ActiveCount25H

MICROBIAL SAMPLER WITH HEPA FILTERED EXHAUST

Operators Manual

LIGHTHOUSE
WORLDWIDE SOLUTIONS

Lighthouse Worldwide Solutions

ActiveCount25H

Microbial Sampler with HEPA filtered Exhaust

Operators Manual

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EU CE DECLARATION OF CONFORMITY

Manufacturer's Name:	Lighthouse Worldwide Solutions, Inc.
Manufacturer's Address:	Lighthouse Worldwide Solutions, Inc. 1221 Disk Drive Medford, OR 97501 USA
Declares the product:	
Product Name:	ActiveCount25H
Model Number(s):	ActiveCount25H

Conforms to the following Product Specifications:

SAFETY	EN61010-1:2010	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 1: General Requirements IEC 61010-1:2010
EMC	EN61326-1:2013	Electrical Equipment for Measurement, Control and Laboratory Use EN 61326-1:2013

Supplementary information

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC amended by Directive 93/68/EEC and the EMC Directive 89/336/EEC amended by Directive 93/68/EEC and carries the CE marking accordingly.

Fremont, CA. July 1st 2018

Jerry Szpak – Director, Engineering

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Introduction

ActiveCount25H Basics

Monitoring air for live microorganisms is essential when manufacturing hygiene-sensitive products in safe and sterile environments, such as:

- Pharmaceutical and hospital
- Cleanrooms, biological safety cabinets, isolators
- IAQ indoor air quality, museums, libraries
- Cosmetics, textiles, agricultural, environment
- Additional aseptic environment monitoring applications

Microorganisms have the potential to contaminate industrial products and harm human health.

ActiveCount25H is a high-performance instrument that uses a well-known method, *impaction,* to aspirate air through a perforated sample head and deposit airborne bacteria onto an agar-coated petri dish. The petri dish is then removed, incubated, and tested for live microorganisms.

Safety Warnings

ActiveCount25H Safety Warnings

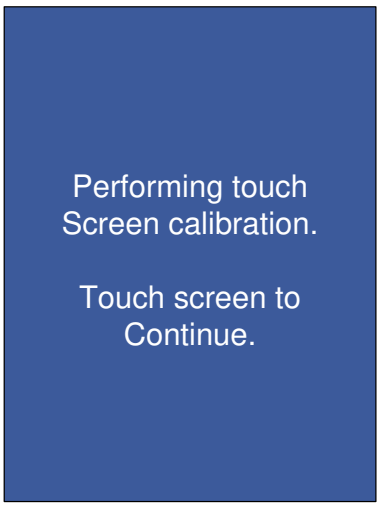
- ActiveCount25H should not be used in Biosafety Level 2 or higher environments.
- Do not sample flammable or corrosive gases.
- ActiveCount25H gas sampler is designed to sample compressed air, CO_2 or NO_2 only.
- To minimize the chance of electric shock, turn off the instrument and disconnect power adapter during sterilization.
- Do not charge ActiveCount25H with a power supply other than one provided by Lighthouse Worldwide Solutions.
- Do not submerge ActiveCount25H in any liquids.
- Do not spray disinfectant solution directly into ActiveCount25H enclosure.
- Do not use gasses to disinfect ActiveCount25H.

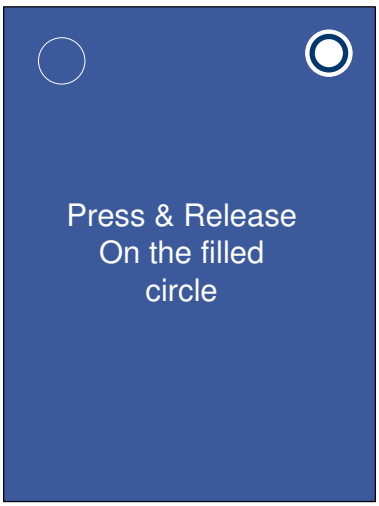
Touch Screen Calibration

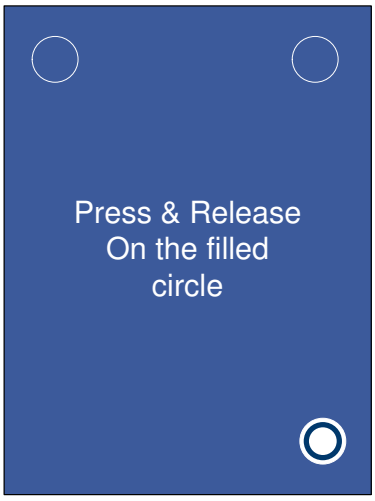
The ActiveCount25H 3.5” color touch screen is calibrated prior to shipping and there should be no need to recalibrate at any time. Alternatively touch screen calibration may be performed at any time by following the steps outlined here.

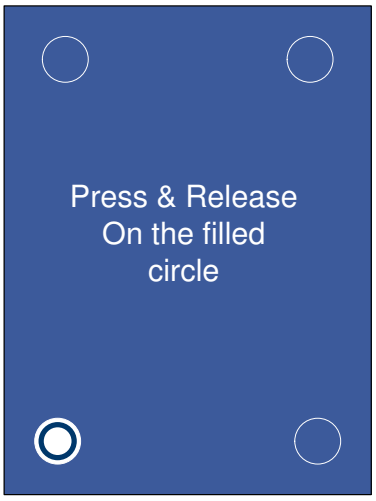
Touch Screen Calibration

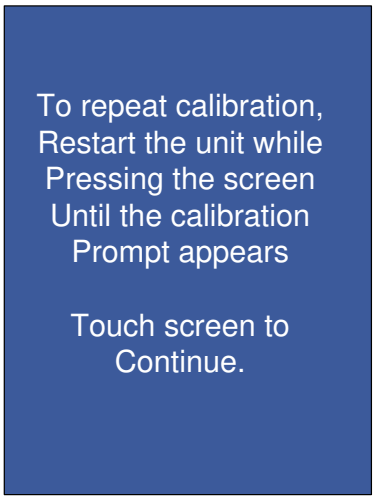
1. Power off the ActiveCount25H.
2. While holding your finger on the touch screen, power on ActiveCount25H and continue to hold your finger on the touch screen until the “Performing touch screen calibration” screen appears.
3. Follow the prompts to calibrate the touch screen by pressing and releasing on the filled circles for all four corners.





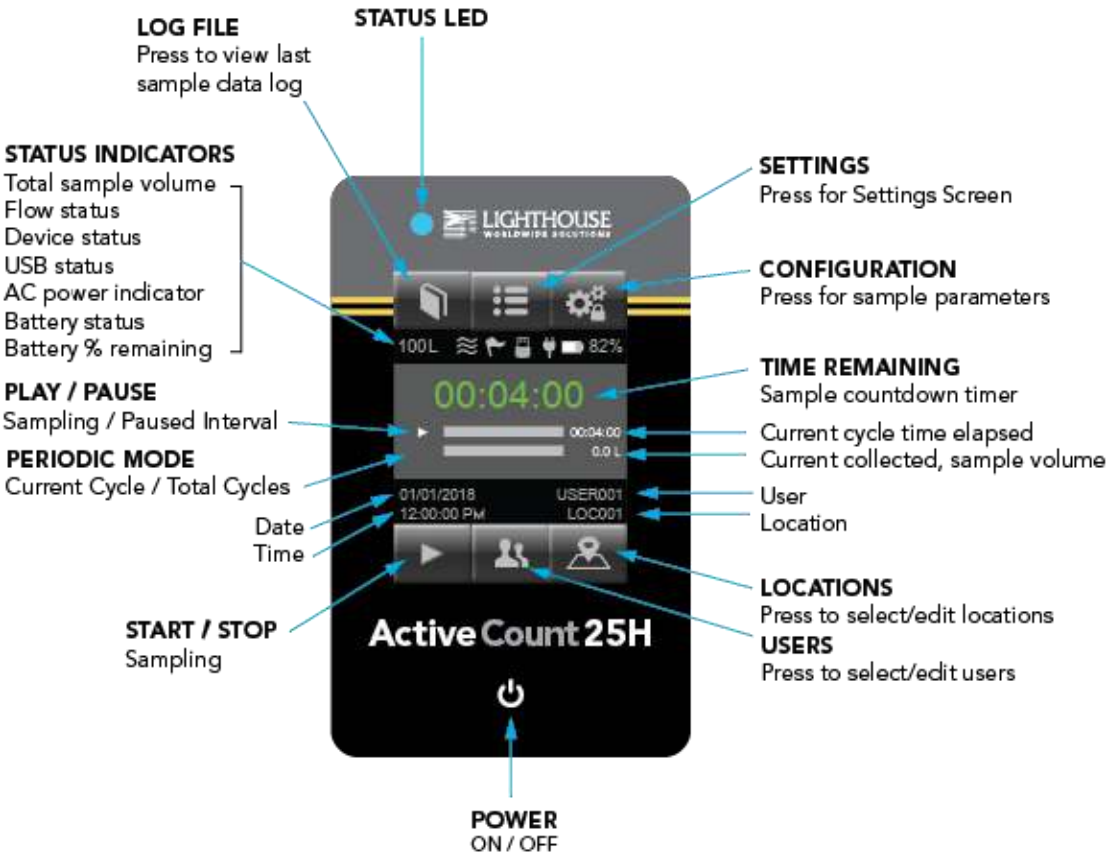






Quick look at ActiveCount25H

- User-friendly and easy to use
- Large 3.5” (8.9 cm) color touchscreen
- Airflow 25 liters per minute
- 8 programmable sample volumes
- 50 programmable users
- 400 programmable locations
- Programmable delay start
- Continuous and periodic sampling modes
- Sampling head dust cover
- Autoclave-able sampling head and dust cover
- Stainless steel sampling head
- Uses standard 90mm petri dishes
- Allen wrench to adjust petri dish holder
- Status LED
- Internal lithium ion rechargeable battery
- Battery life 11 hours continuous sampling or 13 hours normal sampling use. Normal sampling use is defined as sampling 10 minutes, pausing 5 minutes and repeating.
- Battery charge time 4 hours
- Store sample data on USB flash drive
- Supports 3/8” tripod screws
- Tripod adapter for 1/4” tripod screws
- Calibration reminder
- Calibration certificate
- Carrying case
- Optional compressed gas sampler
- Optional remote sample adapter

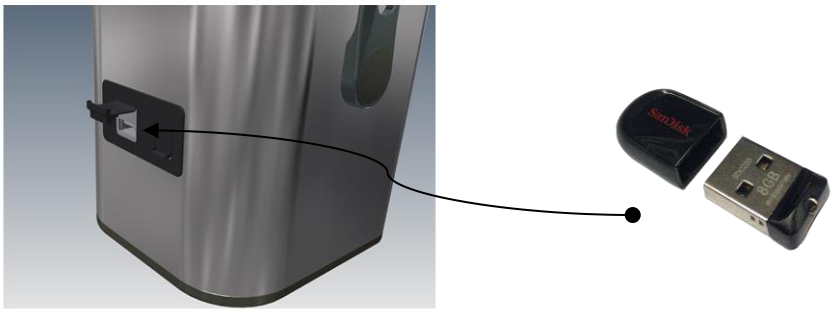


ActiveCount25H Main screen

Data logging on USB Flash Drive

Data logging

Insert the included USB flash drive to store sampling data.

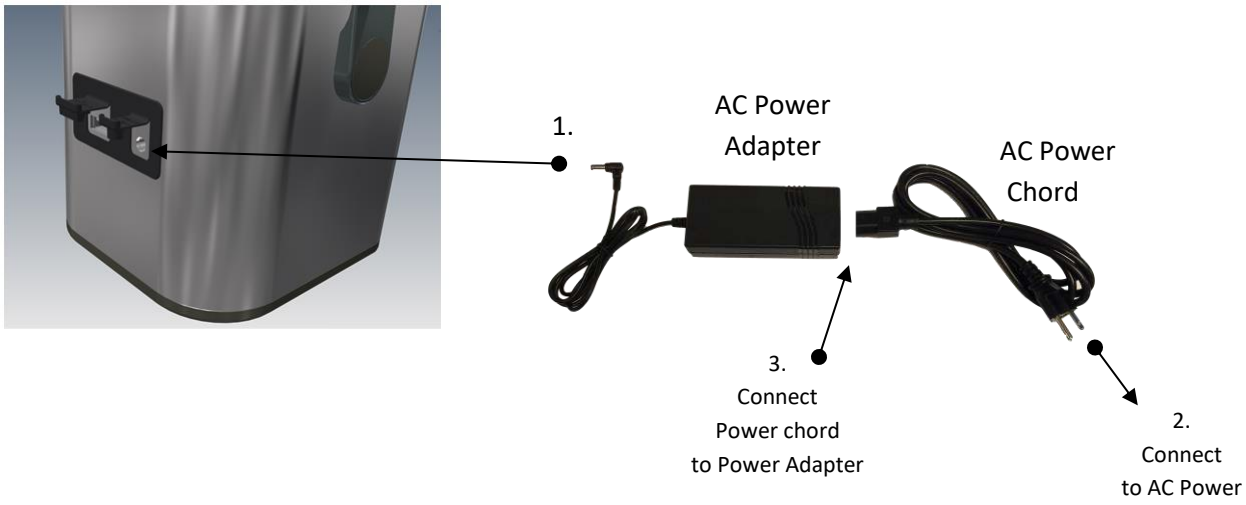


Charge battery

Follow the instructions below to charge the ActiveCount25H battery. To achieve a fully charged battery, please allow four hours.

Connection to Power

1. Connect AC Power Adapter to ActiveCount25H.
2. Connect Power Chord male end to AC Power.
3. Connect Power Chord female end to Power Adapter.
4. Charge Battery to 100%.



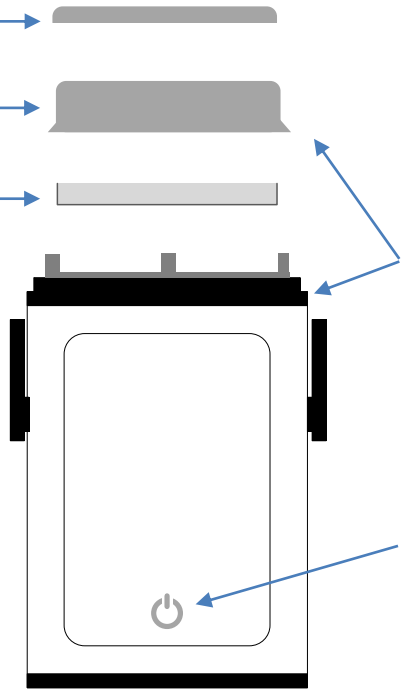
Get Ready For Sampling

Follow these steps to prepare Activecount25H for microorganism sampling.

When ActiveCount25H is not in use, always cover sampling head with dust cover.

Preparing ActiveCount25H for sampling active sample.

1. Remove dust cover.
2. Unscrew sampling head.
3. Insert petri dish with agar.
4. Screw sample head back onto Active Count25H.
5. Turn On ActiveCount25H.



Front of ActiveCount25H

Microorganism Sampling Principles

Microorganisms can be found in droplets suspended in air for long periods, and can contaminate hygiene-sensitive environments. These droplets fall and settle on surfaces, potentially causing infections in medical facilities and contamination in manufacturing facilities.

MPN (most probable number) is a well established method to estimate the number of viable microorganisms in a monitored area. To derive MPN, ActiveCount25H uses the principle that statistically assumes an increasing number of organisms enter the same hole in the sampling head as the number of organisms per sample rises.

After sampling, incubate the petri dish to determine the number of Colony Forming Units (CFU). Then, refer to the Feller Conversation Table in Appendix B to find the Most Probable Number (MPN) of microorganisms.

As an example, if an incubated agar sample contains 5 CFUs, the Feller Conversion Table shows the MPN is 5.

Sampling Modes

Constant Mode

ActiveCount25H supports three sampling modes:

- Constant – samples continuously for a user-specified volume of air.
- Periodic – samples periodically over a user-specified time and volume.
- Gas – samples compressed gas with optional compressed gas adapter.

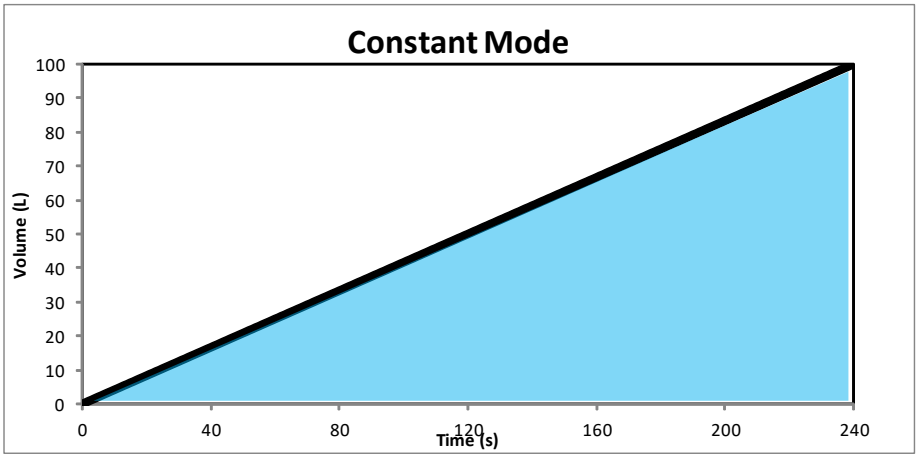
Sampling Mode	Description

Constant Mode samples continuously at a flow rate of 25 liters per minute until it reaches the desired sample volume.

The example below selects 100 liters of air as the desired volume.

ActiveCount25H performs the following calculation to determine the sampling period is 4 minutes.

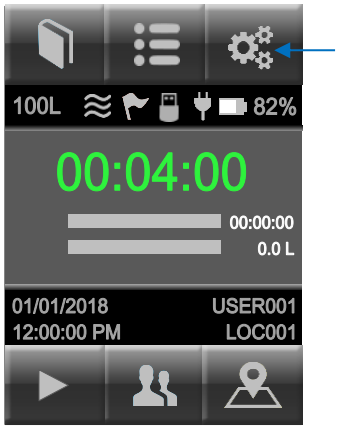
100 liters * 25 liters/minute = 4 minutes



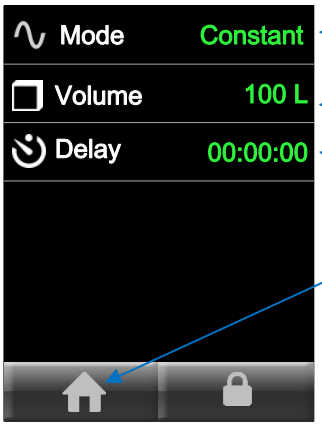
Constant Mode – Sampling Exercise

Select Constant mode: From the Home screen.

1. Press the Configuration button.
2. Select Constant in Mode menu item.
3. Select Total sampling volume.
4. Select Delay sample start time.
5. Press HOME button to return to the Home screen.
6. Press START button to begin sampling.



1. Press Configuration Button

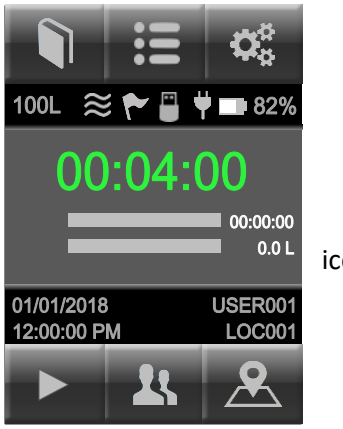


2. Select Constant.

3. Select total sample volume.

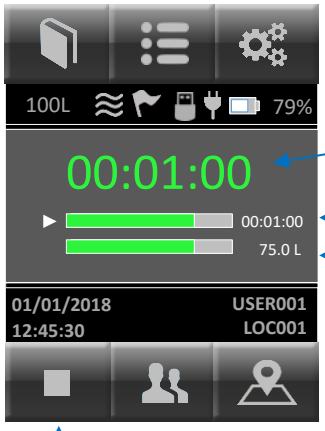
4. Select delay sample start time.

5. Then press the Home button.



6. Press the START button to begin sampling.

The Play icon indicates sampling.



Delay and total countdown timer.

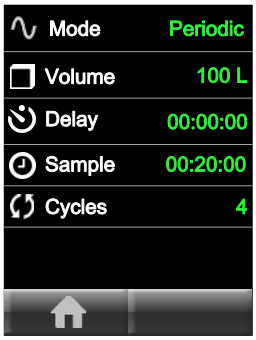
Countdown timer

Total Volume Sampled.

ActiveCount25H will automatically stop sampling when the selected volume has been collected.

To Abort press the STOP button.

Periodic Mode



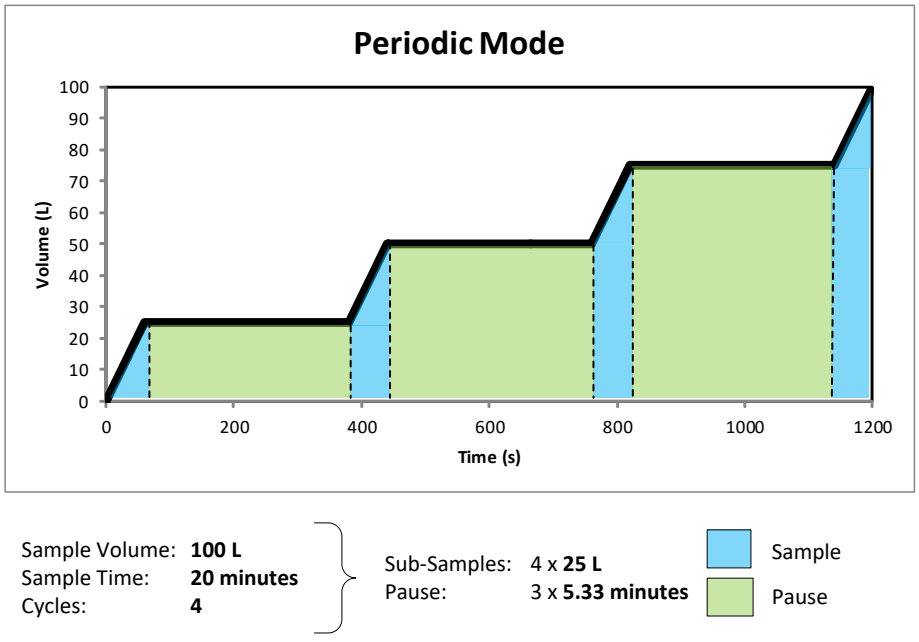
Periodic Mode can sample a specific volume of air periodically over a longer period of time by dividing the sample into periodic cycles of sampling and pausing. During the pause time no air will be impacted on the sample plate.

Periodic mode is useful when monitoring a process over a period of time.

In the example below we selected 100 liter sample over 20 minutes.

Mode = Periodic
Volume = 100L
Delay = 0
Sample = 00:20:00
Cycles = 4

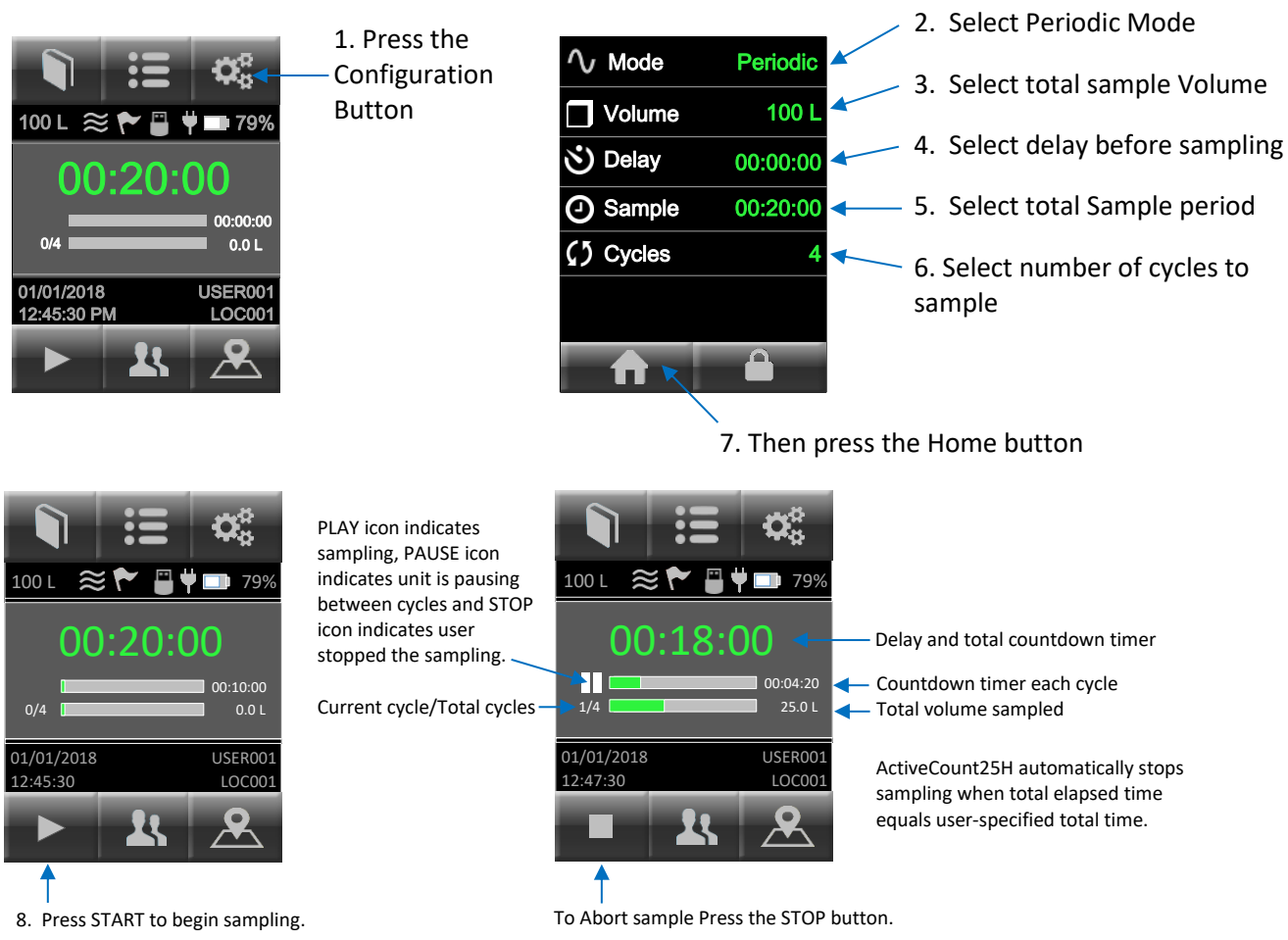
ActiveCount25H divides the 100 liter total volume into 4 one minute 25 liter sampling cycles and calculates the 3 pause times between each cycle covering the 20 minute total sample period.



Periodic Sampling Exercise

Select Periodic mode: From the Home screen.

1. Press the Configuration button.
2. Select Periodic mode menu item.
3. Select Volume to be sampled.
4. Select Delay sample start time.
5. Select total Sample period.
6. Select number of Cycles to sample.
7. Press Home button to return to the Home screen.
8. Press Start button to begin sampling.



Store sampling data: To store sampling data for each sampling run, insert the included USB flash drive into the USB port.

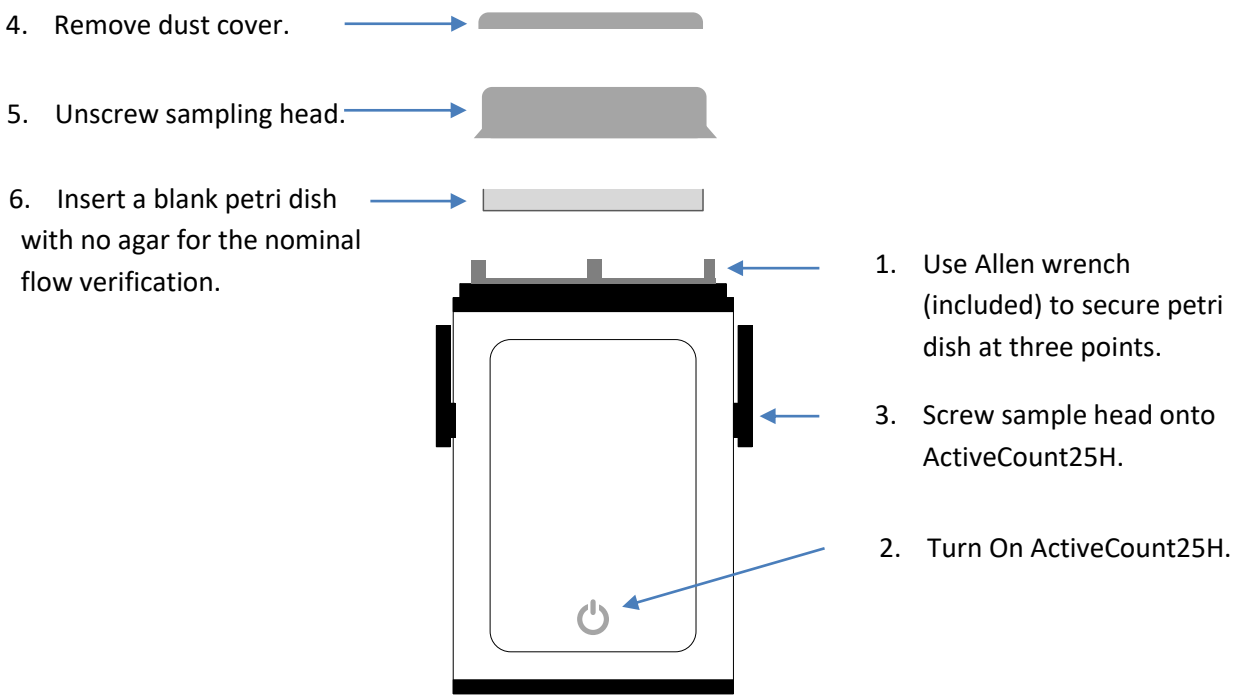
Gas Sample Mode

Gas Sample Mode can sample microbiological contamination in compressed gas lines by using the optional Gas Sampler Adapter. The Gas Sampler Adapter will connect the sample gas source to the sample plate and adjust the compressed gas flow to match ActiveCount25H 25 liters per minute flow rate. After verifying the nominal flow ActiveCount25H is ready to sample compressed gases.

Verify Nominal Flow before Gas Sampling

Setup ActiveCount25H to verify nominal flow

1. Remove dust cover.
2. Unscrew sample head.
3. Add empty petri dish with no agar (for nominal flow test only).
4. Use Allen wrench (included) to secure petri dish at three locations.
5. Screw sample head onto ActiveCount25H.
6. Turn on ActiveCount25H.

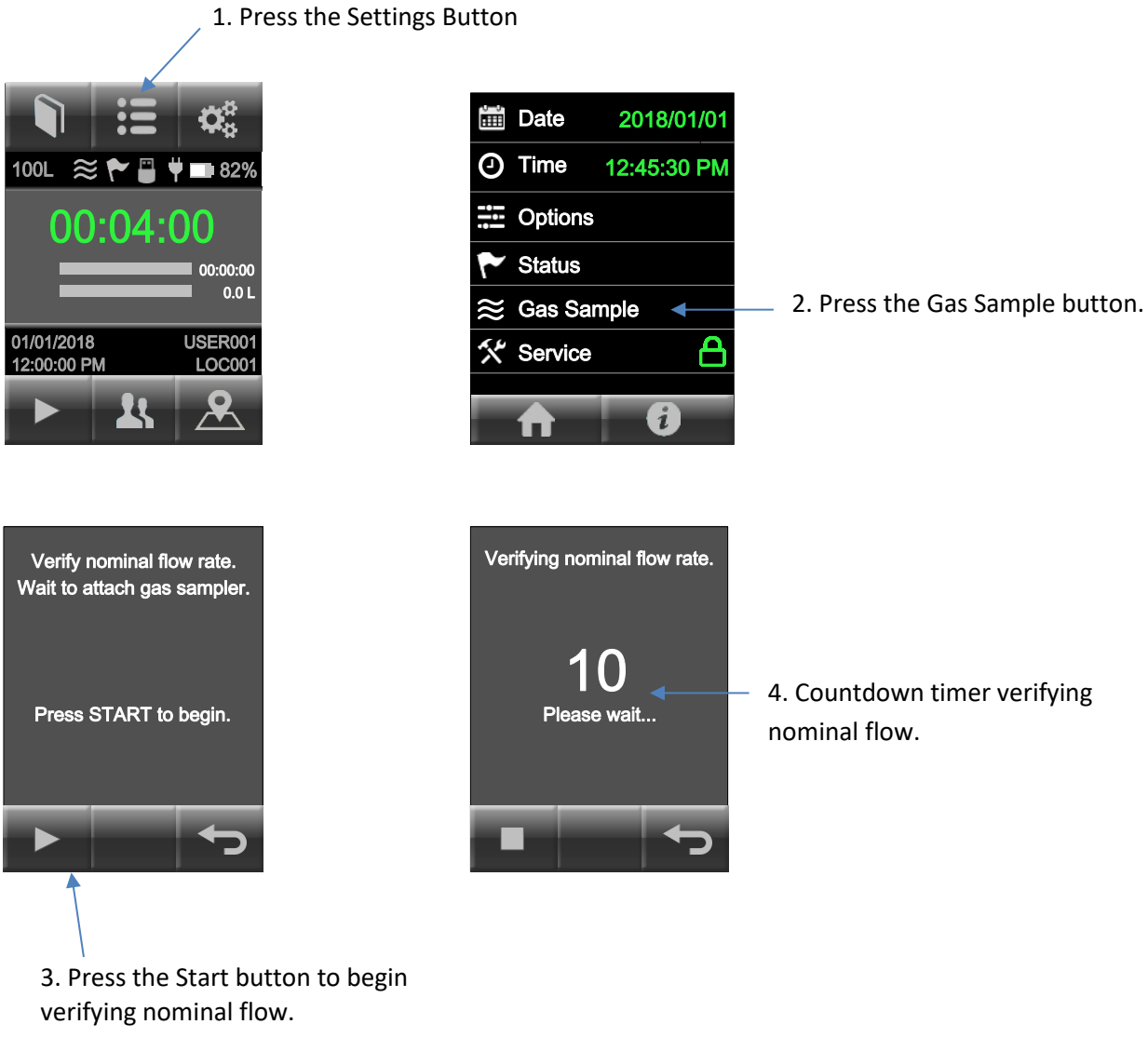


Front of ActiveCount25H

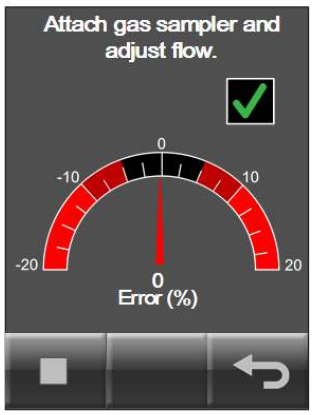
To verify ActiveCount25H nominal flow rate, follow the steps below.

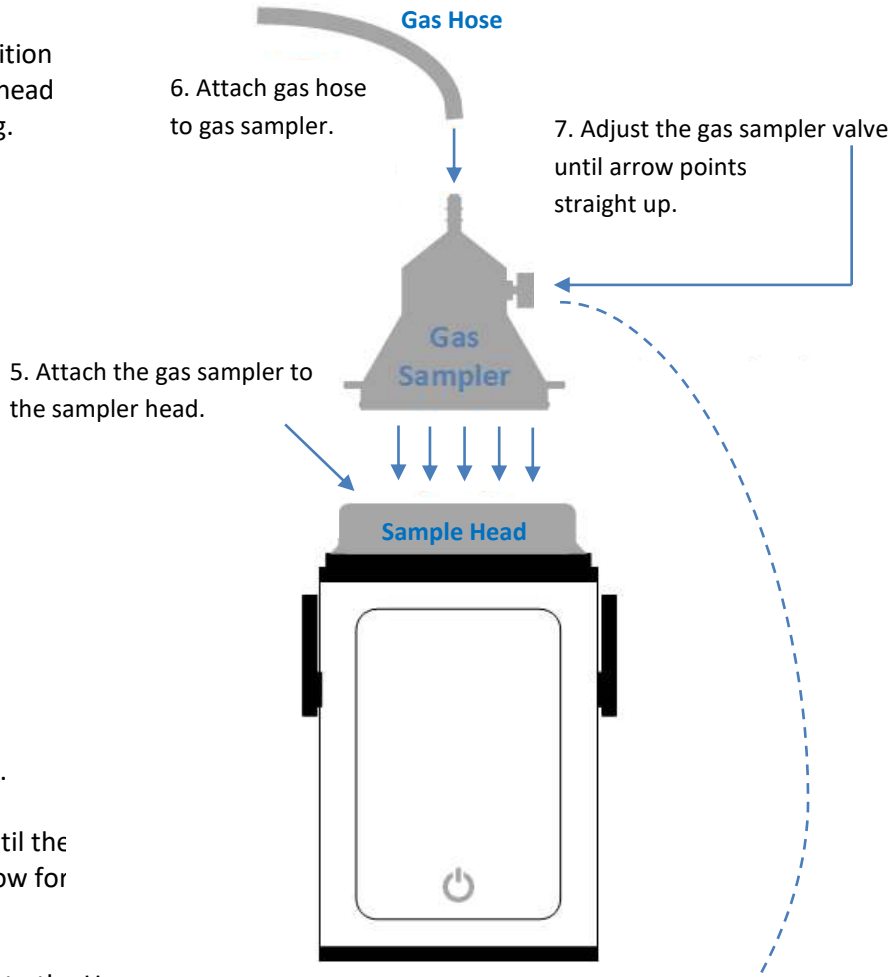
From the Home Screen:

1. Press the Settings button.
2. Press the Gas Sample button.
3. Press the Start button to verify nominal flow.
4. Countdown timer will verify nominal flow.
5. Attach the gas sampler.
6. Adjust the gas sampler valve until the arrow points straight up to 0.



5. Attach the gas sampler and position the gas sampler snugly in the sampling head while ActiveCount25H blower is running.

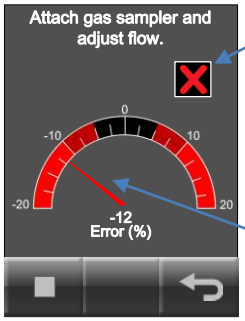




6. Attach gas hose to Gas Sampler.

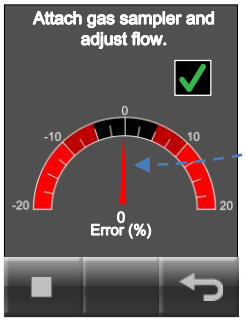
7. Adjust the gas sampler valve until the ActiveCount25H has nominal flow for gas sampling.

8. Press the Back button to return to the Home screen in Gas Sample mode. You are now ready to sample compressed gas.



X mark indicates flow is not nominal yet.

Arrow indicates air flow change when valve is adjusted.



Check mark indicates flow is nominal.

Adjust valve until arrow points straight up to 0.

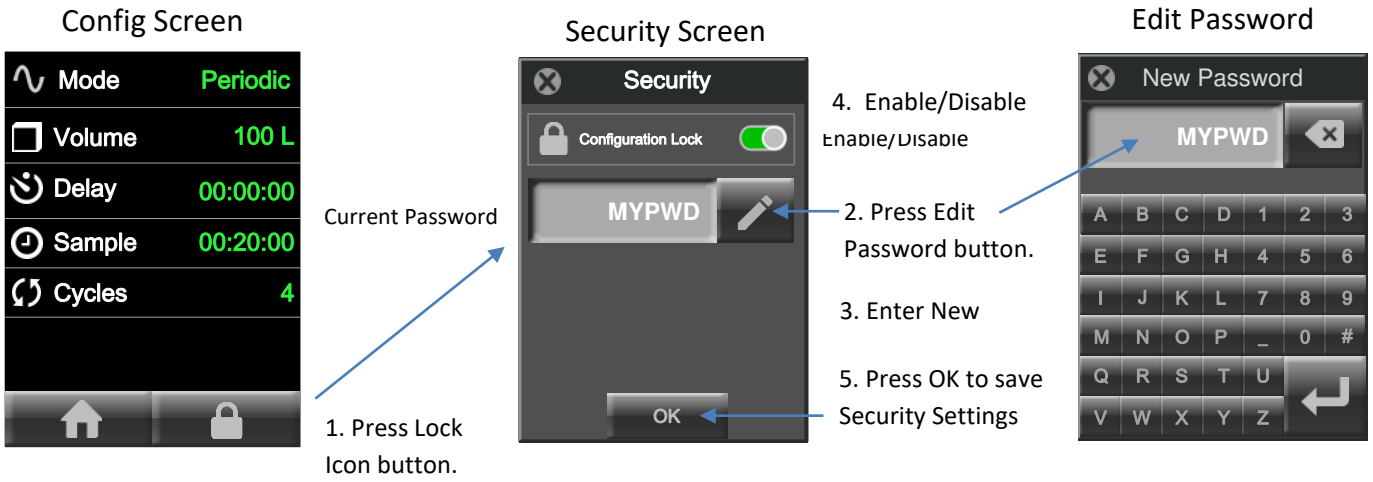
8. Press the Back button to return to the Home screen and configure your gas sample settings.

Do not sample explosive nor corrosive gases. ActiveCount25H gas sampler is designed to sample compressed air only, and is not designed for sampling of explosive nor corrosive gases.

Security: Configuration Lock

ActiveCount25H Sampling Modes can be restricted by locking the Configuration Screen. Before locking the configuration screen; select the sample mode and sample settings to be locked. With the configuration screen locked; users are restricted to the preselected sample mode (Constant/Periodic/Gas). The user may not select any other sample mode and may not change any sample parameters. The user may run the selected sample only.

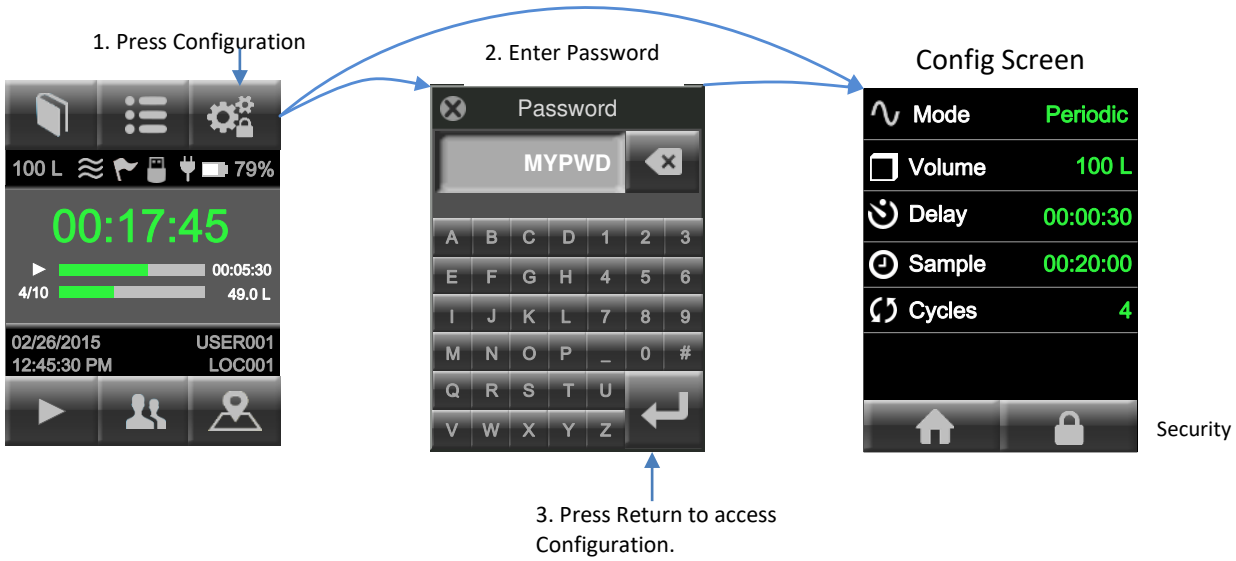
1. From the Home screen press Configuration and then press the LOCK icon button. This will bring up the Security screen.
2. Press the Edit Password button (pencil icon) to bring up the New Password screen
3. Enter the new password and press the return key to save and return to the Security screen.
4. Slide the Configuration Lock toggle button to the right to Enable or to the left to Disable.
5. Press OK to save the Security Settings.



Security: Configuration access when locked

A user can access Configuration while Configuration is locked by entering the Password. The user may change to a new sample mode save and exit and Configuration will remain locked.

1. From the Home screen press Configuration button to bring up the Password screen.
2. Enter the Configuration Password using the key pad.
3. Press the Return button to gain access to the Configuration screen.
4. Change the Sample Mode, Volume, Delay, Sample Time, Cycles.
5. Press the Home button to save and Configuration will remain locked.
6. Press the Security Lock button to either edit the password or disable Configuration Lock.



LED Status:

The below table describes the Sampling Status LED colors and blinking.

Status	Color	Blink
Idle	Off	Off
Sampling	Blue	Solid
Delay/Pause	Green	Solid
Flow Error	Red	Blinking
Writing to USB	White	Solid
Service/Calibration Required	Yellow	Solid

Sampling Status LED Color and Blinking Chart

Sampling Status LED

White LED Indicates Writing To USB Flash Drive: Do not remove USB flash drive and do not power off ActiveCount25H while LED is white and downloads are in progress.

Sampling Status Screens

Display Sampling Status Screens: When a sampling run completes, ActiveCount25H displays a dialog box to indicate (a) success, (b) manual abort by user, or (c) flow error. The sample will be aborted if the instrument is unable to maintain 25 L/min due to flow blockage.

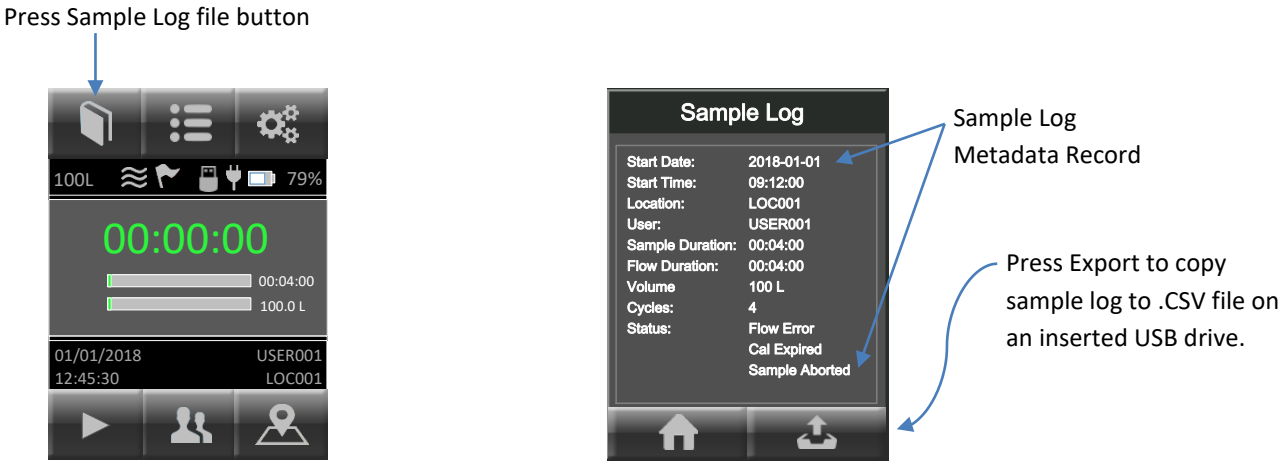
(a) Success

(b) Manual abort by user

(c) Flow error

Sampling Run Metadata

Display Sampling Results: To display sample data results for the most recent sampling run, press the Sample Log button.



Copy sample data to USB Flash Drive: To append data for the current sampling run to a CSV (Comma Separated Value) file, press Export button. For more information on ActiveCount25H CSV files, see Appendix A, *Data Files*.

Total Sampling Volume

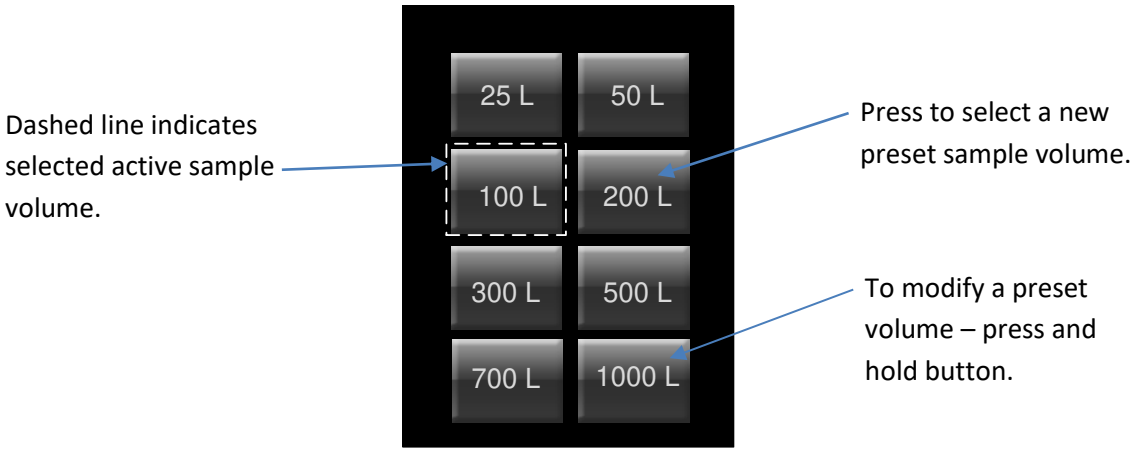
Select Total Sampling Volume

ActiveCount25H supports up to eight programmable sampling volumes. From the Home screen press the Configuration button then the Volume button.

- 25 liters
- 50 liters
- 100 liters
- 200 liters
- 300 liters
- 500 liters
- 700 liters
- 1000 liters (default)

Select Active Sampling Volume: When you press on the Volume menu item, ActiveCount25H displays eight sampling volumes. ActiveCount25H indicates the active sampling volume with a dashed line. Press one of the volume presets to select the active volume for the sample.

Modify Sampling Volume Preset Values: To modify a sampling volume preset value, press-hold then release one of the preset buttons. ActiveCount25H then displays a keypad to enter a new sampling volume preset value. The new value then becomes the active sampling volume.

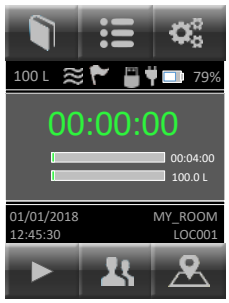


Locations and Users

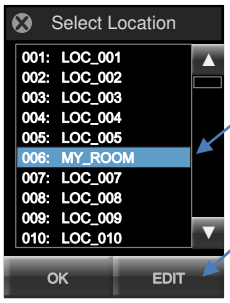
Assigns Active Location to Sampling Runs

Locations Database: ActiveCount25H stores up to 400 locations in its locations database. When ActiveCount25H completes a sampling run, it saves the active location in a data record for the most recent sampling run. Each location can consist of up to 16 characters.

1. Press the Locations button.
2. Select a location name to edit.
3. Press the Edit button.
4. Use the keypad to change the location name.
5. Press the Return button save the location name change.

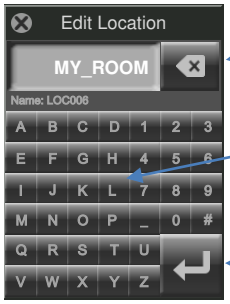


1. Press the Locations button.



2. Select a location name.

3. Press the Edit button.



Backspace button.

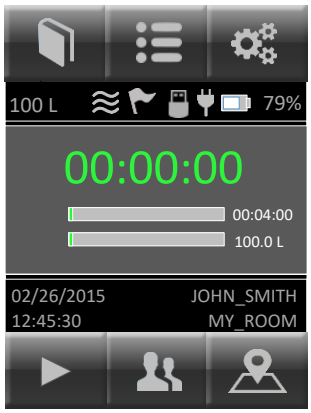
4. Use the keypad to change the location name.

5. Press Return button to save location name change.

Assigns Active User to Sampling Runs

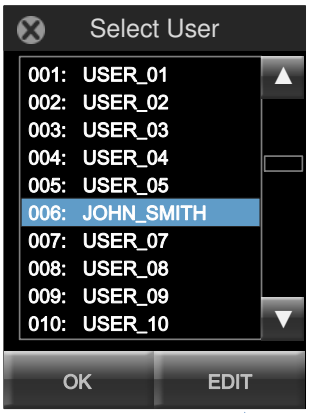
Users Database: ActiveCount25H stores up to 50 users. When ActiveCount25H completes a sampling run, it saves the active user in a metadata record for the most recent sampling run. Each user name can consist of up to 16 characters.

1. Press the Users button.
2. Select a User name to edit.
3. Press Edit.
4. Use the keypad to enter a new user name.
5. Press the Return button to save the new user name.



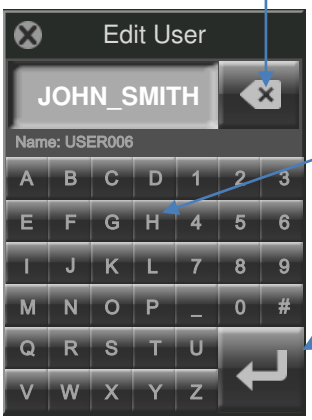
1. Press User button.

2. Select a User name to Edit and it will highlight blue.



3. Press Edit

Backspace key



4. Use the keypad to change the location name.

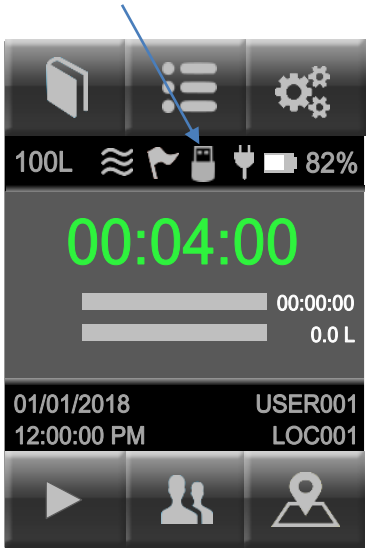
5. Press Return button to save the new location name change.

Data Logging – Sampling Data

Save sampling data to USB flash drive.

No USB Flash Drive: If no USB flash drive is plugged into the rear USB port, ActiveCount25H stores sample data only for the most recent run in volatile memory, which ActiveCount25H deletes when powered off.

USB Flash Drive: When a USB flash drive is plugged into the rear USB port, ActiveCount25H displays a USB Flash Drive icon on the HOME screen.



Save sampling data to USB flash drive: ActiveCount25H appends one line of data for each sample to a comma-separated value (CSV) file on the USB flash drive.

Export sample data stored on the USB flash drive to third-party software, such as laboratory information management (LIM) systems.

For information on ActiveCount25H CSV files, see Appendix A, *Data Files*.

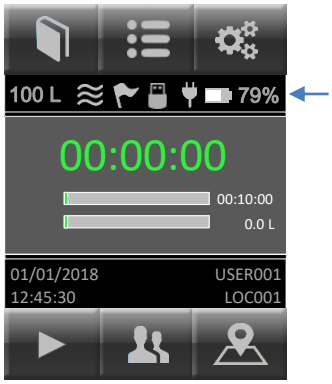
Status Indicators

Device Status Indicators

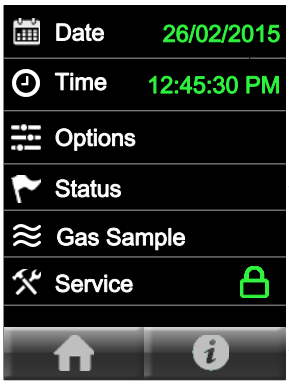
Status Indicators: ActiveCount25H displays status indicators on the Home screen. If ActiveCount25H displays Device status flag, it may indicate a device issue or problem. To display more device status information

1. Press the Settings button to display the Settings screen.
2. Press the Status button to display the Status screen.

1. Press the Settings Button



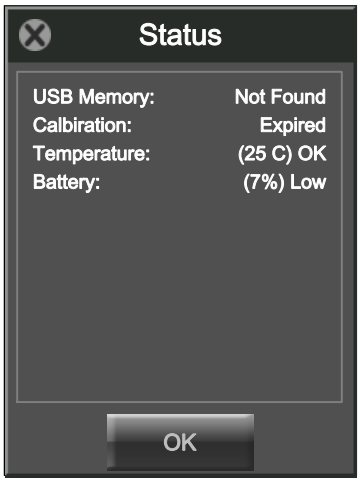
Status indicators
Target sampling volume
Good flow/flow error
Device Status flag
USB drive detected
Charging status
Battery level
Battery percentage



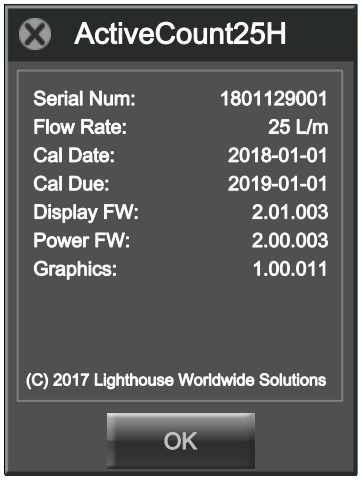
2. Press Status
If Home screen displays the Device status Flag, possibly indicating a device issue, press Status on this screen to see status information.

About ActiveCount25H
Press to display information about this unit, including serial number, flow rate, calibration date, calibration due date, and firmware version numbers.

Device Status screen



About ActiveCount25H screen



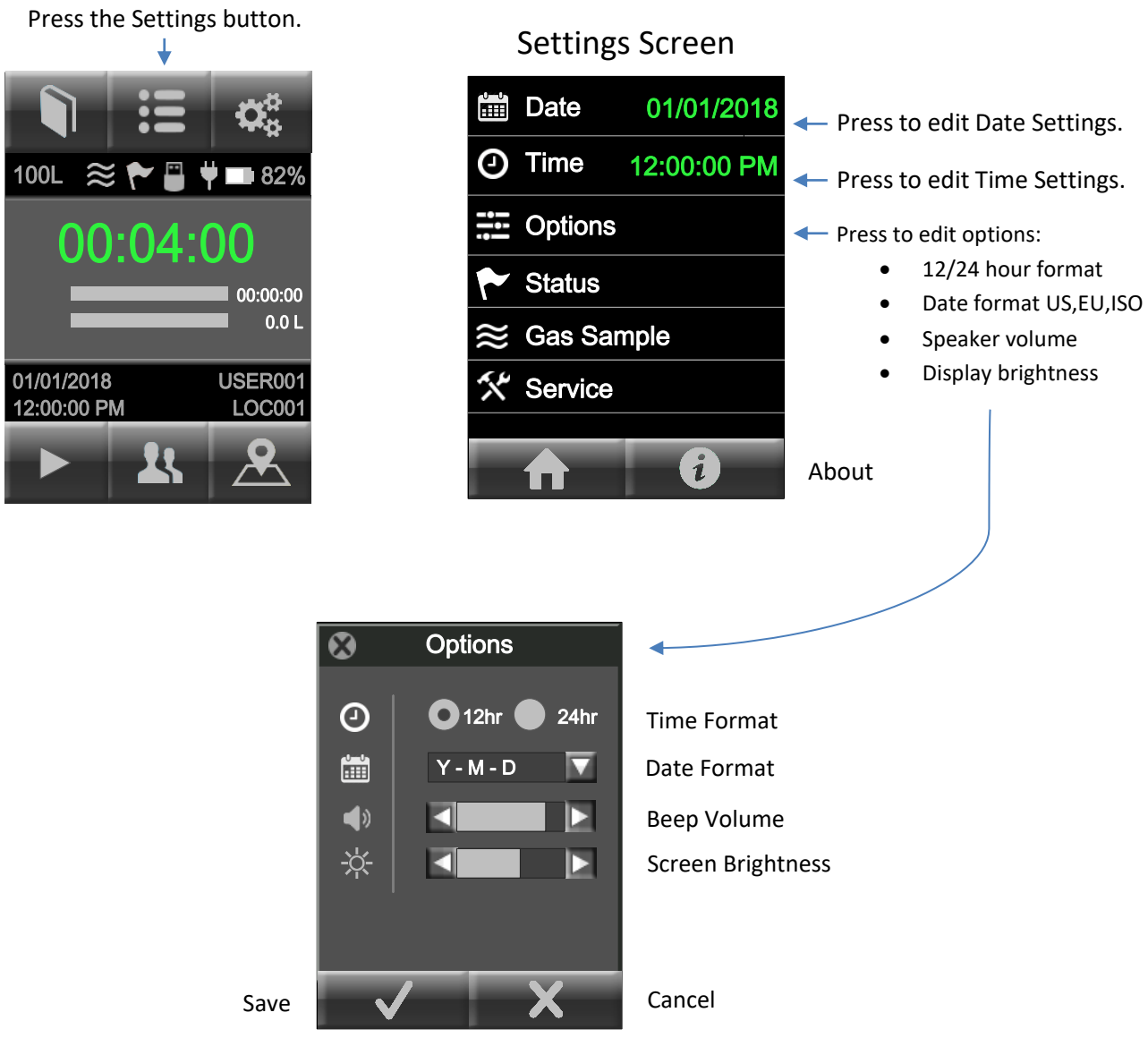
The following table describes status icons.

Icon	Status Indicator	Description
100 L	Target Sampling Volume	Target flow volume.
	Good flow or Flow error	Flow status while sampling. If a flow error condition persists, contact Lighthouse Service and Support. See Section *Technical Specifications* for contact information.
	Device status flag	Possible device error, e.g., flow error, calibration due, etc. To display the device status, press SETTINGS button and Status menu item. The sampling database stores these errors in CSV files. See subsection *Sampling databases* in Appendix A, *Database files*. If this condition persists, contact Lighthouse Service and Support. See Section *Technical Specifications* for contact information.
	USB flash drive	USB flash drive inserted into rear USB port.
	Power adapter connected	Power adapter plugged in and charging battery.
	Battery	Current battery level.

Settings

ActiveCount25H Settings

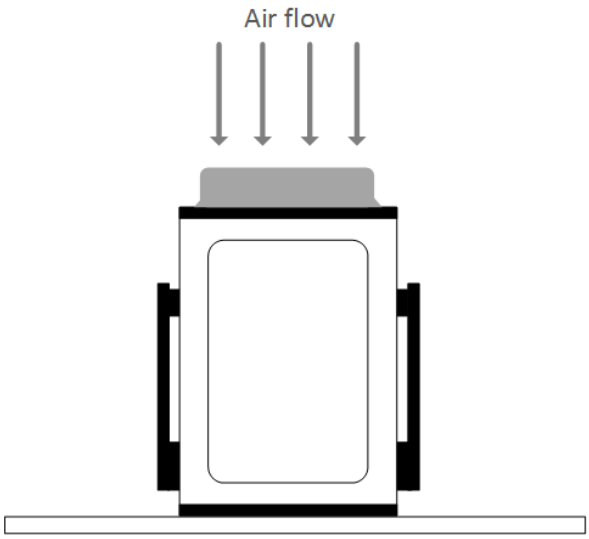
Device Settings: Press the Settings button to display and edit device settings.



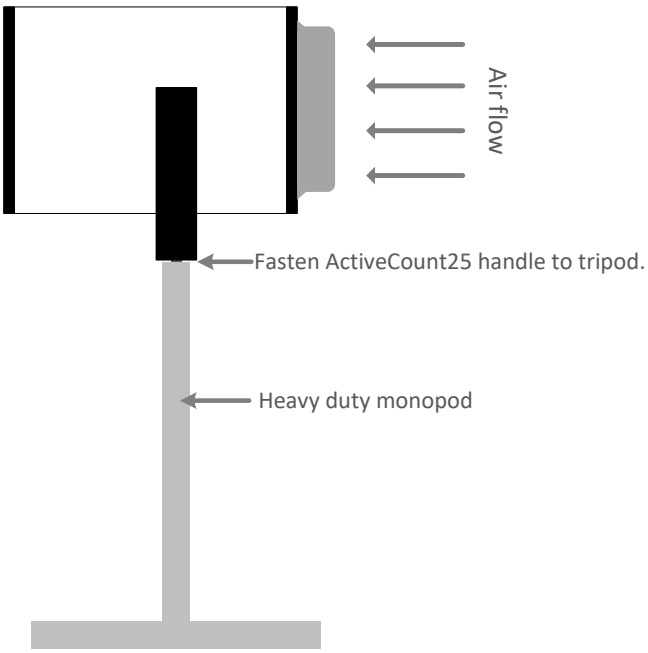
Tripod/Monopod

Vertical and Horizontal Sampling

Vertical Sampling: Place ActiveCount25H on a horizontal surface to sample vertically.



Horizontal Sampling: Mount ActiveCount25H on a tripod/monopod and turn the instrument to sample horizontally. ActiveCount25H supports 3/8" tripod/monopod screws and ¼" tripod/monopod screws using the included adapter.



Clean and Disinfect

Avoid Cross Contamination

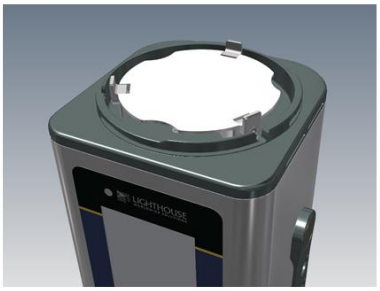
Sterilize ActiveCount25H after each cycle to avoid cross-contamination, which can adversely affect reliability of microbial samples. Always wear a pair of sterile gloves when sterilizing ActiveCount25H. Sanitize gloved hands first, with a disinfectant solution.

Use a commercial disinfectant solution, such as 70% - 90% ethanol solution or 60% - 80% isopropanol/water solution.

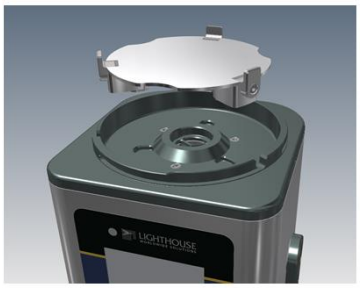
External Enclosure

Remove dust cover, sampling head and petri dish assembly from ActiveCount25H. Use the blower inlet seal to plug the blower inlet. After the blower inlet is sealed, the instrument is ready to be cleaned.

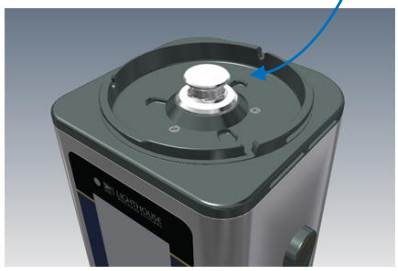
Remove Dust Cover and Sample Head



Remove magnetically attached petri dish assembly



Insert Blower Inlet Seal



To clean the external surface, spray a commercial disinfectant solution or 60% - 80% isopropanol/water solution on a sterile tissue or wipe. Then, wipe the enclosure and petri dish holder with the damp tissue. Wipe dry with another sterile tissue. Always fully remove and wipe dry the disinfectant solution before reusing ActiveCount25H. Let dry at room temperature.

Sampling Head, Dust Cover and Petri Dish Assembly

Partially or fully blocked sampling head holes require an ultrasonic bath to remove the particles. Use an autoclave to sterilize the sampling head, dust cover and petri dish assembly parts; follow a standard sterilization procedure, e.g., 134°C at 18 minutes for hospital applications. Let dry at room temperature.

It is important to sterilize the sampling head, dust cover and petri dish assembly between samples. If an autoclave is not available, use a sterile cloth with disinfectant to wipe down the sampling head and dust cover. Let dry at room temperature.

Transport

When transporting ActiveCount25H, clean and disinfect as described in this Section. Then, transport ActiveCount25H in a sterile plastic bag.

Warnings

- **To minimize the chance of electric shock, turn off and disconnect power adapter during sterilization.**
- **Do not submerge ActiveCount25H in any liquids.**
- **Do not spray disinfectant solution directly into ActiveCount25H enclosure.**
- **Do not use gases to disinfect ActiveCount25H.**
- **Lighthouse will void the warranty if an unsuitable disinfectant solution damages ActiveCount25H.**

Calibration

Calibration – Contact Authorized Facility

ActiveCount25H is factory calibrated to 25 liters/min.

Contact a factory authorized facility to calibrate ActiveCount25H and replace HEPA filter annually.

To display calibration due date, see Section *Settings*.

Technical Specifications

Benefits

- Compact design
- User-friendly and easy to use
- Reliable measurements
- Low cost of ownership
- Includes calibration certificate

Features

- Uses standard ISO 24998 90mm (85mm to 91mm) petri dishes
- Airflow 25 liters/min
- Active flow control
- HEPA filtered exhaust
- Large 3.5-inch color touchscreen
- Eight programmable volumes
- 50 programmable users
- 400 programmable locations
- Programmable start delay
- Constant mode with programmable delay, sample duration, and volume
- Periodic mode with programmable cycles, delay, sample duration and volume
- Body made from stainless steel
- Stainless steel sample head
- Autoclave-able sampling head
- Battery status indicator
- Internal rechargeable battery, approximately 10 hours normal usage
- Alarm on flow fault and low battery
- Status Indicators
- USB Port
- Speaker for alerts and notifications
- Download sampling metadata to USB flash drive
- Real time clock
- Operating conditions 0 to 35° C, humidity 0 to 80% RH
- Weight 5.3 lbs. (2.4 kg)
- Dimensions: 7.6”(h) x 4.7“(w) x 4.7”(d) [19.4 (h) x 12.0 (w) x 12.0 (d) cm]
- Power 100-240 VAC, 50-60Hz external DC power adapter
- CE approval
- Limited 2 Year Warranty

Package Contents

- ActiveCount25H with stainless steel sampling head, dust cover.
- USB flash drive.
- 24V 3A DC power adapter.
- Allen wrench to adjust petri dish holder.
- Tripod/monopod adapter.
- Calibration certificate.
- Operating Manual (this document) supplied on USB flash drive.
- Carrying case (carrying only, not shippable case).
- Optional Gas Sampler.
- Optional Remote Adapter.

Conforming Specifications

- CE.
- 21 CFR Part 11.
- ISO 14698-1, Bio contamination Control, Cleanrooms, Associated Control Environments.
- ISO 14698-2, Bio contamination Control, Cleanrooms, Associated Control Environments.
- Good Automated Manufacturing Practice, GAMP and December 2001.
- Good Manufacturing Practice, GMP, Volume 4, rules governing medicinal products.

Additional Help

For more information, contact Lighthouse Worldwide Solutions.

Service and Support
Tel: 1-800-945-5905 (Toll Free USA)
Tel: +1-541-770-5905 (Outside USA)
techsupport@golighthouse.com
www.golighthouse.com

Appendix A: Database Files

Databases in Comma-Delimited Files

ActiveCount25H stores data in comma-delimited files on a USB flash drive in folder:

`/ActiveCount25H_<serial-number>/`

where <*serial-number*> is the ActiveCount25H serial number. To display the serial number, see Section *Settings*.

```
08/05/2015 15:02:14,LOC012,6,0.10,0,0,0,0,None,Good,Good,None
08/05/2015 15:02:36,LOC013,6,0.10,0,0,0,0,None,Good,Good,None
08/05/2015 15:02:56,LOC014,6,0.10,0,0,0,0,None,Good,Good,None
08/05/2015 15:04:57,LOC015,6,0.10,0,0,0,0,None,Good,Good,None
08/05/2015 15:05:19,LOC016,6,0.10,0,0,0,0,None,Good,Good,None
```

Location Database

Locations in CSV File: ActiveCount100H stores locations in the following file:

`/ActiveCount25H_<serial-number>/aclocations.csv`

A sample location file follows:

```
Location
"LOC001"
"LOC002"
"LOC003"
"ROOM AC 1"
"ROOM AC 2"
"TEST LAB A"
"TEST LAB B"
"TEST LAB C"
 . . .
```

User Database

Users in CSV File: ActiveCount25H stores users in the following file:

`/ActiveCount25H_<serial-number>/acusers.csv`

A sample user file follows:

```
User
"USER001"
"USER002"
"A Jackson"
"L Abrams"
"J Smith"
"P Brown"
"Alice Chow"
"Ray Lopez"
  . . .
```

Sampling Run Databases

Sampling Metadata in CSV Files: ActiveCount25H stores sampling metadata in the following files:

`/ActiveCount25H_<serial-number>/acsamples_<date>.csv`

Where <*date*> is today's date, e.g., YYYY-MM-DD. ActiveCount25H appends one line of sampling data for each sampling run.

Export sampling data to third-party software, such as Laboratory Information Management (LIM) systems, to complement data from other monitoring systems.

Each sampling database file contains the following comma-delimited fields for each sampling run.

	CSV Field	Description	Sample Value
1	Timestamp	Date format – set in Settings menu • US (MM/DD/YYYY) • EU (DD/MM/YYYY) • ISO (YYYY-MM-DD) Time (local 24-hour time) • HH: MM	• 1/1/2018 9:48
2	Location	Current location	LOC001
3	User	Current user	USER001
4	Sample Duration	Total duration of sampling run in minutes	0:04:00
5	Flow Duration	Actual sampling time in minutes	0:04:00
6	Volume	Liters of air sampled	100
7	Cycles	Constant sampling = 1 Periodic sampling = number of user-specified cycles	1
8	Status	No errors detected = Success At least one error detected = Error	Success
9	Flow	Flow good = OK Flow error = Error	OK
10	Service Needed	No service needed = OK Service needed = Error	OK
11	Calibration	Calibration not yet due = OK Calibration due = Error	OK
12	Sample Aborted	User did not abort sampling run = OK User aborted run (no sample) = Error	OK
13	Temperature	Temperature normal = OK Temperature too high = Error	OK
14	Battery	Battery normal = OK Battery low (sample stopped) = Error	OK

	CSV Field	Description	Sample Value
15	USB Memory	USB flash drive detected = OK USB flash drive not detected = Error	OK
16	Model Name	ActiveCount25H model name	ActiveCount25H
17	Serial Number	ActiveCount25H serial number	1806129001
18	Flow Rate	ActiveCount25H flow rate	25 L/m
19	Last Calibration	ActiveCount25H date last calibration	1/1/2018
20	Calibration Due	ActiveCount25H date for next calibration	1/1/2019
21	Firmware 1	ActiveCount25H display firmware version	2.01.004
22	Firmware 2	ActiveCount25H power firmware version	2.00.003
23	Firmware 3	ActiveCount25H graphics firmware version	1.00.011

Appendix B: Feller Conversion Table

Table of Statistical Corrections According to Feller

The statistically corrected count (**Pr**), shown in the below table, accounts for the probability of two particles passing though the same jet/hole producing a single colony. As the concentration of particles rises the probability of two particles passing through the same orifice (and thus only yielding one CFU) also increases.

Pr = N [1/N + 1/N-1 + 1/N-2 + 1/N-r+1]

Where: N = Number of holes in the impactor plate

R = Number of colony forming units counted on standard Petri Dish

Pr = Probable Statistical Total

R	Pr	R	Pr	R	Pr	R	Pr
1	1	23	26	45	62	67	125
2	2	24	28	46	65	68	129
3	3	25	29	47	67	69	133
4	4	26	31	48	69	70	138
5	5	27	32	49	71	71	143
6	6	28	33	50	73	72	148
7	7	29	35	51	76	73	153
8	8	30	36	52	78	74	159
9	9	31	38	53	80	75	165
10	11	32	39	54	83	76	172
11	12	33	41	55	85	77	180
12	13	34	43	56	88	78	188
13	14	35	44	57	91	79	196
14	15	36	46	58	94	80	206
15	16	37	48	59	97	81	217
16	18	38	49	60	100	82	230
17	19	39	51	61	103	83	244
18	20	40	53	62	106	84	262
19	21	41	55	63	109	85	284
20	23	42	57	64	113	86	313
21	24	43	59	65	117	87	357
22	25	44	60	66	121	88	445

Appendix C: Limited Warranty

Limitation of Warranties

A. Lighthouse Worldwide Solutions (LWS) warrants that all equipment shall be free from defects in material and workmanship under normal use for a period of two years from date of shipment to Buyer. LWS does not warrant that operation of the software will be completely uninterrupted or error free or that all program errors will be corrected. Buyer shall be responsible for determining that the equipment is suitable for Buyer's use and that such use complies with any applicable local, state, or federal law. Provided that Buyer notifies LWS in writing of any claimed defect in the equipment immediately upon discovery and any such equipment is returned to the original shipping point, transportation charges prepaid, within two years from date of shipment to Buyer and upon examination LWS determines to its satisfaction that such equipment is defective in material or workmanship, i.e. contains a defect arising out of the manufacture of the equipment and not a defect caused by other circumstances, including, but not limited to accident, misuse, unforeseeable use, neglect, alteration, improper installation, improper adjustment, improper repair, or improper testing, LWS shall, at its option, repair or replace the equipment, shipment to Buyer prepaid. LWS shall have reasonable time to make such repairs or to replace such equipment. Any repair or replacement of equipment shall not extend the period of warranty. If the Instrument is modified or in any way altered without the explicit written consent of LWS then the warranty is null and void. This warranty is limited to a period of two years, except as noted below, without regard to whether any claimed defects were discoverable or latent on the date of shipment. The length of warranty for pumps in hand held particle counters is one (1) year. Batteries and accessories with all products are warranted for one (1) year. Fuses and purge filters carry no warranty. If a third party battery is used in the product, the product warranty is null and void. If the battery is charged by a third party battery charger the battery warranty is null and void.

B. If Buyer shall fail to pay when due any portion of the purchase price or any other payment required from Buyer to LWS under this contract or otherwise, all warranties and remedies granted under this Section may, at LWS's option, be terminated.

C. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER REPRESENTATIONS, WARRANTIES AND COVENANTS, EXPRESS OR IMPLIED WITHRESPECT TO THE EQUIPMENT AND ANY DEFECTS THEREIN OF ANY NATURE WHATEVER, INCLUDING AND WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. LWS SHALL NOT BE LIABLE FOR, AND BUYER ASSUMES ALL RISK OF, ANY ADVICE OR FAILURE TO PROVIDE ADVICE BY LWS TO BUYER
REGARDING THE EQUIPMENT OR BUYERS USE
OF THE SAME. UNDER NO CIRCUMSTANCES SHALL LWS BE LIABLE TO BUYER UNDER ANY TORT, NEGLIGENCE, STRICT LIABILITY, OR PRODUCT LIABILITY CLAIM AND BUYER AGREES TO WAIVE SUCH CLAIMS. LWS's SOLE AND EXCLUSIVE LIABILITY AND BUYERS SOLE AND EXCLUSIVE REMEDY, FOR ANY NONCONFORMITY OR DEFECT IN THE PRODUCTS OR ANYTHING DONE IN CONNECTION WITH THIS CONTRACT, IN TORT, (INCLUDING NEGLIGENCE), CONTRACT, OR OTHERWISE, SHALL BE AS SET FORTH IN THE SUBSECTION A HEREOF AS LIMITED BY SUBSECTION B HEREOF. THIS EXCLUSIVE REMEDY SHALL NOT HAVE FAILED OF ITS ESSENTIAL PURPOSE (AS THAT TERM IS USED IN THE UNIFORM COMMERCIAL CODE) PROVIDED THAT THE SELLER REMAINS WILLING TO REPAIR OR REPLACE DEFECTIVE EQUIPMENT (AS DEFINED IN SUBSECTION A) WITH A COMMERCIALLY REASONABLE TIME AFTER RECEIVING SUCH EQUIPMENT. BUYER SPECIFICALLY ACKNOWLEDGES THAT SELLER'S PRICE FOR THE EQUIPMENT IS BASED UPON THE LIMITATIONS OF LWS'S LIABILITY AS SET FORTH IN THIS CONTRACT.

Warranty of Repairs After Initial Two (2) Year Warranty

A. Upon expiration of the initial two-year warranty, all parts and repairs completed by an authorized Lighthouse repair technician are subject to a six (6) month warranty.

B. Other than the above, LWS makes no warranty of any kind expressed or implied, except that the products manufactured and sold by LWS shall be free from defects in materials and workmanship and shall conform to LWS's specifications; Buyer assumes all risk and liability resulting from use of the products whether used singly or in combination with other products. If instrument is modified or in any way altered without the explicit written consent of LWS, then the warranty is null and void.

C. WARRANTY REPAIRS SHALL BE COMPLETED AT THE FACTORY, BY AN AUTHORIZED SERVICE LOCATION, BY AN AUTHORIZED SERVICE TECHNICIAN, OR ON SITE AT BUYER'S FACILITY BY A LIGHTHOUSE AUTHORIZED EMPLOYEE. BUYER PAYS FREIGHT TO FACTORY; SELLER WILL PAY STANDARD RETURN FREIGHT DURING THE WARRANTY PERIOD. BUYER MAY SELECT A FASTER METHOD OF SHIPMENT AT ITS OWN EXPENSE.

Service and Support
Tel. 1-800-945-5905 (USA Toll Free)
Tel. 1-541-770-5905 (Outside of USA)
techsupport@golighthouse.com
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LIGHTHOUSE
WORLDWIDE SOLUTIONS