

EV100

Electric Vehicle Supply Equipment Tester

Operating Instructions



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CERTIFICATE OF CONFORMITY

As the manufacturer of the apparatus listed, we declare under our sole responsibility that the product:

Seaward EV100

To which this declaration relates are in conformity with the relevant clauses of the following standard:

IEC 61010-1

Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements.

IEC 61557-1,2,3,6,10

Electrical safety in low voltage distribution systems up to 1000V a.c. and 1500V d.c. – Equipment for testing, measuring and monitoring of protective measures

IEC 61326

Electrical equipment for measurement, control and laboratory user-EMC Requirements

Performance: The instrument operates within specification when used under the conditions in the above standards EMC and Safety Standards.

The product identified above conforms to the requirements of Council Directive 2004/108/EC and 2006/95/EC.

Seaward Electronic Ltd is registered under BS EN ISO9001:2000 Certificate No: Q05356.

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 year, provided the instrument is serviced and calibrated by authorised agent in accordance with the manufactures 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 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 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 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 manufacturer for repair and investigation.

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Due to a policy of continuous development SEAWARD Electronic Limited reserves the right to alter the equipment specification and description outlined in this publication without prior notice and no part of this publication shall be deemed to be part of any contract for the equipment unless specifically referred to as an inclusion within such contract.

Introduction

The EV100 is an all-in-one test and diagnostic tool, designed to ensure that electric vehicle supply equipment (EVSE) is operating correctly and safely, both at the time of installation and as part of an ongoing periodic maintenance regime. The units can perform a comprehensive set of measurements at the press of a button, including:

Maximum available charging current
 Output voltage
 Earth loop impedance
 RCD trip time
 Control pilot PWM voltage
 Control pilot PWM frequency
 Control pilot PWM duty cycle
 EVSE state transition time

1 User notes

This instrument and its operating instructions are intended for use by adequately trained personnel using appropriate PPE.

The following symbols are used in these operating instructions and on the EV100.



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.

2 Safety notes

In order to ensure safe operation of this instrument, all notes and warnings in these instructions must be observed at all times.

	The EV100 is intended for use in a dry environment only.
	The EV100 may be used to make measurements on circuits rated up to CAT III 300 V AC/DC with reference to earth. Do not connect the EV100 to voltages that may exceed this rating. Check the rated system voltage marked on the test adaptor against the rating of the system under test before use.
	Check the EV100 and all associated cables and leads before operating the equipment. Do not use if there are signs of damage. Only use test adaptors supplied by the manufacturer.
	Do not touch any exposed metal parts of the EVSE or charging cable during testing.
	Do not open or attempt to disassemble the EV100 or test adaptor.
	Always connect the test adaptor to the EV100 before connecting to the EVSE under test. Do not leave the EV100 permanently connected to an EVSE installation. Always disconnect all test leads immediately after use.

Where safe operation of the EV100 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
- after long periods of storage under adverse environmental conditions.



If the EV100 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.



If the EV100 is used in a manner not specified by this document then the protection provided by the equipment may be impaired.

3 Accessories

3.1 Standard contents

The Seaward EV100 test kit is supplied with the following items:

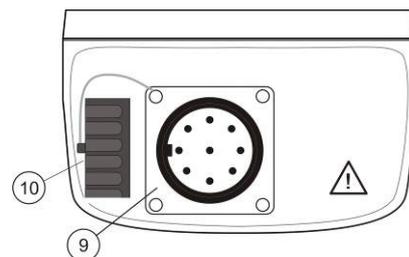
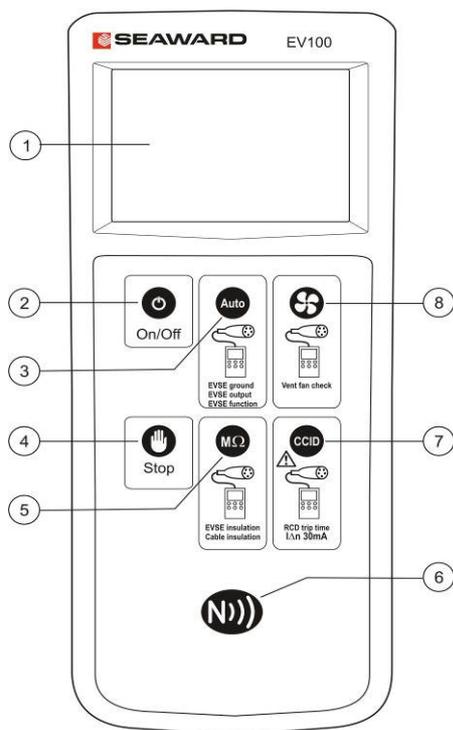
- 1 off EV 100 test instrument
- 1 off professional carry case
- 1 off Type 2 test adaptor
- 1 off Quick Reference Guide
- 6 off MN1500 (AA) 1.5v Batteries

3.2 Optional accessories

Type 1 test adaptor – Part number 405A950

4 Identifying parts of the unit

The numbering below refers to figure 1 and figure 2.



1. LCD Display
2. On/Off key
3. Auto test sequence key – triple action
 - a. Cable simulation setting (no test adaptor is connected)
 - b. Auto test sequence (short press)
 - c. Extended auto sequence (long press >3s)
4. Stop key
5. Insulation test key
6. NFC device position
7. RCD test key – dual action
 - a. Single trip time measurement (short press <2s)
 - b. Auto test sequence (long press >2s)
8. Vent system test key
9. Test port
10. Protective cover

Figure 1 EV100 Front view

LCD display

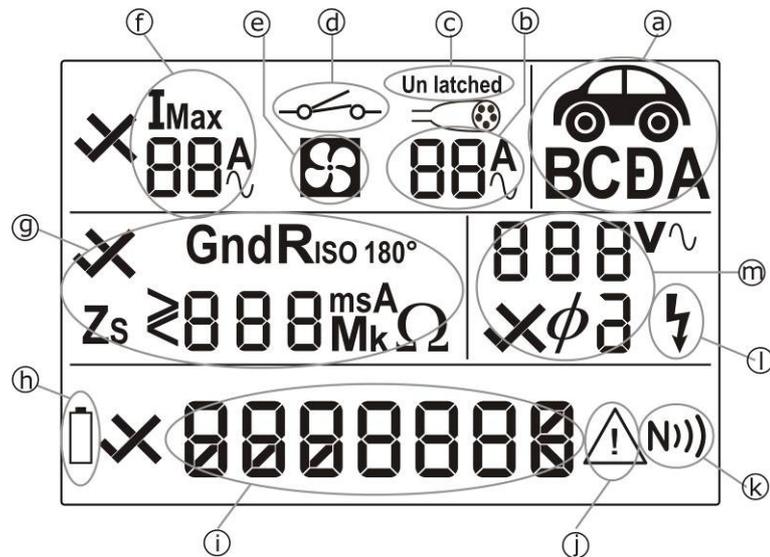


Figure 3 LCD display icons

- a. EVSE state - A/B/C/D/E/F
- b. Charge cable rating
- c. Type 1 latch status – latched/Un latched
- d. EVSE contactor status – open/closed
- e. Vented system test active
- f. Maximum available charging current reported by EVSE
- g. Earth loop impedance / RCD trip time / Insulation resistance result
- h. Low battery indication
- i. Message display
- j. Caution – refer to operating instruction. When this icon is active, the operating instructions must be followed to avoid risk of danger.
- k. NFC data available and ready for transfer
- l. EVSE output active – charging voltage present
- m. EVSE output voltage and phase

5 Using the EV100

5.1 Power On EV100

Press the ON/OFF key (2) to turn the EV100 on. Press and hold the ON/OFF key (2) for 2s to turn the EV100 off

5.2 Battery condition check

The EV100 automatically performs battery condition checks whilst idle and during measurements. When the battery level is low, the battery symbol icon (h) will appear on the EV100 display. The EV100 will continue to function, however the batteries should be replaced.

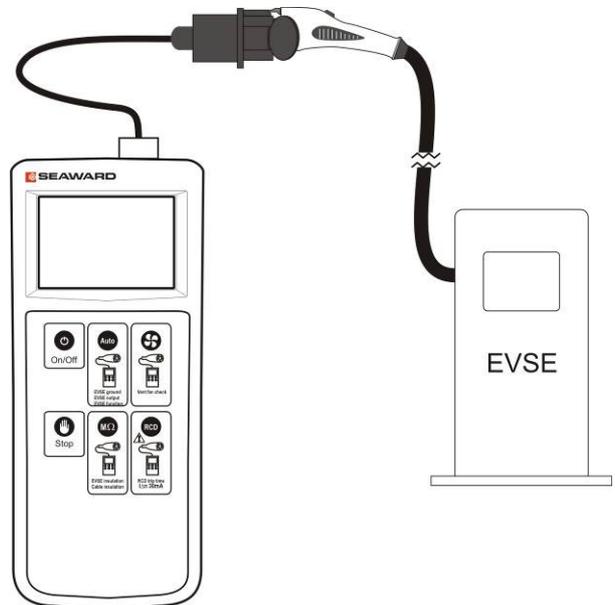
Note: When the battery symbol icon is flashing all tests will be inhibited and the batteries immediately must be replaced as described in section 8.2.

5.3 Connecting the EV100

The EV100 can be used to simulate the presence of an Electric Vehicle (EV) connected to a charge point via a Type 1 or Type 2 tethered cable. Alternatively, in the case of an EVSE fitted with a Type 2 socket, the EV100 can simulate connection of an EV via a detachable charging cable with a rating of 13A, 20A, 32A or 70A by simulating the coding resistor that would be present in a cable of that rating.

5.3.1 Type 1 tethered cable

1. Connect the Type 1 test adaptor to the EV100 test port (9). The test adaptor plug and socket are keyed to ensure correct orientation. Rotate the plug until the key ways are aligned before inserting. Do not force the plug into the socket. When the plug is fully inserted, rotate the outer ring to lock the connector in place.
2. Connect the test adaptor to the tethered cable on the EVSE under test.

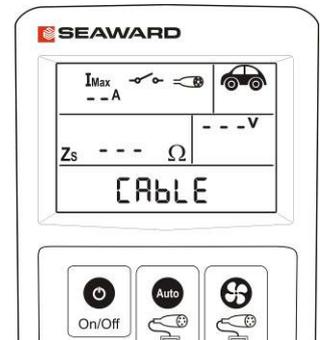


5.3.2 Type 2 tethered cable

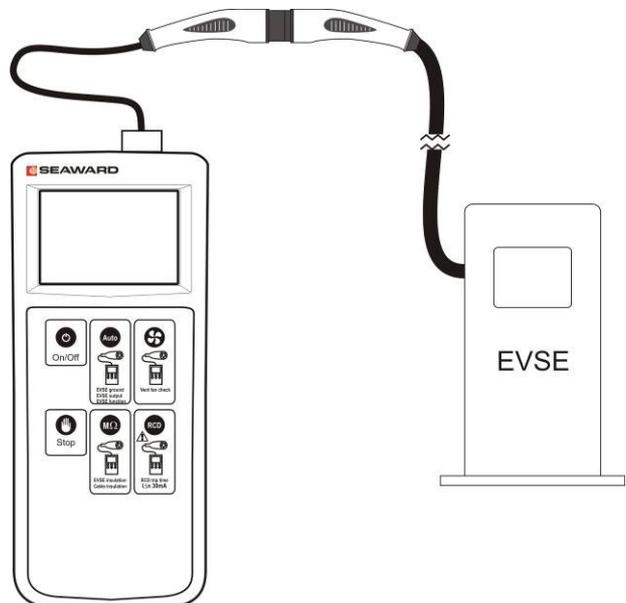
Before connecting the test adaptor,

1. Press the Auto key (2) repeatedly until “Cable” connection type is shown in the message display (i).
2. Each press of the Auto key (2) will cause the message display (i) to toggle to the next available option.

Note: The selected simulation becomes the default setting and will remain until changed using the Auto key (2), even if the EV100 is powered off.



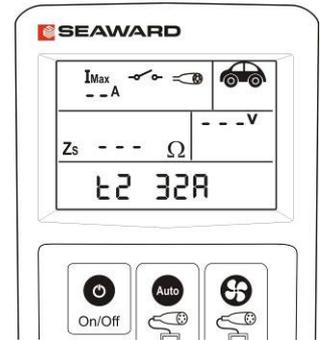
3. Connect the Type 2 test adaptor to the EV100 test port (9). The test adaptor plug and socket are keyed to ensure correct orientation. Rotate the plug until the key ways are aligned before inserting. Do not force the plug into the socket. When the plug is fully inserted, rotate the outer ring to lock the connector in place.
4. Connect the test adaptor to the tethered cable on the EVSE under test.



5.3.3 Type 2 direct connection

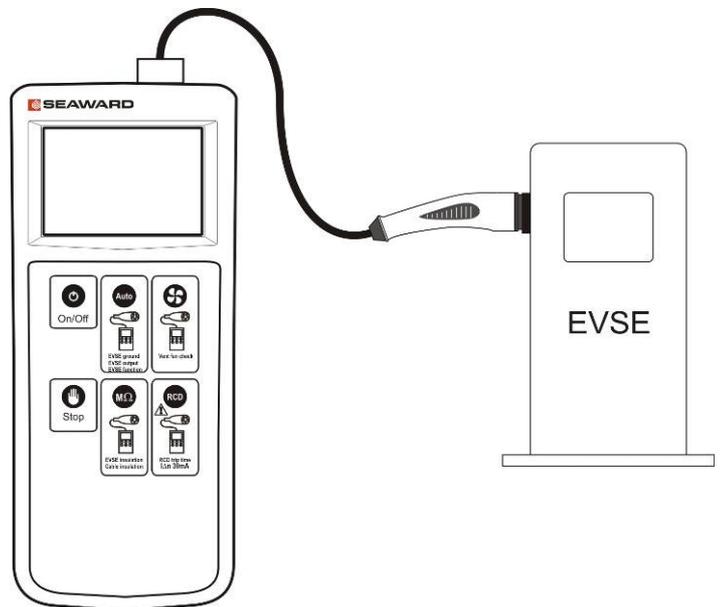
1. Press the Auto key (2) repeatedly until required connection type is shown in the message display (i).
2. Each press of the Auto key (2) will cause the message display (i) to toggle to the next available option.

Note: The selected simulation becomes the default setting and will remain until changed using the Auto key (2) when no test adaptor is connected, even if the EV100 is powered off.



Note: This feature can be used to confirm that the EVSE under test reduces the available current to a value that does not exceed the rating of the charging cable. However, some EVSE will not operate unless the charging cable rating is identical to the rated capacity of the EVSE.

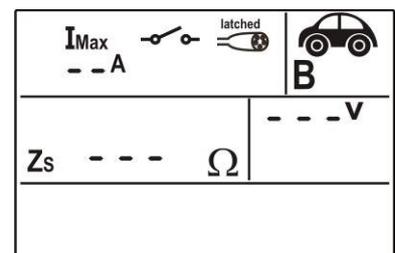
3. Connect the Type 2 test adaptor to the EV100 test port (9). The test adaptor plug and socket are keyed to ensure correct orientation. Rotate the plug until the key ways are aligned before inserting. Do not force the plug into the socket. When the plug is fully inserted, rotate the outer ring to lock the connector in place.
4. Connect the test adaptor to the Type 2 socket on the EVSE under test.



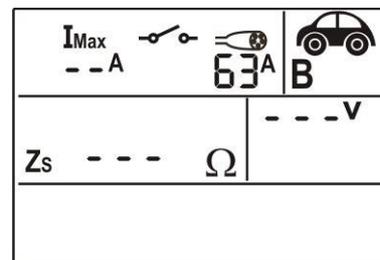
5.4 Standard auto sequence (excluding simulated EV faults)

Note: If the Stop key (4) is pressed at any point in a test sequence, all test results up to that point in the sequence are transferred to the on-board NFC device and are available for transfer to the Seaward EVSEMobile App.

1. Connect the EV100 to the EVSE under test as described above in 5.3.
 2. Press and release the Auto key (2) within 2s
- If the connection type is a Type 1 tethered cable, the charging cable latch position is shown by the display icon (c). If the latched is opened at any point during the test sequence, the sequence will be terminated.



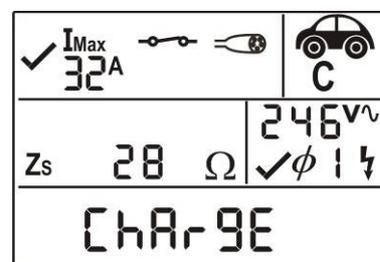
- If the connection type is a Type 2 tethered cable, the cable rating is shown by the display icon (b).



- The automated test will measure the PWM signal from the EVSE and display the maximum available current, **I_{max}**, communicated by the PWM duty cycle. A tick/cross is shown next to the **I_{max}** value to indicate whether the PWM measured values are within the limits specified in section 5.10.
- The EV100 will request charge current from the EVSE under test to drive it into state C.

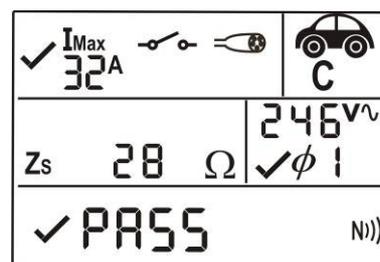
Note: The EV100 will wait for a period of 60s for a response from the EVSE. If the EVSE does not output a control pilot signal the EV100 will timeout and a warning message is displayed as shown in section 5.10

- The display icon (a) will show state **C**, the contactor icon (d) will change to the closed position and the message display (i) will show “charge.”
- The voltage supplied by the EVSE is shown by the display read out (m). A tick/cross is shown next to the voltage measurement to indicate whether the measured values are within the limits specified in section 5.10.



- In the case of a three-phase system, each phase to earth voltage is measured. At the end of the test sequence the voltage display (m) will continually cycle through the three phase to earth voltage and the phase indicator will indicate the phase of the voltage displayed i.e. $\phi 1$, $\phi 2$, $\phi 3$
- The EV100 will then measure the earth loop impedance, **Z_s**, and display the result in the display (g).

- When the test sequence is complete, the test results are transferred to the on-board NFC.
- If all measured values are within the limits specified in section 5.10, a tick and sequence pass result is shown in the message display.
- The NFC display icon (k) appears when data is ready for transfer to the Seaward EVSEMobile App.



5.5 Extended auto, including simulated EV faults

If a fault occurs within an EV during the charge cycle, a correctly functioning EVSE will detect the presence of a fault and open the contactor to terminate AC energy transfer to the vehicle. The EVSE must open the contactor within the mains off delay specified in section 7.10. The EV100 can simulate a number of fault conditions (diode short circuit, diode short to ground and diode open circuit) and measure the mains off delay.

1. Connect the EV100 to the EVSE under test as described above in 5.3.
2. Press and hold the Auto key (2) for >3s. The EV100 will bleep to confirm the extended sequence has been selected

- The EV100 will first perform the test sequence described above in 5.4
 - When the EV100 is ready to begin the simulated EV faults, the message display (i) will show “confirm” (confirm).
3. To proceed with the simulated EV faults, press the Auto key (3) or press the Stop key (4) to abort.
 - The EV100 will send a request for charge to drive the EVSE to state C, apply the following series of faults and measure the time taken for the EVSE to disconnect the supply to the output.
 - Diode short circuit
 - Diode short to ground
 - Diode open circuit
 - After each simulated fault, the EV100 will wait for the EVSE under test to recover to State C before applying the next fault in the sequence.

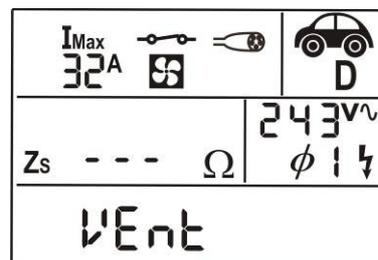
Note: If the EVSE does not automatically recover, user intervention may be required before it can be re-energised to State C.

- When the test sequence is complete, the test results are transferred to the onboard NFC device
- The NFC icon appears when data is ready for transfer to the Seaward EVSEMobile App

5.6 Vented system test

The EV100 can simulate a request for charge from an EV that requires ventilation during the charge cycle. This feature can be used to confirm that the ventilation system is operating correctly.

1. Connect the EV100 to the EVSE under test as described above in 5.3.
2. Press the Vent test key (8) to simulate a request for charge from an EV that requires ventilation.
3. To terminate the test, press the STOP key (4).



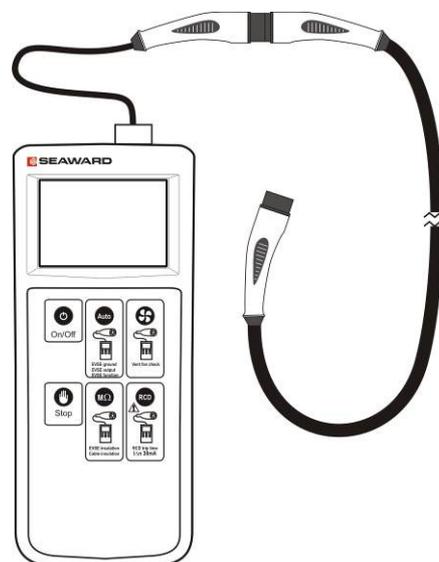
- The EV100 will measure the PWM values, output voltage and the state transitions times
- When the test sequence is complete, the test results are transferred to the onboard NFC device
- The NFC icon appears when data is ready for transfer to the Seaward EVSEMobile App

5.7 Insulation resistance test

The EV100 can perform an insulation resistance measurement using a test voltage of 500V dc. This test can be used to measure the insulation resistance between all live conductors and the protective earth conductor in an EVSE or charging cable. When used to test an EVSE, the voltage will only be applied up to the point in the circuit where open contactor is positioned.

Do not touch the cable or EVSE during an insulation test.

1. Connect the EV100 to the EVSE under test as described above in 5.3.
2. Press the insulation test key (5).



- After a few seconds, the measured insulation resistance and actual test voltage are shown on the EV100 display.
- The measured data can be transferred to the EVSEMobile App when the NFC icon appears on the EV100 display.

Note: Some EVSE have components connected between live conductors and protective earth that may result in a low insulation resistance reading. A low reading may not be due to an insulation failure.



5.8 RCD test

The EV100 can be used to test the operation of the charge current interrupting device (CCID) and measure the disconnection time.

Note: If the EVSE under test is powered from an RCD protected supply, an RCD trip test may also trip the supply RCD.

5.8.1 Single RCD trip time test

1. Connect the EV100 to the EVSE under test as described above in 5.3.
 2. Press the CCID test key (7).
- The EV100 will drive the EVSE into state C to energise the output and then apply a fault current of 30mA
 - When the RCD trips, the trip time shown in the display (g).
 - The starting phase of the test currently alternates between 0° and 180° for each successive press of the CCID key (7).
 - The NFC icon appears when data is ready for transfer to the Seaward EVSEMobile App

5.8.2 Automatic RCD test sequence

The EV100 can automatically perform a complete sequence of trip time tests to check for nuisance tripping and ensure that the RCD operates correctly at the rated residual operating current and at five times the rated residual operating current. The sequence of tests and expected outcome is as follows:

	Test current and phase	Expected outcome
1	half rated current (15mA) / 0°	RCD should not trip
2	half rated current (15mA) / 180°	RCD should not trip
3	rated current (30mA) / 0°	RCD should trip within 300ms
4	rated current (30mA) / 180°	RCD should trip within 300ms
5	five time rated current (150mA) / 0°	RCD should trip within 40ms
6	five time rated current (150mA) / 180°	RCD should trip within 40ms

Note: After each RCD trip, the EVSE must re-initialise and there may be a delay while the EV100 waits for the EVSE to respond. When the EVSE is ready to continue you will see the EV100 display icon (a) change from State A to State B. If the EVSE does not recover within a period of 60s, the EV100 will timeout and report that no control pilot (CP) signal is present.

- Press and hold the CCID test key (7) for >3s. The EV100 will beep to confirm the RCD sequence has been activated.

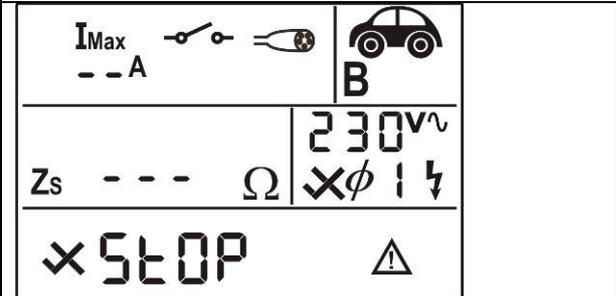
- The EV100 will display **h RCD** (half-current RCD test) and apply a fault current of 15mA starting at 0°.
- The RCD should not trip during the 2s test and the EV100 display will show >2.00s
- The EV100 will display **h RCD** (half-current RCD test) and apply a fault current of 15mA starting at 180°.
- The RCD should not trip during the 2s test and the EV100 display will show >2.00s
- The EV100 will display **RCD** (rated current RCD test) and apply a fault current of 30mA starting at 0°.
- The RCD should trip and the trip time is shown on the EV100 display. When the EV100 display shows **RESET**, reset the RCD then press the CCID key (7) to continue.
- The EV100 will display **RCD** (rated current RCD test) and apply a fault current of 30mA starting at 180°.
- The RCD should trip and the trip time is shown on the EV100 display. When the EV100 display shows **RESET**, reset the RCD then press the CCID key (7) to continue.
- The EV100 will display **5 RCD** (5 times rated current RCD test) and apply a fault current of 150mA starting at 0°.
- The RCD should trip and the trip time is shown on the EV100 display. When the EV100 display shows **RESET**, reset the RCD then press the CCID key (7) to continue.
- The EV100 will display **5 RCD** (5 times rated current RCD test) and apply a fault current of 150mA starting at 180°.
- The RCD should trip and the trip time is shown on the EV100 display. When the EV100 display shows **RESET**, reset the RCD.
- The sequence is now complete. If all of the six tests were satisfactory an overall pass results is shown.
- When the test sequence is complete, the test results are transferred to the onboard NFC device and when data is ready for transfer to the Seaward EVSEMobile App when the NFC icon appears.

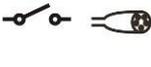
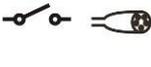
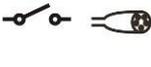
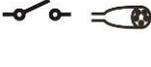
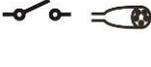
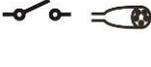
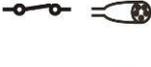
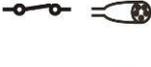
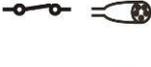
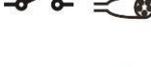
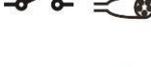
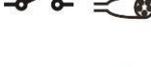
5.9 Auto shutdown

The EV100 will automatically switch off after 3 minutes of inactivity to preserve the life of the internal battery supply. The auto shutdown period cannot be alerted by the user.

5.10 Warning messages

Under certain conditions, the EV100 may display a warning message as shown in the table below.

Display message	Meaning
	<p>Unexpected mains present. The EV100 has measured mains voltage between phase and neutral or phase and ground before a request for charge has been sent the EVSE.</p> <p>Check the EVSE contactor</p>

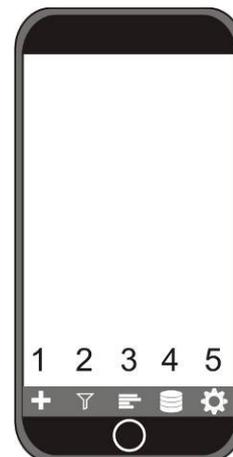
<table border="1"> <tr> <td>I_{Max} -- A</td> <td></td> <td> B</td> </tr> <tr> <td>Zs --- Ω</td> <td colspan="2">0V\sim</td> </tr> <tr> <td colspan="3">no CP </td> </tr> </table>	I_{Max} -- A		 B	Zs --- Ω	0V \sim		no CP 			<p>No PWM signal is present on the control pilot line from the EVSE.</p> <p>This may not indicate a fault, it may simply be that the EVSE is not in state where is ready to charge.</p> <p>Check that the EVSE is ready to charge and repeat the test.</p>
I_{Max} -- A		 B								
Zs --- Ω	0V \sim									
no CP 										
<table border="1"> <tr> <td>I_{Max} -- A</td> <td></td> <td> B</td> </tr> <tr> <td>Zs --- Ω</td> <td colspan="2">0V\sim</td> </tr> <tr> <td colspan="3">× PPEror </td> </tr> </table>	I_{Max} -- A		 B	Zs --- Ω	0V \sim		× PPEror 			<p>The EV100 has been unable to determine the charging cable current capacity.</p> <p>The measured resistance is not one of the values shown in Appendix A.</p>
I_{Max} -- A		 B								
Zs --- Ω	0V \sim									
× PPEror 										
<table border="1"> <tr> <td>I_{Max} 32A</td> <td></td> <td> C</td> </tr> <tr> <td>Zs --- Ω</td> <td colspan="2">0V\sim × ϕ I</td> </tr> <tr> <td colspan="3">no Volt </td> </tr> </table>	I_{Max} 32A		 C	Zs --- Ω	0V \sim × ϕ I		no Volt 			<p>There is no voltage present between phase and neutral or phase and earth when a request for charge is sent to the EVSE</p>
I_{Max} 32A		 C								
Zs --- Ω	0V \sim × ϕ I									
no Volt 										
<table border="1"> <tr> <td>I_{Max} 32A</td> <td></td> <td> B</td> </tr> <tr> <td>Zs --- Ω</td> <td colspan="2">24 V\sim ϕ I</td> </tr> <tr> <td colspan="3">FUSE </td> </tr> </table>	I_{Max} 32A		 B	Zs --- Ω	24 V \sim ϕ I		FUSE 			<p>The internal EV100 fuse is blown, preventing the unit from performing earth loop impedance measurements on the EV100 supply. Check and replace the fuse as described in section 8.3</p>
I_{Max} 32A		 B								
Zs --- Ω	24 V \sim ϕ I									
FUSE 										

6 Seaward EVSEMobile App

6.1 EVSEMobile functions

In the home screen, the following functions are available:

1. Add new record - use to create a new test record for the EVSE under test.
2. Filter - view all records, pass records, fail records or bookmarked records.
3. Sort - the list of test records displayed can be sorted by ID Number, Site Name or Client Name.
4. Memory functions - records can be exported to PC, imported from PC or all records can be deleted.
5. Settings – user name, product registration, language and help can be found here.



In the 'add new record' screen, the follow icons are available at the bottom on the display area:



Camera function used to take a photograph that can be stored with the test and inspection record



Save the record currently displayed



Add additional information about the EVSE, such as make, model, serial number, Modem IMEI.

The current location is automatically displayed in the bottom right hand side of the display and is recorded when the test and inspection record is saved. Latitude and longitude data is available using the data export and PDF report functions.

6.2 Transferring data from the EV100 to EVSEMobile

The result data is stored in a Near Field Communication (NFC) device mounted inside the front case of the EV100 where the NFC logo is located.

Note: The test data remains in the NFC device until it is overwritten by a new set of test results. The data is not lost if the EV100 is switched off.

To transfer data from the EV100 to your Android device:

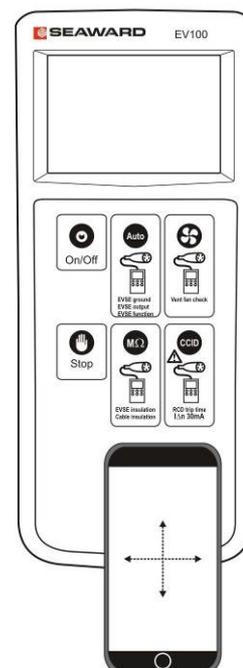
- Ensure that NFC is enabled on the Android device.

Note: S Beam and Android Beam may interfere with the operation of the NFC and should be disabled.

- Open EVSEMobile on the Android device and press the + icon (1) to add a new record.

Note: If an NFC device is detected, the App will open automatically if it is not already open. If the App is opened by detection of an NFC device, the Android device must be removed and replaced on the front of the EV100 to initiate data transfer.

- Place the Android device on top of the EV100 so that the NFC antenna in Android device is over the NFC logo on the EV100.

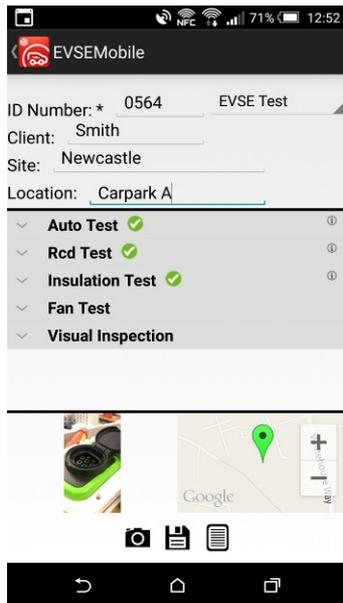


If the location of the NFC antenna in the Android device is unknown, you may need to experiment by moving the Android device slowly around the top surface of the EV100.

- **Do not move the Android device during the data transfer.** When the data has been successfully transferred, a message will appear on the Android display showing “**Transfer Complete.**”
- Enter an ID number and any other details required such as client name, site or location of EVSE or Cable under test

Note: To save a record you must enter an ID Number. All other fields are optional.

- Choose the type or record to be created – EVSE Test or Cable Test using the drop down menu on the top right hand side of the display



It is possible to transfer multiple test results into a single test record e.g. an Auto Test followed by an RCD test followed by an insulation resistance test, building up a comprehensive test record for the EVSE under test.

When all of the required tests have been completed and transferred to EVSEMobile, press the disk icon at the bottom of the display to save the record.

Note: Once a record is saved, it will be locked against further edits.

6.3 Adding photographs to a record

Photographs can be added to a test record. This feature can be used to create a visual record of the condition of the EVSE at the time and date of inspection and testing. To add a photograph to the record,

- Press the camera icon and this will open the camera on the Android device.
- Take the required photograph
- Accept the photograph, (how this is done varies from device to device but is commonly a tick or OK button)

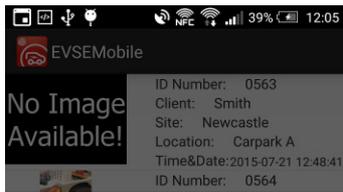
A thumbnail of the photograph will appear in the bottom left hand window but the photograph is stored at the full camera resolution.

6.4 Memory functions

Memory functions are used to import/export data and to clear all data in the database. The EVSEMobile App can export data in two different formats:

1. Individual test records can be exported to a PDF inspection and test certificate

- The complete database can be exported as a single zip file. The exported file contains all photographs and a single XML format data file containing all test data. The XML file can be opened with Microsoft Excel and the results data will automatically be sorted into headed columns.



Exported data can be sent to a number of destinations providing a convenient means of transferring data from the test site back to the office for analysis and reporting.

Send database to:

-  Mail
-  Gmail
-  Mail
-  Android Beam
-  Bluetooth
-  Drive

6.4.1 PDF Export

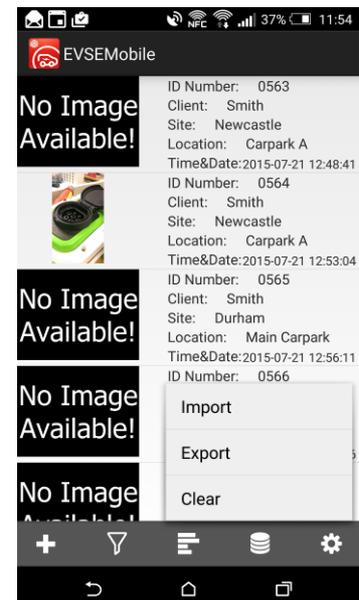
From the home screen

- Tap on the required test record to open the record.
- Select PDF report
- You can enter your own file name or simply press Export to use the default name consisting of the date and time of the export
- Select the required destination from “Send database to:”

6.4.2 Export all data

To export all records in a single file

- go to the home screen
- click on the disk icon (4) to open the memory options
- Click on Export and a pop up window will appear asking for a Name of export file.
- You can enter your own file name or simply press Export to use the default name consisting of the date and time of the export
- Select the required destination from “Send database to:”



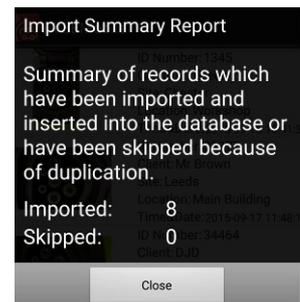
Note: A monthly subscription is required to enable the premium features within EVSEMobile. This includes data import/export and generating PDF certificates. There are no restrictions on the amount of usage once an active subscription is in place. Follow the onscreen instruction to subscribe.

The subscription can be cancelled at any point via Google Play and no further charges will apply.

6.4.3 Import data

Data can be shared by EVSEMobile users by means of the import/export functions. To import feature allows user to import a zip file that previously been created by EVSEMobile

- Go to the home screen
- click on the disk icon (4) to open the memory options
- Click on Import
- Navigate to the folder containing the import file and select the required file
- EVSEMobile will show a summary report detailing the number of records that have been imported.



6.4.4 Clearing the memory

There is no hard limit on the number of records that can be stored using EVSEMobile. The maximum number of records will depend on the amount of memory available on the Android device.

To clear the memory:

- Go to the home screen
- Tap the disk icon (4) to open the memory options
- Select Clear
- Select Yes to confirm that you wish to proceed with memory clear or No to cancel

7 Specifications

7.1 Insulation Resistance	
Display Range	0.01M Ω to 19.9M Ω
Measurement Range	0.10M Ω to 19.9M Ω
Accuracy	+/- 5% +/- 5 digits
Resolution	0.01M Ω maximum
Open Circuit Test Voltage	500V dc -0% +20%
Voltage Indication	+/- 5%
Test current	>1mA into
Short Circuit Test Current	<2mA
Number of Measurements	Minimum of 1000 per IEC61557-2
Circuitry Protection	Test inhibited if \geq 30V AC or DC at inputs

7.2 Voltage measurement	
Display range	0.0V – 300V AC
Measurement range	0.0V – 300V AC
Resolution	1V maximum
Accuracy	$\pm(5\%+2\text{digit})$
Frequency range	45Hz to 65Hz

7.3 Control Pilot PWM Measurements	
Voltage range	$\pm 14\text{v DC}$
Voltage resolution	0.1V
Frequency range	940 Hz to 1040 Hz
Frequency resolution	1Hz
Duty cycle range	2% to 98%
Resolution	1%
Response time range	1ms to 10s
Resolution	1ms

7.4 Earth Loop Impedance (Non trip)	
Supply voltage	195V – 253V 45Hz to 65Hz
Nominal Test current	<15mA (will not trip 30mA RCD)
Display range	1 Ω - 1.6k Ω
Resolution	1 Ω maximum
Measurement range	4 Ω - 1.6k Ω
Accuracy	$\pm 5\% \pm 1 \text{ digit } (4\Omega - 1.6\text{k}\Omega)$

7.5 RCD trip time	
Supply voltage	195V – 253V 45Hz to 65Hz
Test current (rms)	30mA sinusoidal
Test current accuracy	-0% +10% at $I_{\Delta n}$ and $5I_{\Delta n}$ -10% +0% at $\frac{1}{2} I_{\Delta n}$
Trip time ranges	40ms to 2000ms
Time measurement accuracy	$\pm 5\% \pm 2 \text{ digits}$
Available tests	$\frac{1}{2} I_{\Delta n}$, $I_{\Delta n}$, $5 I_{\Delta n}$

7.6 Simulation of cable coding	
EN 61851 13A capability	1.5 kohms +/- 1%
EN 61851 20A capability	680 ohms +/- 1%
EN 61851 32A capability	220 ohms +/- 1%
EN 61851 63A 3Ph capability	100 ohms +/- 1%
EN 61851 70A 1Ph capability	100 ohms +/- 1%

7.7 General	
Weight	0.9kg
Dimensions	260mm x 100mm x 55mm
Power source	6 x AA cells

7.8 Environmental	
Operating temperature	0° C to 40°C Relative humidity, 80% non condensing
Storage temperature	-20°C to – 60°C Relative humidity, 90% non condensing
Environmental Protection	IP40

7.9 Safety	
Protection Class	Double insulated
Overtoltage Category	300V Category III

Pass/Fail limits

7.10 Pass/Fail limits	
PWM voltage	State A $\pm 12V \pm 1V$
	State B $9V \pm 1V$
	State C $6V \pm 1V$
	State D $3V \pm 1V$
PWM frequency	1000 $\pm 0.5\%$
Mains output voltage	196V to 253V
Mains off delay	100ms
RCD trip time at 30mA	300ms
RCD trip time at 1500mA	40ms

8 Maintenance**8.1 Cleaning**

Clean the external case of the EV100 and test adaptor with a clean dry cloth.

Avoid using solvents and abrasive scouring agents to clean the external case of the EV100 or test adaptor.

Check the battery contacts and compartment are free of electrolytic contamination. Any contamination of the battery contacts or compartment should be cleaned with a dry cloth.

8.2 Battery replacement



Before opening the EV100 ensure that it is disconnected from all voltage! Electric shock danger!

Power the unit off.

Disconnect all the test leads from the unit

Position the EV100 face down and undo the slotted captive screw in the battery compartment cover using a suitable tool.

Remove the battery compartment cover.

Remove the discharged batteries from the compartment.

Fit a new set of alkaline batteries.

Relocate the battery cover over the battery compartment and fasten in position using the battery cover captive screw.

8.3 Replacing the fuse



Ensure that the EV100 it is disconnected from all voltages before opening.



Replacement fuse specification is shown on the battery compartment cover on the rear of the EV100.

Power the unit off and disconnect the test adaptor cable from the unit.

Position the EV100 face down, undo the slotted captive screw in the battery compartment cover using a suitable tool and remove the battery compartment cover.

Carefully lift one end of the fuse out of the fuse holder with the help of a flat bladed screwdriver and remove the defective fuse completely from of the fuse holder.

Insert a new fuse as described and specified by the text on the battery compartment cover.

Ensure that the new fuse is seated and centred in the fuse holder.

Relocate the battery cover over the battery compartment and fasten in position with the battery cover captive screw.

8.4 Service and Calibration

To maintain the specified accuracy of the measurement results, the instrument must be recalibrated at regular intervals by either the manufacturer or an authorised Seaward Service Agent. We recommend a recalibration period of one year.

8.5 Spare parts

	Seaward Part No.
Type 1 test adaptor	405A950
Type 2 test adaptor	405A952
Carrying Case	388A951
500mA/1000V/10kA HBC 1¼' fuse	27B137

For help or advice on Service and Calibration contact:

Service Department
Seaward Electronic
Bracken Hill
South West Industrial Estate
Peterlee
Co Durham SR8 2SW
England

Tel: 0191 5878739 / 0191 5878737

Email: service@seaward.co.uk

Appendix A**EVSE simulation options**

Displayed message	EV100 resistance	Simulated EVSE connection
Cable	N/A	Tethered cable – Type 1 or Type 2
t2 70A	1k5 ohms $\pm 1\%$	Type 2 charging cable - 70A rated
t2 32A	680 ohms $\pm 1\%$	Type 2 charging cable - 32A rated
t2 20A	220 ohms $\pm 1\%$	Type 2 charging cable - 20A rated
t2 13A	100 ohms $\pm 1\%$	Type 2 charging cable - 13A rated