SEAWARD

GMC-INSTRUMENTS GROUP

HAL:400

QUICK START GUIDE

To ensure safe and proper use of the instrument, read and follow the instructions in the related user manual.

The user manual can be downloaded from our website

https://www.seaward.com/gb/products/manufacturing/hipot-testers/hal-400/#downloads

seaward.com

TESTED, TRUSTED... WORLDWIDE.

IMPORTANT SAFETY INSTRUCTIONS

The instrument has been built and tested in accordance with:
BS EN 61010-1 and BS EN 61010-2-034.

Read and follow these instructions carefully and completely in order to ensure safe and proper use.

The instructions must be made available to all persons who use the instrument.

Keep for future reference.

General

- The instrument may only be used by sufficiently trained competent personnel in the commercial field. This instrument is not a consumer product.
- Observe and comply with all safety regulations which are applicable for your work environment.
- Wear suitable and appropriate personal protective equipment (PPE) whenever working with the instrument.
- The functioning of active medical devices (for example pacemakers, defibrillators) and passive medical devices may be affected by voltages, currents and electromagnetic fields generated by the tester and the health of their users may be impaired. Implement corresponding protective measures in consultation with the manufacturer of the medical device and your physician. If any potential risk cannot be ruled out, do not use the instrument.

Accessories

- Use only the specified accessories (included in the scope of delivery or listed as options) with the instrument.
- Carefully and completely read and adhere to the product documentation for optional accessories. Retain these documents for future reference.

Handling

- Use the instrument in undamaged condition only.
  Inspect the instrument before use. Pay particular attention to damage, interrupted insulation or kinked cables. Damaged components must be replaced immediately.
- Use the accessories and all cables in undamaged condition only.
  Inspect accessories and all cables before use. Pay particular attention to damage, interrupted insulation or kinked cables.
- If the instrument or its accessories don't function flawlessly, permanently remove the instrument/accessories from operation and secure them against inadvertent use.
- If the instrument or accessories are damaged during use, for example if they're dropped, permanently remove the instrument/accessories from operation and secure them against inadvertent use.
- If there are any signs of interior damage to the instrument or accessories (e.g. loose parts in the housing), permanently remove the instrument/accessories from operation and secure them against inadvertent use.

- Devices and accessories from Seaward Electronic Ltd. are designed to work optimally with the Seaward Electronic Ltd. products expressly intended for this purpose. Unless otherwise expressly confirmed in writing by Seaward Electronic Ltd., they are not intended or suitable for use with other products.
- Route cables in an orderly fashion, e.g. the mains power cable and accessories cable. Loose, disorderly cables result in unnecessary danger of tripping and falling.
- The instrument weighs 18 kg. Ensure that when moving and lifting that best practices for manual handling are followed.

Measurements/Tests

- The power button on the front of the instrument does not remove power from the instrument.
  Do not position the instrument so that it is difficult to switch the power button on the back of the instrument or remove the mains plug from the instrument or mains supply.
- Always ensure that the circuit or appliance under test is electrically isolated.
- The instrument may apply high voltage or mains power to the appliance under test. Do not touch the appliance while tests are active.
- The instrument can produce voltages/currents of up to 5 kV_{rms} / 20 mA and 6 kV_{DC} / 10 mA.
  Ensure that suitable safety precautions have been put in place prior to testing. For example compliance with EN 50191.
- Be prepared for residual / unexpected voltages at the DUT in general and especially after high voltage tests.
- The integrated voltage measuring function and mains check of the test/ measuring instrument may not be used to test systems or system components for the absence of voltage.
  - Germany only - Testing for the absence of voltage is only permissible with a suitable (2-pole) voltage tester / voltage measuring system which fulfils the requirements specified in DIN EN 61243-3.
  - UK only - If the instrument is being used to determine the presence or absence of hazardous voltages, always prove the operation of voltage measurement function before and after use by means of a known voltage source or proving unit.
- Do not attempt to turn off the instrument while tests are active. Otherwise, discharge of capacitively charged elements is prevented and dangerous voltages may occur.

Operating Conditions

- Do not use the instrument and its accessories after long periods of storage under unfavourable conditions (e.g. humidity, dust or extreme temperature).
- Do not use the instrument and its accessories after extraordinary stressing due to transport.
- Do not expose the instrument to direct sunlight for longer periods of time. Overheating may cause damage to the device.
- Only use the instrument and its accessories within the limits of the specified technical data and conditions (ambient conditions, IP protection code, measuring category etc.).
- Do not use the instrument in potentially explosive atmospheres. Danger of explosion!
- Do not use the instrument in atmospheres subject to fire hazard. Danger of fire!

- Implement adequate measures for protection against electrostatic discharge (ESD).

Fuses

- The instrument may only be used as long as the fuses are in flawless condition. Defective fuses must be replaced. If in doubt seek guidance from an approved Seaward service centre
- Never bridge the fuses. Never put the fuses out of operation.

Measurement Cables and Establishing Contact

- Plugging in the measurement cables must not necessitate any undue force.
- Never touch conductive ends (for example of test probes).
- Avoid short circuits due to incorrectly connected measurement cables.
- Prior to testing ensure that all of the test connections on the instrument 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 to arcing and/or overheating which may damage the instrument, accessories and the piece of the equipment under test.
  Touching a disconnected test connection may lead to an electric shock.
- Ensure that alligator clips, test probes, lugs etc. make good contact.
- Do not connect probes to external voltage sources.
- Only make a connection to the No-burn Earth Bond Probe terminal (14) OR the Ground Bond Current + (15) and Ground Bond Sense +(16) terminals. If both are connected then this may lead to measurement inaccuracies during the Earth Bond and Continuity tests.
- Do not move or remove test probes, alligator clips, lugs etc. until testing/measurement has been completed.

Adjustment / Calibration

- Comply with national calibration regulations and laws.
- Calibration must be carried out by an authorised service department.

Data Security

- Always create a backup copy of your measurement/test data.
- The device is equipped with a data memory to which personal and/or sensitive data can be stored. Observe and comply with the applicable national data protection regulations. Use the corresponding functions provided by the test instrument (such as access protection), as well as other appropriate measures to prevent unauthorised access to the data.

IMPORTANT INFORMATION

Intended Use / Use for Intended Purpose

The HAL:400 is a multi-function production line Hipot tester designed to test electrical equipement that is not connected to the mains. It can perform continuity, insulation resistance, and hipot (AC and DC) tests either manually or automatically by setting up user-configurable test sequences.

In addtion, the instrument can be upgraded to add Earth Bond testing via functionality unlock. It can also be combined with a load leakage module to add functional test capabilities (protective conductor, touch current, and power testing).

The test results are fully stored in the on-board memory and then transferred to a secure cloud based software option or to a USB stick.

Safety of the operator, as well as that of the instrument, is only assured when it is used for its intended purpose.

Use for Other than Intended Purpose

Using the instrument for any purposes other than those described in this Quick Start Guide, or the manual, is contrary to use for intended purpose and may impair the protection provided.

Liability and Guarantee

The warranty provided by Seaward Electronic Limited, and its liability, are governed by the applicable contractual and mandatory statutory provisions.

REGISTER YOUR HAL:400 NOW

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

Opening the Instrument / Repairs

The instrument may only be opened by authorised, trained personnel in order to ensure flawless, safe operation and to assure that the guarantee is not rendered null and void. Even original replacement parts may only be installed by authorised, trained personnel.

When the instrument is opened, voltage conducting parts may be exposed. The instrument must be switched off and disconnected from the measuring circuit before performing repairs or replacing parts (including the fuses).

Unauthorised modification of the instrument is prohibited, as is unauthorised use of accessories.

If it can be ascertained that the instrument has been opened by unauthorised personnel, no guarantee claims can be honoured by the manufacturer with regard to personal safety, measuring accuracy, compliance with safety measures or any consequential damages.

If a guarantee seal is included and it has been damaged or removed, all guarantee claims are rendered null and void.

For repair, please see details in section “Service and Calibration” on page 30.

SYMBOLS ON THE DEVICE

	Warning concerning a point of danger (Attention, observe documentation!)
	Warning regarding electrical voltage
	European conformity marking
	The device may not be disposed of with household trash. See page 28.

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 490A913 (with Earth Bond test option)
2. Hipot Test Lead Croc Clip (Red) (2 m)	490A1202
3. Hipot Test Lead Croc Clip (Black) (2 m)	490A1200
4. Earth Bond / Continuity Kelvin Test Lead Set (2 m)	490A1208
5. Guard Plug	490A1212
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	*no part number*

Optional Accessories:

Some measurements requires optional accessories, for example hipot testing requires mandatory safety equipment. In addition, some functions require optional accessories. For more information please refer to the data sheet.

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 Ports (type A)	For use with peripherals and data transfer

Rear Panel

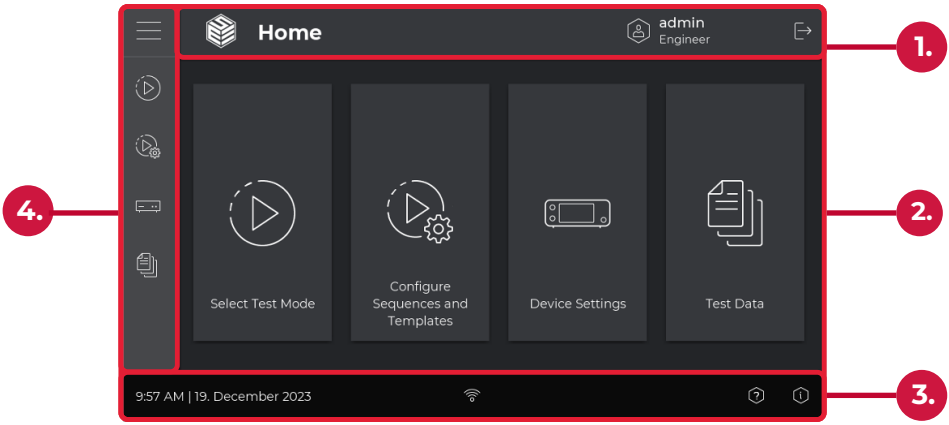
Feature:	Function:
1. Beacon Output	For beacon connection; switch from green to red while the instrument is active (Optional Accessory)
2. Speaker Output (3.5mm Jack)	Reserved for future use
3. Display Output (HDMI)	Output the main display to a large screen
4. Remote Start / Stop	Allows a remote start/stop 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 Ports (Type A)	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 Port (Type B)	Reserved for future use.
11. HAL:PL1 Port	For connection to optional HAL:PL1 Load and leakage module
12. IO Expander Port	Used with I/O Control Modules (For integration)
13. Mains Switch	Incoming supply for the instrument and power switch
14. No Burn Probe Port	For connection of No-burn Earth Bond Probe (Optional Accessory)
15. Earth Bond Current +	Output connection for earth bond current
16. Earth Bond Sense +	Output connection for earth bond sense
17. Earth Bond Current –	Return connection for earth bond current
18. Earth 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)

POWERING ON/OFF

Ensure the Mains switch is set to the ON position at the rear of the instrument.
To put the instrument to sleep press the Soft Power button for 2 seconds.

GETTING TO KNOW THE HOME SCREEN



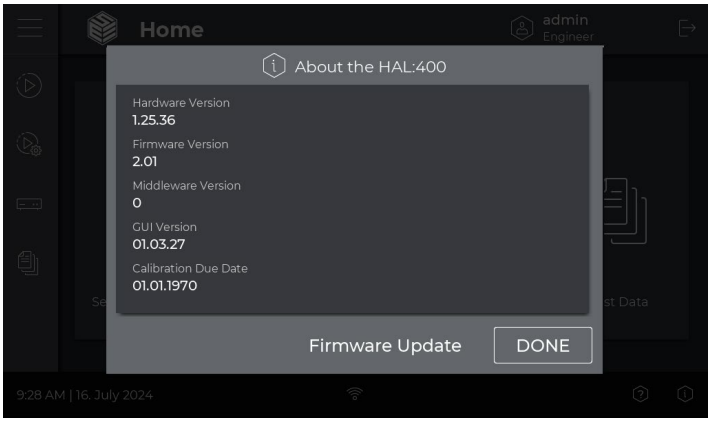
Feature:	Function:
1. Upper Information Bar	This area provides access to the Home icon (Seaward logo) and the Log Out functionality. It also provides information relating to the current screen, and the user who is logged into the instrument.
2. Main area	This area is used to display menu items, text 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.

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 instrument is connected to an active internet connection via the Ethernet cable (or optionally available Wifi Dongle) to proceed.

Checking the Firmware

From the home screen, press the information icon in the lower right corner of the screen.

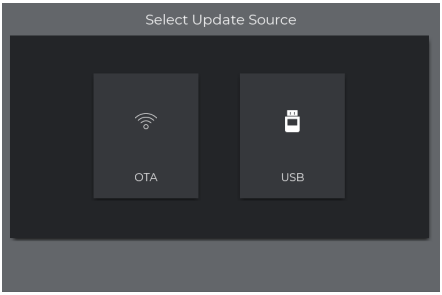


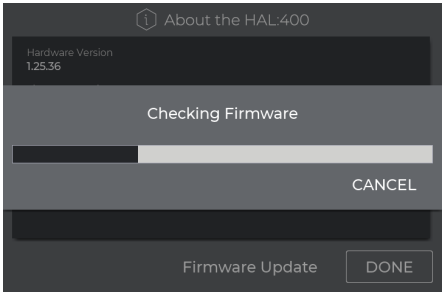
The resulting screen above displays useful information about your instrument including the hardware version and firmware versions. In addition, a reminder function for the calibration due date will also be displayed.

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

Updating the Firmware

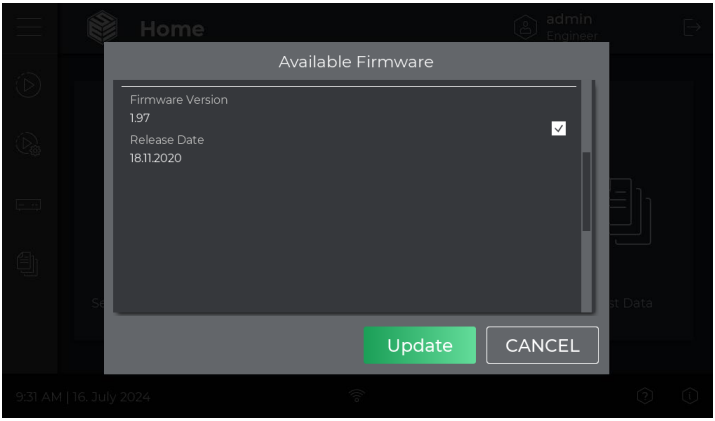
You will be prompted to select a source for the update, it is recommend that this is performed using 'OTA' (Over The Air) function with an instrument connected to the internet. Once selected, a new pop up message appears informing that the unit is checking available firmware.



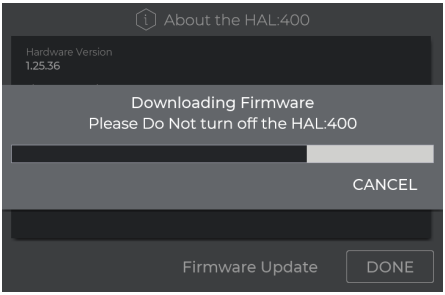


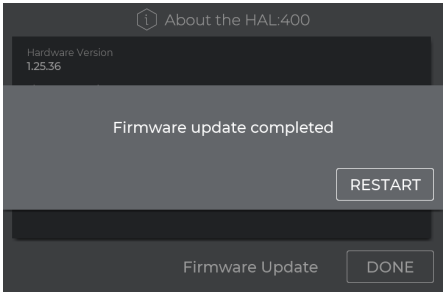
If a new update is available the instrument will display this version, select the new version and press the 'Update' button to begin.

(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 instrument will display a message advising the user that the instrument is downloading the firmware and not to power off.





After completing the download, the instrument will load the new firmware automatically. Upon completion, the instrument will require a restart in order to apply the updates.

USER LEVELS

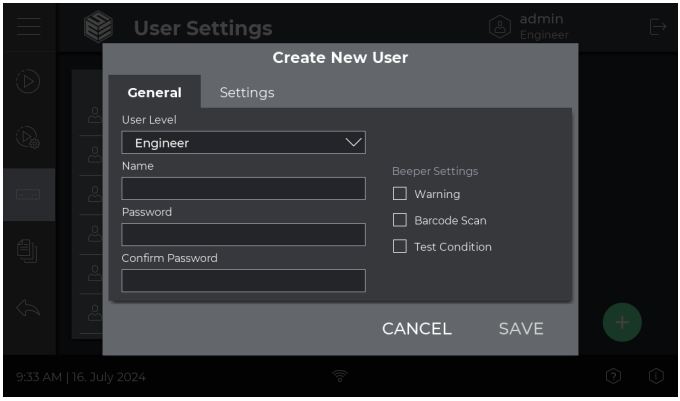
The instrument has three levels of user within the user interface, each with various permissions based on the activities performed with the instrument. Each user level can have multiple assigned users.

User Level	Permissions
Engineer	Has full administrative rights to the instrument.
Supervisor	Has some administrative rights to the instrument, can Add / Edit user lists and accessory behaviour and copy data from the instrument. Cannot edit / create test sequences, change instrument behaviour, and cannot add engineer level users.
Operator	Has no administrative rights, can only use the instrument 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.

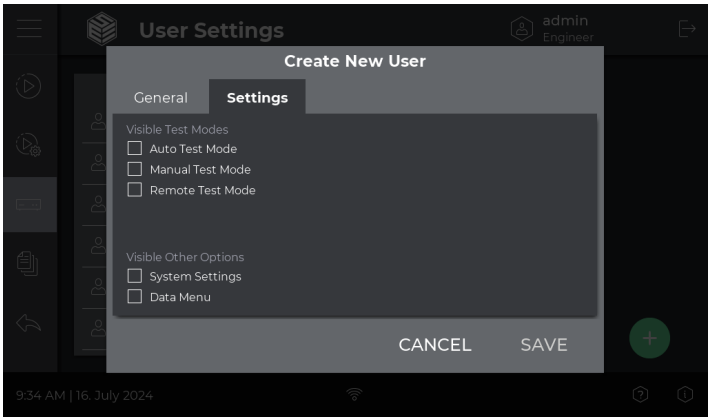
The beeper settings define when the instrument will produce audible feedback to the operator:

Beeper Setting	Provides audible feedback when a...
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 instrument will load automatically into this mode.



'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 instrument 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 instrument will run through in the order you create.	Tests or sequences of tests that can be placed within another sequence. **Note** If a template is 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. However, be aware of all sequences affected.

The process for creating either a sequence or a template is identical other than name.

Creating a New Test Sequence

DANGER

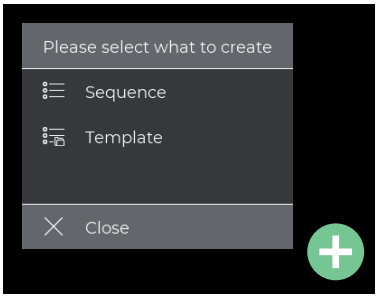
High voltage!
Incorrectly carried out high-voltage work is life endangering.

Hipot testing can cause electric shock.

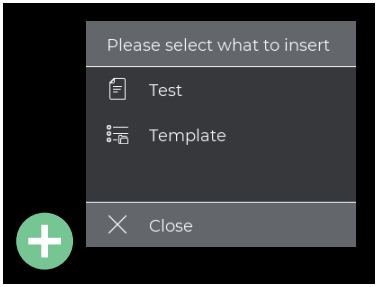
- Read and observe the information from the associated manual. (See link on front page.)
- It is absolutely essential to observe the safety precautions for hipot testing!

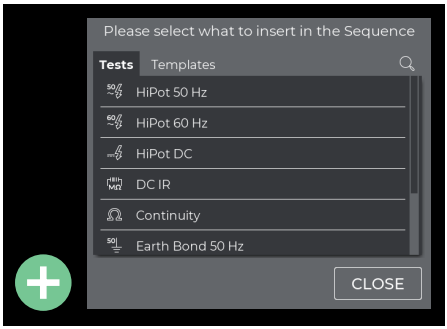
This section provides a basic overview. Please refer to the user manual for full information on creating custom test sequences.

1. Press the 'Configure Sequences and Templates' button from the Home screen.
2. Press the icon to open the creation menu.

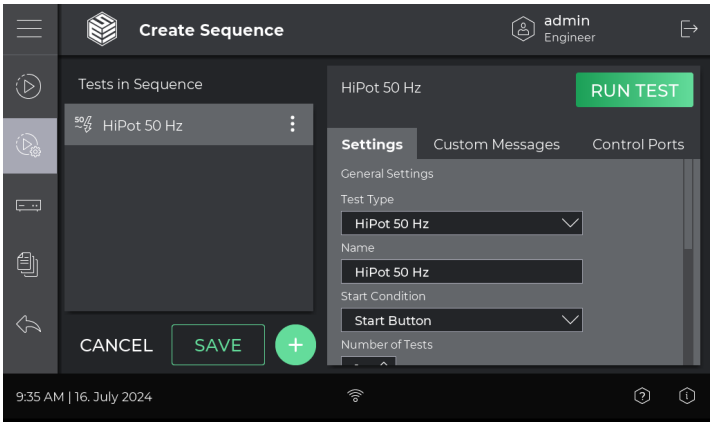


3. Select 'Sequence' to begin creation of a new test sequence.
4. Press the icon again to add a step to the sequence you just created.
5. Select the item to insert, in this case we will add a new 'Test'.





6. Select the test type required.



7. Modify the test settings on the right of the screen to match your requirements.

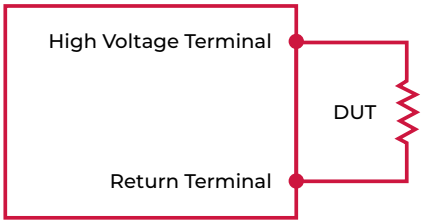
8. Press the 'Save' button SAVE to store the sequence, if this is the first time you have attempted a save, the instrument will prompt you to give the sequence a name.

TEST CONNECTIONS

All test connections for the instrument are positioned at the rear of the device.

Hipot and Insulation Resistance Test Connections

For Hipot and Insulation Resistance testing the test clips or probes are connected as shown across the device to be tested (DUT):



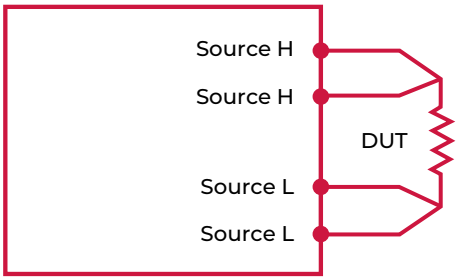
Connect the (Red) High Voltage test lead to the High Voltage Terminal (19) and ensure the plug is firmly connected into the socket.

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

Ensure both clips are connected across the DUT.

Earth Bond and Continuity Test Connections

For Earth Bond and Continuity measurements, the Earth Bond / Continuity Kelvin Test Lead Set is connected as described below:



Earth Bond and Continuity Test Connections using No-burn Earth Bond Probe

The No-burn Earth Bond Probe (optional) accessory can also be used as part of the measuring circuit.

It maintains the four wire measurement principle and 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

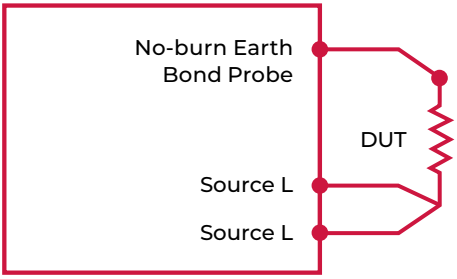
The No-burn Earth Bond Probe is designed to be used as an alternative to the (Output / Return) connection and replaces the (Red / Black) Earth Bond / Continuity Kelvin Test Lead. It is connected as shown:

ATTENTION

Incorrect test connections

Inaccurate Measurement

- Only make a connection to the No-burn Earth Bond Probe terminal (14) OR the Ground Bond Current + (15) and Ground Bond Sense +(16) terminals.



BEGINNING A TEST SEQUENCE

The user can select a number of options for beginning a test when creating their sequence. Each individual test in the sequence can configured to start in one of four ways:

1. Start Button
   The test is started by pressing the green illumated Start button (3 on page 10) or, if used, by a remote start/stop button (4 on page 12).

2. Guard Switch
   The test is started by the detection of the guard switch closing (7 on page 12). In this instance, all test sequences set to 'Guard Switch' will need the guard switch to be opened and then closed to begin.

3. Guard Switch and Start Button
   In this combination the guard switch must be closed as in 2 (see above), but the test will not start until the Start Button (3 on page 10) is also pressed.

4. None (not recommended)
   The test will start immediately. It will not await any condition before starting a test.

DANGER

Uncontrolled test starting in unsafe environment!

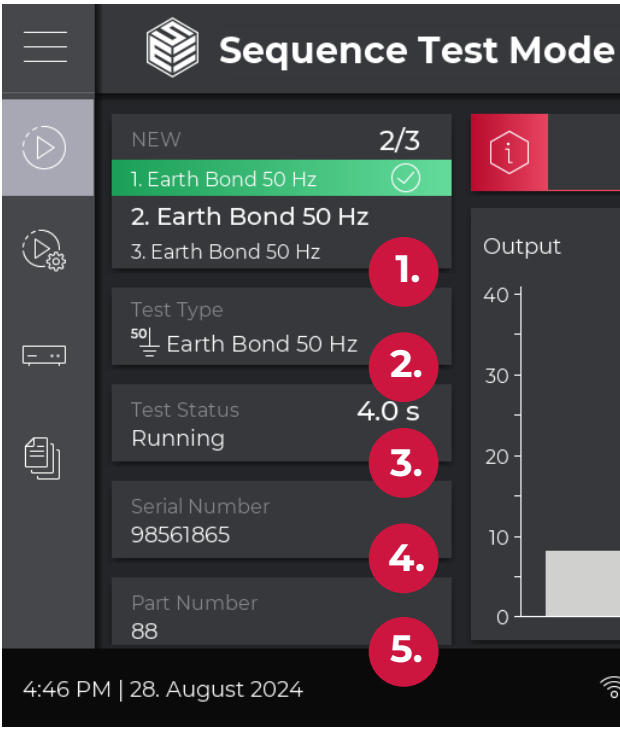
Risk of electric shock and injury.

Risk of damage to the instrument and/or DUT.

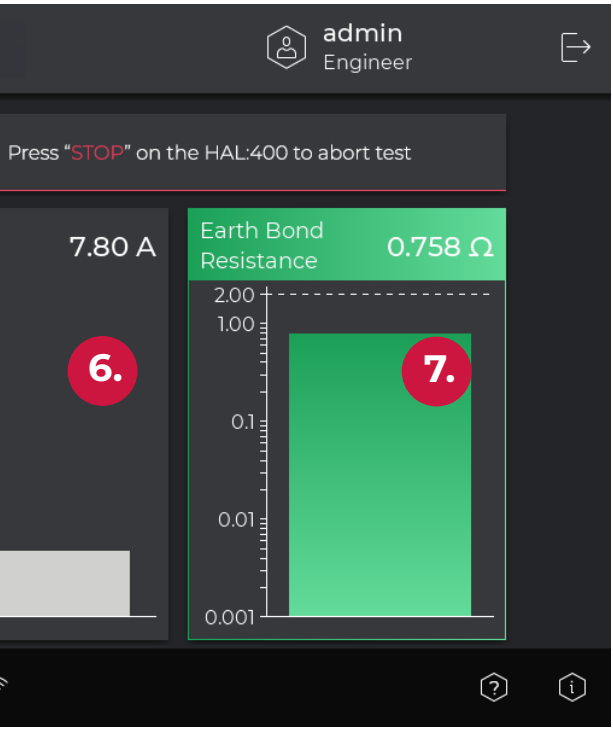
- Only use the starting condition 'none' in safely set up and controlled environments which are not subject to setup change during testing (i.e. are only changed intentionally when testing is paused).
- Make sure that all test connections have been made prior to starting a test (sequence) automatically with 'none'.
- When using 'none', make sure that operators can neither make contact with the instrument nor DUT during testing (e.g. through sufficient enclosures).
- Do not set the starting condition 'none' for the first test in any sequence, if possible. Starting the test with options 1, 2, or 3 ensures controlled starting of tests.

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 instrument is performing a 50 Hz 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 maximum voltage.



Feature:	Function:
4. Serial Number	An optional field displaying the user assigned serial number, this will be included in the test record. (Not displayed in manual mode.)
5. Part Number	An optional field displaying the user assigned part number, this will be included in the test record. (Not displayed in manual mode.)
6. Output Display	This column shows the output of the test. Information shown depends on the type of test, for example "Current" is shown on the Earth Bond Test and "Voltage" on the Hipot test.
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 vs. Fail decision. If the reading is outside of the test parameters, the entire section will turn red to highlight a fail measurement.

TECHNICAL SPECIFICATION

Continuity Test	
Display Range	0.00 Ω ... 9.99 Ω, 10.0 Ω ... 99.9 Ω, 100 Ω ... 999 Ω, 1.00 kΩ ... 10 kΩ
Measurement Range	0.00 Ω ... 9.99 Ω, 10.0 Ω ... 99.9 Ω, 100 Ω ... 999 Ω, 1.00kΩ ... 9.99 kΩ
Display Resolution	0.01 Ω between 0.00 Ω ... 9.99 Ω 0.1 Ω between 10.0 Ω ... 99.9 Ω 1 Ω between 100 Ω ... 999 Ω 0.01 kΩ between 1.00 kΩ ... 10 kΩ
Measurement Accuracy	±2.5% ±0.05 Ω between 0.00 Ω ... 9.99 Ω ±2.5% ±0.1 Ω between 10.0 Ω ... 99.9 Ω ±2.5% ±1 Ω between 100 Ω ... 999 Ω ±5% ±0.01 kΩ between 1.00 kΩ ... 10 kΩ
Open Circuit Voltage	12 V_{DC}
Short Circuit Current	50 mA_{DC}
Earth Bond Test	
Display Range	0.000 Ω ... 1.999 Ω
Measurement Range	0.000 Ω ... 1.999 Ω
Display Resolution	0.001 Ω
Measurement Accuracy	±2.5% ±3 mΩ for currents <2 A ±2.5% ±2 mΩ for currents 2 A ... 5 A ±2.5% ±1 mΩ for currents >5 A
Open Circuit Voltage	6 V_{AC}
Test Current	1 A ... 40 A User definable (240 W maximum output)
Insulation Resistance Test	
Display Range	0.10 MΩ ... 9.99 MΩ for voltages 100V ... 1000V 0.50 MΩ ... 9.99 MΩ for voltages 1001 V ... 5000 V 10 MΩ ... 999 MΩ for voltages 100 V ... 5000 V 1.00 GΩ ... 50.00 GΩ for voltages 500 V ... 5000 V
Measurement Range	0.10 MΩ ... 9.99 MΩ for voltages 100 V ... 1000 V 0.50 MΩ - 9.99 MΩ for voltages 1001 V ... 5000 V 10 MΩ ... 999 MΩ for voltages 100 V ... 5000 V 1.00 GΩ ... 50.00 GΩ for voltages 500 V ... 5000 V
Display Resolution	0.01 MΩ for range 0.10 MΩ ... 9.99 MΩ 1 MΩ for range 10 MΩ ... 999 MΩ 10 MΩ for range 1.00 GΩ ... 50.00 GΩ
Measurement Accuracy	±5% ±0.05 MΩ for range 0.10 MΩ ... 9.99 MΩ ±10% ±5 MΩ for range 10 MΩ ... 999 MΩ ±20% ±50 MΩ for range 1.00 GΩ ± 50.00 GΩ
Output Voltage Range	100 V ... 5000 V_{DC}
Output Voltage Steps	10 V
Output Voltage Accuracy	±1% ±5 digits
Maximum Output Ripple	5% AC_{rms}
Maximum Capacitive Load	2 uF
Maximum Rated Load	50 VA (5 kV @ 10 mA)
Maximum Rated Current	10 mA

AC Hipot Test	
Display Range	0.001 mA ... 20.000 mA
Measurement Range	0.001 mA ... 20.000 mA
Display Resolution	0.001 mA
Measurement Accuracy	±1% ±10 uA
Output Voltage Range	100 V ... 5000 V_{rms}
Output Voltage Steps	10 V
Output Voltage Accuracy	±1% ±5 digits
Output Frequency	50 Hz or 60 Hz
Maximum Rated Load	100 VA (5 kV @ 20 mA)
Maximum Rated Current	20 mA
Arc Detection Sensitivity Level	1 ... 40 / OFF

DC Hipot Test	
Display Range	0.001 mA ... 10.000 mA
Measurement Range	0.001 mA ... 10.000 mA
Display Resolution	0.001 mA
Measurement Accuracy	±1% ±10 uA
Output Voltage Range	100 V ... 6000 V_{DC}
Output Voltage Steps	10 V
Output Voltage Accuracy	±1% ±5 digits
Maximum Output Ripple	5% AC_{rms}
Maximum Rated Load	60 VA (6 kV @ 10 mA)
Maximum Rated Current	10 mA
Arc Detection Sensitivity Levels	1 ... 40 / OFF

Mains Power Supply	
Input Voltage Range	90 V_{AC} ... 264 V_{AC}
Input Frequency Range	50 / 60 Hz
Power Rating (Nominal)	500 W

Dimensions	
Height (h)	160 mm
Width (w)	300 mm
Depth (d)	500 mm
Weight	18 kg

Environmental Conditions	
Environment	indoors, dry
Overvoltage	Category II 300 V
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

DISPOSAL AND ENVIRONMENTAL PROTECTION

Proper disposal makes an important contribution to the protection of our environment and the conservation of natural resources.

ATTENTION

Environmental Damage

Improper disposal results in environmental damage.

- Follow the instructions concerning return and disposal included in this section.

We recommend retaining the respective packaging materials for the case that you might require servicing or calibration in the future.

WARNING

Danger of Asphyxiation Resulting from Foils and Other Packaging Materials

Children and other vulnerable persons may suffocate if they wrap themselves in packaging materials, or their components or foils, or if they pull them over their heads or swallow them.

- Keep packaging materials, as well as their components and foils, out of the reach of babies, children and other vulnerable persons.

Please observe the owner's or end user's responsibility with regard to deleting personal data, as well as any other sensitive data, from old devices before disposal.

Federal Republic of Germany:

The following comments refer specifically to the legal situation in the Federal Republic of Germany. Further information can be obtained, for example, from the responsible authorities or the local distributor.

Waste Electrical Equipment, Electrical or Electronic Accessories and Waste Batteries (including rechargeable batteries)

Electrical equipment and batteries (including rechargeable batteries) contain valuable raw materials that can be recycled, as well as hazardous substances which can cause serious harm to human health and the environment, and they must be recycled and disposed of correctly.

The symbol at the left depicting a crossed-out garbage can on wheels refers to the legal obligation of the owner or end user (German electrical and electronic equipment act ElektroG and German battery act BattG) not to dispose of used electrical equipment and batteries with unsorted municipal waste ("household trash"). Waste batteries must be removed from the old device (where possible) without destroying them and the old device and the waste batteries must be disposed of separately. The battery type and its chemical composition are indicated on the battery's labelling. If the abbreviations "Pb" for lead, "Cd" for cadmium or "Hg" for mercury are included, the battery exceeds the limit value for the respective metal.

Old devices, electrical or electronic accessories and waste batteries (including rechargeable batteries) used in Germany can be returned free of charge to Gossen Metrawatt GmbH or the service provider responsible for their disposal in compliance with applicable regulations, in particular laws concerning packaging and hazardous goods. Waste batteries must be handedover in discharged state and/or with appropriate precautionary measures against short-circuiting. Further information regarding returns can be found on our website.

Packaging Materials

In accordance with German packaging law (VerpackG), the user is obligated to correctly dispose of packaging and its components separately, and not together with unsorted municipal waste (“household trash”).

Packaging which is not subject to so-called system participation is returned to the appointed service provider. Further information regarding returns can be found under https://www.gossenmetrawatt.de/en/about-us/company/product-returns/.

Rest Of World:

Comply with the respective local requirements for disposal and implement them correctly on site.

Further information can be obtained, for example, from the responsible authorities or the local distributor.

SERVICE AND CALIBRATION

Calibration Statement

The instrument is fully calibrated and found to be within the specified performance and accuracy at the time of production. The Seaward Group provides its products through a variety of channels; therefore it may be possible that the calibration date on the provided certificate may not represent the actual date of first use.

Experience has indicated that the calibration of this instrument is not affected by storage prior to receipt by the user. We therefore recommend that the recalibration period be based on a 12 month interval from the first date the unit is placed in to service.

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90471 Nürnberg
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+49 911 817718-0
service@gossenmetrawatt.com

For information on service or calibration visit:
gmci-service.com/en

USA:

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+1 813 886 2775
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For information on service or calibration visit: **calibrationhouse.com/us-capabilities**

REST OF WORLD:

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+44 (0) 191 587 8737
service@calibrationhouse.com

For information on service or calibration visit: **calibrationhouse.com**

REGULATORY INFORMATION

CE Declaration

CE Seaward Electronic Limited hereby declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU and all other applicable EU directive requirements. The complete declaration of conformity can be found at: seaward.com/DoC

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Trademarks

SEAWARD

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Part Number: 490A590 / REV 2 (03/2025)