

Void Scanner Wi-Fi box

user manual



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1 Customer information

1.1 Dear customer

The Void Scanner Wi-Fi box is designed to be easy to operate. However, we would ask you to take the time to read these operating instructions carefully before using the system, and to keep the manual with the equipment at all times.

For any feedback or comments, or if there are questions about the Void Scanner system which are beyond the scope of this manual, contact the product support department at Carlson, or your local Carlson representative.

Alternatively, for information on your local Carlson-approved service centre, visit our website at www.carlsonsw.com.

To ensure best service, please make a note of the serial number. This can be found on a label inside the WiFi box.

1.2 User manual

It is important that you read this manual carefully before using the instrument.

There are three manuals available with the Void Scanner system:

1. This Void Scanner Wi-Fi box manual;
2. A Void Scanner hardware manual which describes the Void Scanner probe and all accessories supplied with a standard system;
3. A **Cavity Profiler – VS** software and operations manual.

It is essential that you read and understand all of the accompanying Void Scanner manuals before using the system with the Void Scanner Wi-Fi box.

This manual has been compiled with care. However, should you discover any errors, we would be grateful if you could contact Carlson directly.

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The information in this document is subject to change without notice.

2 Introduction

2.1 The Void Scanner



Figure 1 Void Scanner unit

The Void Scanner is a ruggedised field instrument designed to produce fast, efficient 3D laser scans of underground voids where access is limited, dangerous or prohibited. The instrument can be mounted on booms, tripods or user-customised deployment devices. The small, lightweight size of the Void Scanner gives flexibility in the nature of the deployment and means that volumes and dimensions which have previously been guessed or estimated can be accurately quantified.

The Void Scanner's laser employs the 'time of flight' technique to measure ranges to rock faces and other objects without the need to place reflectors on the target. This allows measurements to be taken from a safe distance. Two hundred such measurements are made every second, up to a range of 150 m.

Data from the internal pitch and roll sensors are collected in addition to the scan data. This means that all points collected can be accurately geo-referenced and multiple scans can be stitched together. The output data can then be plotted against design drawings or as-built data to help build an invaluable picture of the project site.

The Void Scanner is controlled remotely from a PC or handheld device running **Cavity Profiler – VS** software which plots the data on-screen in real time. **Cavity Profiler – VS** allows the finished scan to be analysed, edited, transformed, combined with other datasets and exported to third-party software.

The Void Scanner is just one of many laser systems that have been designed by Carlson. Other products such as the C-ALS (Cavity Auto-scanning Laser System), Quarryman and Boretrak have all been proved over many years of demanding use around the world. These products complement the Void Scanner and provide a wide range of advanced measurement solutions within the mining, quarrying and geotechnical industries.

2.2 Void Scanner Wi-Fi box



The Void Scanner Wi-Fi box houses a rechargeable battery and wireless module. It negates the need for a separate battery pack, power cable, PC data cable and interface box.

The Void Scanner Wi-Fi box can be used with the Void Scanner to allow personnel to retreat further from the unsafe or inaccessible area which is being scanned. The Void Scanner may be attached to a boom that is extended into the unsafe area, or placed on an unmanned vehicle that is remotely driven into the unsafe area. For more details on attaching the Void Scanner to deployment devices, see the Void Scanner hardware manual. Scanning operations can then continue without having to route a data cable or power cable to the scan site. The operator can be situated in a safe area over 50 m away, receiving scan data wirelessly on a PC.

The Void Scanner Wi-Fi box connects to the Void Scanner probe via the standard 13.6 m power/data cable, or via the 1.5 m power/data cable supplied with the Void Scanner Wi-Fi box. Connection to the PC is then via wireless data communications so no cables are required between the Void Scanner Wi-Fi box and the PC.

Once the PC connects to the Void Scanner system's Wi-Fi network, the Void Scanner can be controlled from **Cavity Profiler – VS software** in exactly the same way as if it were connected to the probe with a cable.

The Void Scanner Wi-Fi box is compatible with all Void Scanner units from Mk3 onwards.

3 Hardware components

This section outlines the various hardware components that are included with the Void Scanner Wi-Fi box Mk4 system.

Details of the operation and care of the system are detailed in subsequent sections.

3.1 Void Scanner Wi-Fi box

The Void Scanner Wi-Fi box is housed in a ruggedised Peli case enclosure.

When the lid of the Peli case is closed, the Void Scanner Wi-Fi box is resistant to water and dust.

With the lid open, the internal panel is visible and the environmental protection IP rating is invalid.

The internal panel incorporates product markings, a 4-pin connector for the battery charger and two fuse holders.



Figure 2 Void Scanner Wi-Fi box internal panel

Written information on the internal panel includes details of the internal battery and power requirements.

The serial number is also printed on the internal panel. Please refer to this serial number when contacting your local Carlson service centre.

There are two fuse holders on the internal panel:

- 'Fuse (Int)' for the internal battery circuit, and
- 'Fuse (Ext)' for the external battery circuit.

The battery is charged through the black, 4-pin female connector labelled 'Battery charger'.

See section 5, for details of the internal and external power requirements, internal battery charging and fuses.

A green 'Output power' light illuminates when the Void Scanner Wi-Fi box is powered up and able to output power to the Void Scanner probe.

During most field operations, the lid of the Peli case should remain closed. This is recommended to ensure the highest level of environmental protection.

The side panel of the Void Scanner Wi-Fi box houses connectors for external power and the Void Scanner probe itself, as well as ON/OFF power buttons.



Figure 3 Wi-Fi box side panel

The yellow, power/data Void Scanner cable runs from the Void Scanner probe to the green, 4-pin female connector on the side panel labelled 'Probe In'. The locking mechanism for this connector is different from the 'Battery Charger' connector on the inside panel, so the battery charger and the main Void Scanner cable cannot be connected to the wrong connectors.

A cable running to a Carlson external lithium-ion battery can be connected to the green, 2-pin male connector labelled 'Battery In' on the side panel.

The two red power buttons on the side panel toggle the Void Scanner Wi-Fi box ON and OFF. One button controls power from the internal battery, the other controls power from an external battery.

See section 5, for further details on supplying power to the Void Scanner Wi-Fi box.

3.2 Battery charger

A battery charger is supplied with the Void Scanner Wi-Fi box to charge the internal lithium-ion battery.

Connect the battery charger to the 4-pin connector on the inside panel labelled 'Battery Charger'. Plug the battery charger itself into a mains power supply. The battery charger is supplied with a selection of plug types to fit mains sockets around the world.



Figure 5 Battery charger



Figure 4 Battery charger plugged into the Void Scanner Wi-Fi box

The battery charger only charges the internal battery if the 'Int. Power Source' power button on the side panel is toggled OFF.

The battery charger can also be used to charge an external battery. In this case connect the battery charger directly to the connector on the external battery.

An LED on the battery charger shows the status of the charging process:

- Green flashing light: charging is in progress.
- Solid green light: charging is complete.
- Red flashing light: there is a fault with the battery charger. Contact your local Carlson service centre for advice.
- No light: there is no power to the battery charger or no connection with the battery.

A fully discharged battery requires around three hours to completely recharge from the mains supply.



WARNING: Only use the supplied battery charger to charge the internal or the external battery.

The battery charger is not intended for outdoor use.

3.3 Power/data cable

The basic Void Scanner system is supplied with a 13.6 m power/data cable to connect the Void Scanner probe to the interface box, and from there to the power source and the PC.

This 13.6 m power/data cable can also be used to connect the Void Scanner probe to the Wi-Fi box, bypassing the interface box, extra cables and external power source.

Alternatively, a shorter, 1.5 m power/data cable is supplied with the Void Scanner Wi-Fi box. This shorter cable can take the place of the 13.6 m power/data cable where the Void Scanner Wi-Fi box and probe are mounted close together: for example, if the probe is on a remotely operated vehicle or on the end of a boom.

When the battery pack is used to operate the Void Scanner, the interface box is not required.



Figure 6 The shorter, 1.5 m power/data cable

The 6-pin 'L'-shaped connector attaches to the Void Scanner probe. The 4-pin connector attaches to the 'Probe In' connector on the side panel of the Void Scanner Wi-Fi box.



Figure 7 Wi-Fi box connected to Void Scanner

3.4 External lithium ion battery (optional accessory)

The Void Scanner Wi-Fi box contains an internal lithium-ion battery. This can be supplemented with a Carlson-supplied external lithium-ion battery which has the same power specifications as the internal battery. This may be required on a particularly long job, or where there is no access to a mains power supply to charge the internal battery.

A dedicated cable is required to connect the external battery to the Void Scanner Wi-Fi box.



Figure 8 External lithium-ion battery and external battery cable

The cable's 2-pin female connector attaches to the connector labelled 'Battery In' on the side panel. The black, 4-pin connector attaches to the external battery.

External lithium-ion batteries can be purchased as optional accessories. Contact your local Carlson service centre for details.



Figure 9 Lithium-ion battery connected to the Void Scanner Wi-Fi box

4 Hardware care and maintenance

4.1 Operation

During operations, where possible keep the lid of the Void Scanner Wi-Fi box closed. This will ensure maximum environment protection while on-site.

Operate the Void Scanner Wi-Fi box within the environment specifications outlined in section 4.5.

Avoid mechanical shock to the system.

The Void Scanner Wi-Fi box is only designed for use with Void Scanner probes from model Mk3 onwards. Mk1 and Mk2 Void Scanners must not be operated with the Void Scanner Wi-Fi box due to their different power demands.



WARNING: Only use the supplied battery charger to charge the internal or the external battery.

DANGER: Failure to use the supplied battery charger may decrease battery life or cause a risk of battery explosion.

4.2 Cleaning

To clean the Void Scanner Wi-Fi box internal panel and side panel, wipe them with a dry lint-free cloth.

If deeper cleaning of the panels is required, this should be done with a dampened, non-abrasive cloth.

Do not use IPA or solvent-based cleaners on the internal panel as this can lead to superficial damage.

If necessary, use a mild detergent to clean the outer structure of the Void Scanner Wi-Fi box.

4.3 Maintenance

A regular visual inspection of the Void Scanner Wi-Fi box is recommended. If evidence of any damage beyond normal wear and tear is found, or if the connectors, fuse holders, power buttons or any accessories seem damaged, please contact your local Carlson service centre for assistance.



WARNING: There are no user-serviceable parts inside the unit. Do not remove the internal panel. Opening the unit whilst it is operational could result in a malfunction. Do not attempt to service parts inside the unit. The battery cannot be changed by the user and must be replaced by a Carlson approved service engineer. If servicing is required, please contact your local Carlson service centre.
DANGER: Failure to use the supplied battery charger may decrease battery life or cause a risk of battery explosion.

DANGER: Short circuit of the battery terminals may be hazardous.

4.4 Storage and transportation

Dry the system thoroughly before storing.

Storage at up to 50 °C is permissible for up to one month, provided there is low humidity, no condensation and no corrosive atmosphere. For long-term storage it is recommended that a maximum temperature limit of 35 °C is observed. Store with the battery charged at 50% for optimum battery life. Do not store in a discharged condition.

Store the Void Scanner Wi-Fi box within the environment specifications outlined in section 4.5.

Although the Void Scanner Wi-Fi box is a ruggedised unit, it should not be transported without being packaged in a separate transit case or suitable protective packaging.

Do not allow the equipment to slide around inside transport vehicles or containers.

4.5 Environmental conditions

The Void Scanner Wi-Fi box and optional, external lithium ion battery:

- meet IP65 of EN 60529:1992+A1:2002 with the lid closed and connector caps fitted
- can be stored from $-20\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ (see section 4.4 for further details)
- can be operated from $-10\text{ }^{\circ}\text{C}$ to $+45\text{ }^{\circ}\text{C}$
- can be used when stationary at altitudes up to 2,000 m.

CAUTION: This product must not be used in environmental conditions beyond those specified.

5 Power management

The Void Scanner Wi-Fi box can be powered from the internal lithium-ion battery or from an optional external lithium-ion battery.

Power can also be 'hot swapped' between internal and external batteries to ensure that scanning operations can continue while the power source is changed.

5.1 Internal power

The Void Scanner Wi-Fi box contains a rechargeable lithium-ion battery which can provide up to 6.2 Ah at a nominal voltage of 14.4 Vdc. This equates to approximately six hours of scanning time.

When the internal battery drops beneath 10.8 Vdc, the Void Scanner Wi-Fi box shuts down.

Battery life is extended by keeping a partial charge on it when in frequent use. The battery can be damaged by deep discharge and is fitted with protection to avoid this occurring. When the battery has run out of charge, use the supplied battery charger to recharge it.

To power the Void Scanner Wi-Fi box from the internal battery, depress the red 'Int. Power Source' power button on the side panel. This turns the Void Scanner Wi-Fi box ON. The power button illuminates when it is pressed, providing the internal battery is sufficiently charged.

The power button changes from constant illumination to flashing when the battery voltage drops below 13.6 Vdc.

Press the 'Int. Power Source' button again to toggle the power OFF.

The Void Scanner Wi-Fi box shuts down automatically when the internal battery voltage drops below 10.8 Vdc. However, if a scan is in progress and the voltage drops below 11.2 Vdc, the Cavity Profiler – VS software carries out a controlled termination of the ongoing scan. In this case, the Cavity Profiler – VS project is automatically saved, along with the terminated scan. See the Cavity Profiler – VS software and operations manual for details.

One of the fuses held on the internal panel is dedicated to the internal battery circuit. The fuse holder is labelled 'Fuse (Int)'. The fuse holder carries a 3.15 A time-delay fuse: T3.15 AH 250 V.

To recharge the internal battery, connect the supplied battery charger. The battery charger supplied with the unit is designed to meet the specific charging requirements of the lithium-ion battery. The battery charger operates at 2 A and takes around three hours to fully charge the battery.

The internal battery will not power the Void Scanner Wi-Fi box when it is being recharged. If the battery charger is connected to the Void Scanner Wi-Fi box, it charges the internal battery until the 'Int. Power Source' button is depressed. At this point, if there is enough charge in the internal battery, the power button illuminates; power is delivered to the Void Scanner probe and the charging process is paused.

When the 'Int. Power Source' button is toggled OFF, the battery charging resumes.

It is possible to charge the internal battery while an external power source is being used. See section 5.2.

5.2 External power

To power the Void Scanner Wi-Fi box from an external battery, connect a charged, external battery to the 'Battery In' connector on the side panel. Depress the red 'Ext. Power Source' power button on the side panel. This turns the Void Scanner Wi-Fi box ON. The power button illuminates when it is pressed, providing the external battery is sufficiently charged.



Figure 10 Void Scanner Wi-Fi box running on external power

The power button changes from constant illumination to flashing when the battery voltage drops below 13.6 Vdc.

Press the 'Ext. Power Source' power button again to toggle the power OFF.

The Void Scanner Wi-Fi box shuts down automatically when the external battery voltage drops below 10.8 Vdc. However, if a scan is in progress and the voltage drops below 11.2 Vdc, then Cavity Profiler – VS software carries out a controlled termination of the ongoing scan. In this case the Cavity Profiler – VS project is automatically saved, along with the terminated scan. See the Cavity Profiler – VS software and operations manual for details.

While the Void Scanner Wi-Fi box is being powered from an external source, the internal battery can be left charging. In this case the 'Int. Power Source' power button must be toggled OFF: i.e., not illuminated.

One of the fuses held on the internal panel is dedicated to the external battery circuit. The fuse holder is labelled 'Fuse (Ext)'. The fuse holder carries a 3.15 A time-delay fuse: T3.15 AH 250 V.

5.3 Hot swapping power sources

The Void Scanner Wi-Fi box has two power options: the internal battery and an optional external battery. Either or both power sources can be used to power the system. During scanning operations it is also possible to 'hot swap' between these sources so that one battery can be on charge while the other is in use. Alternatively, both power sources can be left powered ON to ensure the maximum scanning time is available.

5.3.1 Example 1

For example, if a scan is in progress and the internal battery voltage is low, the power source can be swapped to an external source to ensure that the scan is not interrupted by a power failure.

This can be done while the scan is ongoing and powered from the internal battery. Connect a charged, external battery to the Void Scanner Wi-Fi box and depress the 'Ext. Power Source' battery power button, ensuring that it is illuminated. Power is now drawn from the external power source, assuming that it has a higher voltage than the internal battery.

Once the external battery is powering the unit, two options are available:

1. The 'Int. Power Source' power button can be left ON if required to ensure that both power sources are available. Once the two power sources have balanced, power is drawn from both batteries.
2. Alternatively, the 'Int. Power Source' power button can be toggled OFF. At this point, the internal battery can be charged, if required.

5.3.2 Example 2

Similarly, if a scan is in progress and an external power source is in use, the power source can be switched back to the internal battery. Depress the 'Int. Power Source' power button, ensuring that it is illuminated. In this case, the 'Ext. Power Source' power button can either:

- be left powered ON, or
- be toggled OFF, and the external power cable disconnected from the Void Scanner Wi-Fi box.

6 Data communication

Data from the Void Scanner probe is transmitted by cable to the Void Scanner Wi-Fi box. The data is then sent via Wi-Fi signal to the PC running Cavity Profiler – VS software. Commands from the software to the probe travel in the opposite direction.

The Wi-Fi signal is broadcast over a standard Wi-Fi frequency of 2.4 GHz. The system uses the IEEE 802.11 b/g/n wireless standard.

The PC in use should have a suitable, integrated Wi-Fi card or external Wi-Fi dongle using the 802.11 wireless standard. See section 7, for details of connecting your PC to the Void Scanner Wi-Fi box.

The Void Scanner Wi-Fi box can transmit a wireless signal over a distance of over 50 m as long as there is a clear line-of-sight between the Void Scanner Wi-Fi box and the PC.

There are a number of external environmental factors that can have the effect of reducing the maximum achievable range, or preventing connection between the two devices. The most obvious is the presence of solid objects in the path of the Wi-Fi signal, for example walls, rock masses or machinery.

Where possible, ensure that there is a clear view between the Void Scanner Wi-Fi box and the PC.

6.1 Data channels

It is also possible that the Void Scanner Wi-Fi link could be affected by other Wi-Fi networks operating on 2.4 GHz. Although 802.11 devices tend to work cooperatively, sharing channel capacity, interference is possible in certain circumstances.

There are 14 channels available on a 2.4 GHz network. These are as follows:

| Channel | Frequency (GHz) |
|---------|-----------------|
| 1 | 2.412 |
| 2 | 2.417 |
| 3 | 2.422 |
| 4 | 2.427 |
| 5 | 2.432 |
| 6 | 2.437 |
| 7 | 2.442 |
| 8 | 2.447 |
| 9 | 2.452 |
| 10 | 2.457 |
| 11 | 2.462 |
| 12 | 2.467 |
| 13 | 2.472 |
| 14 | 2.484 |

By default, the Void Scanner Wi-Fi box is set to 'AutoSelect' a channel. Occasionally, if you suspect interference from another Wi-Fi network in the vicinity, you may consider it necessary to manually change to a specific channel.

In this case, it is recommended that the new channel should be at least five channels away from any neighbouring network. For this reason, by general convention, channels 1, 6 and 11 are recommended for 2.4 GHz operations.

Note: Before changing the channel you should be aware of any local legislation regarding restrictions on the use of certain Wi-Fi channels. Some countries forbid the use of some channels or restrict these channels to a specified power level.

To change the channel that the Void Scanner Wi-Fi box is operating over, use the web browser on your PC to connect directly to the Wi-Fi adapter inside the Void Scanner Wi-Fi box.

Note: it is strongly recommended that you only change settings in the browser interface if absolutely necessary. Do not reconfigure any settings other than those specifically mentioned below.

Ensure that the PC is connected to the Void Scanner Wi-Fi box, as per section 7.4.

Open a web browser. In the address bar, enter:

10.10.100.254

The browser connects to the Wi-Fi module. A Windows Security window appears and requests a user name and password.

Enter username:

admin

Enter password:

carlso



Figure 11 Wi-Fi module web browser interface - Login screen

Click OK to progress to the web browser interface.

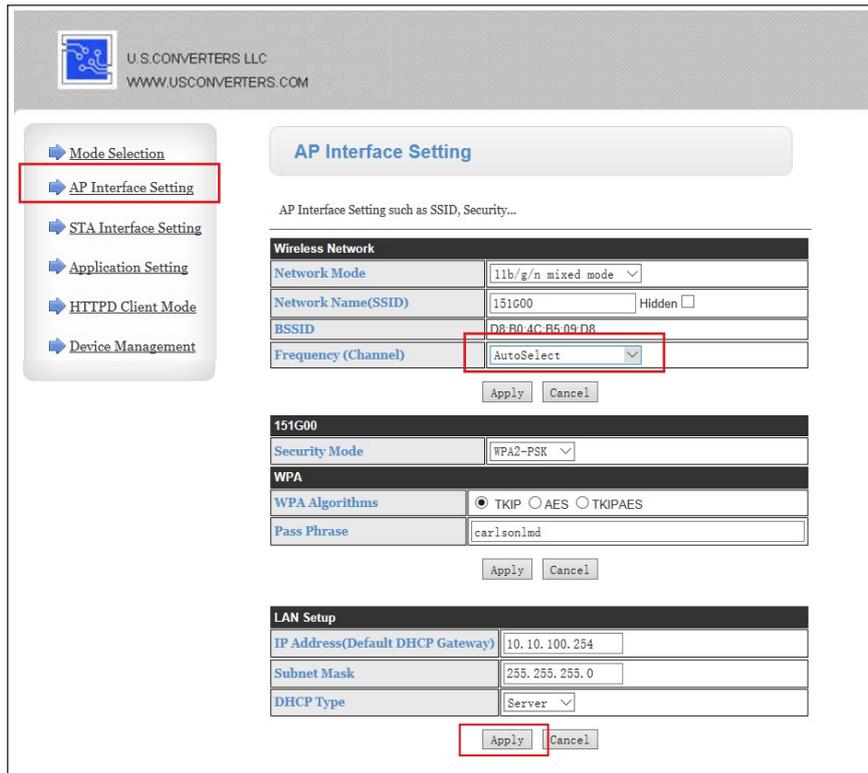


Figure 12 Wi-Fi module web browser - AP Interface Setting screen

From the left-hand menu, select AP Interface Setting.

From the Frequency (Channel) drop down list, select the required Wi-Fi channel. Click Apply to confirm the channel selection.

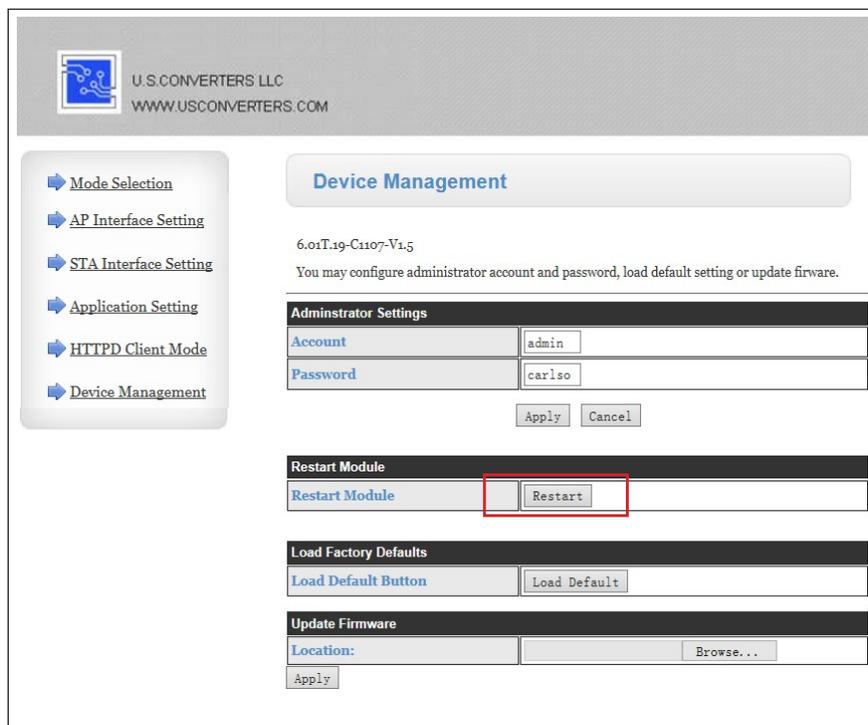


Figure 13 Wi-Fi module web browser interface – Device Management screen

After making any changes, you are redirected to the **Device Management** screen. From the **Restart Module** frame, click **Restart** to reboot the system.

Close down your web browser to end the process. You may need to reconnect your PC to the Void Scanner Wi-Fi box to continue using the system.

Be aware that, although interference from other Wi-Fi networks is a possibility, RF (radio frequency) interference can be generated by almost any device that emits an electromagnetic signal – from microwave ovens to Bluetooth® headsets. Such interference can be highly variable and intermittent. The closer the source of interference to the Void Scanner Wi-Fi box or the PC, the greater the level of interference. It may be the case that the only way of overcoming this problem is to identify and remove the source of the interference.

6.2 IP address

By default, the IP address of the Wi-Fi box is 10.10.100.254. It is strongly recommended that this address is left unchanged.

However, there may be a specific need to change the IP address, for example in order to avoid clashing with an adjacent network or perhaps to fit into a pre-existing, on-site network.

In this case, the IP address can be changed using the same web browser interface described in section 6.1. Follow the procedure described in that section to access the web browser interface and select the **AP Interface Setting** page as shown in Figure 12.

Use the options in the **LAN Setup** section to enter your new network settings as required.

Note: It is your responsibility to maintain a record of any changed network settings. If you fail to do this, you may find it impossible to reconnect to the Void Scanner Wi-Fi box. You must also inform Carlson of any IP address change when service or support is required.

The changed IP address will need to be entered into Cavity Profiler – VS software to enable it to connect. See section 7.5.

7 Using the Void Scanner Wi-Fi box

7.1 First-time use – Power

For protection during shipping, the Void Scanner Wi-Fi box is shipped with the fuse cartridges removed. Open the lid of the unit and find the fuse cartridges taped to the lid.

Remove the black fuse holder caps from the internal panel by rotating them anticlockwise to the unlocked position.

Press each fuse cartridge into a fuse holder cap and screw the fuse holder cap back into the internal panel by rotating it clockwise.

The battery may have lost some charge during transportation. To fully charge the battery, connect the battery charger to the connector on the top panel labelled 'Battery Charger'. Ensure both power buttons on the side panel are toggled OFF.

Plug the battery charger into a mains power supply. The LED indicator flashes green to indicate that the internal battery is charging. When the battery charge is complete, the LED shows as solid green.

The unit can now be switched on. Depress the 'Int. Power Source' power button so that it is illuminated.

7.2 First-time use – PC compatibility

Carlson is able to supply a ruggedised field PC which is optimised for use with the Void Scanner and Void Scanner Wi-Fi box. It is highly recommended that such a PC is used to control the Void Scanner system.

However, you may opt to use your own PC hardware. In this case Carlson cannot guarantee a reliable connection between the Wi-Fi box and your PC. This will depend on the particular combination of PC hardware, Wi-Fi and software configuration you are using.

For further advice on PC compatibility, please contact your nearest Carlson service centre.

7.3 First-time use – PC set-up

The first time that the Void Scanner Wi-Fi box is used with a new PC, first check that the PC is set up correctly.

In Windows, go to **Control Panel** and select **Network and Sharing Centre** (or select **Network and Internet**, then **Network and Sharing Centre**). Select **Change adapter settings**.

Right-click on your Wi-Fi adapter and select **Properties** from the context menu.

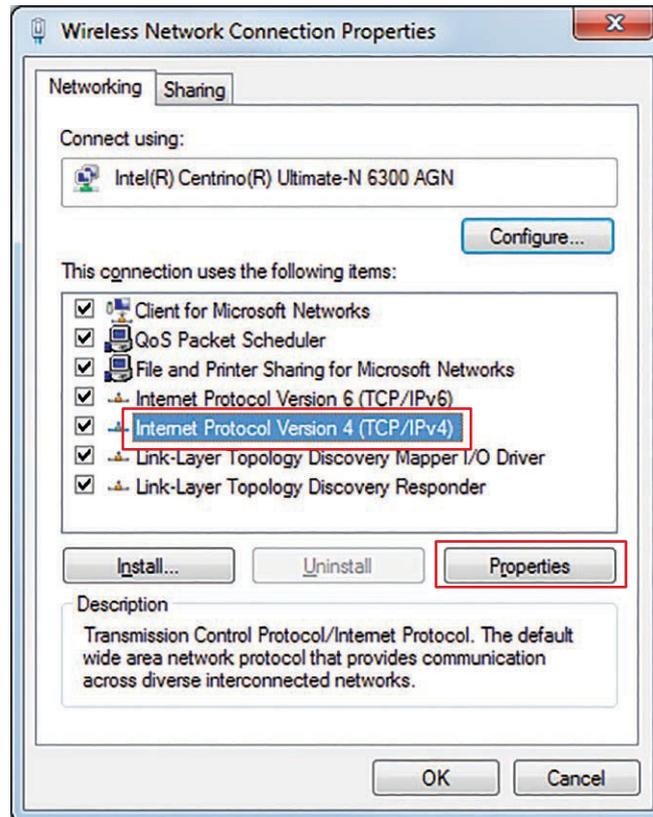


Figure 14 Wireless network connection properties window

In the **Wireless Network Connection Properties** window, select **Internet Protocol Version 4 (TCP/IPv4)**. Click the **Properties** button.

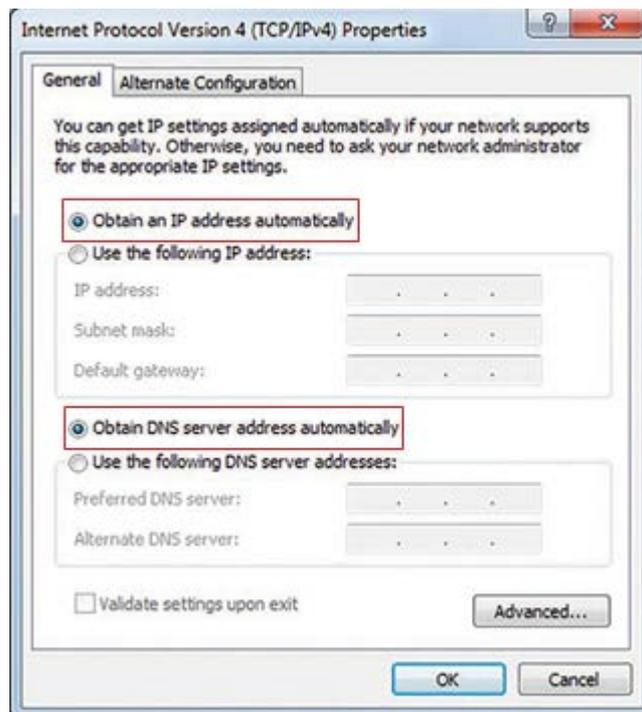


Figure 15 Internet Protocol Version 4 (TCP/IPv4) Properties window

In the **Internet Protocol Version 4 (TCP/IPv4) Properties** window, select **Obtain an IP address automatically** and **Obtain DNS server address automatically**.

Ensure the PC's Wi-Fi adapter is physically switched on, if required, and that it is not disabled in the **Change adapter settings** window.

7.4 Connection with PC

Switch on the Void Scanner Wi-Fi box so that one of the power buttons is illuminated.

On the PC, in the task bar, click on the Wi-Fi icon to see the available Wi-Fi networks. The Void Scanner Wi-Fi box is identified by its serial number. In the case below, the Wi-Fi network is named 'WSU12345678'.



Figure 16 Wi-Fi network connections

Click on the appropriate network and allow the PC to connect with the Void Scanner Wi-Fi box.



Figure 17 Connect to a Network window

A **Connect to a Network** window appears and requests a security key. Enter the security key:

carlsonlmd

Click **OK** to complete the connection to the Void Scanner Wi-Fi box. You can now run Cavity Profiler – VS.

7.5 Cavity Profiler – VS

A full description of Cavity Profiler – VS software is included in the Void Scanner software and operations manual which accompanies the Void Scanner system. This section is concerned only with connecting Cavity Profiler – VS to the Void Scanner Wi-Fi box.

Once the Void Scanner Wi-Fi box is connected to the PC (as in section 7.4), start Cavity Profiler – VS software as normal. From the **New Project** screen, click **Accept** to connect to the Void Scanner.

The **Connection** window appears as below.



Figure 18 Connection window

Note that, depending on how the software has been used before, Cavity Profiler – VS may initially attempt to connect to the Void Scanner automatically. In this case, an on-screen busy spinner appears, indicating that the software is working.

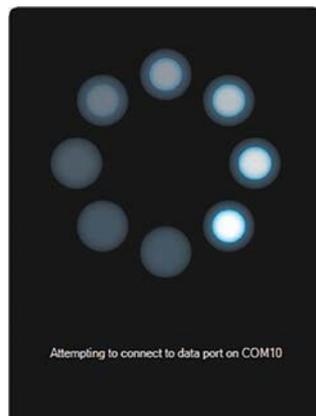


Figure 19 'Busy spinner'

If the software has already been set up, then a successful connection will be made and Cavity Profiler – VS progresses into the **Scanning Mode** screen. However, if the software fails to connect, then the Connection window eventually appears as in Figure 18.

To connect to Cavity Profiler – VS with a Void Scanner Wi-Fi box Mk4, tick the **Using Renishaw Wi-Fi box Mk4 (IP connection)** check box.

The IP address text entry box contains the default IP address: **10.10.100.254**.

There should be no reason to change this IP address. However, if the IP address of the Void Scanner Wi-Fi box has been altered (see section 6.2, for details), then the new IP address must be entered here.

If you are happy with the configuration of options in the **Connection** window and if you intend to connect with the Void Scanner Wi-Fi box for all future operations, then tick the **Auto connect** check box. This will ensure that Cavity Profiler – VS always attempts to connect automatically in the future, using the entered settings.

If you intend to regularly use different methods of connection, leave the Auto connect check box unticked. You can then manually select the appropriate settings for each operation and click **Connect**.

Note that if you try to connect with a previous variant of Void Scanner Wi-Fi box, or with a cabled connection, then you should untick the **Using Renishaw Wi-Fi box Mk4 (IP connection)** check box. You will also need to select the correct COM port from the **COM port** drop-down list.

If the **Connection** window reappears without a connection to the Void Scanner being established, make sure that the Void Scanner is powered up and check all connections and Wi-Fi links. Click the **Connect** button to let the software attempt to find the connection again.

If the connection is successful, Cavity Profiler – VS connects and progresses into the **Scanning Mode** screen.

7.6 On-site use



Figure 20 Void Scanner deployed on a boom

To ensure maximum environmental protection, keep the lid of the Void Scanner Wi-Fi box closed during on-site operations. Unless the unit needs to be recharged, there is no reason to open the lid.

For most operations, the Void Scanner Wi-Fi box is located on the floor next to the Void Scanner probe and connected with the 1.5 m cable. If the Void Scanner is mounted on a boom, typically the 13.6 m data cable is used and the Wi-Fi box remains located on the floor near to the end of the boom.

You may find it appropriate to design your own boom fixtures or other mounting brackets for the Wi-Fi box. However,

be aware that there is no design intent or authority from Carlson to do so.

Connect the 6-pin 'L'-shaped connector on the 13.6 m or 1.5 m power/data cable to the Void Scanner probe. Mount the Void Scanner probe as required. Connect the other end of the power/data cable – the 4-pin connector – to the 'Probe In' connector on the Void Scanner Wi-Fi box side panel.

Depress the 'Int. Power Source' power button on the side panel. If the internal battery has sufficient charge, the power button illuminates and the Void Scanner Wi-Fi box is powered ON. Power is supplied from the Void Scanner Wi-Fi box to the Void Scanner probe.

When the Void Scanner Wi-Fi box is powered ON, the probe head rotates vertically and horizontally as the encoders are initialised.

Run Cavity Profiler – VS software to begin scanning operations.

Note: Due to the nature of Wi-Fi communications, scans carried out using the Void Scanner Wi-Fi box may take marginally longer than those carried out with a cable connection to the probe.

In addition, due to the nature of the data collection process and scanning sequence in the Void Scanner, for optimum performance it is recommended that you carry out horizontal scans rather than vertical scans when using the Void Scanner Wi-Fi box.

After use, turn off the Void Scanner Wi-Fi box by toggling the illuminated power button OFF.

Disconnect the Void Scanner power/data cable and dismount the Void Scanner probe.

Pack the equipment away in preparation for transport from the project site.

After returning to base, charge up the internal battery ready for the next use.

8 Troubleshooting guide

The following list provides a guide to basic faults or problems which may occur during day-to-day operation of the Void Scanner Wi-Fi box, along with their possible causes and a recommended course of action to take.

It is strongly advised that, should any fault occur which is not listed, or if the recommended action does not rectify the fault, you should contact your local Carlson service centre.

| The 'Int. Power Source' button does not illuminate when pressed | | |
|---|---|---|
| Cause | Remedy | Reference in manual |
| The internal battery is not charged. | Plug the unit into the charger and the charger into the mains. Use the LED indicator on the charger to determine the status of the battery. | Section 3.2 Battery charger and section 5 Power management' |
| The fuse for the internal battery circuit has blown. | Check the fuse cartridge in the fuse holder on the internal panel labelled 'Fuse (Int.)'. If necessary, replace the fuse cartridge. | Section 5 Power management |

| The 'Ext. Power Source' button does not illuminate when pressed | | |
|---|---|--|
| Cause | Remedy | Reference in manual |
| The external battery is not charged. | Plug the external battery into the charger and the charger into the mains. Use the LED indicator on the charger to determine the status of the battery. | Section 3.2 Battery charger and section 5 Power management |
| The fuse for the external battery circuit has blown. | Check the fuse cartridge in the fuse holder on the internal panel labelled 'Fuse (Ext.)'. If necessary, replace the fuse cartridge. | Section 5 Power management |

| The fuse needs replacing frequently | | |
|--|--|---|
| Cause | Remedy | Reference in manual |
| Inappropriate charging method | Use only the charger supplied with the unit. | Section 3.2 Battery charger |
| Using an inappropriate version of Void Scanner probe | Do not use the unit with a Void Scanner Mk1 or Mk2. These units have different power consumption requirements from Void Scanner Mk3 onwards. | Section 4 Hardware care and maintenance |
| Electrical fault in the unit or in the probe | Contact your local Carlson service centre. | Section 1.1 Dear customer |

| The Void Scanner does not park when the Void Scanner Wi-Fi box is powered ON | | |
|--|---|---|
| Cause | Remedy | Reference in manual |
| The unit is not powered ON. | Ensure that one of the power buttons is depressed and illuminated. | Section 5 Power management |
| Power/data cable is damaged or faulty. | Check all pins, connectors and cables for signs of damage. If possible, check the system with another power/data cable. | Section 4 Hardware care and maintenance |
| The Void Scanner is faulty. | Contact your local Carlson service centre. | Section 1.1 Dear customer |

| The Void Scanner will not connect to Cavity Scan - VS software | | |
|---|---|--|
| Cause | Remedy | Reference in manual |
| The PC is not set up correctly. | Check the PC's network settings. | Section 7.3 First-time use - PC set-up |
| The PC is not connected to the correct Wi-Fi signal. | Check that the PC is connected to the Void Scanner Wi-Fi box signal. | Section 7.4 Connection with PC |
| The connection has not been set up correctly in Cavity Profiler - VS. | Tick the Using Renishaw Wi-Fi box Mk4 (IP connection) check box. | Section 7.5 Cavity Profiler - VS |
| The incorrect IP address is being used. | Check the IP address in the Connection window in Cavity Profiler - VS. | Section 7.5 Cavity Profiler - VS |

| Void Scanner parks when the Void Scanner Wi-Fi box is powered ON, but it will not scan | | |
|--|--|--|
| Cause | Remedy | Reference in manual |
| Lack of wireless connection to the PC. | 1. Check that the connection has been established in Cavity Profiler - VS software. | Section 7.3 First-time use - PC set-up |
| | 2. Situate the PC closer to the Void Scanner Wi-Fi box. Remove any solid obstructions between the PC and unit. | Section 6 Data communication |

| The probe stops responding to instructions or stops sending data during a scan | | |
|--|--|------------------------------|
| Cause | Remedy | Reference in manual |
| Weak wireless connection to the PC | 1. Do not move the PC further away from the Void Scanner during a scan. 2. Try situating the PC closer to the unit, or removing any solid obstructions between the PC and the unit. | Section 6 Data communication |
| Interference to Wi-Fi signal | Change Wi-Fi channel or remove RF interference. | Section 6 Data communication |

The battery charger shows a red 'fault' light

| Cause | Remedy | Reference in manual |
|--|--|---------------------------|
| Electrical fault in the unit or in the charger | Contact your local Carlson service centre. | Section 1.1 Dear customer |

9 Technical details

9.1 Specifications

Information contained here is believed to be accurate. However, no responsibility is assumed by Carlson for its use. Technical information is subject to change without notice

| Physical data | |
|-------------------------------|--|
| IP degree of protection * | IP65 (when lid is closed and connector caps are fitted) |
| Operational temperature range | -10 °C to +45 °C |
| Storage temperature range ** | -20 °C to +50 °C for up to one month, thereafter -20 °C to +35 °C |
| Dimensions | 260 mm × 198 mm × 109 mm |
| Weight | 2 kg |
| Power | |
| Internal battery | 14.4 Vdc, 6.8 Ah lithium-ion battery |
| External battery | Optional, Carlson-supplied 14.4 Vdc, 6.8 Ah lithium-ion battery pack |
| Maximum current | 3.15 A |
| Maximum power rating | 45.4 W |
| Fuse | T3.15 AH 250 V cartridge |
| Operations | |
| Connection to Void Scanner | Via power/data cable: supplied 1.5 m cable or standard 13.6 m cable |
| Data connections | Wi-Fi connection to PC RS232 connection to Void Scanner probe |
| Scanning time (typical) *** | Typically 6 hours on internal battery |
| Wi-Fi range | > 50 m line-of-sight |
| Charge time | Approximately 3 hours |
| Charging temperature | +10 °C to +45 °C |
| Compatibility | |
| Void Scanner probe | Mk3 onwards |
| Wi-Fi frequency | 2.412 GHz to 2.484 GHz |
| Wi-Fi standard | 802.11 b/g/n |
| Operating system | Windows versions 7 onwards |
| Software | Cavity Profiler - VS: version 1.3 onwards |

* Environmental compatibility requirements of EN 60529:1992+A1:2002.

** Storage at up to 50 °C permissible within guidelines. Prolonged storage at high temperatures will dramatically shorten life.

*** Under standard Carlson test conditions.

10 Product Information

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Carlson has made considerable efforts to ensure the content of this document is correct at the date of publication but makes no warranties or representations regarding the content. Carlson excludes liability, howsoever arising, for any inaccuracies in the document.

Warranty

Equipment requiring attention under warranty must be returned to your equipment supplier.

Unless otherwise specifically agreed in writing between you and Carlson, if you purchased the equipment from a Carlson company, the warranty provisions contained in Carlson's CONDITIONS OF SALE apply. You should consult these conditions to find out the details of your warranty but, in summary, the main exclusions from the warranty are if the equipment has been:

- neglected, mishandled or inappropriately used, or
- modified or altered in any way except with the prior written agreement of Carlson.

If you purchased the equipment from any other supplier, you should contact them to find out what repairs are covered by their warranty.

Safety

The following symbol is used in this manual wherever important safety information is present:



Before proceeding with any electrical connection or operation of the laser system, refer to the general safety information throughout this manual.

EC declaration of conformity



Carlson declares that the Rodded Boretrak complies with the applicable standards and regulations.

Contact Carlson or visit www.carlsonsw.com for the full EC declaration of conformity.

FCC (USA only)

Information to the user (47CFR section 15.19)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Information to the user (47CFR section 15.21)

The user is cautioned that any changes or modifications not expressly approved by Carlson or authorised representative could void the user's authority to operate the equipment.

Information to the user (47CFR section 15.105)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WEEE directive



The use of this symbol on Carlson products and/or accompanying documentation indicates that the product should not be mixed with general household waste upon disposal. It is the responsibility of the end user to dispose of this product at a designated collection point for waste electrical and electronic equipment (WEEE) to enable reuse or recycling. Correct disposal of this product will help to save valuable resources and prevent potential negative effects on the environment. For more information, please contact your local waste disposal service or Carlson representative.

Battery safety

An internal lithium-ion battery is supplied with the Void Scanner Wi-Fi box. The battery cannot be changed by the user and must be replaced by a Carlson approved service engineer.

Additional Carlson external batteries can be purchased as optional accessories, to which these cautions apply:

- Please dispose of waste batteries in accordance with your local environmental and safety laws.

- Do not store batteries in direct sunlight.
- Do not heat or dispose of batteries in a fire.
- Do not short-circuit or force discharge the batteries.
- Do not disassemble, pierce, deform or apply excessive pressure to the batteries.
- Keep the batteries out of the reach of children.
- Do not get batteries wet.
- If a battery is damaged, exercise caution when handling it.

Battery disposal



The use of this symbol on the batteries, packaging or accompanying documents indicates that used batteries should not be mixed with general household waste. Please dispose of the used batteries at a designated collection point. This will prevent potential negative effects on the environment and human health which could otherwise arise from inappropriate waste handling. Please contact your local authority or waste disposal service concerning the separate collection and disposal of batteries. All lithium and rechargeable batteries must be fully discharged or protected from short circuiting prior to disposal.