supply limit, so the setting can only lower it. The PLC holds the limit by trimming the DC charge current. Lower it on a weak or shared circuit.
OPERATOR LOCKOUT					
Enable	Enabled	Disabled / Enabled	Anyone (locked in Rental)	Press Save	Operator Lockout on or off. Switching it off asks for confirmation, because it bypasses a safety device that stops accidental motion.
MAX SPEED					
Speed limit	100 %	10 to 100 %, step 5	Anyone (locked in Rental)	Press Save	Scales the joystick top speed of the tracks, in both directions, to this percentage.
MORE					
About this machine	*Opens a page or sub-list.*				
Tools	*Opens a page or sub-list.*				
Engineering	*Opens a page or sub-list.*				

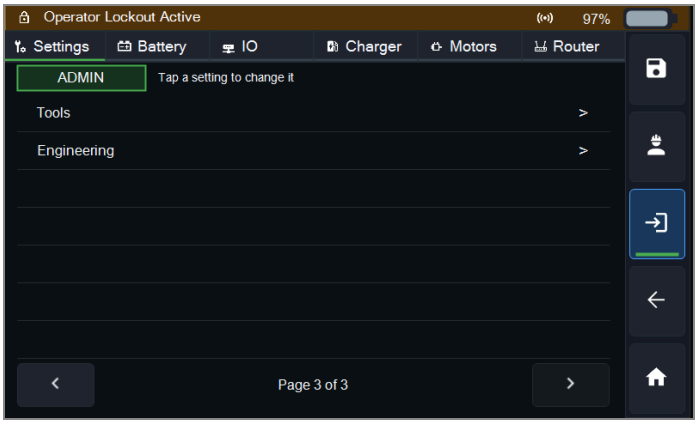
Screens



Page 1



Page 2



Page 3

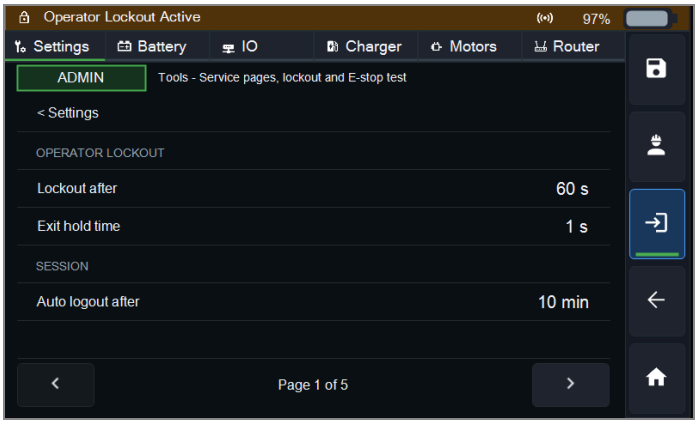
7. Tools settings (Service login)

Settings > Tools.

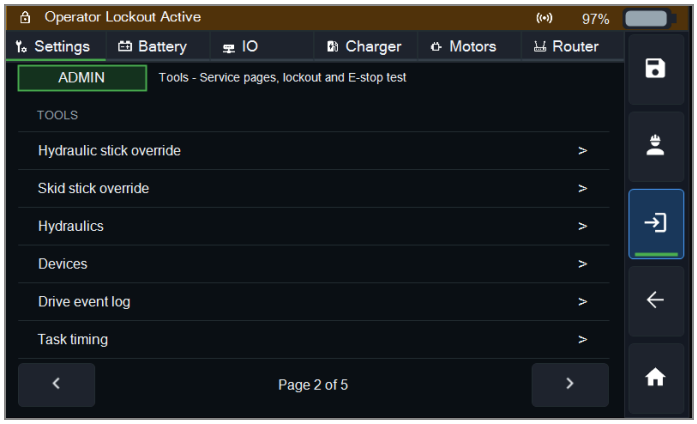
Setting	Default	Range	Who / when	Kept	What it does
< Settings	*Opens a page or sub-list.*				
OPERATOR LOCKOUT					
Lockout after	60 s	30 to 600 s, step 10	Service	Press Save	Inactivity time (traction, pump, joysticks and touch screen all unused) before the Operator Lockout box appears.
Exit hold time	1 s	1 to 5 s, step 1	Service	Press Save	How long the lockout box must be held to leave the lockout.
SESSION					
Auto logout after	10 min	1 to 60 min, step 1	Service	Saved at once	A Service or Admin session ends by itself after this long without use.
TOOLS					
Hydraulic stick override	*Opens a page or sub-list.*				
Skid stick override	*Opens a page or sub-list.*				
Hydraulics	*Opens a page or sub-list.*				
Devices	*Opens a page or sub-list.*				
Drive event log	*Opens a page or sub-list.*				
Task timing	*Opens a page or sub-list.*				
CAN trace	*Opens a page or sub-list.*				
CAN NODES					
Drives CAN	On	On / Off	Service, stopped only	Until power-off	Off stops the PLC talking to the two traction drives so a laptop tool (imtool or the drive tool) can use the bus. Returns to On at power-up.
Charger CAN	On	On / Off	Service, stopped only	Until power-off	Off stops the PLC talking to the charger so a laptop tool can use it. Returns to On at power-up.
Joysticks CAN	On	On / Off	Service, stopped only	Until power-off	Off stops the PLC reading the joysticks. Returns to On at power-up.
CAN transport (restart)	Shared bus	Per device / Shared bus	Admin, stopped only	Saved at once	How the PLC reaches the devices on the CAN bus: per device, or one shared bus. Read once at start-up, so a change takes effect after a restart. Shared bus is the default.
DAILY E-STOP TEST					
Run E-stop test now	*Opens a page or sub-list.*				
Test history	*Opens a page or sub-list.*				

Test mode	Reminder		Service	Saved at once	Daily E-stop test behaviour: Off, Reminder (the page prompts, can be skipped, the skip is logged) or Required (a code is needed to skip).
Due after keyed off	60 min	1 to 1440 min, step 5	Service	Saved at once	The test becomes due when the key has been off this long.
Test time-out	5 min	1 to 30 min, step 1	Service	Saved at once	How long the E-stop test page waits for the E-stop to be pressed and released.
DEFAULTS					

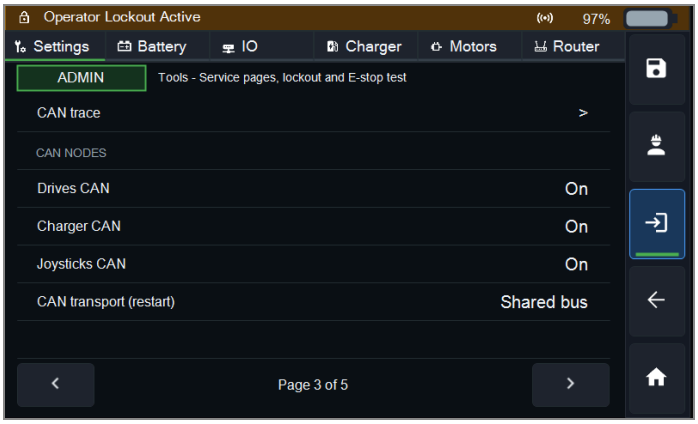
Screens



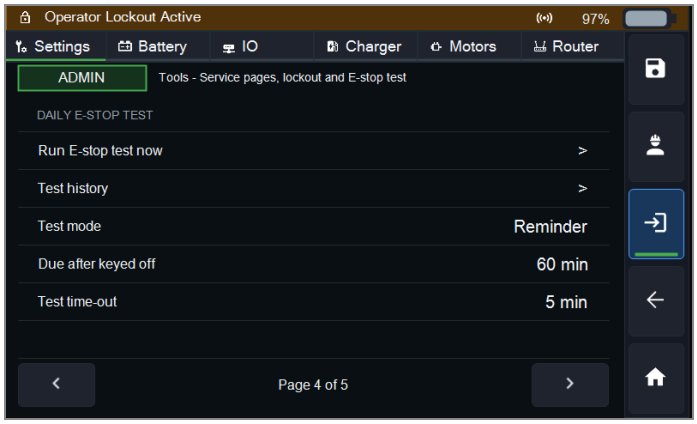
Page 1



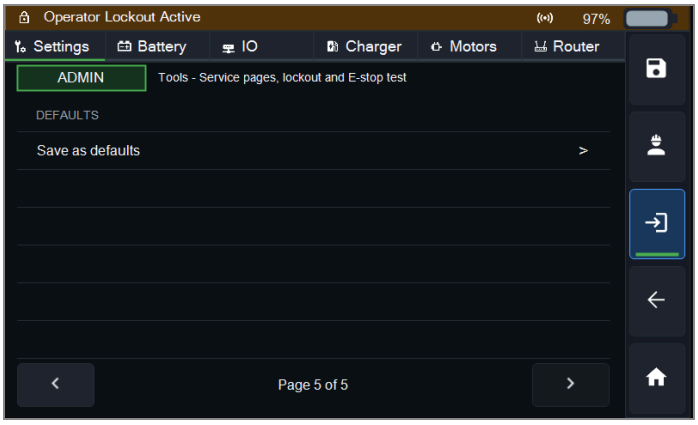
Page 2



Page 3



Page 4


Operator Lockout Active
97%
Settings
Battery
IO
Charger
Motors
Router
ADMIN
Tools - Service pages, lockout and E-stop test
DEFAULTS
Save as defaults
>
Page 5 of 5

Page 5

8. Charge settings (Charger tab, page 4)

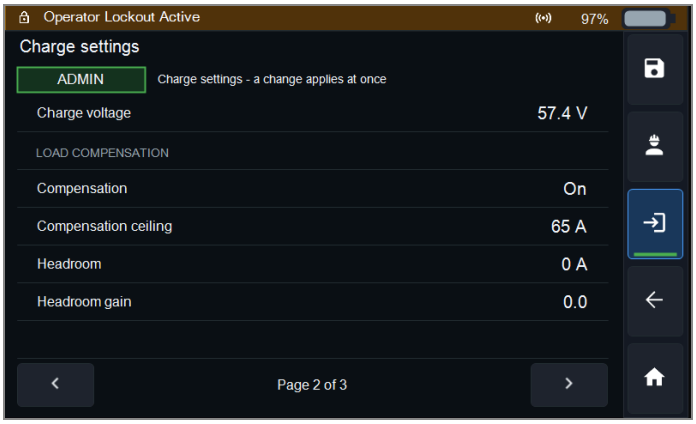
Charger tab > page 4 > Charge settings. The first two rows are visible to everyone; the rest appear only in a Service session.

Setting	Default	Range	Who / when	Kept	What it does
CHARGING					
AC input limit	Same setting as in section 6, Operator settings.				
Charge limit	Same setting as in section 6, Operator settings.				
Resume below limit	2 %	1 to 10 %, step 1	Service	Saved at once	A finished charge restarts when the state of charge falls this far below the Charge limit. 10 is the most the charger driver accepts.
CURRENT + VOLTAGE					
Charger max output	65 A	5 to 65 A, step 1	Service	Saved at once	Highest charge current requested from the charger. 65 A is the XV3300 rating.
Ramp-up	5 A/s	1 to 20 A/s, step 1	Service	Saved at once	How fast the charge current is raised at the start of a charge.
Charge voltage	57.4 V	48 to 58.1 V, step 0.1	Service	Saved at once	Charge voltage setpoint. 57.4 V = 4.10 V x 14 cells. The pack maximum is 58.1 V (4.15 V x 14).
LOAD COMPENSATION					
Compensation	On	Off / On	Service	Saved at once	On raises the charger output to cover loads that run during charging (for example hydraulics on charge).
Compensation ceiling	65 A	0 to 80 A, step 5	Service	Saved at once	The most the charger output may be raised to by Compensation.
Headroom	0 A	0 to 20 A, step 1	Service	Saved at once	Extra charge current allowed above the measured load.
Headroom gain	0.0	0 to 1 , step 0.1	Service	Saved at once	Extra headroom added per amp of load.
SUPPLY					
AC sag warning	8 %	1 to 30 %, step 1	Service	Saved at once	A warning is raised when the AC voltage under load falls this far below the no-load voltage.

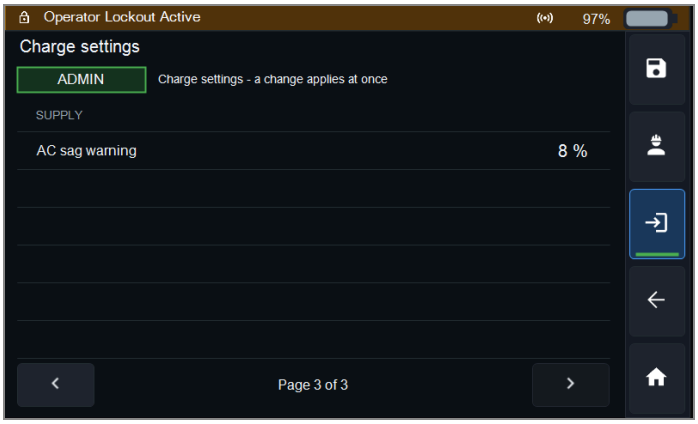
Screens



Page 1



Page 2



Page 3

9. Engineering settings (Service login; traction rows Admin)

Settings > Engineering. Admin-only rows are in TRACTION (ADMIN) and the Admin PIN.

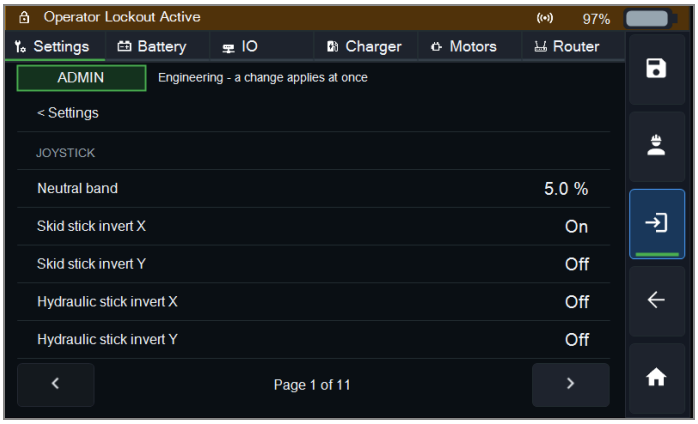
Setting	Default	Range	Who / when	Kept	What it does
< Settings	*Opens a page or sub-list.*				
JOYSTICK					
Neutral band	5.0 %	3 to 20 %, step 0.5	Service, stopped only	Press Save	Joystick dead zone: movement below this percentage of full travel is treated as neutral.
Skid stick invert X	On	Off / On	Service, stopped only	Press Save	Reverses the left-right axis of the traction stick, on top of its wiring.
Skid stick invert Y	Off	Off / On	Service, stopped only	Press Save	Reverses the forward-back axis of the traction stick.
Hydraulic stick invert X	Off	Off / On	Service, stopped only	Press Save	Reverses the left-right axis of the hydraulic stick.
Hydraulic stick invert Y	Off	Off / On	Service, stopped only	Press Save	Reverses the forward-back axis of the hydraulic stick.
Hydraulic threshold	10 %	1 to 50 %, step 1	Service, stopped only	Press Save	How far the hydraulic stick must move before a hydraulic function counts as active.
SKID STEER					
Drive feel	*Opens a page or sub-list.*				
Sprocket pitch dia	9.9 in	5 to 20 in, step 0.1	Service	Saved at once	Drive sprocket pitch diameter, used to convert track rpm to the ground speed (mph) on the Main screen. Measured value 9.925 in (11 teeth x 72 mm).
Max speed	6000 rpm	500 to Drive speed ceiling rpm, step 100	Service, stopped only	Press Save	Track speed at full joystick deflection. Cannot exceed the Drive speed ceiling.
Eco max speed	3000 rpm	500 to Max speed rpm, step 100	Service, stopped only	Press Save	Track speed limit while Eco mode is on.
Motor off delay	1.0 s	0 to 5 s, step 0.5	Service, stopped only	Press Save	How long the traction motors stay enabled after the stick returns to neutral.
ADAPTIVE FILTER					
Filter gain	1.0	0.1 to 5 , step 0.1	Service, stopped only	Press Save	Adaptive stick filter: how strongly the filter reacts to stick movement. (The filter is switched on under Drive feel.)

Max deadband	10.0 %	0 to 20 %, step 0.5	Service, stopped only	Press Save	Adaptive stick filter: the largest extra dead zone the filter may add.
Time constant	30 ms	10 to 200 ms, step 10	Service, stopped only	Press Save	Adaptive stick filter: its smoothing time.
MOTION DELAY					
Motion delay	Off	Off / On	Service, stopped only	Press Save	On holds the tracks back for the Delay time after the stick leaves neutral.
Delay time	500 ms	0 to 2000 ms, step 50	Service, stopped only	Press Save	The hold time used by Motion delay.
TANK TURN					
Tank turn limit	On	Off / On	Service, stopped only	Press Save	On limits track speed during a turn on the spot (tank turn) to Tank turn speed.
Tank turn speed	40 %	10 to 100 %, step 5	Service, stopped only	Press Save	Track speed limit, as a percentage, while turning on the spot.
Y threshold	20 %	0 to 100 %, step 5	Service, stopped only	Press Save	Tank-turn detection: the forward-back stick must be below this percentage for a movement to count as a turn on the spot.
X threshold	90 %	0 to 95 %, step 5	Service, stopped only	Press Save	Classic drive feel only: the pivot limit applies once the side stick is above this percentage.
REGEN					
Regen floor when full	30 A	0 to 50 A, step 5	Service	Saved at once	Minimum regen braking current allowed while the battery is full and reports no charge acceptance. 0 = off.
Low-regen stop brake	On	Off / On	Service	Saved at once	On applies the brakes at a stop when regen braking is weak, so the tracks cannot overrun. On by default.
Stop brake wait	2.0 s	0.3 to 5 s, step 0.1	Service	Saved at once	How long a track may overrun at a stop before the brakes apply (when Low-regen stop brake is On).
Regen dump via pump	40 A	0 to 45 A, step 5	Service	Saved at once	Extra regen braking absorbed by running the hydraulic pump over relief as a dump load, in amps, when the battery cannot take it. 0 = off. Ships at 40 A. While it runs the status band adds "Pump dump: NN A regen".

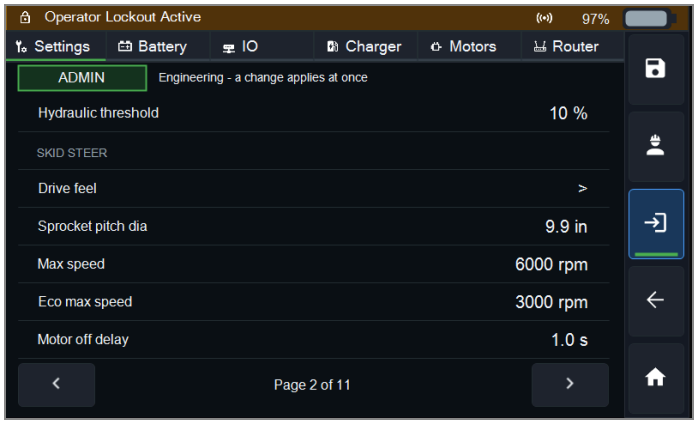
Regen share tracks	Off	Off / On	Service	Saved at once	On lets the braking track regenerate up to what the other track is drawing, so energy moves between the tracks instead of the battery.
Regen floor state	*Read-only display.*				
CHARGING					
AC input limit	Same setting as in section 6, Operator settings.				
Charge limit	Same setting as in section 6, Operator settings.				
Resume below limit	Same setting as in section 8, Charge settings.				
Charger max output	Same setting as in section 8, Charge settings.				
Ramp-up	Same setting as in section 8, Charge settings.				
Charge voltage	Same setting as in section 8, Charge settings.				
Compensation	Same setting as in section 8, Charge settings.				
Compensation ceiling	Same setting as in section 8, Charge settings.				
Headroom	Same setting as in section 8, Charge settings.				
Headroom gain	Same setting as in section 8, Charge settings.				
AC sag warning	Same setting as in section 8, Charge settings.				
LOW BATTERY DERATE					
Derate	On	Off / On	Service	Press Save	On reduces maximum speed as the battery runs low.
Derate starts at SOC	10 %	Full derate SOC + 1 to 50 %, step 1	Service	Press Save	State of charge below which the speed derate begins.
Full derate at SOC	5 %	Limp SOC to Derate start SOC - 1 %, step 1	Service	Press Save	State of charge at which the full derate (Max speed derate) applies.
Max speed derate	75 %	0 to 95 %, step 5	Service	Press Save	Speed reduction at the full derate point.
LIMP MODE					
Limp mode	On	Off / On	Service	Press Save	On limits the machine to a crawl when the battery is nearly empty.
Limp below SOC	1 %	0 to Full derate SOC %, step 1	Service	Press Save	State of charge below which Limp mode applies.
Limp speed derate	85 %	0 to 99 %, step 5	Service	Press Save	Speed reduction while in Limp mode.
HYDRAULIC VALVES					
Invert bucket dump	On	Off / On	Service, stopped only	Press Save	Reverses the dump valve direction.
Invert bucket rotate	Off	Off / On	Service, stopped only	Press Save	Reverses the bucket rotate valve direction.
TRACTION (ADMIN)					

Drive speed ceiling	6000 rpm	Max speed (min 500) to 6000 rpm, step 100	Admin, stopped only	Save commissioning	Hard speed clamp at the drives for any command source, Hand included. Max speed cannot be set above it.
Hard limit	*Read-only display.*				
Left leader (restart)	7	1 to 127 , step 1	Admin, stopped only	Save commissioning	CAN node number of the left (leader) traction drive. Takes effect after a restart.
Right follower (restart)	8	1 to 127 , step 1	Admin, stopped only	Save commissioning	CAN node number of the right (follower) traction drive. Takes effect after a restart.
Invert left motor	Off	Off / On	Admin, stopped only	Save commissioning	Reverses the rotation direction of the left motor.
Invert right motor	Off	Off / On	Admin, stopped only	Save commissioning	Reverses the rotation direction of the right motor.
Brake engage hold	500 ms	100 to 1000 ms, step 50	Admin, stopped only	Save commissioning	How long the drives hold after a stop before the parking brakes are applied.
Brake cap after disable	4000 ms	500 to 5000 ms, step 100	Admin, stopped only	Save commissioning	Upper limit on how long after the drives are disabled the brakes may stay released.
E-stop ramp	On	Off / On	Admin, stopped only	Saved at once	On makes an E-stop bring a moving machine to zero speed in a controlled ramp, then brake, then power down.
E-stop ramp time	1000 ms	200 to 3000 ms, step 100	Admin, stopped only	Saved at once	Ramp time from top speed to zero during the E-stop controlled stop.
E-stop stop limit	2000 ms	ramp time + brake guard to 6000 ms, step 100	Admin, stopped only	Saved at once	Longest the controlled stop may take. The minimum follows the ramp time and the brake hold (settings guard).
ACCESS CODES					
Service PIN	****		Service	Saved at once	PIN for a Service login. Entered on the keypad and shown as stars.
Admin PIN	****		Admin	Saved at once	PIN for an Admin login. Entered on the keypad and shown as stars.
SYSTEM					

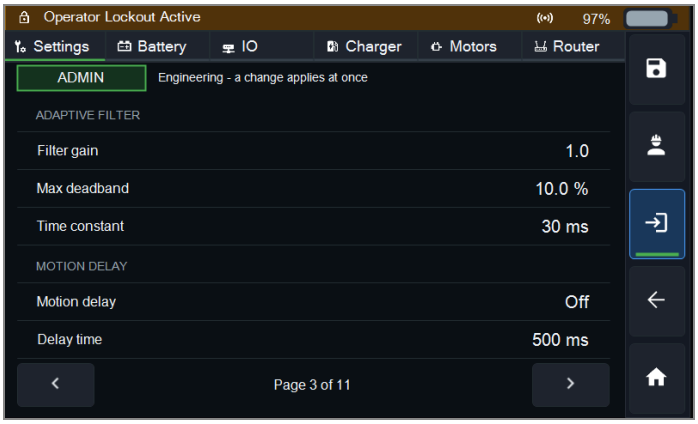
Screens



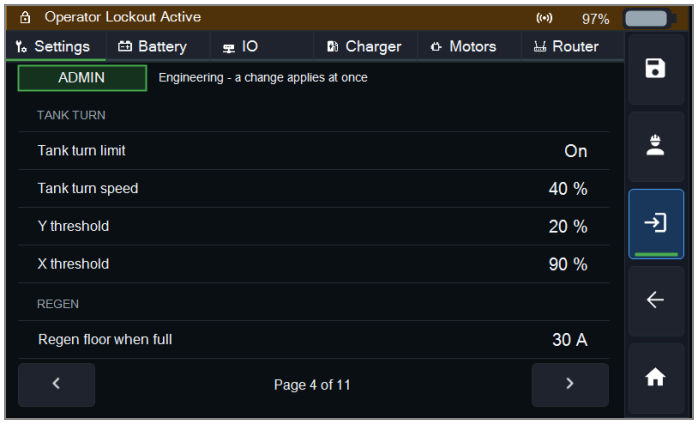
Page 1



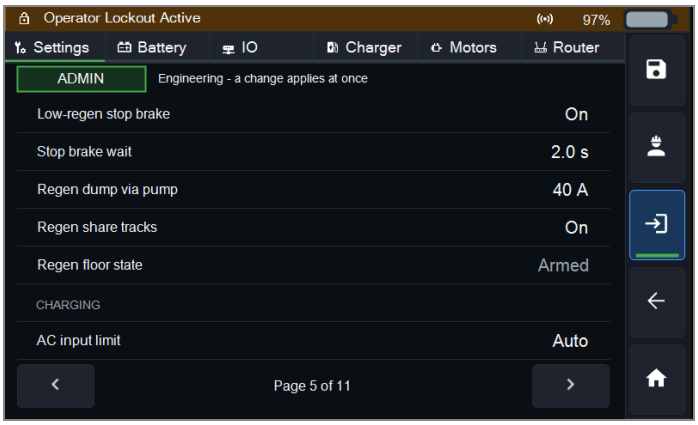
Page 2



Page 3



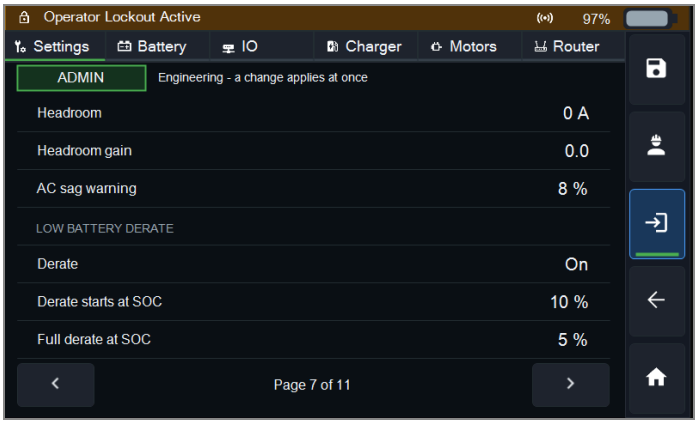
Page 4



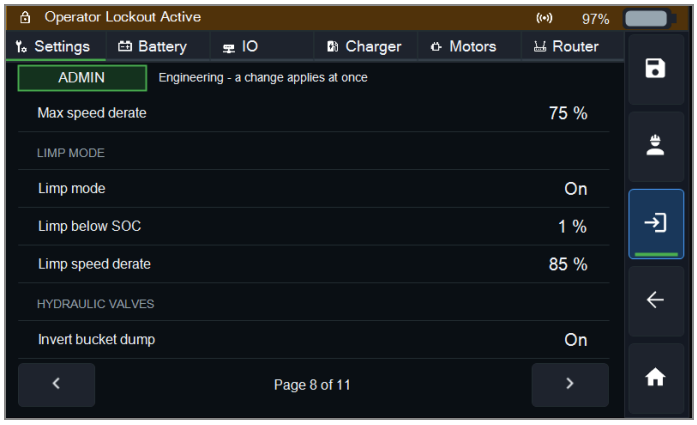
Page 5



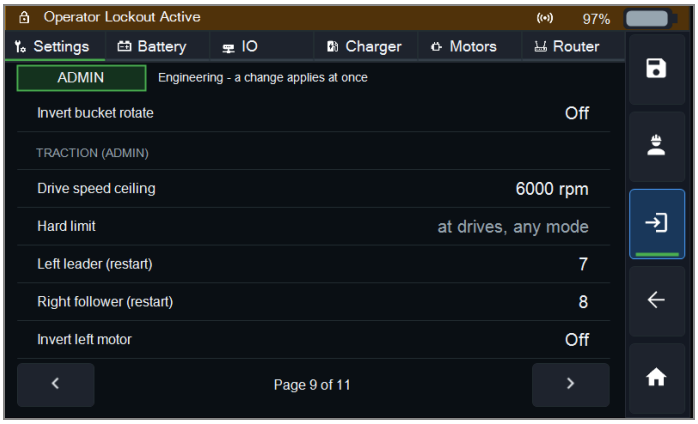
Page 6



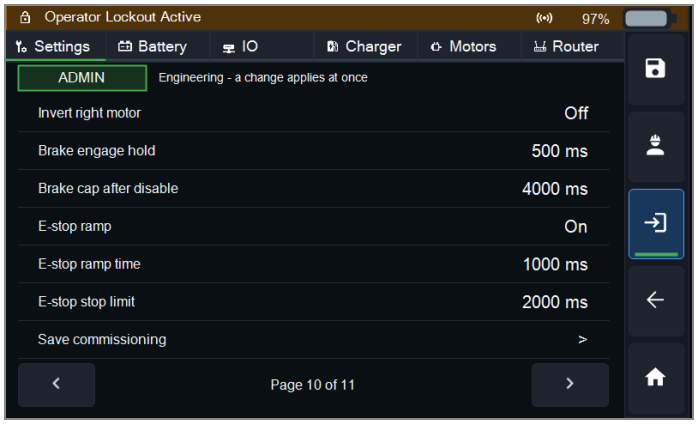
Page 7



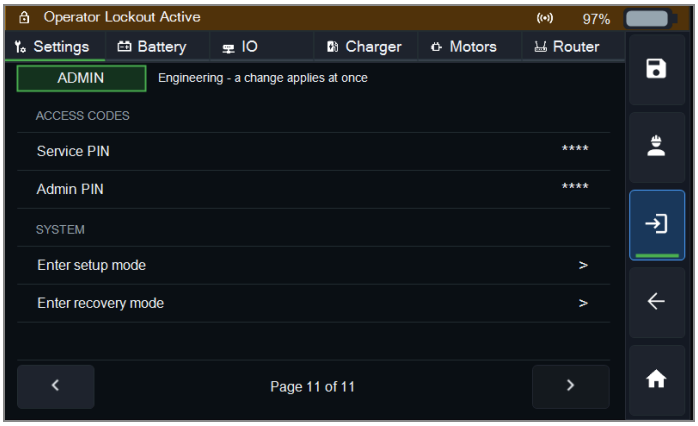
Page 8



Page 9



Page 10



Page 11

10. Drive feel (Engineering > Drive feel)

Stick shaping and ramps. Every row is stopped-only and kept at once.

How a stick position becomes track speed with the **New** feel, in order (rows set elsewhere are named):

1. **Bump filter:** drops short jolts.
2. **Adaptive filter:** removes jitter (tuning under Engineering > Adaptive filter).
3. **Stick smoothing:** damps a shaking hand.
4. **Neutral band** (Engineering > Joystick): speed starts from zero at the edge of the band, with no step and no creep.
5. **Curves:** Travel curve and Steering curve.
6. **Reverse limit.**
7. **Less steering at speed.**
8. **Tank turn limit** (Engineering > Tank turn): limits turns on the spot; fades out as the travel stick is pushed.
9. **Mix:** travel and steering become left and right track speed; the turn radius is kept when a track reaches its limit.
10. **Counter-rotation limit.**
11. **Motion delay** (Engineering), if on.
12. **Ramps and S-curve:** Acceleration, Deceleration, Steering rate and S-curve, never above Max speed.

Classic uses steps 1-3, the tank turn limit, the mix and the motion delay, and leaves the ramps to the drives (2500 rpm/s).

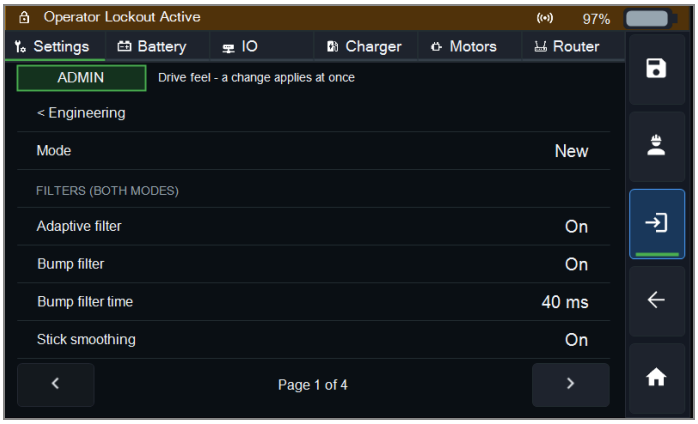
> **Tuning.** Change one row at a time and test on flat open ground. Jerky starts: lower Acceleration or raise S-curve. Machine runs on after the stick is released: raise Deceleration. Twitchy steering at speed: raise Less steering at speed or lower Steering rate. Too sensitive near centre: raise the curves. Restore the delivered values from this table if the feel gets worse.

Setting	Default	Range	Who / when	Kept	What it does
< Engineering	*Opens a page or sub-list.*				
Mode	New	New / Classic	Service, stopped only	Saved at once	Chooses how stick position becomes track speed. New runs the full chain shown above: curves, reverse and turn limits, counter-rotation limit, and PLC ramps with an S-curve. Classic is the original logic (turn limit, mix, motion delay only), with the drives' own 2500 rpm/s ramps doing the smoothing. The filters work in both modes. New is the default.
FILTERS (BOTH MODES)					
Adaptive filter	On	Off / On	Service, stopped only	Saved at once	Adaptive dead-band filter on the stick, in both modes. Suppresses small jitter around the current stick position. Tuned with Filter gain, Max deadband and Time constant under Engineering > Adaptive filter.

Bump filter	On	Off / On	Service, stopped only	Saved at once	Ignores jolts of the stick shorter than Bump filter time, for example when the machine hits a bump and jerks the operator's hand. Works in both modes.
Bump filter time	40 ms	20 to 80 ms, step 20	Service, stopped only	Saved at once	Longest jolt the bump filter removes. A longer time removes bigger jolts but adds up to this much delay to every stick movement.
Stick smoothing	On	Off / On	Service, stopped only	Saved at once	Smooths a shaking stick: the operator's hand shaken by machine surges at about 1-2 Hz. Two filter stages per axis. It lets go at once at neutral, on a change of direction and on a stop, so stopping is never delayed. Works in both modes.
Travel smoothing	0.7 Hz	0.3 to 3 Hz, step 0.1	Service, stopped only	Saved at once	Cut-off frequency of the forward/back smoothing. Lower = smoother, but slower to follow the stick.
Steer smoothing	1.0 Hz	0.3 to 3 Hz, step 0.1	Service, stopped only	Saved at once	Cut-off frequency of the steering smoothing. Lower = smoother, but slower to follow the stick.
Smoothing limit	10 %	2 to 30 %, step 1	Service, stopped only	Saved at once	How far, in % of full stick, the smoothed value may trail the real stick. Keeps a deliberate movement from feeling delayed.
STICK (NEW FEEL)					
Travel curve (expo)	30 %	0 to 100 %, step 5	Service, stopped only	Saved at once	Shape of the forward/back response. 0 % = linear (speed in proportion to stick). 100 % = cubic (very fine control near centre, full speed only near full stick). The delivered 30 % gives finer control at low speed.
Steering curve (expo)	20 %	0 to 100 %, step 5	Service, stopped only	Saved at once	Shape of the steering response, as for Travel curve.
Less steering at speed	0 %	0 to 90 %, step 5	Service, stopped only	Saved at once	Reduces the turning effect of the side stick as travel speed rises, so the machine is less twitchy at speed. 0 % = off; 50 % = half the steering at full speed.
Counter-rotation limit	100 %	0 to 100 %, step 5	Service, stopped only	Saved at once	While travelling, limits how fast the inner track may run backwards in a turn, as % of top speed. 100 % = no limit. Lower values make turns at speed wider and gentler. A turn on the spot from standstill is not affected.
Reverse limit	Off	Off / On	Service, stopped only	Saved at once	On caps reverse speed at Reverse speed.

Reverse speed	70 %	10 to 100 %, step 5	Service, stopped only	Saved at once	Reverse top speed as a percentage of forward top speed, used when Reverse limit is On.
RAMPS					
Acceleration	5000 rpm/s	500 to 10000 rpm/s, step 100	Service, stopped only	Saved at once	How fast the speed command may rise when the stick is pushed (New feel). 5000 rpm/s takes 0 to 6000 rpm in 1.2 s. The drives' own ramps stay as a backstop.
Deceleration	7000 rpm/s	500 to 10000 rpm/s, step 100	Service, stopped only	Saved at once	How fast the speed command may fall when the stick is released or reversed (New feel). 7000 rpm/s stops from 6000 rpm in under 0.9 s. The ramp follows the measured motor speed, so the machine does not keep speeding up after the stick is released.
Steering rate	8000 rpm/s	500 to 10000 rpm/s, step 100	Service, stopped only	Saved at once	How fast a steering change may build up or fall away (New feel).
S-curve	100 ms	0 to 500 ms, step 20	Service, stopped only	Saved at once	Rounds the start and end of each ramp so speed changes begin and finish smoothly (New feel). 0 = sharp corners; higher = softer but slightly slower.
OTHER					
Virtual stick speed	1000 rpm	100 to 3000 rpm, step 100	Service, stopped only	Saved at once	Top track speed on the Skid stick override page (section 4.2).
Brake release delay	0 ms	0 to 500 ms, step 10	Admin, stopped only	Saved at once	After the parking brakes release, the speed command waits this long so the brakes are open before the tracks pull. 0 ms = no wait.

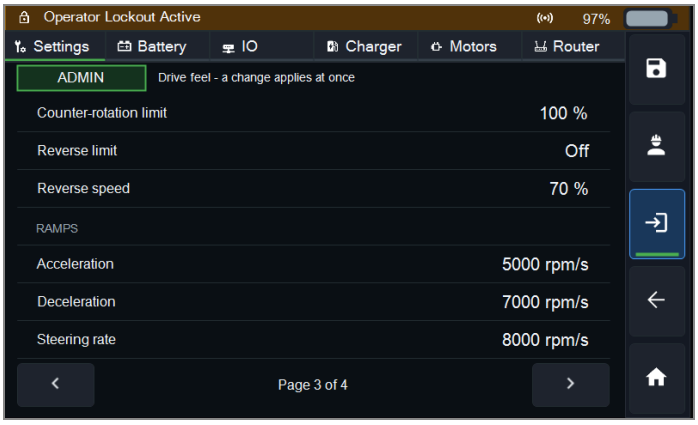
Screens



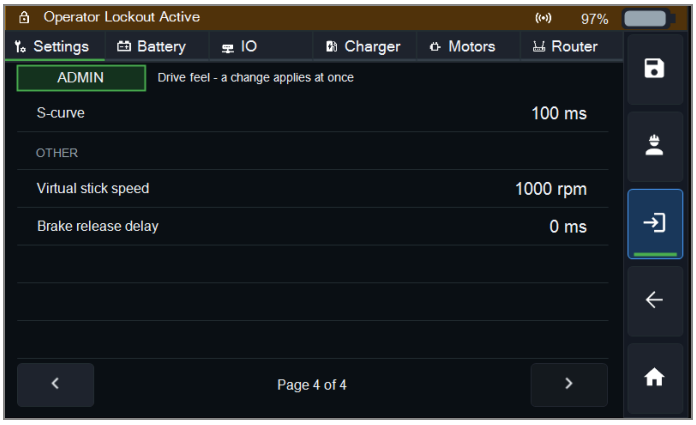
Page 1



Page 2


Operator Lockout Active
97%
Settings
Battery
IO
Charger
Motors
Router
ADMIN
Drive feel - a change applies at once
Counter-rotation limit
100 %
Reverse limit
Off
Reverse speed
70 %
RAMPS
Acceleration
5000 rpm/s
Deceleration
7000 rpm/s
Steering rate
8000 rpm/s
Page 3 of 4

Page 3


Operator Lockout Active
97%
Settings
Battery
IO
Charger
Motors
Router
ADMIN
Drive feel - a change applies at once
S-curve
100 ms
OTHER
Virtual stick speed
1000 rpm
Brake release delay
0 ms
Page 4 of 4

Page 4

11. Motor config (Motors tab, page 2 > Config; Admin)

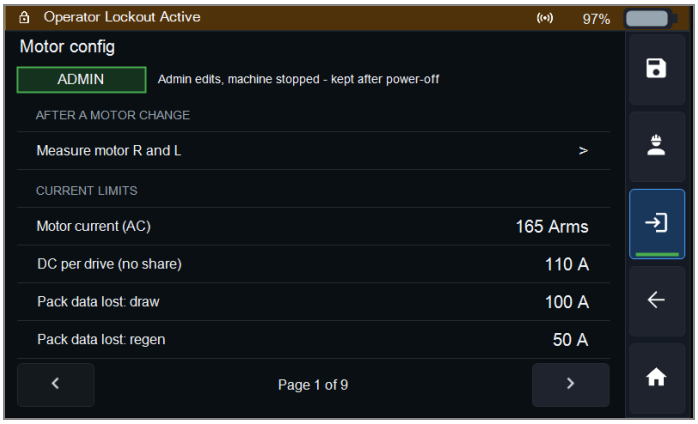
Drive current limits, DC budget sharing, ramps, the motor R/L measurement and read-only drive information. Admin login, machine stopped.

Setting	Default	Range	Who / when	Kept	What it does
AFTER A MOTOR CHANGE					
Measure motor R and L	*Opens the motor R/L measurement (section 12).*				
CURRENT LIMITS					
Motor current (AC)	165 Arms	20 to 165 Arms, step 5	Admin, stopped only	Saved at once	Maximum motor current per drive, motoring and regen braking. 165 Arms is the gearbox limit.
DC per drive (no share)	110 A	10 to 250 A, step 5	Admin, stopped only	Saved at once	DC current limit per drive when DC budget sharing is off.
Pack data lost: draw	100 A	10 to 300 A, step 5	Admin, stopped only	Saved at once	Battery discharge current limit used if pack data is lost.
Pack data lost: regen	50 A	0 to 300 A, step 5	Admin, stopped only	Saved at once	Battery regen current limit used if pack data is lost.
DC BUDGET SHARING					
Share the DC budget	On	Off / On	Admin, stopped only	Saved at once	On splits one DC current budget between the two drives according to demand.
Budget, both drives	240 A	20 to 300 A, step 5	Admin, stopped only	Saved at once	Total DC current for both drives together when sharing. 300 A is the main fuse rating.
Floor per drive	50 A	0 to 150 A, step 5	Admin, stopped only	Saved at once	Smallest share each drive always keeps when sharing.
Max per drive	250 A	20 to 300 A, step 5	Admin, stopped only	Saved at once	Largest share one drive may take when sharing.
Re-split time	300 ms	100 to 2000 ms, step 50	Admin, stopped only	Saved at once	How often the budget split is recalculated.
SPEED + PLC RAMPS					
Eco max speed	Same setting as in section 9, Engineering settings.				
Acceleration	Same setting as in section 10, Drive feel.				
Deceleration	Same setting as in section 10, Drive feel.				
Steering rate	Same setting as in section 10, Drive feel.				
S-curve	Same setting as in section 10, Drive feel.				
E-stop ramp time	Same setting as in section 9, Engineering settings.				
REGEN					

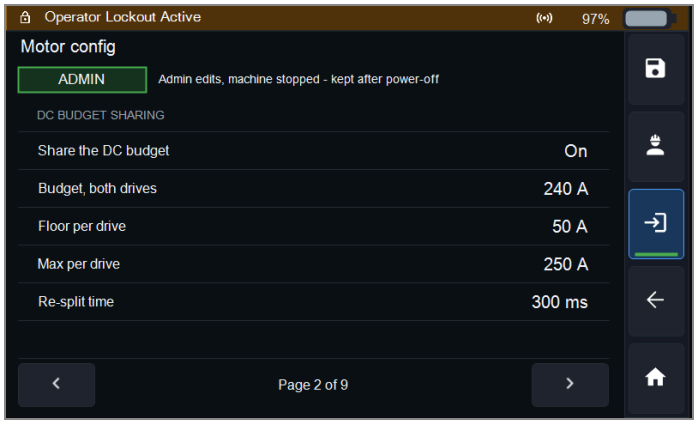
Regen floor when full	Same setting as in section 9, Engineering settings.				
Low-regen stop brake	Same setting as in section 9, Engineering settings.				
Stop brake wait	Same setting as in section 9, Engineering settings.				
Regen dump via pump	Same setting as in section 9, Engineering settings.				
Regen share tracks	Same setting as in section 9, Engineering settings.				
Regen floor state	*Read-only display.*				
DRIVE RAMPS (IN DRIVES)					
PLC writes drive ramps	On	Off / On	Admin, stopped only	Saved at once	On makes the PLC write the four drive-internal ramps to both drives (RAM only) at start-up and on a change.
Forward accel	12750 rpm/s	50 to 12750 rpm/s, step 50	Admin, stopped only	Saved at once	Drive-internal forward acceleration ramp.
Forward decel	12750 rpm/s	1500 to 12750 rpm/s, step 50	Admin, stopped only	Saved at once	Drive-internal forward deceleration ramp.
Reverse accel	12750 rpm/s	50 to 12750 rpm/s, step 50	Admin, stopped only	Saved at once	Drive-internal reverse acceleration ramp.
Reverse decel	12750 rpm/s	1500 to 12750 rpm/s, step 50	Admin, stopped only	Saved at once	Drive-internal reverse deceleration ramp.
SAFETY TIMINGS					
E-stop to contactor	*Read-only display.*				
E-stop to key off	*Read-only display.*				
Stale data to brakes	*Read-only display.*				
Follower enable time	*Read-only display.*				
Key-off hold, max	*Read-only display.*				
E-stop decel limit	*Read-only display.*				
TUNE: NODE 7 | NODE 8					
Ramp mode	*Read-only display.*				
Speed P	*Read-only display.*				
Speed I	*Read-only display.*				
Field weakening P	*Read-only display.*				
Field weakening I	*Read-only display.*				
Max voltage angle	*Read-only display.*				
Upeak in FW	*Read-only display.*				
Upeak limit	*Read-only display.*				
Overspeed fwd	*Read-only display.*				
Overspeed rev	*Read-only display.*				
Current loop P	*Read-only display.*				
Current loop I	*Read-only display.*				
Motor offset	*Read-only display.*				

Software version	*Read-only display.*

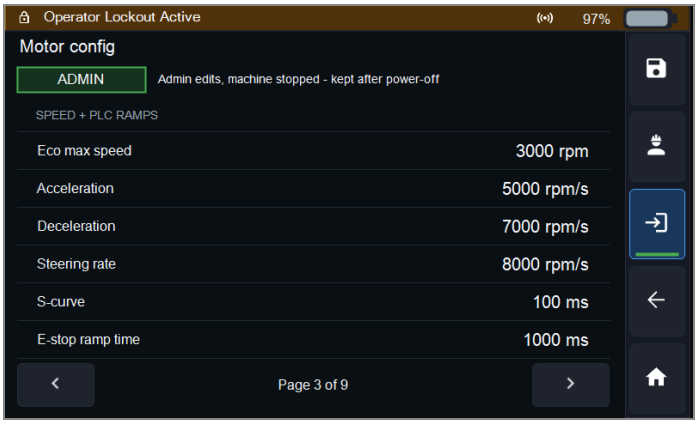
Screens



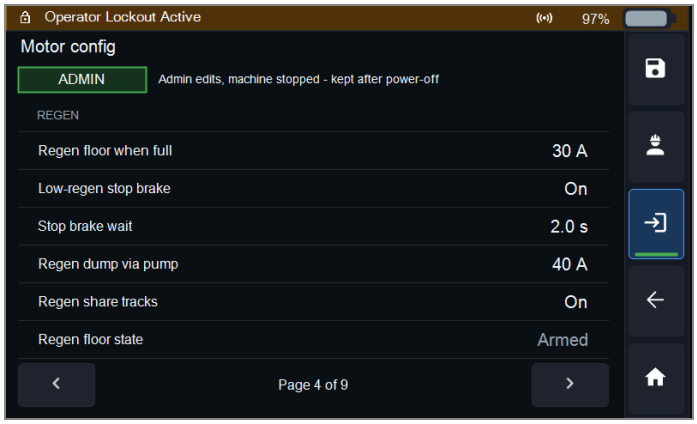
Page 1



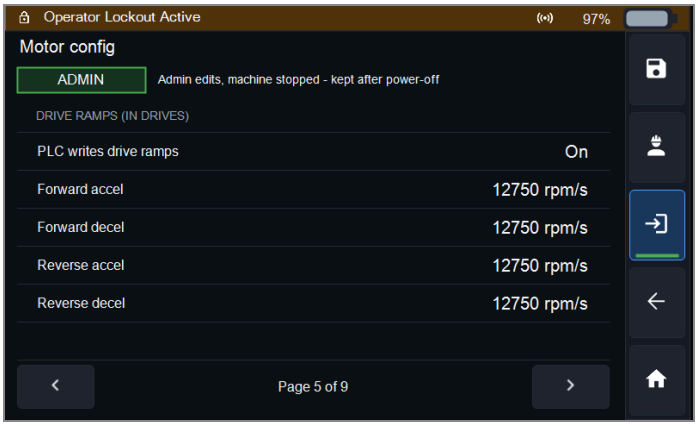
Page 2



Page 3



Page 4



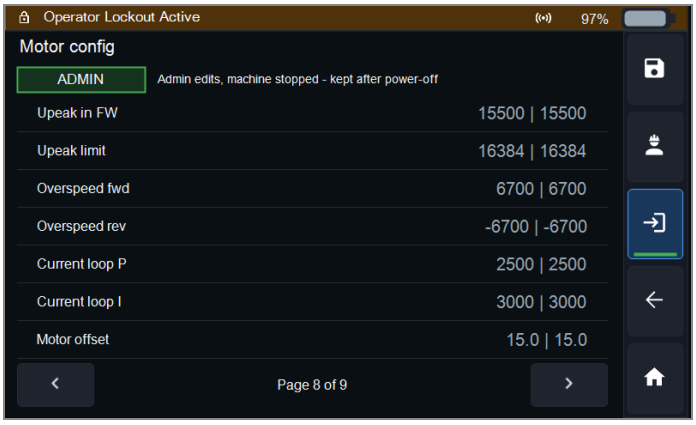
Page 5



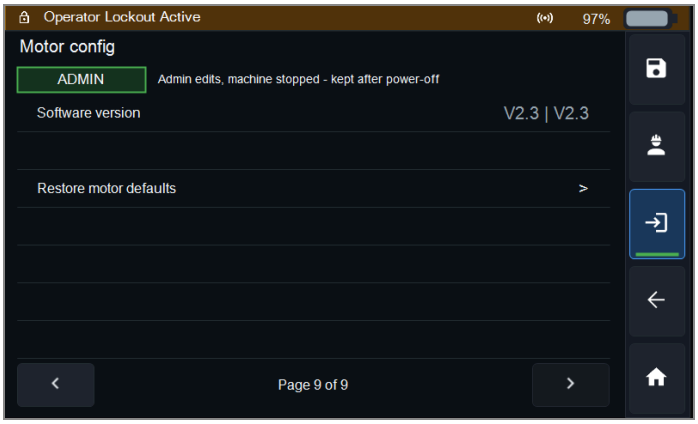
Page 6



Page 7



Page 8



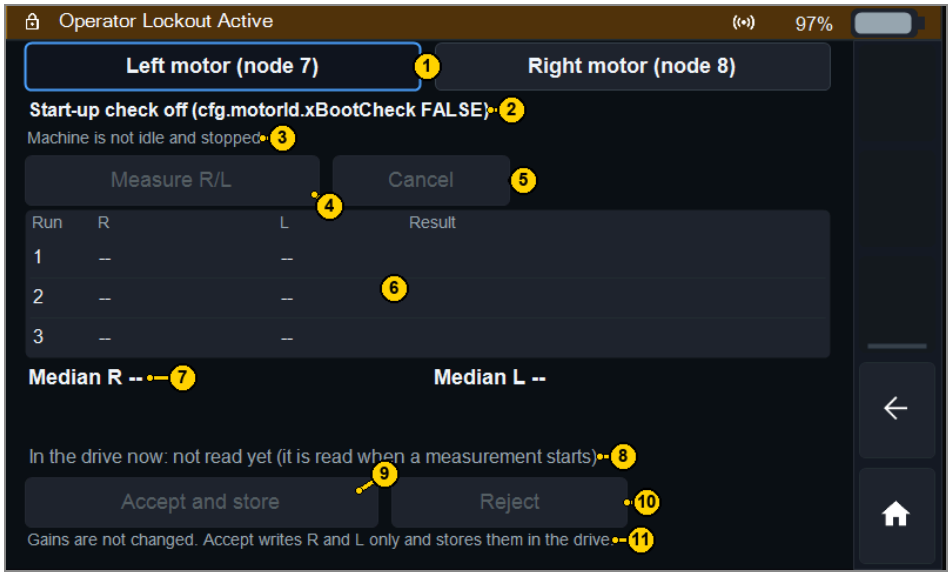
Page 9

12. Measure motor R and L (Admin)

Use after a motor or motor cable change. Opened from Motor config > AFTER A MOTOR CHANGE > Measure motor R and L.

1. Machine idle and stopped, Admin login. Block the machine; the drive energises the motor during the measurement.
2. Select the motor: **Left motor (node 7)** or **Right motor (node 8)**.
3. Press **Measure R/L**. The drive runs the measurement three times; the table shows R and L for each run and the median.
4. Compare the medians with the values in the drive (shown below the table once read). **Accept and store** writes R and L only and stores them in the drive; **Reject** leaves the drive unchanged.

> The measurement never changes the control gains. The start-up check line shows whether the drive's motor-ID check at start-up is on.



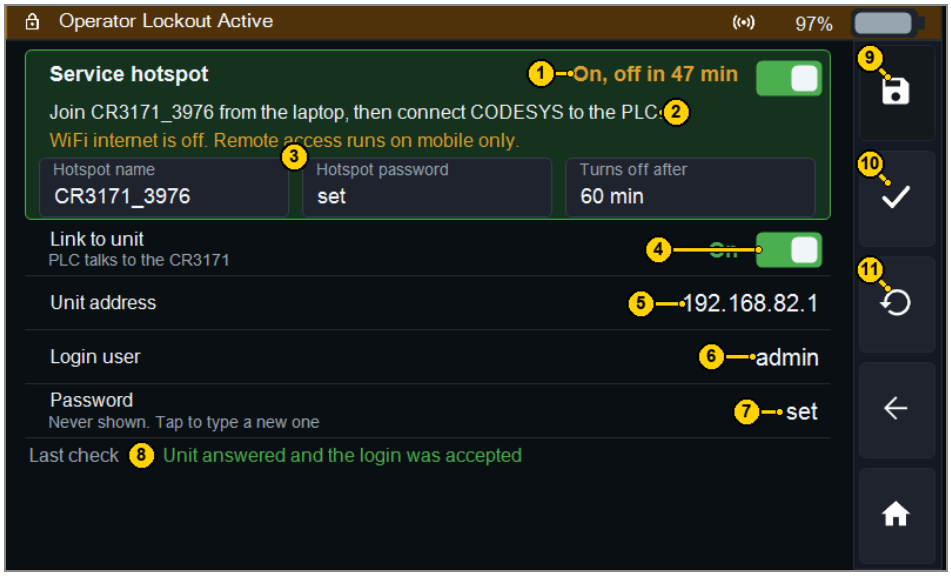
Measure motor R and L

1. **Motor select:** left (node 7) or right (node 8).
2. **Start-up check** state of the drive's motor-ID check.
3. **Readiness:** why Measure is not available yet (machine must be idle and stopped).
4. **Measure R/L.**
5. **Cancel** a running measurement.
6. **Runs 1-3** with R, L and result.
7. **Median R and L** of the runs.
8. **Values in the drive now,** read when a measurement starts.
9. **Accept and store:** writes R and L only, and stores them in the drive.
10. **Reject:** leaves the drive unchanged.
11. Gains are never changed.

13. Router setup (Service)

Router tab > Setup (Service). Settings for the CR3171 telematics unit.

Item	What it does
Service hotspot	Turns on the unit's own WiFi hotspot so a laptop can join it and reach the PLC with the programming tool. Turns itself off after the set time (delivered 60 min, 10-240 min). While it is on, WiFi internet is off and remote access runs on mobile only.
Hotspot name / password	The hotspot's network name and password. Set after the hotspot is on (the unit refuses changes while it is off).
Link to unit	On = the PLC talks to the CR3171. Off stops the Router pages.
Unit address, login user, password	How the PLC logs in to the unit (delivered 192.168.82.1, user admin). The password is never shown; tap to type a new one.
Save / Check connection / Restart unit	Save stores pending edits; Check logs in again and reads the unit; Restart reboots the unit (confirm box).



Router setup with the service hotspot on

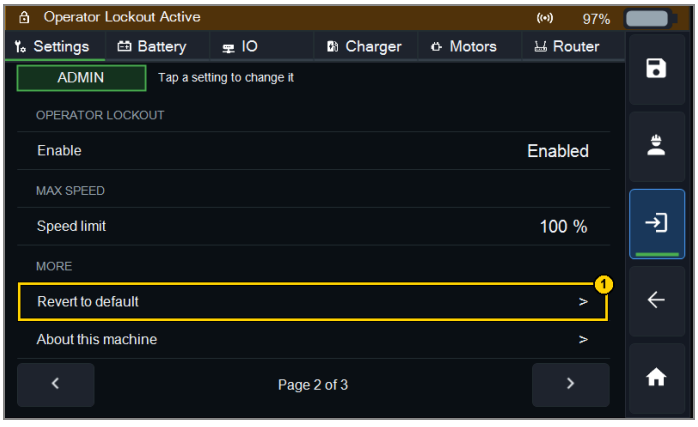
1. **Service hotspot** on/off and time left.
2. **How to use it**, and what is off while it runs.
3. **Hotspot name, password, turns off after.**
4. **Link to unit** on/off.
5. **Unit address.**
6. **Login user.**
7. **Password** (never shown).
8. **Last check** result.
9. **Save** pending edits.
10. **Check connection.**
11. **Restart unit.**

14. Commands

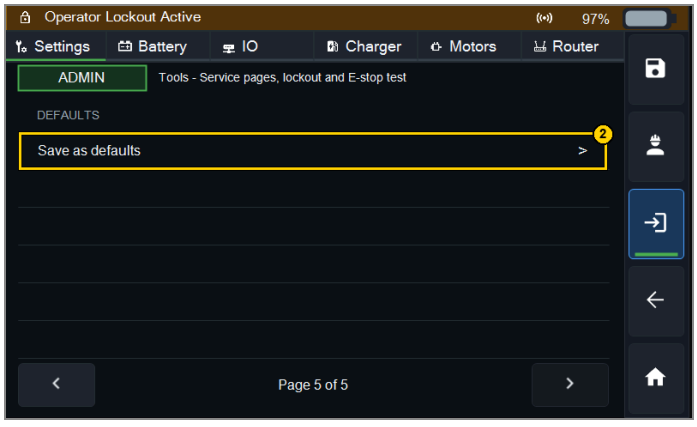
Commands act when tapped. They open a confirm box; most need a press-and-hold (about 1.5 s). The gate is tested again when you confirm. The number in the first column matches the yellow box on the screenshots below, which show where each command is.

#	Command	Where	Who / when	What it does
1	Revert to default	Settings tab, page 2 (MORE)	Anyone (locked in Rental), stopped only	Restores the process recipe to its saved defaults and saves them. Joystick flip and the stick and valve inversions are kept.
2	Save as defaults	Settings > Tools, page 5 (DEFAULTS)	Admin, stopped only	Makes the values the machine has now the defaults that Revert restores.
3	Reset IO stop	Settings > Tools, page 3, under CAN trace (shown only while the stop is latched)	Service, stopped only	Clears the control-stall stop so the outputs can run again, without a restart.
4	Save commissioning	Settings > Engineering, page 10 (TRACTION)	Admin, stopped only	Stores node numbers, motor inverts, drive speed ceiling and brake times.
5	Enter setup mode / recovery mode	Settings > Engineering, page 11 (SYSTEM)	Service, stopped only	Restarts the controller into setup or recovery mode now.
6	Restore motor defaults	Motors tab, page 2 > Config, page 9	Admin, stopped only	Resets current limits, DC sharing and drive-internal ramps. Speed and PLC ramps are kept.
7	Reset drives	Motors tab, page 2	Press-and-hold	Resets drive faults.
8	Reset charger (Send reset)	Charger tab, page 4	Press	Clears a charger fault.
10	Release brakes / Apply brakes	Motors tab, page 2 (from v2026.10.26.51)	Service, stopped, conditions in 4.9	Releases both brakes for towing; Apply brakes ends it. See 4.9.
9	Drives / Charger / Joysticks CAN On-Off	Settings > Tools, page 3 (CAN NODES); also Motors page 2 and Charger page 4	Service for Off	Off stops the PLC talking to that node so a laptop tool can; the machine will not run or charge until it is On again. Back to On at the next power-up.

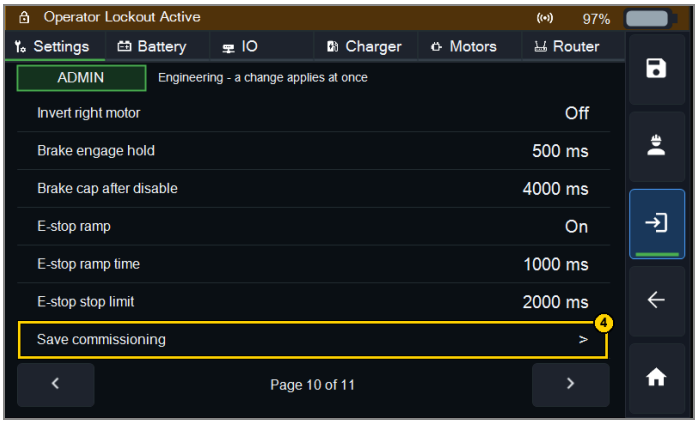
Where the commands are



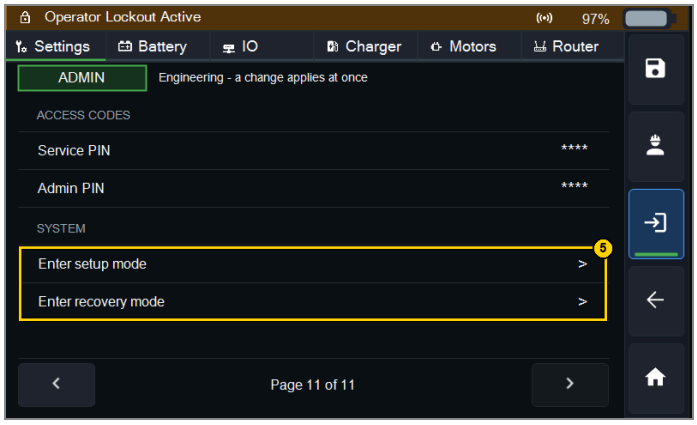
1 Revert to default: Settings, page 2



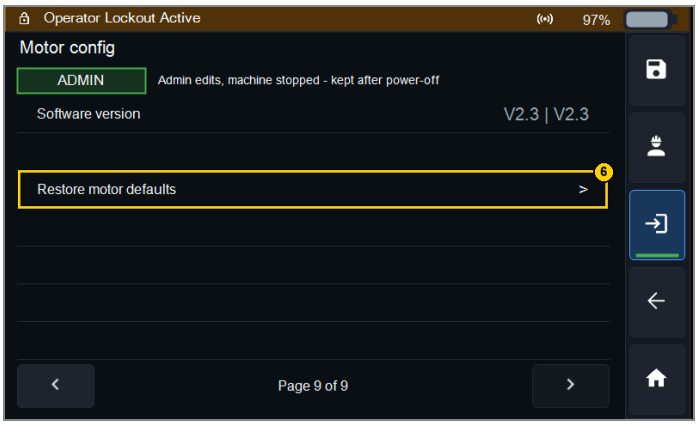
2 Save as defaults: Tools, page 5



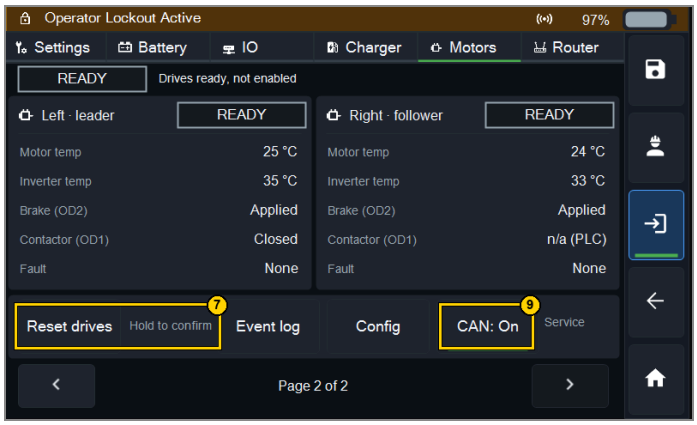
4 Save commissioning: Engineering, page 10



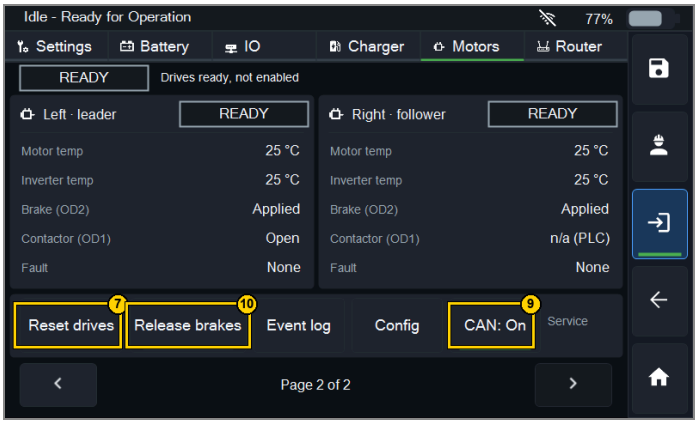
5 Enter setup / recovery mode: Engineering, page 11



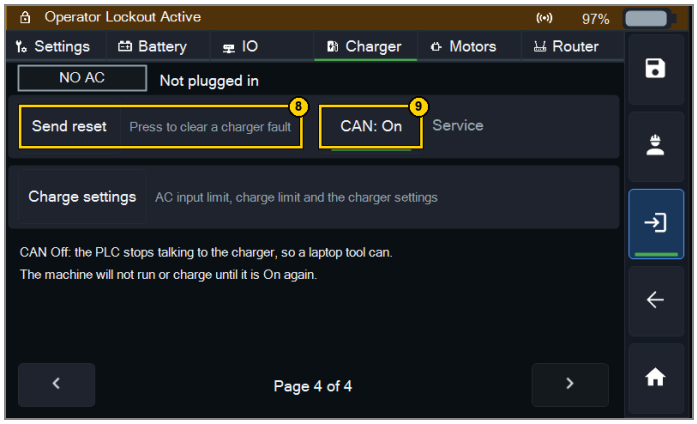
6 Restore motor defaults: Motor config, page 9



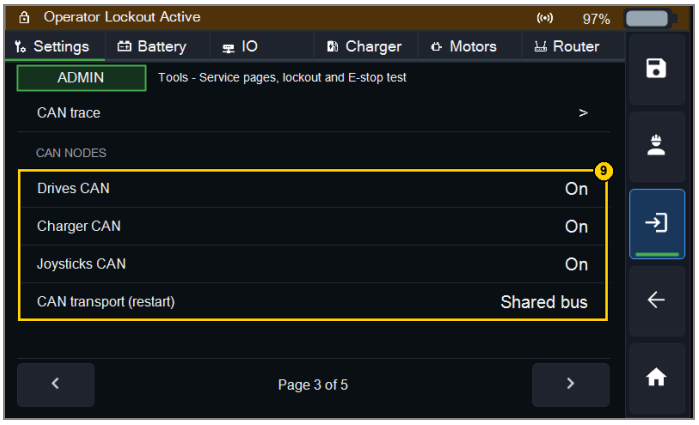
7 Reset drives and 9 Drives CAN: Motors, page 2 (v2026.10.23.1751)



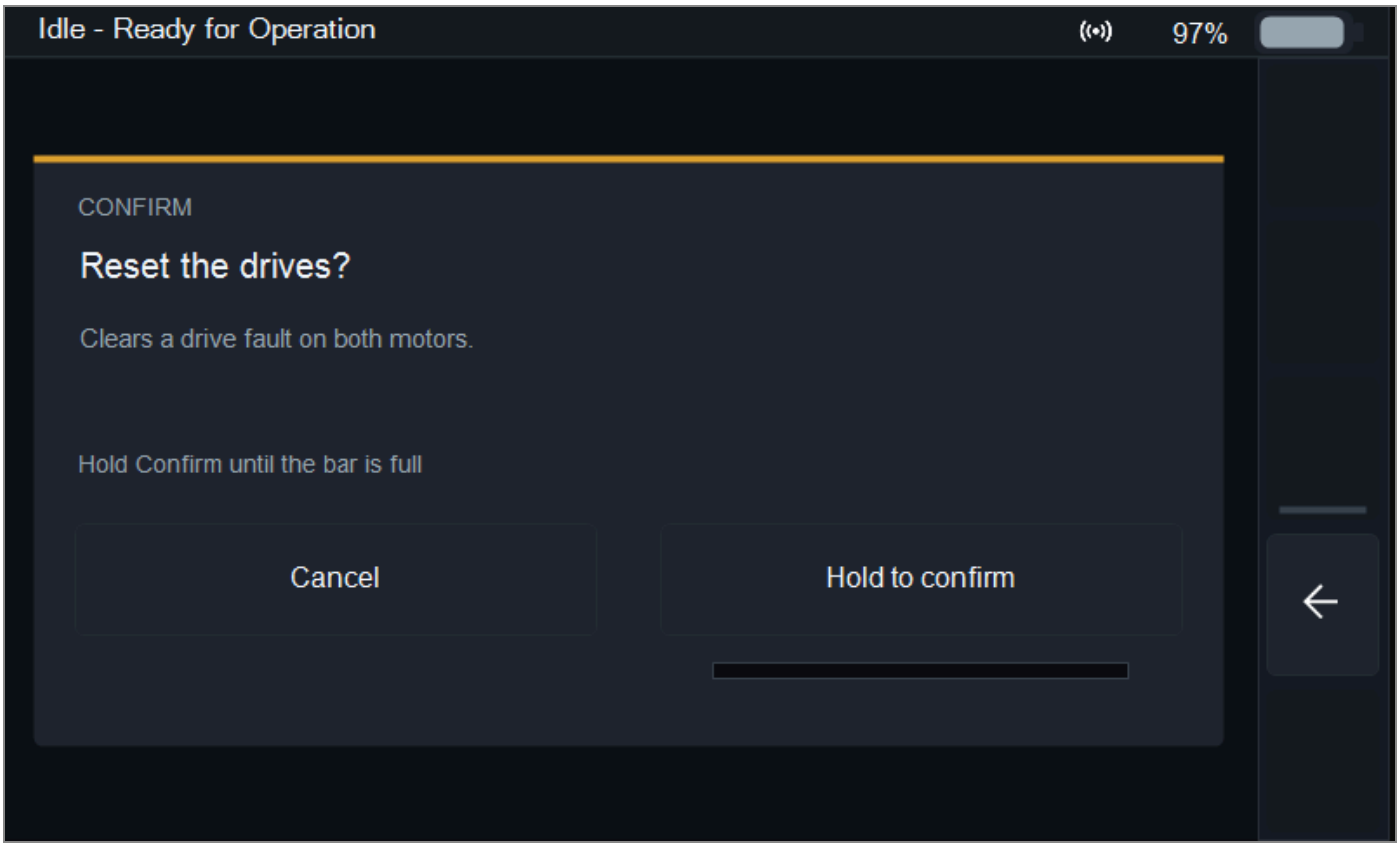
7, 9 and 10 Release brakes: Motors, page 2 on v2026.10.26.51 and later



8 Reset charger and 9 Charger CAN: Charger, page 4



9 CAN nodes: Tools, page 3 (Reset IO stop, 3, appears here when latched)



The hold-to-confirm box every command opens (shown for Reset drives)

15. Read-only rows (Motor config)

Group	Rows	Meaning
Safety timings	E-stop to contactor (300 ms); E-stop to key off (500 ms); Stale data to brakes (500 ms); Follower enable time (2000 ms); Key-off hold, max (5000 ms); E-stop decel limit (5000 rpm/s)	Timings fixed in the program, shown so the values in force are visible (delivered values in brackets).
Tune: node 7 | node 8	Ramp mode; Speed P and I; Field weakening P and I; Max voltage angle; Upeak in FW; Upeak limit; Overspeed fwd and rev; Current loop P and I; Motor offset; Software version	Read from both drives at start-up and on Refresh. A "!" marks a value that differs between the two nodes. Change them with the drive tool only.

Regen floor state	Regen floor state	Live state of the regen floor (for example Armed).