



**SEAWARD**

GMC-INSTRUMENTS GROUP

# PV:1525

## QUICK START GUIDE



Read the complete manual (available at [www.seaward.com](http://www.seaward.com)).  
The Quick Start Guide does not replace the complete manual!

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# 1. SAFETY INSTRUCTIONS



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 adequately trained and qualified personnel in the commercial trades. It 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 (e.g. pacemakers, defibrillators) and passive medical devices may be affected by voltages, currents and electromagnetic fields generated by the instrument, 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 it is not possible to rule out any potential risk, do not use the instrument.

## Accessories

- Use only the specified accessories (included in the scope of delivery or listed as optional accessories) 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.
- 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 do not function flawlessly, permanently remove the instrument/accessories from operation and secure against inadvertent use.
- If the instrument or accessories are damaged during use, e.g. if they are dropped, permanently remove the instrument/accessories from operation and secure 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 against inadvertent use.
- The instrument and the accessories may only be used for the tests/measurements described in the documentation for the instrument.
- The instruments and accessories of Seaward Electronic Ltd are designed to ensure optimum compatibility with the Seaward Electronic Ltd products that are expressly provided for them. Unless otherwise expressly confirmed in writing by Seaward Electronic Ltd, they are neither intended nor suited for use with other products.

- 
- Route cables, e.g. the mains power cable and accessories cable, in an orderly fashion. Loose, disorderly cables result in unnecessary danger of tripping and falling.

### **Measurements / Tests**

- Please note that the voltage measurement function is subject to regional requirements, e.g.
  - European Union:  
The voltage measuring function and/or mains check integrated into the instrument may not be used to test systems or system components for the absence of voltage.  
Testing for the absence of voltage is only permissible with a suitable (2-pole) voltage tester or voltage measuring system which fulfills the requirements specified in EN 61243.
  - United Kingdom:  
If the instrument is used to determine the presence or absence of dangerous voltages, the function of the voltage measurement unit must always be checked with a known voltage source or test unit before and after use.

### **Operating Conditions**

- Do not use the instrument and its accessories after long periods of storage under unfavorable conditions (e.g. humidity, dust or extreme temperature).
- Do not use the instrument and its accessories after extraordinary stressing due to transport.
- 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 areas subject to the risk of fire. Danger of fire!
- Implement adequate measures for protection against electrostatic discharge (ESD).

### **Rechargeable Battery Pack**

- Only use the rechargeable battery pack supplied with the instrument or listed as replacement part.
- Use the rechargeable battery pack in undamaged condition only. Risk of explosion and fire in the case of a damaged rechargeable battery pack!  
Inspect the rechargeable battery pack before use. Pay particular attention to leaks and damage.
- The test / measuring instrument may only be used with the battery compartment lid inserted and secured. Otherwise, dangerous voltages may occur at the battery terminals under certain circumstances.
- Do not charge the rechargeable battery pack if it is damaged. Risk of explosion and fire in the case of a damaged rechargeable battery pack!  
Inspect the rechargeable battery pack before charge. Pay particular attention to leaks and damage.

### **Measurement Cables and Establishing Contact**

- Plugging in the measurement cables must not necessitate any undue force.
- Never touch conductive ends (e.g. of test probes).
- Avoid short circuits due to incorrectly connected measurement cables.
- Ensure appropriate contacting (e.g. on the test probes, alligator clips, Kelvin probes,

- 
- etc.).
  - Do not move or remove contacts (e.g. the test probes, alligator clips, Kelvin probes etc.) until testing/measurement has been completed. This may result in electrical arcing and cause injury or damage to the installation and/or the instrument.

### **Calibration**

- Comply with national calibration regulations and laws.
- Calibration may only be carried out by authorized service centers.

### **Emissions**

- The instrument is equipped with a Bluetooth® module. Determine whether or not use of the implemented frequency band of 2400 to 2483.5 MHz is permissible in your country.

### **Data Security**

- Always create a backup copy of your measurement/test data.
- The instrument 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 instrument (e.g. access protection), as well as other appropriate measures to prevent unauthorized access to the data.

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## 2. APPLICATION

Please read this important information!

### 2.1 Intended Use / Use for Intended Purpose

The instrument is designed for the purpose of performing electrical safety testing and performance measures of photovoltaic systems up to 1500 V<sub>DC</sub> and 25 A (residential and commercial level installations).

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

### 2.2 Use for Other than Intended Purpose

Using the instrument for any purposes other than those described in this Quick Start Guide or the manual for the instrument is contrary to use for intended purpose. Use for other than intended purpose may lead to unpredictable damage!

### 2.3 Repairs and Modifications

Unauthorized modification of the product is prohibited. Only authorized, trained personnel are permitted to perform repairs. Refer to the manual for the instrument for information concerning repairs.

### 2.4 Liability and Guarantee

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

Register your instrument now

To activate your 2-year warranty please register your product at [seaward.com/register](https://seaward.com/register)

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## 3. DOCUMENTATION

### 3.1 Information Concerning these Instructions

The Quick Start Guide does not replace the complete manual!

Read the complete operating instructions (available at [www.seaward.com](http://www.seaward.com)).

Read these instructions attentively and carefully. They contain all necessary information for the safe use of the instrument. Comply with these instructions in order to protect yourself and others from injury, and to avoid damaging the instrument.

The latest version of these instructions is available on our website:

<https://www.seaward.com/gb/support/>

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Due to a policy of continuous development, Seaward Electronic Ltd 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.

### 3.2 Identification of Warnings

Instructions for your safety and for the protection of the instrument and its environment are provided as warnings and notes at certain points in these instructions.

They are laid out as shown below and are graded in terms of the severity of the respective hazard. They also describe the nature and cause of the hazard, the consequences of non-observance and what must be done to avoid it.



#### **DANGER**

Death or serious injury is almost certain.

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#### **WARNING**

Death or serious injury is possible.

---



#### **CAUTION**

Minor or moderate injury possible.

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## ATTENTION

Damage to the product or the environment.



### Note

Important information.



### Tip

Useful additional information or application tip.

## 3.3 Identifiers

The following identifiers are used in this documentation:

Identifier	Meaning
<b>Control Element</b>	Keys, buttons, menus and other controls
✓ Prerequisite	A condition etc. which must be fulfilled before a given action can be taken
1. Procedural step	Steps of a procedure which must be completed in the specified order
↳ Result	Result of a procedural step
• Enumeration	Bullet lists
• Enumeration	

## 3.4 Symbols in the Documentation

The following icons are used in this documentation:

Icon	Meaning
	Read and adhere to the product documentation.
	General warning symbol.
	Warning regarding electrical voltage.



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## 4. GETTING STARTED

This chapter gives you an overview of the initial steps with the instrument.

1. Read and adhere to the product documentation. In particular, observe all safety information in the documentation, on the instrument and on the packaging.
  - Safety Instructions on page 3.
  - Application on page 6.
  - Documentation on page 7.
2. Familiarize yourself with the instrument on page 10.
3. Start up the instrument on page 17.
4. Familiarize yourself with the instrument's operation on page 18.
5. Configure the instrument on page 21.
6. Perform measurements / tests on page 21 on page 24.

## 5. THE INSTRUMENT

### 5.1 Scope of Delivery

The PV:1525 Complete Kit includes:


- 1 × PV:1525 instrument
- 1 × Set 4 mm test probes (red, black and yellow) with alligator clips
- 1 × Set instrument to MC4 test leads (yellow and black)
- 1 × Rechargeable battery pack
- 1 × Battery charging cradle
- 1 × Quick Start Guide PV:1525
- 1 × Calibration certificate PV:1525
- 2 × Declaration for PV:1525 (CE, UKCA)
- 1 × PV:1500 Clamp\*
- 1 × SS:200LR Wireless Irradiance Meter\*
- 1 × Solar Survey – Quick release panel mounting bracket
- 1 × Carry case
- 1 × Solar Certs software licence

\* Complete product. Full scope of supply see PV:1500 Clamp Manual and Quick Start Guide SS:200LR Wireless Irradiance Meter.

#### Optional Accessories

Some measurements necessitate optional accessories:

Bypass measurement leads for power measurement      Part Number: 601A1201

	<p>Information on replacement parts can be found in the instrument's data sheet.</p>
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## 5.2 Instrument Overview

### Front



- 1 3.5" color screen display
- 2 Function button 1  
(illumination color changes dependent on function, see "7. Operation" on page 18)
- 3 Function button 2  
(illumination color changes dependent on function, see "7. Operation" on page 18)
- 4 Directional keypad
- 5 Power button



- 6 Negative (-) PV test lead input and negative (-) continuity lead input (black)
- 7 Positive (+) PV test lead input and positive (+) continuity lead input (yellow)
- 8 Insulation lead output (red)

5.3 Symbols on the Instrument and the Included Accessories

Icon	Meaning	Icon	Meaning
	Warning regarding a point of danger (attention: observe documentation!)		The instrument may not be disposed of with household trash. See "Disposal and Environmental Protection" on page 33.
	Warning regarding dangerous electrical voltage		European conformity marking
			UK conformity marking

## 5.4 Included Features

Feature	Included in the PV:1525 instrument
Continuity test – Test lead null	✓
Continuity test – Continuity measurement	✓
Insulation resistance measurement – $R_{iso}$ (point to point)	✓
$R_{PE}$ voltage measurement	✓
PV panel / String insulation resistance ( $R_{iso}$ ) measurement	✓
$I_{sc}$ / $V_{oc}$ measurement	✓
Power measurement using PV:1500 Clamp	✓

## 5.5 Relevant Standards

The instrument has been manufactured and tested in accordance with the following safety regulations:

IEC 60529	Degrees of protection provided by enclosures (IP code)
IEC 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements
IEC 61010-2-034	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-034: Particular requirements for measurement equipment for insulation resistance and test equipment for electric strength
IEC 61326-1	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements
IEC 61557-1	Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 1: General requirements
IEC 61557-2	Safety of transformers, reactors, power supply units and combinations thereof – Part 2-2: Particular requirements and tests for control transformers and power supply units incorporating control transformers
IEC 61557-4	Electrical safety in low voltage distribution systems up to 1000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 4: Resistance of earth connection and equipotential bonding

## 5.6 Technical Specification

### Open Circuit Voltage and Voltage Measurement (PV Terminals)

Display range	+10.0 V <sub>DC</sub> ... +1500 V <sub>DC</sub> -10.0 V <sub>DC</sub> ... -440 V <sub>DC</sub> 10.0 V <sub>AC</sub> ... 440 V <sub>AC</sub>
Measuring range	+10.0 V <sub>DC</sub> ... +1500 V <sub>DC</sub> -10.0 V <sub>DC</sub> ... -440 V <sub>DC</sub> 10.0 V <sub>AC</sub> ... 440 V <sub>AC</sub>
Resolution	0.1 V <sub>DC</sub> maximum
Accuracy	for +DC: $\pm (0.5 \% + 2 \text{ digits})$ for -DC and AC: $\pm (5 \% + 2 \text{ digits})$

### Short Circuit Current Measurement (PV Terminals)

Display range	0.00 A <sub>DC</sub> ... 25.00 A <sub>DC</sub>
Measuring range	0.50 A <sub>DC</sub> ... 25.00 A <sub>DC</sub>
Maximum power	37.5 kW
Resolution	0.1 A <sub>DC</sub> maximum
Accuracy	$\pm (1 \% + 2 \text{ digits})$

### Maximum Power

Maximum power rating	37.5 kW
Voltage	1500 V <sub>DC</sub>
Current	25 A <sub>DC</sub>

### Earth Continuity / Resistance Measurement

Test voltage open circuit	$> 4 \text{ V}_{\text{DC}}$ , nominal
Test current into 2 $\Omega$	$> 200 \text{ mA}$
Display range	0.00 $\Omega$ ... 199 $\Omega$
Measuring range (IEC 61557-4)	0.05 $\Omega$ ... 199 $\Omega$
Resolution	0.01 $\Omega$ maximum
Accuracy	0.05 $\Omega$ ... 0.09 $\Omega$ $\pm (2 \% + 1 \text{ digit})$ 0.10 $\Omega$ ... 0.19 $\Omega$ $\pm (2 \% + 2 \text{ digits})$ 0.20 $\Omega$ ... 1.99 $\Omega$ $\pm (2 \% + 3 \text{ digits})$ 2.0 $\Omega$ ... 4.9 $\Omega$ $\pm (2 \% + 2 \text{ digits})$ 5.0 $\Omega$ ... 199 $\Omega$ $\pm (2 \% + 5 \text{ digits})$
Test leads zero	Zero up to 10 $\Omega$
Visible warning	$\geq 30 \text{ V}_{\text{AC}}$ or $\text{V}_{\text{DC}}$ at inputs
Circuitry protection	Test inhibited if $\geq 30 \text{ V}_{\text{AC}}$ or $\text{V}_{\text{DC}}$ at inputs
Repeat tests as per IEC 61557-4	Approx. 4000 1-second tests

### Insulation Resistance Measurement

Test voltage open circuit	250 V, 500 V, 1000 V, 1500 V (as per IEC 61557-2)
Test voltage specification	-0 % +20 % (open circuit)
Test current short circuit	$< 2 \text{ mA}$
Test voltage at 1 mA	$> 1 \text{ mA}$ into $U_n \times (1000 \Omega/\text{V})$ (as per IEC 61557-2)
Display range	0.05 M $\Omega$ ... 999 M $\Omega$

Measuring range (IEC 61557-2)	250 V / 500 V string mode: 0.05 M $\Omega$ ... 200 M $\Omega$ 1 kV / 1.5 kV string mode: 0.05 M $\Omega$ ... 999 M $\Omega$ 250 V point to point: 0.05 M $\Omega$ ... 300 M $\Omega$ 500 V point to point: 0.05 M $\Omega$ ... 500 M $\Omega$ 1 kV / 1.5 kV point to point: 0.05 M $\Omega$ ... 999 M $\Omega$
Resistance resolution	0.01 M $\Omega$ for 0.05 M $\Omega$ ... 1.99 M $\Omega$ 0.1 M $\Omega$ for 2.0 M $\Omega$ ... 19.9 M $\Omega$ 1 M $\Omega$ for 20 M $\Omega$ ... 999 M $\Omega$
Resistance accuracy	$\pm(5\% + 1 \text{ digit})$ for 0.05 M $\Omega$ ... 0.19 M $\Omega$ $\pm(5\% + 3 \text{ digit})$ for 0.20 M $\Omega$ ... 1.99 M $\Omega$ $\pm(5\% + 2 \text{ digit})$ for 2.0 M $\Omega$ ... 5.0 M $\Omega$ $\pm(5\% + 5 \text{ digit})$ for 5.1 M $\Omega$ ... 99 M $\Omega$ $\pm(10\% + 5 \text{ digit})$ for > 99 M $\Omega$
Insulation voltage resolution	1 V
Insulation voltage accuracy	$\pm(2\% + 2 \text{ counts})$
Maximum system capacitance	2 $\mu$ F
Visible warning	$\geq 30 \text{ V}_{\text{AC}}$ or $\text{V}_{\text{DC}}$ at inputs
Repeat tests as per IEC 61557-2	Approx. 4000 1-second tests

### Operating Current (Wireless via PV:1500 Clamp)

Display range	0.1 A <sub>DC</sub> ... 400.0 A <sub>DC</sub>
Current measuring range	0.1 A <sub>DC</sub> ... 400.0 A <sub>DC</sub>
Resolution	0.1 A
Accuracy	$\pm (2\% + 5 \text{ digits})$

### Operating Power (PV Terminals & Wireless via PV:1500 Clamp)

Display range	0.00 kW ... 600 kW
Measuring range	0.50 kW ... 600 kW
Resolution	0.01 kW
Accuracy	$\pm (6\% + 2 \text{ digits})$

### Mechanical Design

Weight	Approx. 1 kg / 2.2 lb
Dimensions	265 mm × 115 mm × 78 mm / 10.4" × 4.6" × 3.1"
Display type	3.5" color display with backlight
Display resolution	480 × 320 pixels
Display FOV	70° left to right 60° top to bottom
Power source	11.55 V 2930 mA lithium ion battery (rechargeable)
Auto power down	User-configurable
Onboard memory	1000 slots

### Environmental Conditions

Environment	Dry, without moisture condensation indoor or outdoor use
Operating temperature	+5 °C ... +40 °C / +41 °F ... +104 °F
Barometric elevation	Max. 2000 m / 6562 ft.
Storage	-25 °C ... +65 °C / -13 °F ... +149 °F Dry, without moisture condensation; without battery pack

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## Electrical Safety

Overvoltage category	IEC 61010-01 CAT III / 1500 V (Measurement Category III is applicable to test and measurement circuits connected to the distribution part of the buildings low-voltage mains installation, this includes distribution boards, circuit breakers and wiring.)
Pollution degree	2 (as per IEC 61010-1)
Protective system	Housing: IP40 as per IEC 60529 (Protection against ingress of solid foreign objects: $\geq 1.0\text{ mm}$ / $0.039''\text{ }\varnothing$ ; protection against ingress of water: not protected)
Protection category	II

## Electromagnetic Compatibility (EMC)

Interference emission	IEC 61326-1, class A
Interference immunity	IEC 61326-1

## Data Interfaces

### Bluetooth® LE

Frequency band(s)	2402 MHz ... 2480 MHz
Transmit power range(s)	20 dBm
Modulation type(s)	GFSK
Channel spacing(s)	2 MHz
Radio spectrum efficiency (Art. 3.2)	STSI EN 300 328 V2.2.2
Antenna type and gain	PCB antenna, 3.26 dBi
Usage	Transfer of test data; connection to peripherals, software updates

### Long-Range RF

Frequency band(s)	433.375 MHz ... 434.625 MHz
Transmit power range(s)	4.89 dBm ERP
Modulation type(s)	CSS
Channel spacing(s)	250 kHz
Radio spectrum efficiency (Art. 3.2)	ETSI EN 300 220-2 V3.2.1
Antenna type and gain	FPC antenna, 2.8 dBi peak gain
Usage	Connect to SS200:LR Wireless Irradiance Meter



## 6. START-UP

### 6.1 Powering ON / OFF

1. Press the power button for 2 seconds.  
↳ The display becomes active/inactive.

### 6.2 Battery Charging

The instrument comes with a battery charging cradle to enable the battery to be recharged. The charging cradle uses a USB-C connection, so it can be used with a wall charger or even on the go in a vehicle.

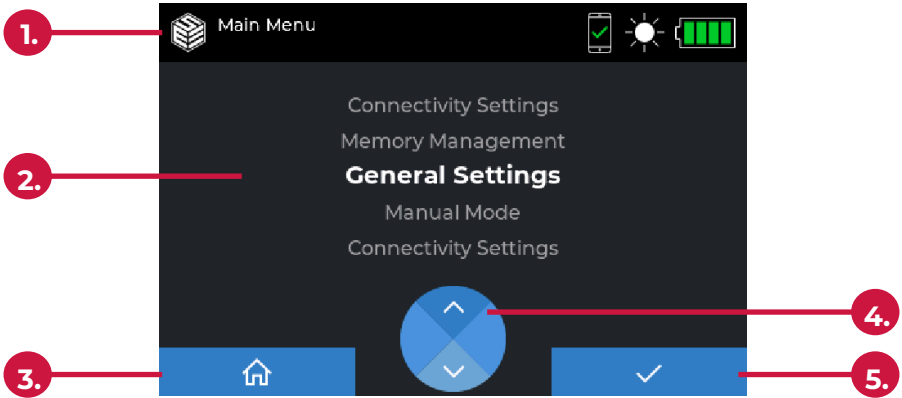
To charge the battery, ensure the cradle has been supplied with power via the USB-C socket and place the battery into the cradle, ensuring the charging sockets of the battery mate with the charging pins of the cradle.

Red and green LEDs will indicate various stages of the charging cycle.

LED Illuminated Buttons	Meaning
Alternating flashing red and green	The cradle has power, but no battery is connected.
Flashing red	The unit is charging the battery, current charge level less than 33 %.
Flashing red and green together	The unit is charging the battery, current charge level between 33 % and less than 66 %.
Flashing green	The unit is charging the battery, current charge level between 66 % and 100 %.
Solid green	The battery is fully charged.

# 7. OPERATION





## Main menu



Display element	Function
1. Information bar	This area provides information about the status of the instrument and its peripherals. This will always include the currently selected screen and status of battery and connected devices. In addition, if hazardous voltages are present, this will be indicated by a yellow bar with a warning triangle.
2. Information area	This area is used to display menu items, text fields or test information.
3. Function key 1	This section shows the current function of the F1 key. This will vary from screen to screen and is only present where the buttons have a function.
4. Directional keys	Allow simple navigation through on screen menus and displays. This will vary from screen to screen and is only present where the buttons have a function.
5. Function key 2	This section shows the current function of the F2 Key. This will vary from screen to screen and is only present where the buttons have a function.








### Information Bar Symbols

The symbols on the information bar provide information about the status of the instrument and its peripherals. The instrument is equipped with the following display symbols:

Symbol	Function
	Indicates battery level. Each section of the battery represents 25 % of the battery life remaining, any percentage over 50 % will show green, then yellow until 25 % and finally red when in the last quarter.
	Indicates that a Wireless Irradiance Meter (SS:200LR) is paired and connected to the Instrument.
	Indicates that the PV:1525 is paired to a Bluetooth® device. (Mobile device or PV:1500 Clamp).
	Indicates that hazardous voltages might be present due to the nature of the test being performed, or the presence of voltage has been detected when making connections.





### Function Button Symbols

The following symbols may be shown on either of the Function 1 or Function 2 buttons. They vary from screen to screen and are only present where the buttons have a function.

Symbol	Function
	<b>Home</b> – Pressing this symbol navigates back to the home screen.
	<b>Menu</b> – This symbol will open a menu screen.
	<b>Back</b> – Returns to the previous screen.
	<b>Accept</b> – Confirms the action.
	<b>Start Test</b> – This option begins a test or test sequence.
	<b>Save</b> – Used to save test details, including result.
	<b>About</b> – Gives detail on the hardware and firmware of the device.




### Directional Button Symbols

The on-screen representation of the directional buttons show the functions available when pressing one of the four buttons. Only a directional arrow populated with a symbol will have a function.

Symbol	Function
	A traditional arrow will indicate when a cursor movement is possible, i. e. for entering data or navigating a menu. It may also indicate a page movement, e.g. a down arrow may represent a page down function, where extra options are available.
	From the home screen, numbered slots represent the stored auto test sequences.
	Prior to beginning an insulation resistance test V+ will allow the user to cycle through the applied voltage between 250 V <sub>DC</sub> , 500 V <sub>DC</sub> , 1000 V <sub>DC</sub> and 1500 V <sub>DC</sub> .
	Deletes any marked items or results from the memory management menus.

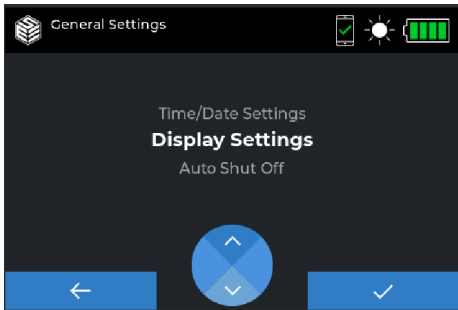
### LED Illuminated Function Buttons

The instrument has two smart function buttons that will illuminate in different colors depending on the functionality of the button as an action within the current screen.

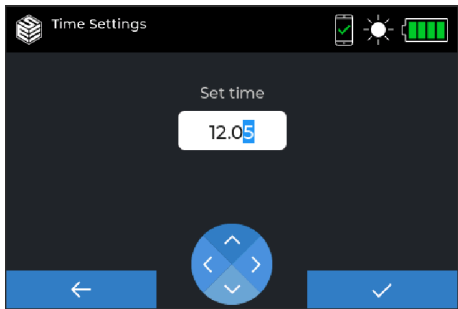
Symbol	Function
	Blue illumination indicates that a button press will perform a function.
	Green illumination indicates that a button press will start a test.
	Red illumination indicates that a button press will abort a test.

## 8. CONFIGURATION

### 8.1 General Settings

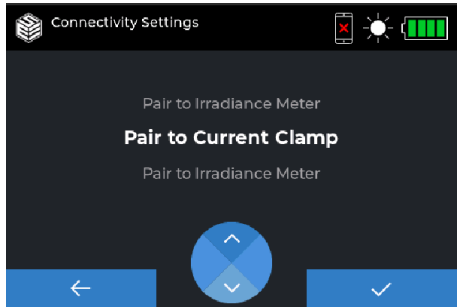


The general settings option allows for the main system settings to be changed. These include language, time and date settings and screen brightness with timeout and auto shut off time for battery savings.



The date and time are factory set but can be manually changed. Alternatively, when connected to the PV:Sync Mobile app, the instrument will automatically sync with the mobile device time.

### 8.2 Connectivity Settings

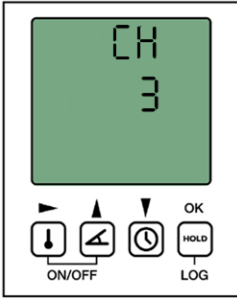


Connectivity settings allow for the pairing of the Wireless Irradiance Meter (SS:200LR) and the Current Clamp (PV:1500).

This chapter only describes the pairing of the Wireless Irradiance Meter (SS:200LR) and the Current Clamp (PV:1500). For more information on those devices, see their product documentation.

## Pairing with SS:200LR Wireless Irradiance Meter

- ✓ You have read the SS:200LR documentation and set it up for use. See Quick Start Guide for SS:200LR Wireless Irradiance Meter.
- ✓ The PV:1525 and SS:200LR to be paired are within a range of less than 150 m. Ideally, next to each other.
- ✓ Prevent interference during pairing: Have no other PV:1525 and/or SS:200LR turned on anywhere within a 300 m radius.



On the SS:200LR:

1. Connect the temperature sensor to the instrument.
2. Press and hold **ANGLE** and **CLOCK** for 2 s to enter the channel selection mode.
3. Select a channel ID between 0 and 5 and press **OK** to store the channel.
4. Note the channel you set.



On the PV:1525:

1. Enter the **Main Menu** by pressing the **Menu** button.
2. Navigate to **Connectivity Settings** and press **Accept**.
3. Select **Pair to Irradiance Meter** and press **Accept**.
4. From the list **Channel**, select the channel you set on the SS:200LR.
5. Press **Accept** to save the selected channel.

6. Turn both instruments off and then back on to initiate communications.

↳ The instruments are paired.

Tests on the PV:1525 can now be performed with data of irradiance and both ambient and panel temperature.



### Note

Prevent interference:

Keep any other paired set of instruments away; if paired with a different channel for a distance 10 m, if paired on the same channel for a distance of 300 m.

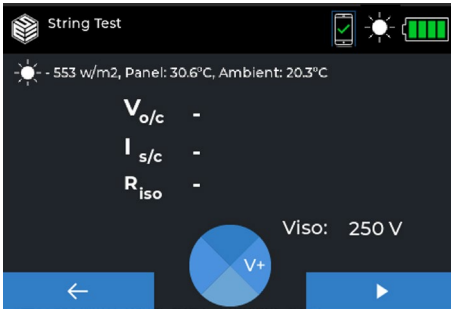


### Note

The SS:200LR Wireless Irradiance Meter will automatically power off after

- 30 min of measured darkness
- 15 min from switch on with no initial pairing to a PV:1525 and no button presses
- 12 hours after first switch on

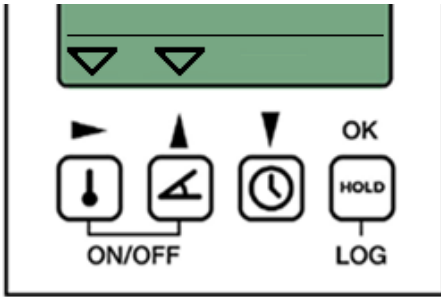
Indication of connection status:



On the PV:1525:

Any test screen displays a sun in the upper right corner to indicate connection to a SS:200LR Wireless Irradiance Meter.

Live values for irradiance and both the ambient and panel temperature are displayed in a line on the test screen.

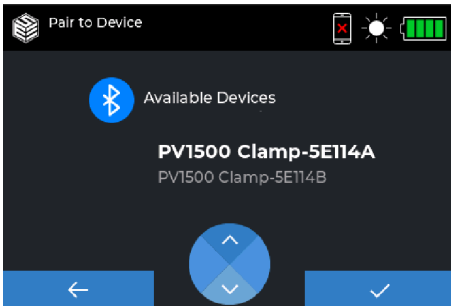


On the SS:200LR Wireless Irradiance Meter:  
The triangles in the display indicate the connection status:

- paired = solid triangle above temperature button
- paired and transmitting = solid triangle above temperature button + simultaneously flashing triangle above the angle button
- (never paired = flashing triangle above temperature button – on for 2 s, then off for 10 s)

## Pairing with PV:1500 Clamp

The instrument can be paired with the PV:1500 Clamp (via Bluetooth®) for power measurements.



1. Enter **Main Menu** by pressing the **Menu** button.
2. Navigate to **Connectivity Settings** and press **Accept**.
3. Select **Pair to Current Clamp** and press **Accept**.
4. Select the required current clamp and press **Accept** to store the device.



### Note

The number after PV:1500 is the current clamp's serial number, which can be located on the rear of the instrument and serves as a useful identifier.

---

## 9. MEASURING/TESTING



### WARNING

#### Risk of electrical shock

The instrument may apply high voltage or mains power to the appliance under test.

- The DC supply must be isolated from earth/ground during testing.
  - Do not touch the PV installation or any metal parts while tests are active.
  - Always ensure that the circuit under test is electrically isolated.
  - Do not leave the test instrument permanently connected to a PV installation. Always disconnect all test leads immediately after use.
  - The instrument is not intended for continuous use. When the instrument is not being used, disconnect it from the system under test.
  - Do not attempt to turn the instrument off while tests are active.
  - Do not test with optimizers connected.
  - Use test probes with alligator clips only.
  - Always ensure that the circuit under test is electrically isolated before attempting an earth resistance measurement or insulation measurement.
  - During insulation measurement, high voltages are present at the test tips. Use alligator clips to connect prior to testing.
- 

### 9.1 Switching the PV Installation ON / OFF

The PV installation cannot be turned off and is tested live. The PV string or panel must be disconnected from the PV inverter during string tests, insulation tests, and continuity tests. For power tests, the PV string or panel must be connected to the inverter.

### ATTENTION

#### Improper disconnection

Risk of a blown internal fuse and loss of functions if you do not disconnect the PV string/panel from the PV inverter properly. The fuse is not user-replaceable.

- During testing, always ensure that the PV string/panel is connected or disconnected properly.
-



## 9.2 Connections

Use the following connections for the corresponding tests.

### Continuity Test – Test Lead Null



### Continuity Test – Continuity Measurement



### Insulation Resistance Measurement – $R_{ISO}$ (Point to Point)



### $R_{PE}$ Voltage Measurement



**PV Panel / String Insulation Resistance ( $R_{iso}$ ) Measurement**

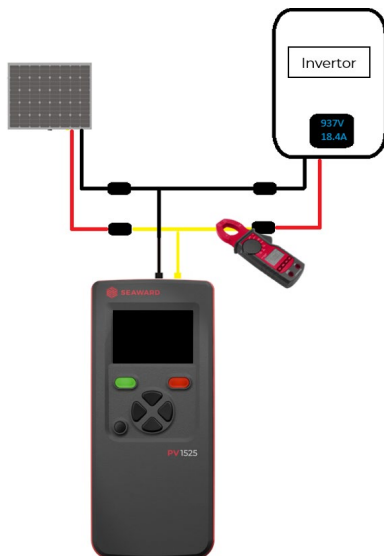
**$I_{sc}$  /  $V_{oc}$  Measurement**



**Note**

During automatic sequences where  $I_{sc}$  measurements are taken along with insulation resistance tests, the red insulation probe may left in place for the entire sequence.

**Power Measurement Using PV:1500 Clamp**



PV:1500 Clamp:





### Note

In order to measure using the PV:1500 Clamp, please ensure the PV:1500 Clamp is paired and connected to the instrument.  
In addition, an optional bypass measurement lead set (Part Number: 601A1201) is required to tap into the connection between inverter and solar module(s).

- Ensure the PV:1500 Clamp rotary switch is placed to AAC/DC position.

## 9.3 Auto Test Sequence Mode

For ease and simplicity of running auto test sequences, these are available to run directly from the home screen of the instrument.






### Note

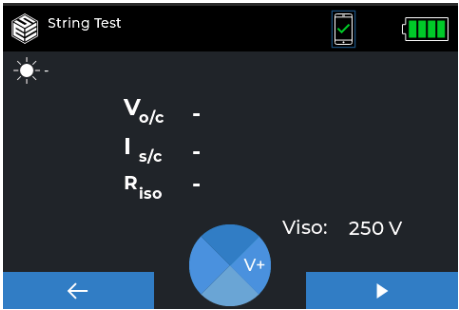
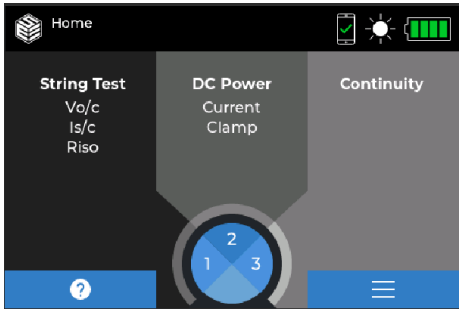
For correct measurements, the SS:200LR Wireless Irradiance Meter needs to be connected as current and voltage are affected by irradiance and temperature.

### Symbols

The following symbols are present during a test sequence:

	Indicates the test sequence is running.
	Indicates that a test, if accompanied by limits, has passed.
	Indicates that a test, if accompanied by limits, has failed or has been aborted by the user by pressing the stop button.

## Selecting and Performing Auto Test Sequences



A typical sequence showing  $V_{o/c}$ ,  $I_{s/c}$  and the insulation resistance measurement.

1. Press the corresponding directional button.
  - ↳ The instrument enters into the test mode for the selected sequences.
2. Press the function button 2 (green illuminated) to start the test sequence.
  - ↳ The measured value will be displayed and the instrument will go on to the next test.
  - ↳ Once the sequence is complete, the results will be displayed on-screen for review.



### Note

String test:

If the instrument measures a current of greater than 25 A, it will NOT perform the insulation resistance ( $R_{iso}$ ) test!

Instead, it will record the open circuit voltage and a value of >25 A for the string test. These values can be saved to memory, but the insulation resistance test ( $R_{iso}$ ) will NOT be recorded.

## Save Test Reference



The test data can be saved to memory and can include the option of adding a reference to the result. To save the result, press the save function key.

There are three information fields in the resulting screen:

- Site location – Area in which testing is being performed, for example town, or name of plant.
- Test reference – Invertor or circuit reference for example.
- String number – or other reference.

Enter the reference data, for example circuit reference, and string number then press the save button once more. Results are now stored to memory and ready to be downloaded to the PV:Sync Mobile app.

The PV:1525 instruments can store a maximum of 1000 records (a record is described as any combination of tests taken as part of a sequence).

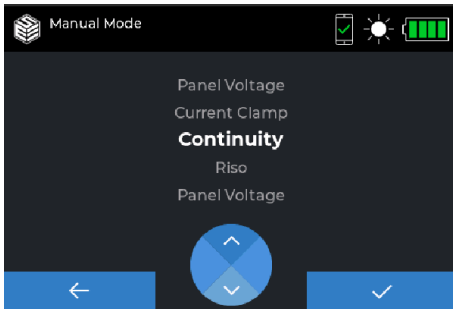
## 9.4 Manual Mode

The instruments can also run all tests in manual mode. This can be useful where diagnostic checks are required. Tests performed in manual mode cannot be stored to memory and thus cannot be downloaded. Manual mode can be accessed from the main menu.

The following tests are available in manual mode:

- Continuity
- Insulation resistance ( $R_{iso}$ ) – point to point
- Panel voltage
- Clamp current – using external current clamp PV:1500

### Selecting and configuring a manual test



1. Press the **Menu** button.  
↳ Main menu opens.
2. Select **Manual Mode**.  
↳ All available test options are displayed.
3. Use the up and down direction arrows to select the required test.
4. Press **Accept** to enter test mode.

The left / right directional arrows will display any available optional parameter changes, such as insulation test voltage, prior to the start of the test.

If connected to a SS:200LR Wireless Irradiance Meter, the irradiance will be constantly displayed in the top left-hand corner of the main test area.

Pressing the back button will return you to the manual test list.

### Performing a manual test

1. Press **Start Test** button.  
↳ Test starts. Animation indicates that the test is in progress.
- ↳ Measured values are displayed on screen and held until further action is taken, i.e. changing tests, or moving away from the screen.

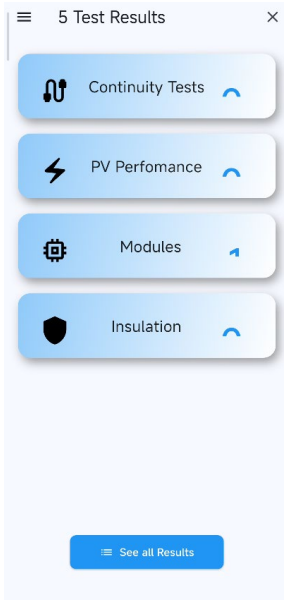
## 9.5 Downloading Test Results

Downloading data from the PV:1525 requires a mobile device and PV:Sync Mobile app. This chapter only gives a brief overview of how to use the PV:Sync Mobile app.



For detailed information regarding the app and how to use the SolarCert PV reporting software, please refer to the PV:1525 manual.

### Transfer to PV:Sync Mobile App



- ✓ Bluetooth® is activated on both devices.
  - ✓ Results are stored in the instrument.
1. Install the PV:Sync Mobile app:  
You can find it in the Google Play Store (app by Seaward Group) or in the Apple App store (app by Seaward Electronics Ltd.)
  2. Start the app.
  3. Scan for devices.
  4. From the list select your PV:1525 instrument (the serial number helps you find it) and click **Connect**.
  5. Follow the Bluetooth® pairing instructions on the screen (the default key is 111111).
  - ↳ App and device are connected.
  6. Press **Sync Data**.
  - ↳ Test results are displayed.

### Further Usage of Downloaded Data With SolarCert PV Reporting Software

With the SolarCert PV reporting software, you can download and manage recorded results and produce easy to read and professional reports.

The software can be downloaded here:

<https://www.seaward.com/gb/products/solar/software-and-apps/389a950-solarcert-pv-reporting-software/>

# 10. SERVICE AND CONTACT

## GERMANY:

### GMC-I Service GmbH

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90471 Nürnberg  
Deutschland



+49 911 817718-0



service@gossenmetrawatt.com

For information on service or calibration visit:

[gmci-service.com/en](https://gmci-service.com/en)

## REST OF WORLD:

### Calibrationhouse (UK)

11 Bracken Hill,  
South West Industrial Estate  
Peterlee, County Durham  
SR8 2LS



+44 (0) 191 587 8737



service@calibrationhouse.com

For information on service or calibration visit:

[calibrationhouse.com](https://calibrationhouse.com)

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# 11. CERTIFICATIONS

## 11.1 CE Declaration

The instrument fulfills all requirements of applicable EU directives and national regulations. We confirm this with the CE marking.

A printed version of the CE declaration is included in the scope of delivery.

## 11.2 UKCA marking

The instrument fulfills all requirements of applicable UK requirements. We confirm this with the UKCA marking.

A printed version of the UKCA declaration is included in the scope of delivery.

## 11.3 Calibration Statement and Certificate

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 certificate provided 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.

Please contact us for calibration services, see "10. Service and Contact" on page 31.



## 12. 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.

- Observe the information in this section.

### 12.1 Disposal of Old Devices, Batteries and Rechargeable Batteries

Old devices and (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 depicting a crossed-out garbage can on wheels refers to the legal obligation of the owner or end-user not to dispose of old devices and batteries or rechargeable batteries with unsorted municipal waste ("household trash"). The (rechargeable) batteries must be removed from the old instrument (where possible) without destroying them and the old instrument and the (rechargeable) batteries must be disposed of separately. The type and chemical composition of the (rechargeable) battery are indicated on the battery's labelling. If the abbreviations "Pb" for lead, "Cd" for cadmium or "Hg" for mercury are included, the (rechargeable) battery exceeds the limit value for the respective metal.

You are obliged to comply with respective local requirements and implement them correctly on site. Further information can be obtained, for example, from the responsible authorities or the local distributor.

Please also 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.

### 12.2 Disposal of Packaging Materials

Packaging and its parts must be correctly disposed of separately from unsorted municipal waste ("household trash").

You are obliged to comply with respective local requirements and implement them correctly on site. Further information can be obtained, for example, from the responsible authorities or the local distributor.

We recommend retaining the original packaging materials in case 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.

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## 12.3 Regulations for the Federal Republic of Germany

The following comments refer specifically to the legal situation in the Federal Republic of Germany.

### **Old devices, electrical or electronic accessories and batteries or rechargeable batteries**

Old devices, electrical or electronic accessories, batteries and 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. Batteries and rechargeable batteries must be returned in the discharged state or with appropriate precautions against short circuiting. Further information regarding returns can be found on our website.

### **Packaging Materials**

Packaging which is not subject to so-called system participation is returned to the appointed service provider. Further information regarding returns can be found on our website.





# SEAWARD

GMC-INSTRUMENTS GROUP

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