HAL:400
QUICK START GUIDE

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TESTED, TRUSTED... WORLDWIDE.

LIMITED WARRANTY & LIMITATION OF LIABILITY

SEAWARD Electronic Limited guarantees this product to be free from defects in material and workmanship under normal use and service for a period of 2 years, provided the instrument is serviced and calibrated by an authorised agent in accordance with the manufacturer's instructions. The period of warranty will be effective at the day of delivery.

Manufacturer does not provide any warranty for the following:

- Any normal wear and tear

- Errors or damage caused by: (i) misuse or not using your product in accordance with the user guide, such as if the product has been exposed to moisture, to dampness or to extreme thermal or environmental conditions or to rapid changes in such conditions, to corrosion, to oxidation, to spillage of food or liquid or to influence from chemical products, (ii) using your product with, or connecting it to, any product, accessory, software, or service not manufactured or supplied by the manufacturer, (iii) any products combined with your product by a third party, (iv) damage or errors caused by hacking, cracking, viruses, or other malware, or by unauthorised access to services, accounts, computer systems or networks; or (v) other acts beyond the manufacturer's reasonable control.

This Warranty is not valid:

- If your product, or the software it runs on, has been (i) opened, modified, or repaired without the manufacturer's authorisation, or (ii) repaired with unauthorised spare parts;

- If you have not installed the latest software updates that are publicly available for your product within a reasonable time of their release; or

- If you refuse to give possession of the product to the manufacturer for repair and investigation.

ENVIRONMENTAL CONDITIONS

The HAL:400 has been designed to perform tests and measurements in a dry environment.

Overvoltage category II 300V.

Pollution degree 2 according to IEC 61010-1.

Protective system IP40 according to IEC 60529.

Electromagnetic compatibility (EMC). Interference immunity and emitted interference conforming to IEC 61326-1, Class B.

USER NOTES

This instrument and its operating instructions are intended for use by adequately trained personnel. Protective measures should be always considered when using any HAL:400 unit. This quick start guide is not intended to be a substitute for the operating manual, which should be read fully.

The following symbols are used in these operating instructions.

Warning of electrical danger!
Indicates instructions must be followed to avoid danger to persons.

Important, follow the documentation!
This symbol indicates that the operating instructions must be adhered to in order to avoid danger.

SAFETY NOTES

⚠	In order to ensure safe operation of the HAL:400, all notes and warnings in these instructions must be observed at all times.
⚠	Do not attempt to turn off the HAL:400 while tests are active.
⚠	The HAL:400 is intended for use in an indoor dry environment only.
⚠	Check the HAL:400 and all associated cables and leads before operating the equipment. Do not use if there are signs of damage. Only use the test leads supplied with the HAL:400.
⚠	Prior to testing ensure that all of the test connections on the HAL:400 are fully mated into their intended terminals and that there is no risk of these connection being disconnected. Disconnected or partially mated test connections can lead arcing and/or over heating which may damage the HAL:400, accessories and the piece of the equipment under test. Touching disconnected test connection may lead to an electric shock.
⚠	Do not touch any exposed metal parts of the device under test during testing.
⚠	Always ensure that the circuit under test is electrically isolated from all other external influences.
⚠	Where safe operation of the HAL:400 is no longer possible it should be immediately shut down and secured to prevent accidental operation. It must be assumed that safe operation is no longer possible:

- If the instrument or leads show visible signs of damage or
- The instrument does not function or
- On-screen messages warn against further use or
- After long periods of storage under adverse environmental conditions.

⚠	If the HAL:400 is used in a manner not specified by this document then the protection provided by the equipment may be impaired.

⚠️	Do not open the HAL:400, no user serviceable parts.
⚠️	It is advised to regularly verify the correct operation of the instrument and any associated test accessories.
⚠️	Prolonged test times using high current may result in the test tips or jaws becoming hot. Care should be taken to avoid contact after long periods of testing.
⚡	The HAL:400 can produce voltages of up to 5kVrms and 6kVdc. Ensure that suitable safety precautions have been put in place prior to testing.
⚠️	The power button on the front of the HAL:400 does not remove power from the HAL:400. Do not position the HAL:400 so that it is difficult to switch the power button on the back of the HAL:400 or remove the mains plug from the HAL:400 or mains supply.
⚠️	The HAL:400 weighs 18kg. Ensure that when moving and lifting that best practices for manual handling are followed.
⚠️	Only make a connection to the Remote Earth probe terminal OR the V+ and I+ terminals. If these are connected then this may lead to measurement inaccuracies during the Ground Bond and Continuity tests.
⚠️	Do not use probes without measurement category on mains circuit.
⚠️	Do not connect probes to external voltage sources.

WHAT'S IN THE BOX?

The following items are supplied as part of your new HAL:400 instrument:

Product Name	Part Number
1. HAL:400 Instrument	490A910 (without Ground Bond) 490A913 (with Ground Bond)
2. Hipot Test Lead Red	490A1050
3. Hipot Test Lead Black	490A1049
4. Earth Bond / Continuity Kelvin Test Lead Set	490A1008
5. Guard Plug	490A1012
6. Start / Stop Plug	490A1048

Also supplied as standard:

Product Name	Part Number
Power Lead UK	39044
Power Lead EU	44B053
Power Lead US	44B118
Quick Start Guide	490A590
Calibration Certificate	N/A

HAL:400 TOUR

Front Panel

Feature	Function
1. Touch Screen	Main user interface
2. Soft Power Button	Turn on/off
3. Start Button	Initiates test
4. Stop Button	Aborts test

Feature	Function
5. Test Indicators	Indicates test status: ● Fail ● Test in Progress ● Pass
6. USB Slots	For use with peripherals and data transfer

Rear Panel

Feature:	Function:
1. Beacon Output	Switch from green to red while HAL:400 is active (Optional Accessory)
2. Speaker Output (3.5mm Jack)	Reserved for future use
3. Display Output	Output the main display to a large screen
4. Remote Start / Stop	Allows a remote start/stop button to be used (For integration)
5. Pass / Fail	Outputs a pass/fail signal (For integration)
6. Aux Beacon	Outputs an idle or warning signal (For integration)
7. Guard Switch	Safety cut out switch (Supplied plug must be used in normal use)
8. USB Slots x4	For connection to peripherals / accessories and for remote PC control
9. Network Cable	Physical internet connection for firmware updates/ cloud connectivity.

Feature:	Function:
10. USB-B Port	Reserved for future use.
11. IO Expander Port	Used with IO Modules (For integration)
12. HAL:PL1 Port	For connection to optional load and leakage module (HAL:PL1)
13. Mains Switch	Incoming supply for the instrument and power switch
14. No Burn Probe Port	No burn earth bond probe port (Optional Accessory)
15. Ground Bond Current +	Output connection for earth bond current
16. Ground Bond Sense +	Output connection for earth bond sense
17. Ground Bond Current -	Return connection for earth bond current
18. Ground Bond Sense -	Return connection for earth bond sense
19. High voltage +	High voltage output (Hipot and insulation resistance)
20. High Voltage Return -	High voltage return (Hipot and insulation resistance)

BEFORE FIRST USE

Before using your HAL:400 for the first time, please ensure that you fully inspect the instrument and associated leads for signs of defects.

POWERING ON/OFF

Ensure the Mains switch is set to the ON position at the rear of the HAL:400.

To put the HAL:400 to sleep press the Soft Power button for 2 seconds.

GETTING TO KNOW THE HOME SCREEN
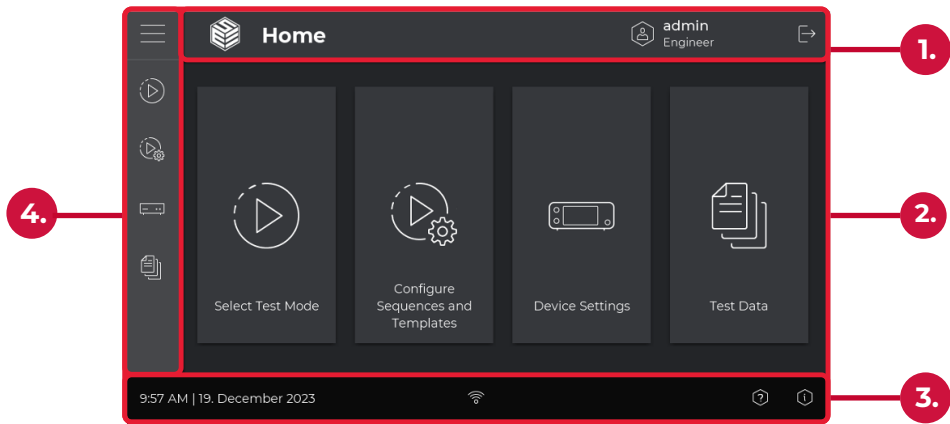
Feature:	Function:
1. Upper Information Bar	This area provides access to the Home icon (Seaward logo) and the Log Out functionality. It also provides information relating to the current screen, and the user who is logged into the HAL:400.
2. Main area	This area is used to display menu items, text fields or test information.
3. Lower Information Bar	This area of the screen shows the Date, Time, Connection Status and provides access to help and about screens (where relevant).
4. Quick Menu	This side menu offers short cuts to the main options screen. This provides fast access to selecting test modes, configuring tests and the device and data menus.

TEST CONNECTIONS

This section describes the test connections for the HAL:400 and how they are designed to be connected to the accessories. All test connections for the HAL:400 are positioned at the rear of the device.

Hipot and Insulation Resistance Test Connections

This section shows the correct method for connection of the HAL:400 test instrument for both Hipot and Insulation Resistance Testing.

For Dielectric Withstand and Insulation Resistance testing the test clips or probes are connected as shown across the device to be tested.
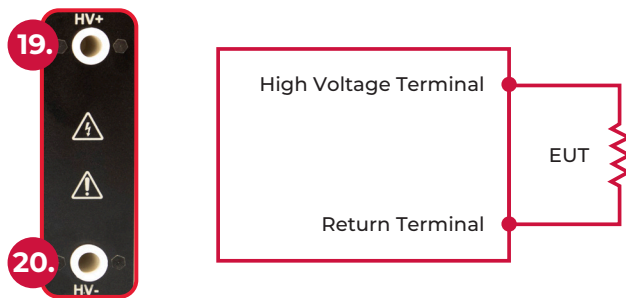
Connect the (Red) High Voltage test lead to the High Voltage Terminal (19) and ensure the plug is firmly connected into the socket.

Connect the (Black) Return Test Lead into the Return Terminal (20).

Ensure both clips are connected across the item under test.

Earth Bond and Continuity Test Connections

> ⚠️ Only make a connection to the Remote Earth probe terminal OR the V+ and I+ terminals. If these are connected then this may lead to measurement inaccuracies during the Ground Bond and Continuity tests

For Earth Bond and Continuity measurements the Kelvin test lead set is connected as described above for the Continuity measurement.
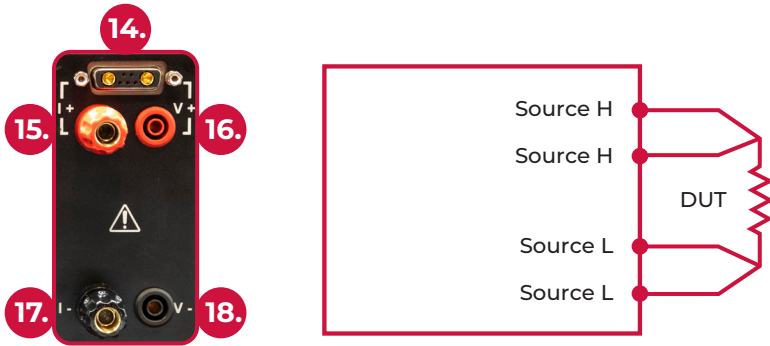
Earth Bond and Continuity Test Connections using No-burn Probe

Additionally the No-Burn probe (optional) accessory can also be used as part of the measuring circuit. This is designed to be used as an alternative to the (Output / Return) connection and replaces the (Red / Black) Kelvin lead.

The No-Burn probe is connected as shown
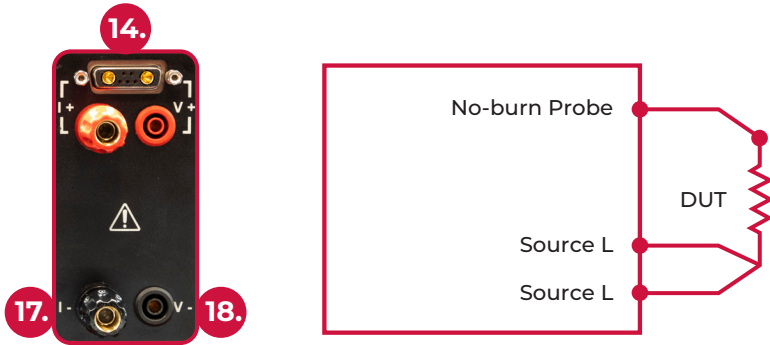
The No-Burn probe maintains the four wire measurement principle. It has a unique press and hold facility to ensure no marking on the product surface due to poor contact resulting in sparking. The probe also serves to provide the operator information via the inbuilt LED during the Earth Bond Test, with the following conditions:

Rapid Flash	Slow Flash	Solid Light
Probe ready to rest	Test in progress	Test pass

CHECKING AND UPDATING FIRMWARE

It is recommended that on first use of the instrument that a check is performed to ensure the latest firmware is applied. Firmware updates are provided over the air (OTA) by internet connection. Ensure the HAL:400 is connected to an active internet connection via the Ethernet cable (or Wifi Dongle) to proceed.

Checking the Firmware

From the home screen of the HAL:400, press the information icon [i] in the lower right corner of the screen.
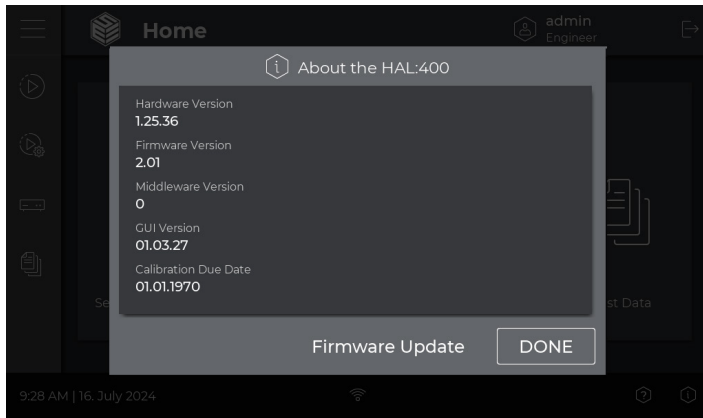
The resulting screen, above displays useful information about your HAL:400 including the hardware version, firmware versions. In addition a reminder function for the calibration due date will also be displayed.

Updating the Firmware

After confirming the version numbers the next step is to initiate the update by selecting the Firmware update button.

You will then be prompted to select a source for the update, it is recommend that this is performed using the Over The Air function with a HAL:400 connected to the internet.

Once selected a new pop up message appears informing that the unit is checking available firmware.
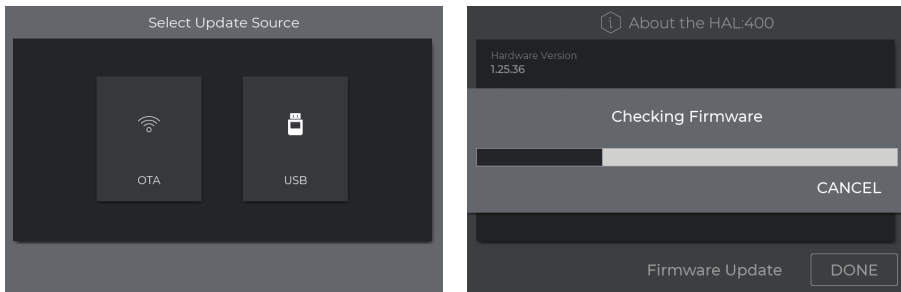

If a new update is available the HAL:400 will display this version, select the new version and press the update button to begin.

Note: If there is no update available, the available update screen will be blank indicating the HAL:400 is on the latest version.
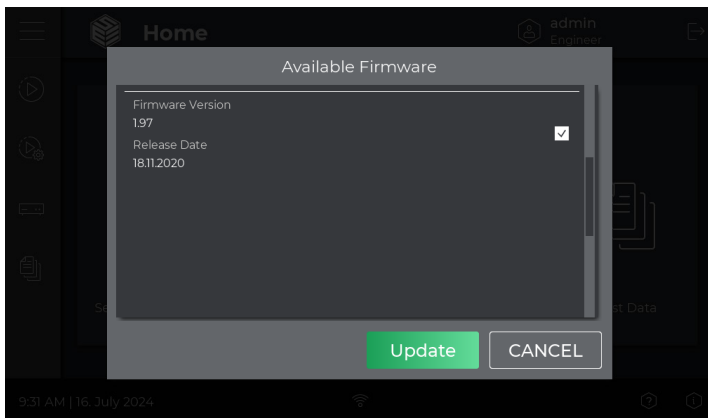
After selecting update the HAL:400 will display a message advising the user that the unit is downloading the firmware and not to power off.
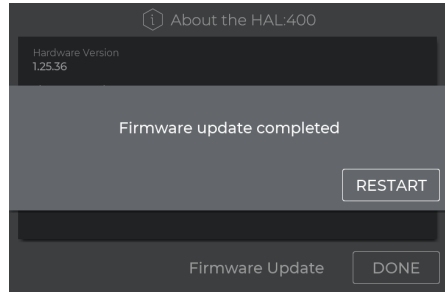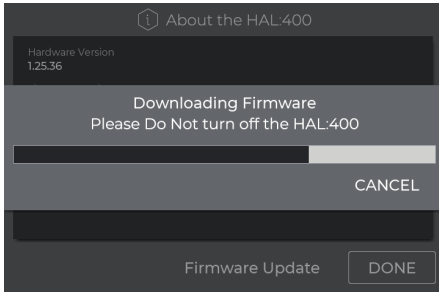
After completing the download, the HAL:400 will load the new firmware automatically. Upon completion the HAL:400 will require a restart in order to apply the updates.

USER LEVELS

The HAL:400 has three levels of user within the user interface, each with various permissions based on the activities performed with the HAL:400. Each user level can have multiple assigned users.

User Level	Permissions
Engineer	Has full administrative rights to the HAL:400.
Supervisor	Has some administrative rights to the HAL:400, can Add / Edit user lists and accessory behaviour and copy data from the HAL:400. A supervisor level user cannot edit / create test sequences, change HAL:400 behaviour, and cannot add engineer level users to the HAL:400.
Operator	Has no administrative rights, can only use the HAL:400 to perform testing as defined by their user options.

Adding a New User

To add a new user, simply tap the Add Icon ➕ and define the level of user to be added.

Once selected the Create New User screen will be displayed, with two tabs (General and Settings).

General Tab
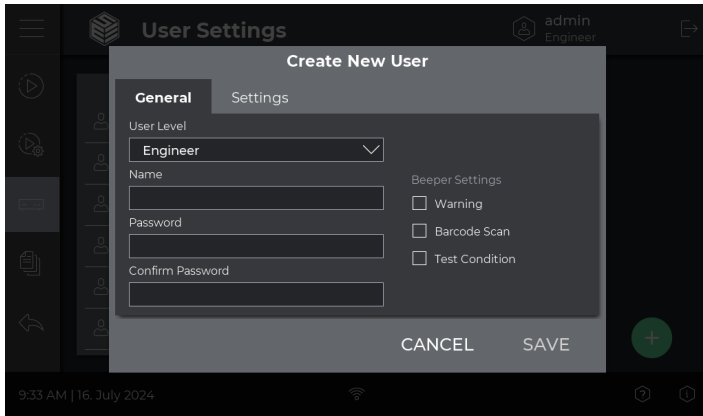
Allows the user level to be modified if needed and the username to be set. A password is required for both Supervisor and Engineer level users, but can be left blank for operators if a password is not desired.

The beeper settings define when the HAL:400 will produce audible feedback to the operator:

Beeper Setting	Provides audible feedback when...
Warning	Warning is displayed and requires attention
Barcode Scan	User correctly scans a Barcode
Test Condition	Test condition signifies a failed test

Settings Tab

For each new user added the available test modes they can access can be chosen by simple check boxes. If a user is not given access to a test mode, then they will not see this mode from their home screen.

The Test Mode screen is the default home screen for an operator level user, if only one option is selected, the HAL:400 will load automatically into this mode.
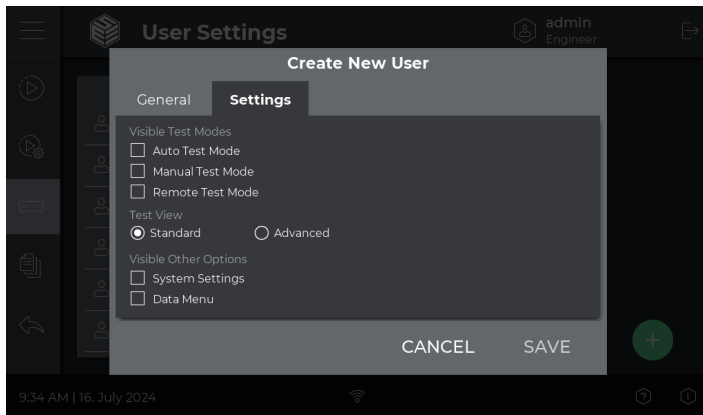
The Test View option defines the default test screen as either the Standard or Advanced View. By default all users created will be set to Standard View.

Visible Other Options will only be present when adding either a new Supervisor or Engineer level user. This will determine whether that user can enter the corresponding menus and edit settings relevant to their login.

So for example if a Supervisor is only required to take data from the unit, but is not to be permitted to add new users, then they should only have the Data Menu option checked.

CREATING YOUR FIRST TEST SEQUENCE

The HAL:400 allows you to create test sequences and templates. There are subtle differences between the two, but both are designed to simplify and standardise the testing operation for the user.

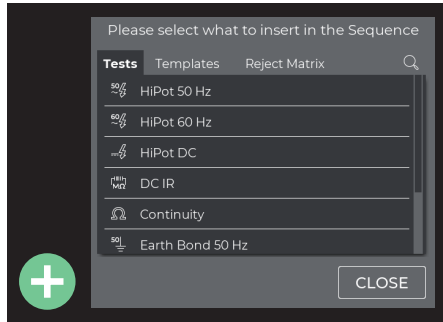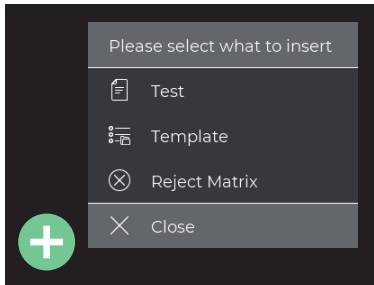| Test Sequence	Test Template:
List of individual tests that the HAL:400 will run through in the order you create.	Tests or sequences of tests that can be placed within another sequence.

If these templates are altered, then each sequence containing the template is also updated. This is very useful if there is a change to a standard or the procedure you choose to use for your testing. The process for creating either a sequence or a template is identical other than name.

Creating a New Test Sequence

1. Press the 'Configure Sequences and Templates' button ⏵⚙ from the Home screen.

2. Press the ➕ icon to open the creation menu.

Please select what to create

- Sequence
- Template
- ⊗ Reject Matrix
- ✕ Close

➕
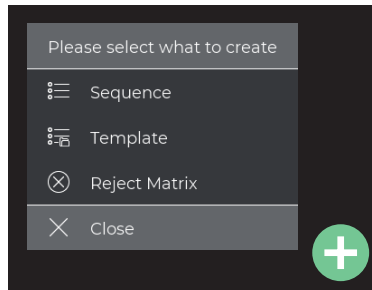
3. Select 'Sequence' to begin creation of a new test sequence.

4. Press the ➕ icon again to add a step to the sequence you just created.

5. Select the item to insert, in this case we will add a new 'Test'.
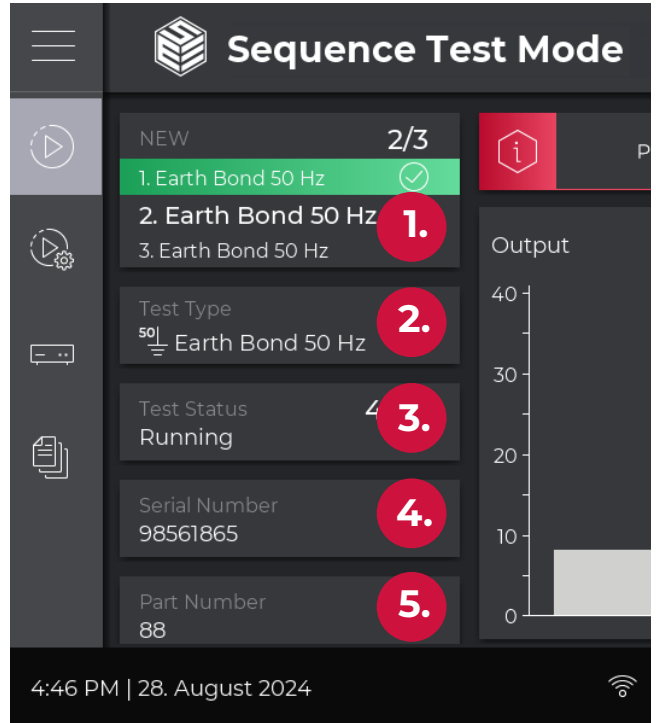
6. Select the test type required.
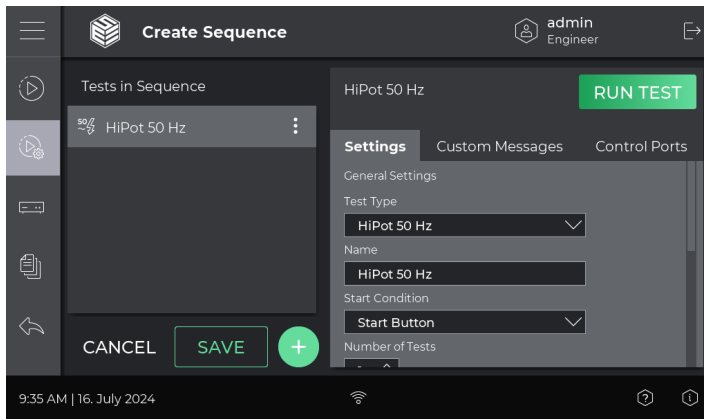
7. Modify the test settings on the right of the screen to match your requirements.

8. Press the 'Save' button SAVE to store the sequence, if this is the first time you have attempted a save, the HAL:400 will prompt you to give the sequence a name.

For full information on creating custom tests please refer to the HAL:400 user manual.

UNDERSTANDING A TEST SCREEN

During a Test Sequence or Manual Test, the test screen displays various pieces of useful information:

Feature:	Function:
1. Test Sequence	This section shows the tests in the sequence, at any one time three tests will be shown on screen. In this example we can see the previous, current and next tests on screen. The item with the green band, shows the previous test, and the colour indicates the status of that test. The current test is shown in Bold, and is always central, the lower test is the next test in the sequence.
2. Test Type	This section shows the type of test currently being performed, in this example the HAL:400 is performing a 50Hz Earth Bond Test.
3. Test Status	This shows the current status of the test, for example Running when the test is under way and has reached its max voltage.
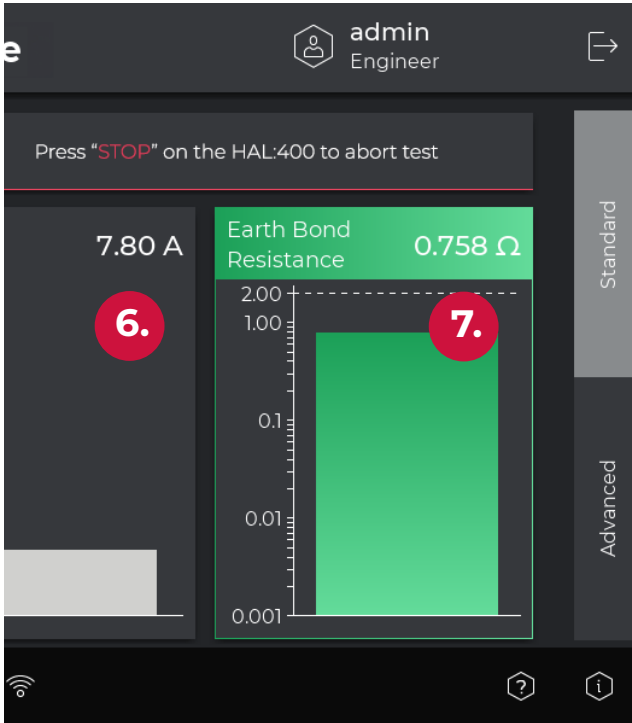
Feature:	Function:
4. Serial Number	An optional field displaying the user assigned Serial number, this will be included in the test record.
5. Part Number	An optional field displaying the user assigned part number, this will be included in the test record.
6. Output Display	This column shows the output of the test where this is configurable in settings, for example Current on the Earth Bond Test and Voltage on the Hipot.
7. Leakage Display	This column represents the current state of the test. Included within the graphical display is the measured value along with any target lines for Pass / Fail decision. If the reading is outside of the test parameters, the entire section will turn red to highlight a fail measurement.

CALIBRATION

To maintain the specified accuracy of the measurement results, the instrument must be recalibrated at regular intervals by Calibrationhouse (Seaward's sister brand) or an authorised Seaward Service Agent. We recommend a recalibration period of one year.

CALIBRATIONHOUSE (UK HEAD OFFICE)

✉ service@calibrationhouse.com

📞 +44 (0) 191 587 8739

calibrationhouse.com

CALIBRATIONHOUSE (USA)

✉ usaservice@calibrationhouse.com

calibrationhouse.com

ONLINE RESOURCES

INFORMATION & MANUAL DOWNLOAD

For more information about your HAL:400,
and to access a downloadable version of the
operation manual, please visit
seaward.com/HAL400

REGISTER YOUR HAL:400 NOW

To activate your 2 year warranty please register your
product at **seaward.com/register**

Notes

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SEAWARD

GMC-INSTRUMENTS GROUP

Head Office

📞+44 (0) 191 586 3511   ✉ sales@seaward.com

📍 Seaward, 15-18 Bracken Hill, South West Industrial Estate,
Peterlee, County Durham, SR8 2SW, United Kingdom

USA Office

📞+1 813 886 2775   ✉ usasales@seaward.com

📍 Seaward Group USA, 6304 Benjamin Road, Suite 506,
Tampa, FL 33634, United States

seaward.com