CASELLA
A DIVISION OF TSI

USER MANUAL

Vortex3E

High Flow Air Sampling Pump

HB4101-05

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Safety and warnings

The ***Vortex™*** 3E pump does not present a safety risk when you use it as instructed in this User Manual. However, it is possible that the environment where you use the instrument may present a safety risk. For this reason, always follow correct, safe working practices.

CAUTION

The ***Vortex™*** 3E air sampling pumps are designed to be robust, however please use the pump as follows:

- Do not drop the pump or subject it to mechanical shock.
- Avoid letting the pump suck in water, solid materials or highly saturated or corrosive gases as this may cause damage and will invalidate the warranty.
- The ***Vortex™*** 3E pump contains no user serviceable parts. If a fault is suspected, return the pump to Casella or a Casella approved service centre.

CAUTION

If the equipment is likely to come into contact with aggressive substances, take precautions to prevent the instrument from being adversely affected, so that the type of protection is not compromised. (Aggressive substances such as solvents may affect polymeric materials.) Suitable precautions include regular checks as part of routine inspections and establishing from the material's data sheet that the pump is resistant to specific chemicals.

CAUTION

Repair of this equipment shall only be carried out by the manufacturer or an authorised representative in accordance with the applicable code of practice. If the product has to be returned, please clean and decontaminate the pump prior to returning it to us. If the pump is returned to us without cleaning, it will be returned with no work undertaken by Casella.

CAUTION

When Bluetooth® is enabled, care must be taken to avoid interference with sensitive equipment such as in medical, aviation or safety critical environments.

Disposal



WEEE Notice

At the end of the instrument's life please do not throw away with the unsorted municipal waste. Please recycle with a registered WEEE handler.

Disclaimer

Do not use the ***Vortex™*** 3E pump until you have thoroughly read this manual or have been instructed by a Casella engineer.

At the time of writing, this manual was up to date but due to continual improvements the final operating procedures may differ slightly from those in the manual. If there are any questions, please contact Casella for clarification.

Casella makes continual advancements in its products and services. We therefore reserve the right to make changes and improvements to any information contained within this manual.

Whilst every care is taken to ensure that the information in this manual is correct, Casella will assume no responsibility for loss, damage or injury caused by any errors in, or omissions from, the information given.

Introduction

The enhanced ***Vortex™*** 3E pump delivers exceptional flow rate accuracy, extended service life, and intelligent connectivity via the Airwave app. It features a new long-life brushless motor that reduces ownership costs, along with advanced environmental compensation sensors for reliable flow control in asbestos sampling.



Both models with & without remote connectivity, all the running parameters are clearly displayed on the pump's full colour OLED screen.

To provide protection against dust/fibre and water ingress, the pump is IP65 rated, and its smooth finish makes it easier to decontaminate.

The ***Vortex™*** 3E pump has a maximum flow rate of 12 L/min and an impressive back pressure capability, which ensures it operates reliably with a wide range of filter media. Inlet pressure is continually sensed to establish filter loading and aid diagnostics.

On a full battery charge the pump is designed to operate for up to 5 hours @ 12L/min hours before it needs to be re-charged but may also be run from a mains supply.

The following table summarises the features and capabilities of the Vortex3E range of pumps.

	Vortex3E	Vortex3E Pro
Flow range 5-12 L/min	✔	✔
Flow control +/- 5%	✔	✔
Run Duration 10 Hours @ 8 L/min	✔	✔
Ambient pressure sensor	✔	✔
Internal air flow temperature sensor	✔	✔
Battery & mains powered	✔	✔
Bluetooth®		✔
Remote Start/Stop		✔
Battery Gauge		✔
Pressure Indicator		✔

Controls and fittings

The ***Vortex™*** 3E pump has a small number of easy-to-use controls and a unique, patent pending interlocking mechanism that allows multiple units to be carried to site.

Controls and menu structure



Scroll up / increase
Scroll down / decrease

Colour display
View all run parameters and menu items

Start / stop / enter

On / off / cancel

Status indicator
Blue light flashes when pump running normally
Red light flashes when there is a fault or during charging



The up / down arrows, are used to scroll through menu and setting items and to change values.



The On / Off button, which is used to turn the pump on and off, and to return to a previous screen.



The enter key, which is used to enter sub-menu items and to save changed values.



This is one of seven dashboard screens that can cycle after you turn on the pump. The same information is also displayed when the pump is running (see *Operation* on page 12).

When SCREEN SCROLL is set to AUTO:-

The seven screens will automatically scroll to the next screen every few seconds. To temporarily maintain a single screen as the visible screen, press and hold .

When SCREEN SCROLL is set to OFF:-

Press the key to cycle to the next screen.

(see SCREEN SCROLL menu option on page 19)



This is the menu that you use on a regular basis to set the flow and calibrate the pump between sample runs. It also gives you the ability to pre-select a sample volume or perform a timed run (see *Setup before starting a run* on page 13).



The settings can be used to change the functionality of the pump or to access diagnostic information. You will probably access these settings infrequently (see *Settings* on page 18).

Sampling inlet



There is convenient stowage for a sampling head and tubing. Remove the sampling head (if already fitted) from its stowed position and unwind the tubing noting that there is a clip just below the handle and a guide to 'manage' the tube where it connects to the inlet nozzle.

If necessary, connect the tube as shown and extend the integral telescopic mast to the desired height i.e., a maximum of 1.6m (the nominal breathing zone) and clip the tubing and sampling head in place.

Use appropriate sampling media in accordance with the chosen methodology e.g. MDHS or NIOSH and in accordance with the sampling head's own instructions.

The chosen method will also indicate the required flow rate and sampling time/volume required.

Interlocking system

The ***Vortex™*** 3E pump has a unique, patent-pending interlocking mechanism which enables a number of pumps to be connected together making them easier to carry and distribute around a site.

Note: Only carry as many units as you feel comfortable with and if in any doubt, consult local manual handling guidance.



Interlocking grooves



Interlocking lugs

Units connect using the grooves on the front and lugs on the back of the Vortex3E.

With the units vertical, slide the lugs of one unit into the grooves of the adjacent unit. A retractable clip will 'snap' into position when the units are aligned.

To disconnect, lay the units on their side, locate the spring-loaded clip with a thumb or finger and pull it back to disengage while separating one unit from another.

Operation

This section describes how to use the pump to take air samples using the minimum settings. The Vortex3E has many other menu and settings options and these are described in later chapters.

Turn the pump on/off

To turn on the pump:

Press to turn on the pump.

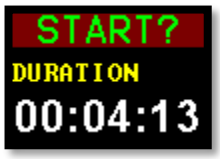
The following sequence is displayed:





This is followed by the seven scrolling dashboard screens showing data from the last run.















To turn off the pump:

Press and hold until the countdown has finished to turn off the pump.







Note: The pump cannot turned off during a sampling run.

Charge the pump battery

Before using the pump, check the battery level icon or battery gauge to ensure there is enough charge for the intended sampling run. A good discipline is to place the pump on a charger at the end of the shift so that it is always fully charged at the start of next shift. Remember, it takes less than 6 hours to fully charge the pump battery.

To check the battery level:

1. Turn on the pump as described.
2. Check the battery level, which will show either a percentage when the pump is not running or number of hours remaining when the pump is running.
3. Turn off the pump.



To charge the pump battery:

1. Ensure that the pump is either off or on and displaying START with the pump NOT running.
2. Connect the supplied mains adaptor to the Vortex3E charging point indicated.
3. A green LED on the mains adaptor indicates it is powered and turns red when charging.
4. The red LED on the top of the pump flashes during the whole of the charging time and the charge state is also displayed for a user defined period.





5. To see the amount of charge at any time press .

   Once fully charged the blue light turns on for 10 minutes, after which time the pump turns off.

Setup before starting a run

Depending on sampling requirements the following setup procedures may need to be performed prior to starting a sampling run.

To access the menu items described below:

Ensure the pump is turned on and then press to display the menu.

Press or to highlight the menu item you want to alter, and then press .

Set the flow rate

1. Navigate to **SET FLOW**, and then press .



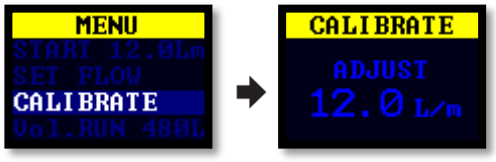
2. Press or to change the flow rate, and then press the enter key.

Calibrate the pump

Always calibrate the pump at the required sampling flow rate for greatest accuracy.

Note: If using a filter with a small pore size or if operating at a high flow rate, which results in a high back pressure, it may take the pump a little longer to stabilise when adjusting the calibrated value.

1. Attach a sampling head or other flow-measuring device to the pump's inlet nozzle. The flowmeter should be connected to the inlet of the sampling head.
2. Navigate to **CALIBRATE**.

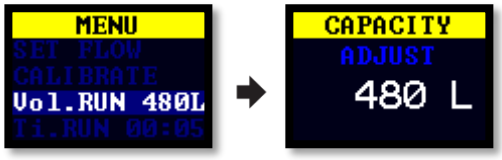


3. Press to start calibration.
4. Press or to change the pump flow until the meter flow rate and the pump flow rate match.
5. Press to stop calibration.

Pre-set the sample volume

Use this menu item to run the pump for a pre-set volume. The maximum volume that can be selected is 10,000 litres.

1. Navigate to **Vol. RUN** and then press .



2. Press or to adjust the sample volume.
3. Press for 3 seconds to start the pre-set volume run or press to return to the menu.

Start/stop a sampling run

Ensure the pump is calibrated and set to the correct flow rate. If you want to start a timed sampling run, see page 16.

To start a sampling run:

1. Turn on the pump.
2. Press 
3. Select : Run or Resume

   (this allows the user to start a new run or resume run in terms of the volumetric counter and run duration time)
4. Press  for 3 seconds.



The following screens should be visible.





To stop a sampling run:

- Press and hold  for 3 seconds.



Pausing/resuming a sampling run

While a sampling run is under way, you can pause the run and then resume or stop the run while paused.

To pause a sampling run:

1. Press during a sampling run this will change the top banner to shown PAUSE?



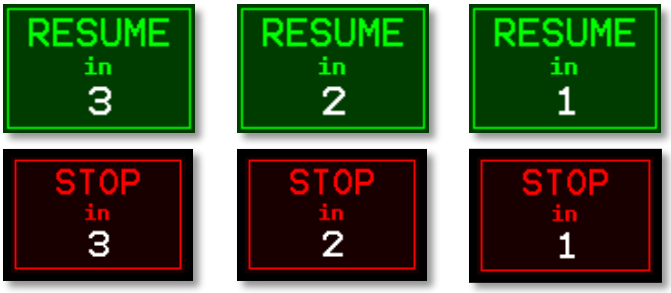
2. Press and hold to start a countdown to pause the run.



3. Press the or buttons to switch between stop and resume options.



4. Press and hold to start the countdown for either resuming or stopping the run.



Lock and unlock the pump

Partial lock



Partial Lock mode is denoted by a half open padlock icon and can be set in **Run** or **Stop** modes. While partially locked, the user may stop and start the sampling pump but has no access to the menu or other functions.

To partially lock and unlock the pump:

- Press and hold , and then press 3 times within quick succession. The partial lock icon will be displayed.

> **Note:** To remove partial lock when the pump is running, perform the partial lock procedure twice, the first time the pump will enter full lock mode the second time the pump will be unlocked.

Full lock



Full lock mode is denoted by a closed padlock icon and can only be set when the pump is running. While in full lock mode, the keypad is fully de-activated, and the user cannot stop or disturb the pump by any key presses.

To fully lock the pump:

- Press and hold , and then press 6 times in quick succession. The full lock icon will be displayed.

To unlock the pump:

- Press and hold , and then press 3 times in quick succession.

Timed run

Using this mode, you can run the pump for a set period, after which the pump will turn off automatically.

To start a timed run for a set period:

1. Navigate to **Ti. RUN 08:00**, and then press .

> **Note:** 08:00 in this example is the previously set time.



2. Press or to set the time in hours and minutes.
3. Press for 3 seconds to start the timed run or press to return to the menu.

Real time flow indication

Real time flow indication is designed to provide an indication only of the live flow rate that the pump is outputting. When backpressure increases, it will illustrate the subtle changes in flow rate before the pump works to stabilise the flow rate to the set point.

Real time flow is activated through the diagnostics menu in the settings as shown on page 19.

Achieve greater confidence in every sample with enhanced flow rate accuracy of better than ±5%. The pump's advanced flow control system combines external pressure sensors, an internal air temperature sensor, and intelligent compensation algorithms to continuously monitor and correct for changing environmental conditions. This innovative technology automatically maintains the set flow rate, even as ambient pressure and temperature fluctuate, delivering more reliable and repeatable sampling results. The result is improved data quality and reduced uncertainty in critical workplace and environmental monitoring applications.

Once activated, press the button to scroll through to the real time flow screen. If the screen is set to auto scroll, it will not stay on this screen, this can be changed through the settings menu (shown on page 19).



Where the standard pump operation mode (without real-time flow enabled) shows the actual flow only when it is outside of +/-5% of the target flow, therefore when inside of the +/-5%, the display will default to showing the target flow. The real time flow will show actual flow regardless of how close to or far from the target flow it is.

Closed loop flow is still active within the real-time flow mode, this ensures that the pump adjusts in performance to maintain the target flow.

Real time flow indication is a feature that enables the user to monitor the minor deviations (only as 0.1L increments) in flow rate based on how the pump reacts to the changing of back pressure over the course of the run.

Without the feature enabled the actual flow will immediately return to the target flow after any backpressure changes so it does not need to be enabled for normal operation, compliance with ISO 13137, or to maintain target flow to within 5%.

This will also display as real time flow within the Airwave app (see page 22 onwards).

Settings

This section describes the settings you may wish, or need, to alter occasionally, and it describes how to access system information you may be asked for by a service technician.

To access the SETTINGS menu:

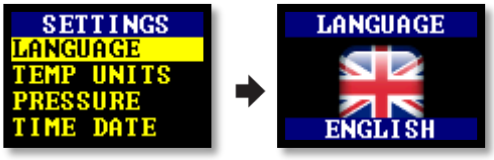
Press   With the Casella screen visible, press & hold for a few seconds  

Press  or  to scroll to any of the following settings.

Press  to enter/save a setting or move between values and press  to go back.

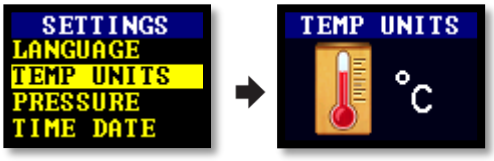
Language

Supported languages include English, Brazilian - Portuguese, Spanish, Italian, German, French and Chinese.



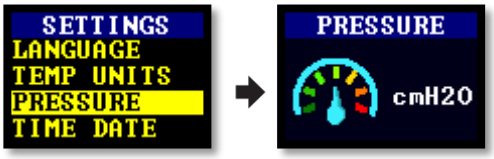
Temperature units

Select Celsius or Fahrenheit.



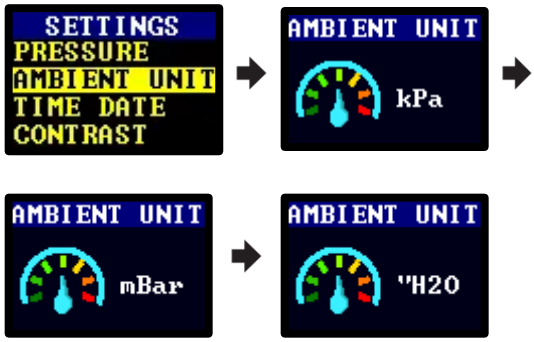
Pressure units

Select cmH2O, kPa, H2O or mBar.



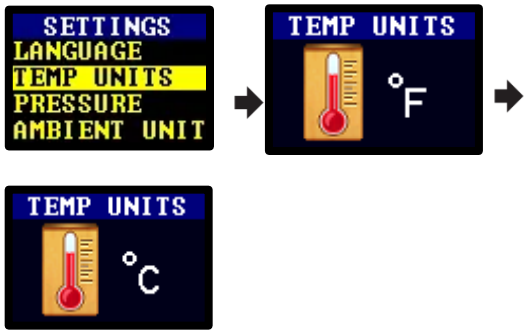
Ambient units

Select the Ambient pressure units to be displayed. Press ↵ to select the required pressure unit.



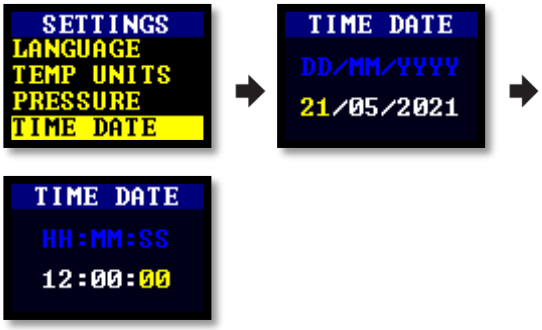
Sample Temperature

Select the inlet air temperature units to be displayed. Press ↵ to select the required temperature unit.



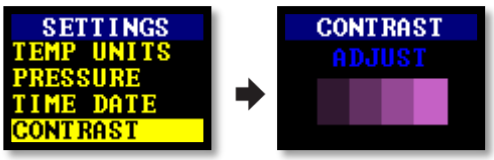
Time and date

Set the date and time. Press ↵ to sequence through the numbers to be set.



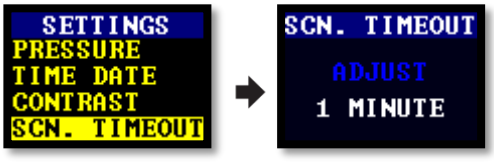
Contrast

You may want to reduce the contrast for operation in low light conditions.



Screen timeout

Use a screen timeout if you want to save power. Once the screen is off, press any key to turn it on again.



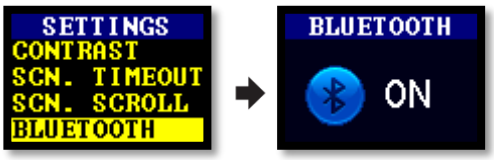
Screen scroll

Allows the screen to scroll between the 7 available screens in START or STOP modes. Select AUTO or OFF



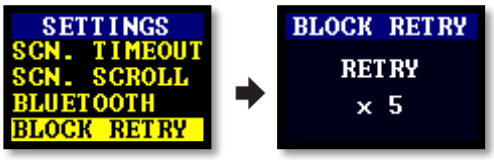
Bluetooth

Enable or disable Bluetooth. You need to enable Bluetooth when using the Airwave app (see page 22).



Block retry

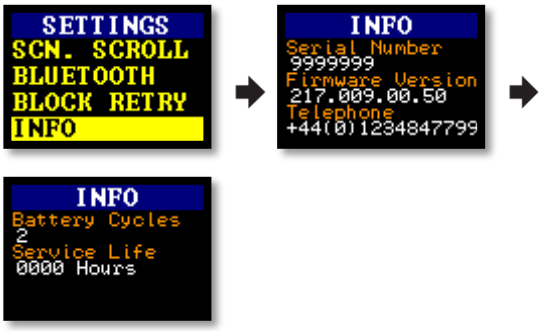
When the inlet is blocked for more than 20 seconds, the pump stops sampling. After 1 minute the pump tries to resume sampling.



You can set the number of retries before the pump stops working.

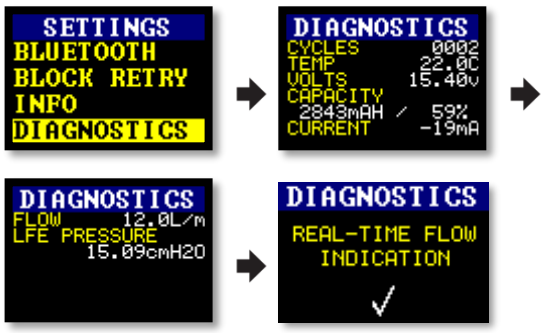
Info

Use this setting to see the serial number and firmware version. Press ↵ to toggle between screens. A contact telephone number is also provided.



Diagnostics

This information is intended for routine maintenance and fault diagnosis. Press ↵ to toggle between screens.



Auto – lock

Use this setting if you want a full lock (see page 15) to be applied automatically after you start the pump.



Auto – run

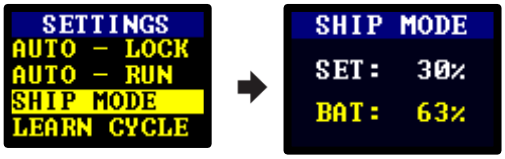
When set to ON the pump runs automatically when connected to the charger. This mode could be used when you want to run a static long-term sample.



Shipping Mode

Reduces the battery charge for shipping (default 30%).

Then press ↵ to start the unit, then it will run at 12L per minute until it reaches 30% battery level and then turn off.

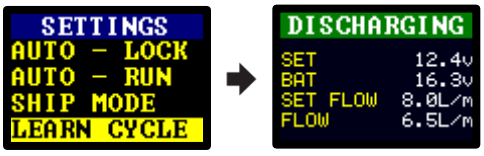


Learn cycle

Setting to start battery power cycle to reset the battery charge gauge.

Press ↵ to begin the discharge.

Performing a learn cycle will discharge the battery to 12.4v rather than 0%, then after fully



charging it will ensure the full capacity range of the battery.

Then can just discharge and charge as normal.

It is possible that over time, if battery life starts becoming an issue with a device, then a learn cycle could be performed to try to correct it and ensure that the battery is using the full capacity available.

Warning and error messages

Warnings

When turning the pump on, if the battery level is too low a warning message will be displayed. The pump will then switch off. Recharge the pump as necessary.

Errors

If the pump cannot maintain the target flow rate within 5% for more than 20 seconds (due to a kinked tube or inlet blockage) then it will automatically stop sampling and show the Blocked Retry message.





After one minute the pump will attempt to re-start. If the pump has not been able to re-start after the specified number of retry attempts (see Settings, page 19), the pump will terminate the current sampling run and display an error message.

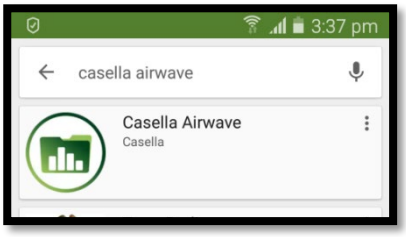
Airwave software for mobile devices

The Airwave software allows you to control and check the pump's status and measurement progress remotely.

Note: Your mobile device must support Bluetooth®4.0 connectivity and must be running Android version 4.3 or higher. Check your device specifications if unsure.

To install the Airwave software:

1. On your mobile device go to the Play Store and search for Casella Airwave.
2. Click the **Casella Airwave** selection to install the software.



Bluetooth connection and security

With Bluetooth® enabled, Airwave can connect to the Vortex3E whether it is stopped or in a sampling run.

However, Airwave compatible products, such as the Vortex3E, will only accept connection and control requests from a single known or paired mobile device. This prevents an unknown mobile device making a connection and then interrupting an active measurement run.

To pair a mobile device with your pump:

1. Ensure the pump is in Stop mode and that Bluetooth is switched on.
2. On your mobile device, open the Airwave software.

Note: The identity of your mobile device is not used.

Dashboard view

When the Airwave Software is first opened it automatically scans for any Airwave compatible products within range (up to 25m in a direct line of sight with no solid obstructions in the path).

The dashboard provides an instantaneous view of the measured data and status of all Airwave compatible devices in range plus access to previous runs and notes. Each device updates and broadcasts its dashboard data approximately every 3 seconds.



To save power, the Airwave Software stops scanning when all instruments within range have been detected.

To rescan for new devices, in the top-right corner of the software, touch .

Control panel

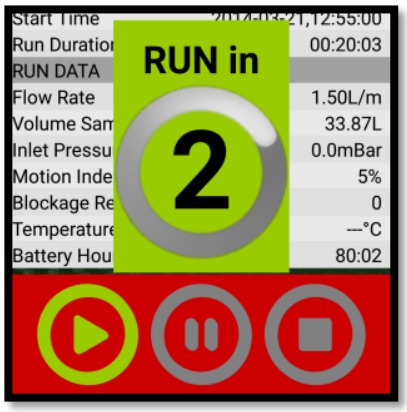
On the dashboard, touch the device you want to control.

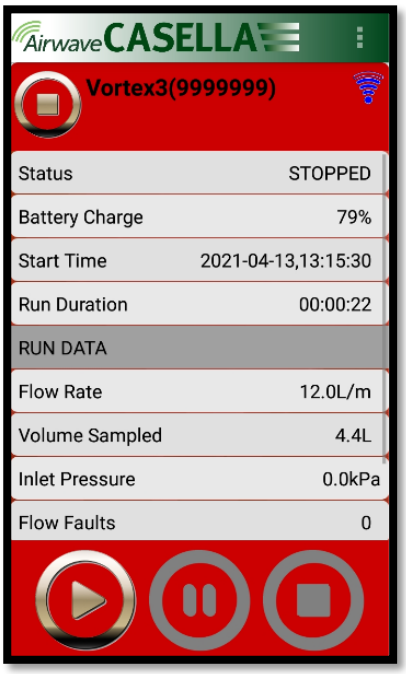
A comprehensive set of measurement results similar to those shown on the right will be displayed. You may need to scroll up and down to view all the available data.

On the control panel you can, start and stop a sampling run, applying a pause actually stops a run.

To start, stop or pause a run:

At the bottom of the screen, touch the appropriate icon for 3 seconds, during which time a countdown is displayed as shown below. Please note that pausing a sampling run actually stops the sampling run.



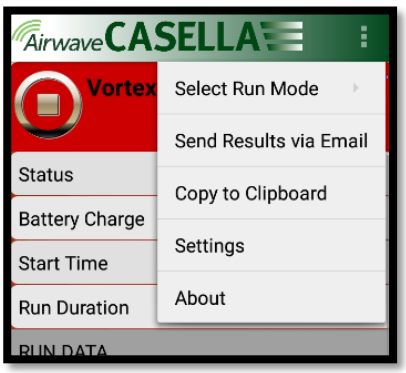


Release at any time during the countdown to abort the operation.

Menu options

At the top of the control panel screen, touch to display the options you can see in the screenshot on the right.

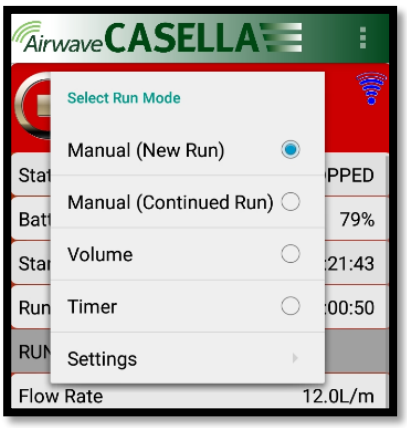
Each option is described below.



Select run mode

Use the options on this screen to select how a run will be 'managed' e.g. either manually start a new or continue a previous run or select a volume (see page 14) or timed (see page 16) run.

Press Settings to review what volume or time has been pre-selected.



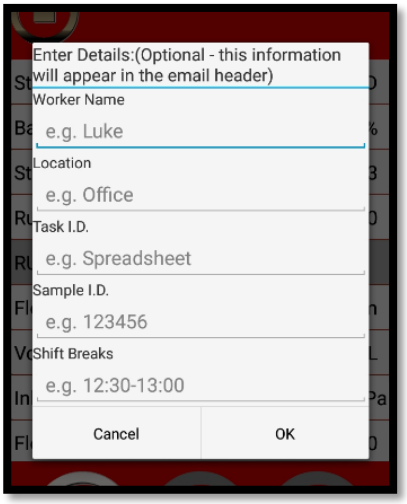
Send results via eMail

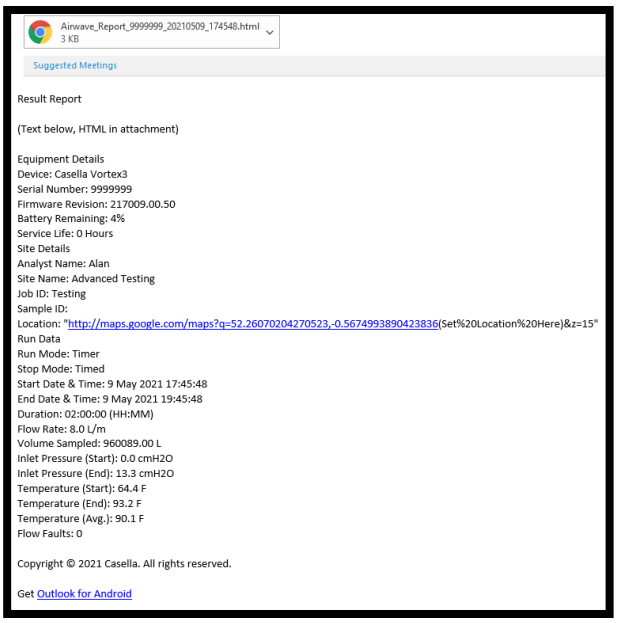
Use this option to email the sampling run results to an email address.

When you select the option, the following form is displayed that allows you to add some additional information to the email.

You can alter the field names (see **Settings** on page 23).

Examples of email results are shown below.





Airwave_Report_9999999_20210509_174548.html
3 KB

Suggested Meetings

Result Report

(Text below, HTML in attachment)

Equipment Details
Device: Casella Vortex3
Serial Number: 9999999
Firmware Revision: 217009.00.50
Battery Remaining: 4%
Service Life: 0 Hours
Site Details
Analyst Name: Alan
Site Name: Advanced Testing
Job ID: Testing
Sample ID:
Location: "http://maps.google.com/maps?q=52.26070204270523,-0.5674993890423836(Set%20Location%20Here)&z=15"
Run Data
Run Mode: Timer
Stop Mode: Timed
Start Date & Time: 9 May 2021 17:45:48
End Date & Time: 9 May 2021 19:45:48
Duration: 02:00:00 (HH:MM)
Flow Rate: 8.0 L/m
Volume Sampled: 960089.00 L
Inlet Pressure (Start): 0.0 cmH2O
Inlet Pressure (End): 13.3 cmH2O
Temperature (Start): 64.4 F
Temperature (End): 93.2 F
Temperature (Avg.): 90.1 F
Flow Faults: 0

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Equipment Details	
Device	Casella Vortex3
Serial Number	9999999
Firmware Revision	217009.00.50
Battery Remaining	4%
Service Life	0 Hours
Site Details	
Analyst Name	Alan
Site Name	Advanced Testing
Job ID	Testing
Sample ID	
Location	Google Maps
Run Data	
Run Mode	Timer
Stop Mode	Timed
Start Date & Time	9 May 2021 17:45:48
End Date & Time	9 May 2021 19:45:48
Duration	02:00:00 (HH:MM)
Flow Rate	8.0 L/m
Volume Sampled	960089.00 L
Inlet Pressure (Start)	0.0 cmH2O
Inlet Pressure (End)	13.3 cmH2O
Temperature (Start)	64.4 F
Temperature (End)	93.2 F
Temperature (Avg.)	90.1 F
Flow Faults	0

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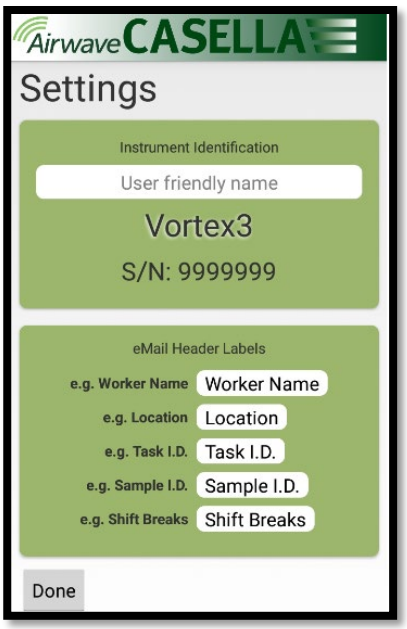
Copy to clipboard

Use this option to copy and paste the sampling run results into any mobile software with text editing capabilities.

Settings

Use this option to change Instrument Identification and/or the field names on the **Send Results via eMail** form (see page 22).



About

Use this option to see the version number of the Airwave software (bottom right of the screen).



Saved runs & notes

From the Dashboard View (right) you can download runs stored in the Vortex3E or make notes by pressing the file folder or notes icon respectively.



Download stored runs

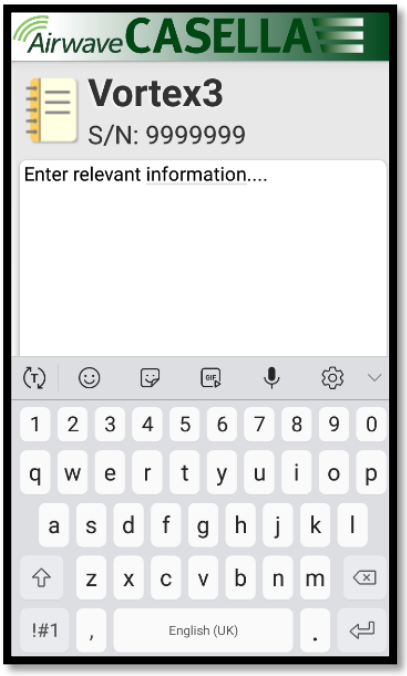
Stored runs are downloaded to the Airwave app and touching  brings up the options as shown below.



Toucing an individual run also provides the “Copy Result to clipboard” and Create Email options.

Notes

Touching the screen brings up the QWERTY keyboard.



Pressing return takes you back to the dashboard screen.

Technical specifications

Flow Performance	
Flow Range ml/min	5,000 to 12,000
Flow Control	< ± 5% at calibrated point
Fault Detector	Detects blockages with a selectable number of automatic restarts up to 10 times
Compliance	Flow performance compliant with ISO 13137
Service Life	Pump service life 4000 operating hours

Operating	
Display	Colour OLED
Controls	4 buttons
Status Indicators	Red/Blue LED
Dimensions	316 x 170 x 116mm (12.44 x 6.69 x 4.56 inches)
Weight	2.33 kg (5.16 lbs)

Environmental	
Temperature	Operation, 0 to 40°C
	Storage, -10 to 50°C
Humidity	30 to 95% RH (non-condensing)
Barometric Pressure	Auto-correcting
Air Sampling Temperature	Sensor measurement range, -40C to +85°C Flow compensation range (Flow<5%), 0 to 40°C
Environmental Pressure	Sensor measurement range, 300 mbar to 1200mbar Flow compensation range (Flow<5%), 900mbar to 1100mbar
Ingress Protection	IP65

Electrical	
Battery Type	Li-Ion
Battery Level Indicator	% or hours (Pro model)
Battery Life	>4.0 hours depending upon flow rate/ filter type.
Power Supply	Yes, mains operated
Charge Time	Typically <6 hours

Declarations

WIRELESS BLUETOOTH 5.x CONNECTIVITY

All models support wireless connection via Bluetooth® 5.x (Low energy or Smart). This connectivity is compatible with mobile and PC devices that support Bluetooth® 5.x only.

TX power: 0 dBm to +20 dBm

Receiver sensitivity: -104.5 to -94.1 dBm (Data Rate Dependant)

Range: Typically >25m line-of-sight and depending on local RF conditions.

The instrument contains a Bluetooth® Low energy wireless transmission module, BGM210P Series from Silicon Laboratories. The Bluetooth® Qualified Design IDs for this module are:

Bluetooth Controller QDID: 231202, **Declaration ID: D066522**.

Copies of the modules regional approvals certificates may be obtained from Casella or Silicon Laboratories.

This product contains an FCC and Industry Canada certified Bluetooth® Low energy wireless transmission module:

FCC IDENTIFIER: **QOQGM210P**

Industry Canada **IC:5123A-GM210P**

Producer: Silicon Laboratories

Model: BGM210P Series Bluetooth smart module

Modular Type: Single Modular

FCC CONFORMITY STATEMENT

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

(1) This device may not cause harmful interference

(2) This device must accept any interference received, including interference that may cause undesired operation

RADIATION EXPOSURE STATEMENT

The product complies with the FCC portable RF exposure limit set forth for an uncontrolled environment and is safe for intended operation as described in this manual.

CE

CE DECLARATION OF CONFORMITY

Casella declares that this product is in compliance with the essential requirements and other relevant provisions of applicable EC directives. A copy of the EU Declaration of Conformity for this product may be obtained by clicking on the product compliance documentation link at www.casellasolutions.com.



WEEE - INFORMATION FOR EU MEMBER STATES ONLY

The use of the WEEE symbol indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about recycling of this product, please contact your local waste disposal service or contact the agent where you purchased the product.

Frequently asked questions

What is the difference between the Standard and Pro models?

We recognise that different users have different requirements, so we have created two models listed in the table below. If you want a basic version of the pump, i.e. without Bluetooth® connectivity, the Vortex3E standard is the pump that you require. However, but if you would like greater functionality including the ability to remotely view and control the pump then the Vortex3E Pro is the model to select.

	Vortex3E	Vortex3E Pro
Flow range 5-12 L/min	✔	✔
Flow control +/- 5%	✔	✔
Run duration 10 Hours @ 8 L/min	✔	✔
Ambient pressure senor	✔	✔
Internal air flow temperature sensor	✔	✔
Battery & mains powered	✔	✔
Bluetooth®		✔
Remote Start/Stop		✔
Battery Gauge		✔
Pressure Indicator		✔

I would like to upgrade models Std to Pro – is this possible?

If you own a standard Vortex3E and would like greater programming capability it is possible to upgrade the firmware. Please contact salessupport@casellasolutions.com.

I would like to upgrade models Vortex3 to Vortex3E – is this possible?

If you own a Vortex3 is not possible to upgrade this to a Vortex3E due to the large changes in the internal hardware.

How do I know what filters and accessories I need for my application?

Filters and accessories do depend very much on your application. Please contact info@casellasolutions.com for further information.

What is the battery life and charge time and what's the benefit?

The Vortex3E incorporates Li-Ion batteries for greater battery life. You can be confident that you can get to the end of the shift without running out of charge. Battery life does depend on the application, and factors such as the flow rate and the back pressure must be taken into account. It is difficult to give a definitive answer as to how long the charge will last because it does depend on the individual sample criteria used. We can only provide guidance.

What is the flow control and why is that so important?

During the sample, run a number of factors can slow the pump, for example a loaded filter or reduced battery voltage, resulting in a reduced flow rate. If this happens the air volume measurement becomes inaccurate, affecting the accuracy of your results. To counter this potential issue, the Vortex3E monitors and maintains flow accuracy so you can have confidence in your results.

The Vortex3E conforms to ISO13137:2022, which states that flow control is ±5% for ambient temperatures between specified by the manufacturer. This is the international standard specifying performance requirements for personal sampling pumps.

What is back pressure?

This is the resistance to flow caused by the filter media as opposed to free flow of air through the pump (like having a sock over your vacuum cleaner nozzle, the pump has to work a bit harder!). Back pressure is measured in inches or cm of water. The smaller the pore size of your filter, the greater the back pressure and the harder the pump has to work. As well as being a drain on the battery the pump needs to be powerful enough to overcome the resistance. Another factor is the flow rate and it is the combination of flow rate and filter media that determines the back pressure.

Having a pump that is capable of dealing with a wide variety of flow rates and filter media is really important and the Vortex3E has class beating back pressure capability. Please refer to the table below for typical back pressures exerted by particular filter media.

	25 mm MCE/0.8		25 mm Gold	
Flow rate L/min	Back Pressure (cmH_2O)	Runtime (hours)	Back Pressure (cmH_2O)	Runtime (hours)
12	180.5	5	205	4
10	159.3	7	-	-
8	125	10	138	10
6	95	20	-	-

Servicing, maintenance, and support

Servicing

The Vortex3E pump contains no user serviceable parts and if a fault is suspected, return the pump to Casella using the RMA procedure or a Casella approved service centre.

The warranty DOES NOT extend to cleaning of the instrument.

The Vortex3E pump MUST be decontaminated prior to return and the decontamination form MUST be completed when raising an RMA. If the pump is returned without cleaning, it will be returned with no work undertaken by Casella.

Casella's in-house service department offers a comprehensive range of repair and calibration services designed to maintain a fast and efficient back-up for all our products. The Service Department is operated in accordance with our BSI registration for products manufactured by us. We will not however, undertake the repair of other manufacturer's equipment.

For further information please contact our service department at our UK headquarters (salessupport@casellasolutions.com) or contact an approved servicing distributor. We will be happy to provide quotations for individual repairs or provide annual maintenance under contract.

Maintenance

The Vortex3E Air Sampling Pump is designed to provide long and reliable service. Routine maintenance should be minimal.

- Avoid leaving the battery pack in a discharged state for extended periods.
- Keep the instrument body clean using a damp cloth.
- The telescopic mast may be removed to aid de-contamination or replacement if damaged.

Removing/replacing the telescopic mast

To remove the mast:

1. With the Vortex3E on its side, unscrew the 2.5 mm Allen (hex) screw holding the mast in place.
2. Remove the mast if damaged or to de-contaminate.
3. Re-fit the mast or replace with a replacement if necessary and screw in place.

Intelligent battery gauge

The Vortex3E incorporates an intelligent battery gauge that monitors the capacity remaining in the internal battery pack. If not used regularly and/or to maintain the accuracy of the battery gauge the Vortex3E charge learn cycle is recommended.

Signs of the battery gauge getting inaccurate are if when running the pump the battery screen displays an inaccurate life remaining time, on the diagnostics screen the battery capacity after a full charge is showing a much higher capacity than expected or when charging the Vortex3E it may also not get up to 100% charge shown on the display.

Support

For support, please go to casellasolutions.com or email us at techsupport@casellasolutions.com.

Part numbers and accessories

Vortex3E models	
VORTEX3E	Vortex3E Standard pump
VORTEX3EPRO	Vortex3E Pro pump

All pumps include a 1.8 m tube, PC18 Mains power supply, Field Guide and Certificate of Conformity.

Vortex3E accessories	
CM362	Rotameter 1-20l/ min Flow Meter
P110004	Asbestos Head with Cowl
PC18	Mains Power Supply
217002B	Spare Telescopic Mast