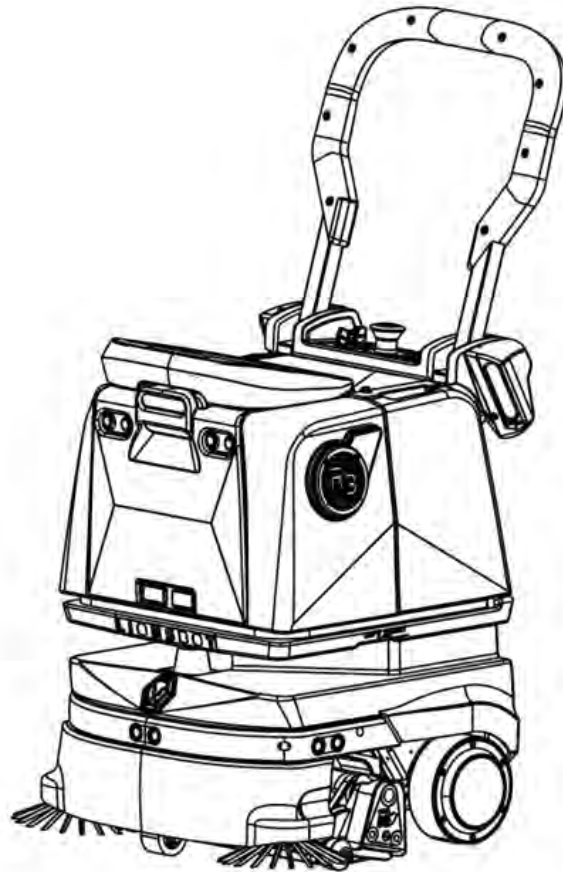


# R3-VAC – OPERATION MANUAL



## AUTONOMOUS CLEANING ROBOT – FLOOR VACUUM CLEANER

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**ENGLISH (EN)**

**OPERATION MANUAL**

**Rev 0.6 (05-2023)**



**ORIGINAL INSTRUCTIONS MANUAL**



**LIONSBOT**

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## INTRODUCTION TO THE R3 VAC

The R3 VAC is an autonomous floor-vacuum cleaner developed by LionsBot. The R3 VAC is equipped with two side brush for floor sweeping and a floor brush with vacuum suction for floor. The brushes and vacuum are activated automatically or manually during cleaning operations.

All work with the R3 VAC can be carried out through the Touchscreen or LionsClean mobile app.

This document introduces the user to the overall structure and components of the R3 VAC, safety precautions related to its use, and the procedures for work preparation, cleaning and maintenance with the R3 VAC. Any questions pertaining to this manual or R3 VAC operation in general should be directed to the respective distributor or the original manufacturer (see '[DISTRIBUTOR INFORMATION](#)' or '[CONTACT INFORMATION](#)' sections).

This machine will provide excellent service. However, the best results will be obtained at minimum costs if:

- The machine is operated with reasonable care.
- The machine is maintained regularly - per the machine maintenance instructions provided.
- The machine is maintained with manufacturer supplied parts.

|                                                                                                                                                                         |                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|   | <p><b>Read this manual completely and understand the machine before operating or servicing it.</b></p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                         |                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | <p><b>PROTECT THE ENVIRONMENT</b></p> <p>Please dispose of packaging materials, used components such as batteries and fluids in an environmentally safe way according to local waste disposal regulations.</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

This operator manual contains information to allow for quick start-up of the R3 VAC, powered by LionsOS. This document may be periodically revised. The R3 VAC, can be used in manual mode or as a robotic vacuum cleaner. Use in robotic (autonomous) mode requires a subscription to LionsBot International Autonomy Services. It is important to follow all provided instructions and warnings. Failure to adhere to instructions could result in damage to the machine and injury. The R3 VAC is a commercial floor vacuum cleaner powered by LionsOS software. The machine is capable of functioning in either manual or robotic (autonomous, self-driving) modes. When in robotic mode, the LionsOS software enables autonomous navigation. This product may be covered by one or more patents or pending patent applications. Email LionsBot International for details. Discrete portions of this product were made possible by open-source software. Please email LionsBot International for details.

## MAIN R3 VAC COMPONENTS

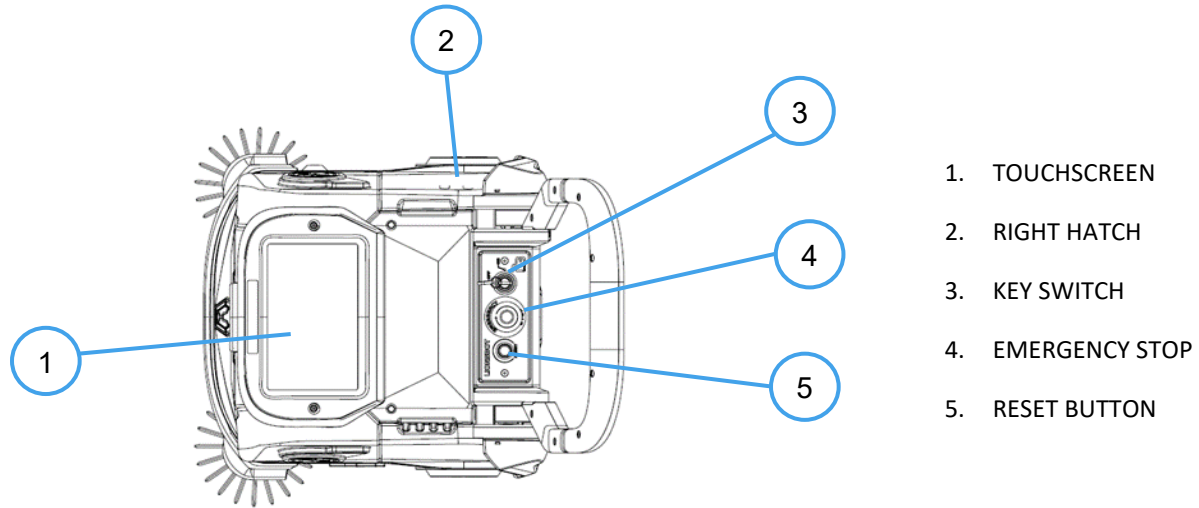


Fig. 1

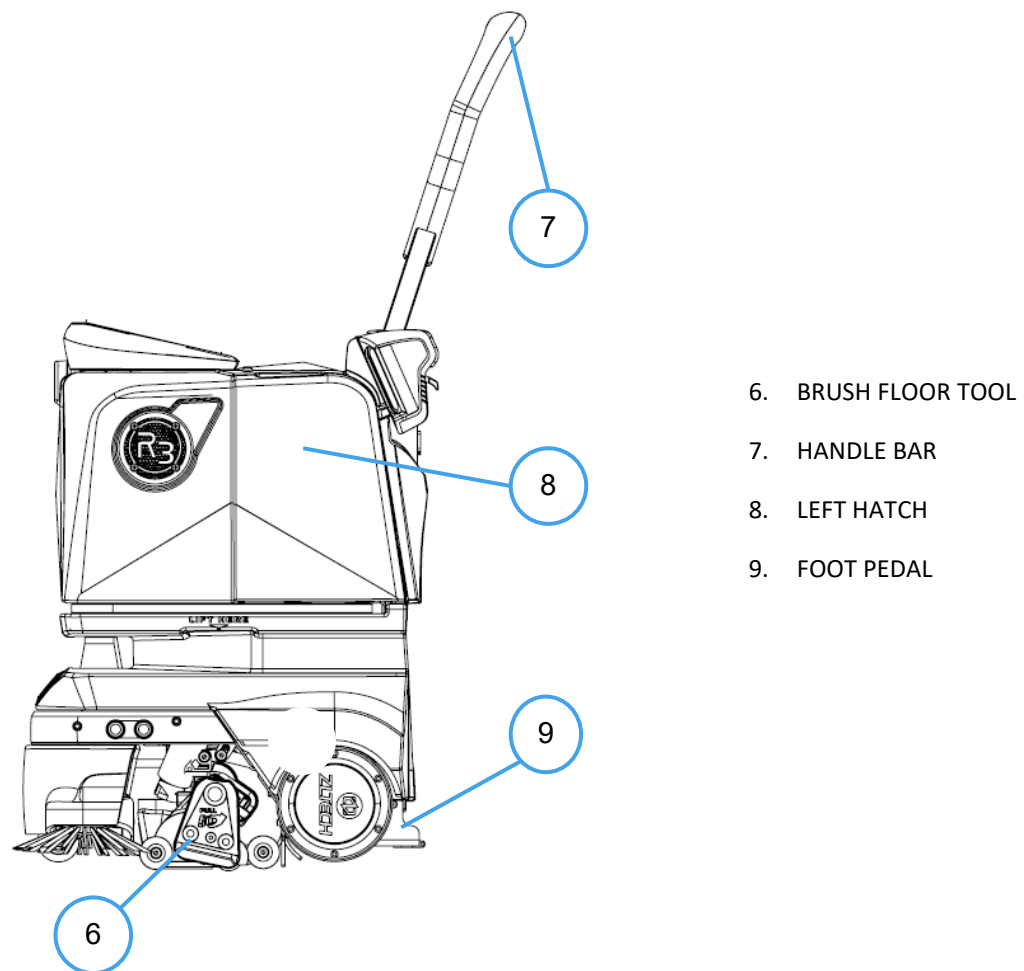
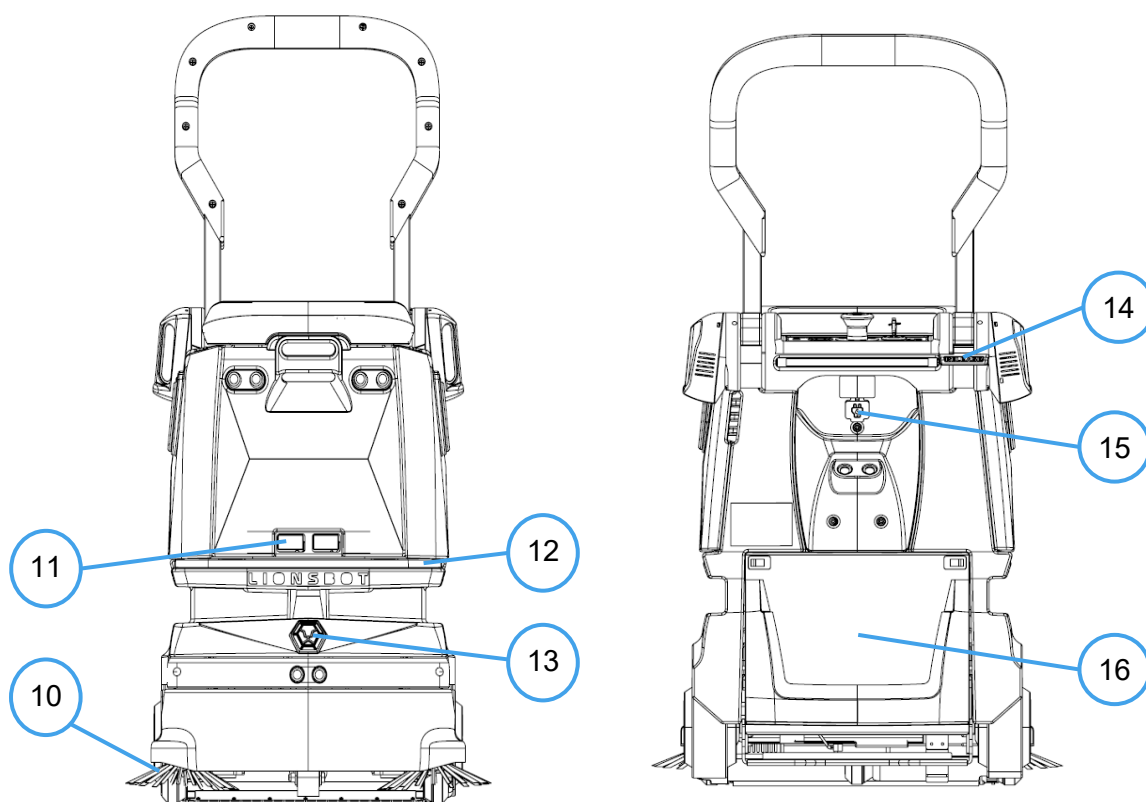


Fig. 2



*Fig. 3*

10. SIDE BRUSH

11. CHARGING CONTACTS

12. LED STRIP

13. LIONSBOT LOGO

14. HANDLE RELEASE LATCH

15. MANUAL CHARGING  
PORT

16. BATTERY PANEL

## INTENDED USAGE ENVIRONMENT

The R3 VAC is designed and built for the cleaning of smooth, compact flooring in an enclosed environment (ex. offices spaces, corridors, meeting rooms, classrooms, laboratories etc.) by a qualified operator in proven safety conditions. It is only intended to be used in an enclosed indoor environment. This machine is not intended for use on public roadways and narrow areas less than 10 m<sup>2</sup>. Only use this machine as described in operation manual.

Use the machine in approved environments in accordance with the LionsBot Software End User License Agreement (EULA). Approved environments shall also be limited to cleaning areas with adequate cellular communication signals permitting cellular data communication with the machine to enable periodic software updates.

The operator is responsible for the use of each R3 in both manual and robotic mode. As the machine begins robotic operation, observe vacuum performance to ensure that all components are functioning properly. Each operator must be mindful to use the machine in accordance with its intended use and precautions at all times. Operators will not engage in any of the following conduct or activities with respect to the Autonomy Services or LionsOS:

- Transmission of any software or other materials that contain any viruses, worms, trojan horses, defects, spyware, spiders, screen-scrapers, or other items of a destructive or disruptive nature;
- The machine onboard cameras may capture images of people who happen to be in its surrounding. There may be local laws of operation relating to use of technology with cameras. Please comply with all applicable laws, including using signage or obtaining consents as required; Lions cloud does not store any images or video captured by the robot.
- Exploitation of the Autonomy Services, LionsOS, hardware in any unauthorized manner, including by trespassing or burdening server or network capacity or infrastructure;
- Framing, mirroring, or reselling any part of the Autonomy Services or LionsOS without written authorization from LionsBot International;
- Unauthorized collection of user information; or
- Attempting to deliberately damage the Autonomy Services or LionsOS, or undermine the legitimate operation of the Autonomy Services or LionsOS.

## GENERAL SAFETY

This section consists of safety information which must be read and understood by the user before the first usage of the robot. Operator cooperation is paramount for accident prevention; most workplace accidents are caused by a failure to adhere to safety regulations. An attentive and careful user is the most effective guarantee against accidents.

The following symbols are used to indicate any potentially hazardous situations. Please take the necessary precautions to protect people and objects that may be present around the R3.

## DESCRIPTION OF SYMBOLS

The following symbols categories explain the level of harm or damage that can occur if warnings are not observed and the machine or related equipment is used incorrectly. Understand these symbols and their correlating meanings before reading the remainder of this manual.

|                                                                                     |                                                                                                                                                    |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|   | <p><b>DANGER:</b> Indicates an imminent hazardous situation which, if not avoided, could result in serious injury or death.</p>                    |
|  | <p><b>WARNING:</b> Indicates a potentially hazardous situation which, if not avoided, could result in injury or major damage to the equipment.</p> |
|  | <p><b>CAUTION:</b> Indicates a situation which, if not avoided, could result in major damage to the equipment.</p>                                 |

## PICTORIAL INDICATIONS

The following pictorial indication categories explain information to be observed. Read this guide after thoroughly understanding the information.

|                                                                                     |                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <b>NOTE:</b> Indicates safety information, precautions on dos and don'ts to ensure safe product usage and/or user safety.                                                                                                                 |
|    | <b>COMPULSORY:</b> Action based on instruction must be performed.                                                                                                                                                                         |
|    | <b>PROHIBITED:</b> Not allowed action. Do not perform any operation not given in this manual. Use of the machine in a manner inconsistent with this manual may lead to personal injury or significant physical damage or property damage. |
|    | <b>NO WATER EXPOSURE:</b> Do not expose to water or moisture.                                                                                                                                                                             |
|  | <b>UNPLUG:</b> Unplug from power outlet.                                                                                                                                                                                                  |
|  | <b>Recycling symbol:</b> Informs the user to carry out the operations in compliance with environmental regulations in force in the place of usage of the appliance                                                                        |
|  | <b>Bin Symbol:</b> To indicate that separate collection for waste electric and electronic equipment (WEEE) is required.                                                                                                                   |
|  | <b>Wear Gloves</b>                                                                                                                                                                                                                        |
|  | <b>Wear Protective Eyewear</b>                                                                                                                                                                                                            |

## BATTERY CHARGING



### DANGER



- **Warranty shall be voided if instructions in this manual are not followed.**

- If the battery charge cable is damaged or broken, it should be replaced by the manufacturer or authorized service personnel or a qualified person in order to prevent hazards.
- Keep sparks, flames and incandescent materials at a safe distance from the batteries.
- Keep the robot secure during the entire battery recharging cycle, and only perform the procedure in well-ventilated areas.



- The socket for the battery charger cable must have a prescribed earth connection. Do not modify the polarized plug to fit a non-polarized outlet or extension cord.
- Before charging check that the electric cable that connects the battery charger to the batteries is not damaged, and if it is damaged do not use it and contact technical assistance. Do not use with a damaged plug or lose power outlet.



- Do not disconnect the battery charger cable from the machine socket when the battery charger is operating. This is necessary to prevent electric arcs forming. To disconnect the battery charger when charging, first disconnect the power cable from the mains socket.
- Do not use extension cords or outlets with inadequate current carrying capacity.
- The robot charger should not share an AC plug point with any other devices. Do not use more than one charger per AC plug.
- Do not charge frozen batteries.
- Do not unplug by pulling on the cord. To unplug, grasp the plug and not the cord.
- Do not replace the battery without contacting authorized distributor centre.
- Do not expose the battery charger/ docking station to high temperatures or allow moisture/ humidity of any kind to come in contact with the battery charger/ docking station.
- Do not leave the battery to charge unattended/ overnight as a safety precaution for the Lithium-polymer batteries. Unplug the charger after the charging is complete (a typical full charge cycle takes about 2 hours).



## DANGER



- Do not mutilate or incinerate batteries as they will explode at high temperatures.
- Do not attempt to open the battery charger/ docking station. Repairs should only be carried out by a qualified service personnel.



- Unplug the battery charger/ docking station from the outlet when not in use and before servicing.



- Do not charge the robot if it is wet.
- Do not use outdoors or on wet surfaces.



## WARNING



- Install the battery charger in a location that can be easily accessed by the robot. Away from water, on a flat surface and elevated.
- Do not pull or carry by the cord, use the cord as a handle, close the door on the cord, or pull the cord around sharp edges or corners. Keep the cord away from heated surfaces.
- Never smoke in the machine's vicinity while the batteries are charging.
- Use only a compatible battery charger with purchased batteries.



- The charger surface becomes hot while charging.

## USING THE R3 VAC



### DANGER



- **Warranty shall be voided if instructions in this manual are not followed.**

- Immediately discontinue use if anything unusual is noticed during use, recharging, or storage such as noise, smoke, odour, etc. Failure to do so may result in fire, injury, electric shock, damage, malfunction, overheating, leakage, chemical explosion, or other damage to the machine, battery charger and docking station.
- Report machine damage or faulty operation immediately.
- Use the machine within an ambient temperature range of 2°C to 40°C, humidity of 10% to 80%. Also, store in a dry environment with no dust in an ambient temperature range of 2°C to 40°C. Failure to do so may result in fire, injury, electric shock, damage, malfunction, overheating, leakage, chemical explosion, or other damage to the machine, battery charger, battery or docking station.
- In the event of danger, promptly activate the emergency stop push-button to immediately stop all robot motion.
- In areas where the machine is inoperable or unmovable due to power not turning on, move the machine to a safer location.
- **If wearing an implanted cardiac pacemaker or implanted defibrillator, consult with the manufacturer of such medical device to confirm a safe operational distance from the machine.** Electric signals may affect the operation of the pacemaker or defibrillator.



- **Do not use in a healthcare environment or near electronic medical devices.** \*The machine does not comply with UL or IEC 60601 standards (or equivalent standards).
- Flammable materials can cause an explosion or fire. Do not use flammable materials in tank(s).
- Do not use the robot in a potentially combustible atmosphere (such as near dusty areas, candles, desktop lamps or a fireplace).
- Do not use the robot to collect gases, explosive/ flammable liquids or powders, nor acids or solvents – including gasoline, paint thinners, acetones, aluminium and magnesium powders.
- Do not operate machine in environments requiring fail-safe performance (areas where machine failure could lead to personal injury or property damage).
- Do not block the machine's ventilation vents. Doing so may cause fire, injury, electric shock, damage, malfunction, overheating, leakage, chemical explosion, or other damage to the machine, battery charger.



## WARNING



- Machine can only be operated by trained and authorized users. Operator must be mentally and physically capable of following machine instructions or touchscreen prompts. Operator must read and fully understand the manual.
- This machine is for dry use only. On floors with hard surfaces or thin carpets (Pile height 10mm or less), of 0 % incline.
- Use and store only indoors, in a clean environment to keep pests out of robot enclosure (i.e., in an enclosed and covered environment).
- Always operate machine in manual mode when going into elevators or through automatic doors, transport loading and unloading. Robotic routes should never include going into elevators or through automatic doors.
- Use robots only in environments, with minimal glare. Do not expose robot to direct sunlight, light sources or environments with high brightness and reflectivity.



- This machine may be equipped with technology that automatically communicates over the cellular network. If this machine will be operated where cell phone use is restricted because of concerns related to equipment interference, please contact a LionsBot representative for information on how to disable the cellular communication functionality.
- This machine is **not suitable** for picking up hazardous dust.



- In the event of a fire, use a fire blanket, powder or carbon dioxide extinguisher. Do not use water.
- Do not handle the robot or charger with wet hands.
- Do not operate the robot if it has been damaged in any way.
- Do not operate in a very crowded location
- Do not allow children to play with the robot unattended.
- Do not allow unauthorized persons near the machine.
- Do not operate on slopes or uneven terrain or low traction environments (ice, oil, etc.)
- Do not attempt to ride, climb or sit on machine or allow machine to be used as a toy, transport or any other function other than its intended purpose in this manual.
- Do not leave electrical cords or low-profile items (anything having a height of less than 5 cm from ground) in area of machine operation.
- Do not use ladders, scaffolds, or other temporary constructed structures in area of machine operation.



## CAUTION



- This machine is for indoor use only.
- Avoid operating the robot in places/times frequented by elderly visitors, general public for noise hazard concerns.
- Exercise caution when running the robot autonomously near visually impaired persons.
- If Operator is allergic to rubber or metal. Gloves must be worn when operating machine.



- Do not operate near cliffs, escalators, stairs or moving platforms in an area of machine operation. Near is defined as 3x robot length or 5 m. (The higher value is used)
- Do not drive the robot over steps or curbs higher than 2cm.
- In manual mode, do not operate the robot over uneven surfaces and steep slopes more than 5% grade (2.9 degrees).
- In autonomous mode do not operate on slopes, the floor must be flat.
- Do not use any acidic, strong solvents, chlorine based and flammable chemicals on the machine.
- Do not press the ultrasonic sensors.
- Do not put any weight on the robot, do not stand/sit on any part of the machine.
- Do not use the robot to pick up anything that is burning, such as cigarettes or matches.



- Do not leave the robot unattended and stationary in a public area.



- To Ensure optimal performance, check the vacuum bag capacity when turning the robot on or off.
- Check the battery level of the robot regularly.
- Check that the LIDARs and cameras are clean and dry before starting.
- Place proper floor cleaning signage in areas where the machine is operating and people are present, in accordance with standard floor cleaning practices.
- Follow site safety guidelines concerning wet floors.
- Operator cooperation is paramount for accident prevention; most workplace accidents are caused by a failure to adhere to safety regulations. An attentive and careful user is the most effective guarantee against accidents.

## STATUS MONITORING SYSTEM

R3 is equipped with a status monitoring system. This system acts as a secondary channel for the robot's navigation related safety system. The system receives a heartbeat status signal from the computer at a pre-defined frequency (2Hz). The system only drives the traction motors and other moving parts such as brush motors & vacuum motors if the heartbeat is regularly updated. This ensures that the robot cannot move if the IPC (Industrial PC) is switched OFF or spoilt half-way through the autonomous or manual operation.

This system is to prevent R3 from moving on its own without receiving correct instructions from on-board computer.

## DEACTIVATION AND STORAGE



### WARNING



- Store the robot in a dry, sheltered place in a clean environment free of pests.
- Stop the robot on a flat surface. Turn the key switch off and remove the key.



- Do not store the robot near combustible materials.

## CLEANING AND MAINTENANCE



### WARNING



- Do not spray water directly at the robot to clean it.



- Do not use chemicals such as benzene, thinner, acetone or alcohol to clean the robot.
- Do not attempt to modify, disassemble or repair the robot. Repairs should only be carried out by a qualified service personnel.



- Stop robot on a level surface. Turn off robot and remove the key before cleaning or activate E-STOP before maintenance of the robot to prevent activation.
- Wear personal protective equipment as needed, and where recommended in this manual.
- Avoid moving parts. Do not wear loose clothing, jewellery and secure long hair.
- Block machine wheels before transport.
- Robot may be placed on its back (battery panel facing the floor) for maintenance.

## TRANSPORT



**CAUTION** The R3 VAC can be pushed manually in **manual mode** or moved using the autonomous-control function on the touchscreen. When moving around narrow areas, it is easier to push the R3 VAC.



Fig. 1

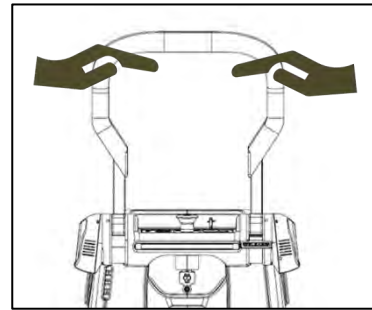
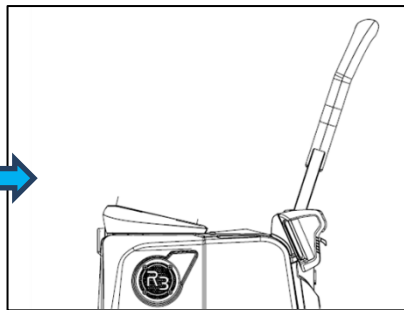


Fig. 2

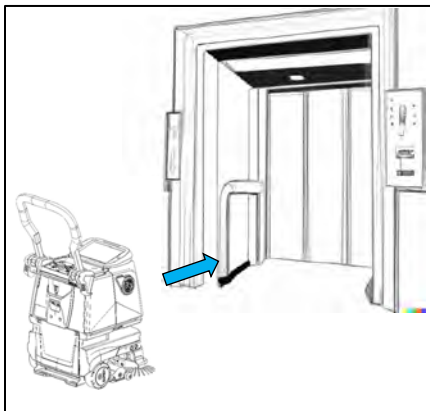


Fig. 3

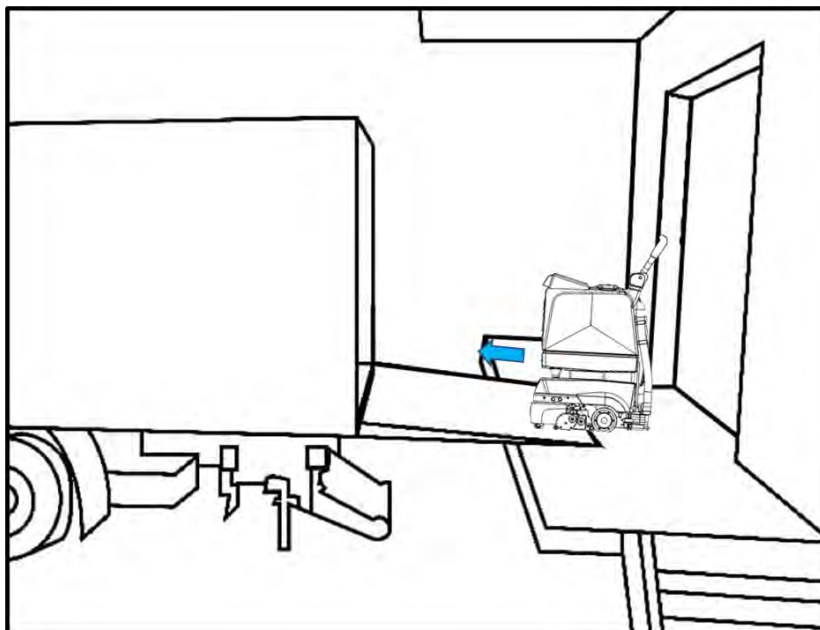
- Use the touchscreen and select **manual mode** to move the robot.
- Pushing the R3 VAC manually: Lift up the handle from the rest position as shown (Fig. 1). Ensure that the handle is being clasped into the fitting of handle mount bar.
- Use both hands to push from the handle as shown (Fig. 2).
- Moving the R3 VAC into lifts: step on the pedal, tilt up robot and push in, as the smaller front wheel can get stuck (Fig. 3).
- Moving over uneven surfaces (humps, steps): in any situation that could cause the R3 VAC to tilt or tip over an obstacle while moving, always use the foot pedal to move over the obstacle.



**WARNING:** Do not drive the robot over steps or curbs higher or lower than 2cm. Check your surrounding environment for hazards (people, slopes, escalators etc.) before moving the robot.



**NOTE:** For R3 VAC dimensions and turning radius in narrow corridors see [‘Technical Data’](#).



*Fig. 4*

- Transporting in a truck:
  - Use ramp, truck or trailer that will support the weight of the machine and operator.
  - When moving the R3 VAC onto a hydraulic ramp of a truck (Fig. 4).
  - Do not load/unload on ramp inclines that exceed 10% grade / 6°.
  - Do not drive/load robot on a slippery ramp.
  - When the R3 VAC is on the ramp, keep both hands on the handle to prevent it from sliding.
  - Block machine tires.
  - Turn off machine and remove the key.
  - Use tie-down straps to secure machine.



**WARNING:** The user is at risk of tipping over the robot and subject to crush hazards when loading/ unloading the robot. The operator and spotter are responsible for identifying and mitigating loading/ unloading hazards and taking safety precautions.

## ROBOT RECOVERY

In event where robot battery is dead, push the robot to charging station.



**WARNING:** Pushing robot with the handle bar up. There is no active break on the robot when power is off. Do not leave robot unattended on a slope or ramp.

## DISPOSAL



**NOTE:** Due to the presence of toxic or harmful materials inside the R3 VAC (e.g., batteries, IPC), the robot should not be left unattended at the end of its working life. See section on '**DISPOSAL**' for instructions on scrapping.

## EMERGENCY STOP ACTIVATION



**WARNING:**

- If you anticipate any imminent danger to the R3 VAC or its surroundings, or in operating the robot in any novel situation, always be on standby to trigger the emergency stop button either directly on the robot or through the app (see the section on '[EMERGENCY STOP](#)' for details on usage).
- After the Emergency stop button is pressed, all of robot motor operations will stop immediately, cleaning functions and traction motor will cease operation. **The robot traction break will be active.**
- The operator is to secure the robot when emergency stop is activated.
- Before resuming normal operation, the operator must check the robot's condition and surrounding for safety.
- After releasing the emergency stop and pressing the reset switch the operator can resume operation using the touch screen application.

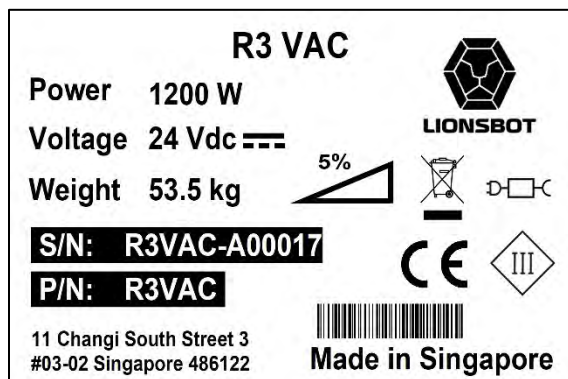
## WARNING ON NOISE LEVEL



**WARNING:** R3 VAC noise level less than 65dB during cleaning operation.

## NAME PLATE

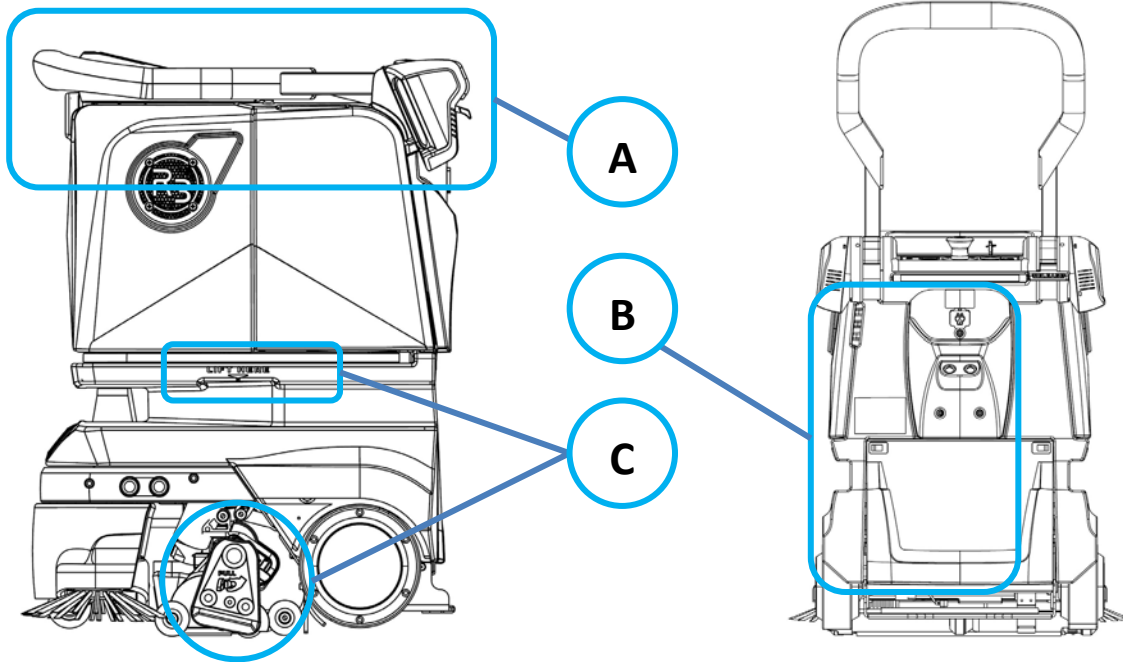
The serial number sticker is located on the robot left side. Please provide this serial number along with any request for assistance/ servicing or spare parts purchase.



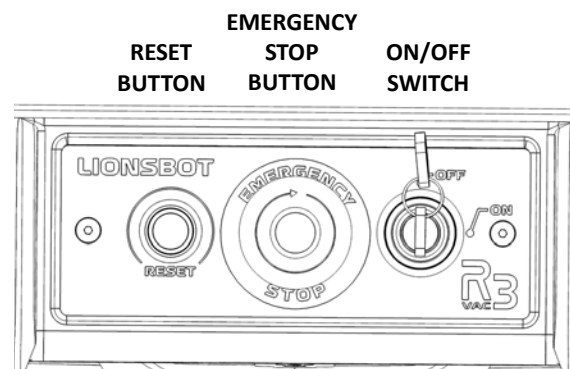
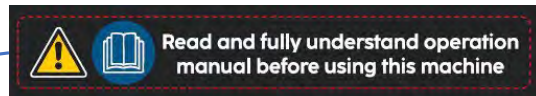
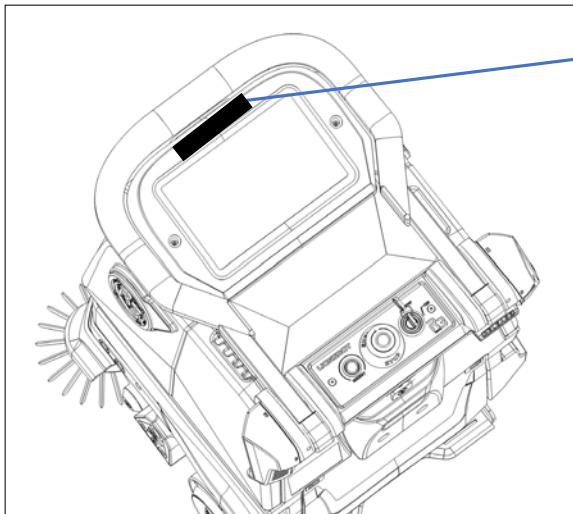
The Serial Number is formatted as follows:

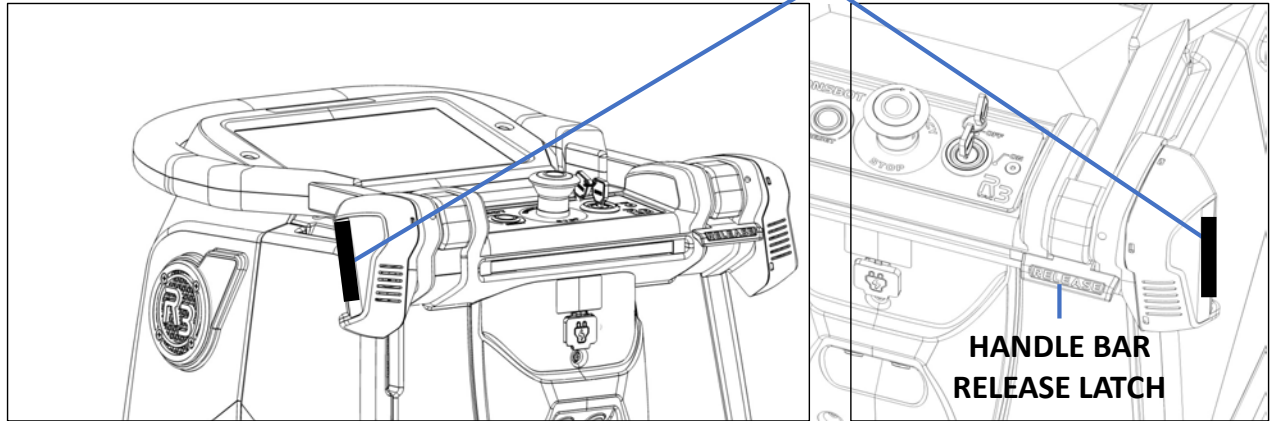
1. First five alphabets (R3VAC).
2. Next six characters (A00001) encode the factory location (A = Singapore) followed by the sequential number of the product.

## SYMBOLS ON THE R3 VAC

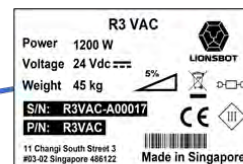
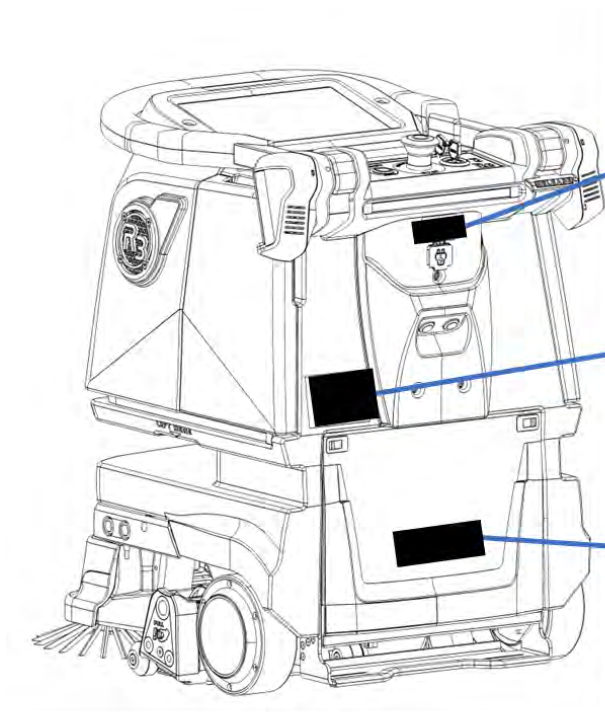


A

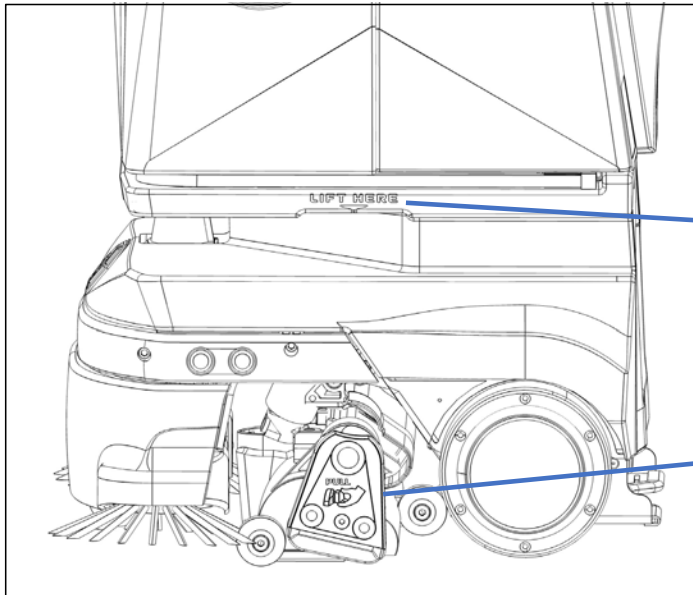




B



C



**LIFT HERE**

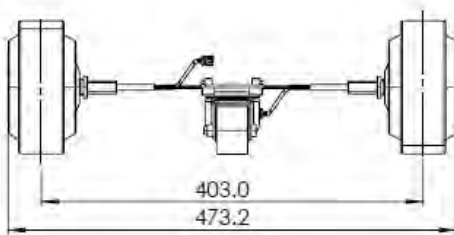
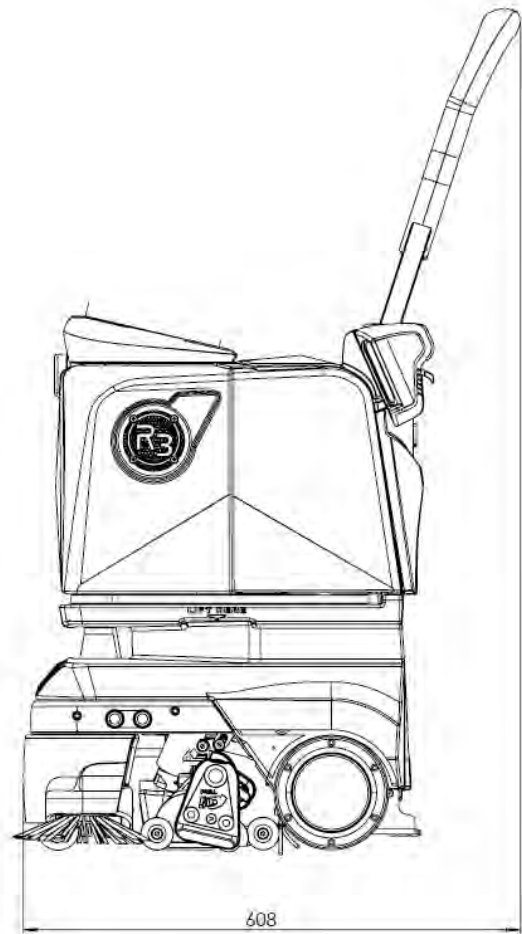
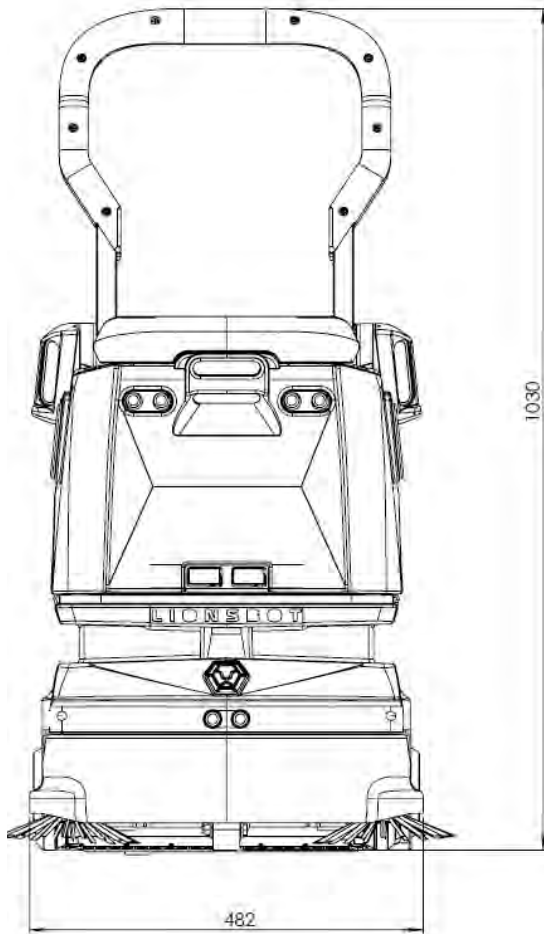
**PULL TO  
REMOVE FLOOR  
TOOL**

## TECHNICAL DATA

| Technical Data                                                          | SI [KMS]          | Value                  |
|-------------------------------------------------------------------------|-------------------|------------------------|
| <b>General Specifications</b>                                           |                   |                        |
| Rated Machine Power                                                     | kW                | 1.2                    |
| Working Capacity <sup>1</sup>                                           | m <sup>2</sup> /H | 1050                   |
| Working Width                                                           | mm                | 550                    |
| Roller Brush Width                                                      | mm                | 350                    |
| Battery (Nominal Voltage –Capacity)                                     | V/Ah              | 24/40                  |
| Front Wheel (External Ø - Width)                                        | mm/mm             | 50/33                  |
| Maximum Forward Speed During Cleaning (Autonomous)                      | m/s               | 1                      |
| Maximum Reverse Speed                                                   | m/s               | 0.15                   |
| Turning Radius                                                          | m                 | 0                      |
| Robot Dimensions (Length – Width - Height) <sup>2</sup>                 | mm                | 633.2 x 482.4 x 1026.8 |
| Robot Dimensions (Length – Width - Height) <sup>3</sup>                 | mm                | 520.1 x 482.4 x 655.2  |
| Sound Pressure Level                                                    | dB                | 60                     |
| Vacuum Bag Capacity                                                     | L                 | 6                      |
| <b>Operating Conditions</b>                                             |                   |                        |
| Maximum Slope During Ascent and Descent During Transport <sup>(2)</sup> | % / °             | 8.75/5                 |
| Maximum Ambient Temperature for Machine Operation                       | °C                | 40                     |
| Minimum Temperature for Using the Scrubbing Function                    | °C                | 2                      |
| Robot Weight During Transport <sup>(4)</sup>                            | Kg                | 53.5                   |
| Maximum Altitude                                                        | m                 | 2000                   |

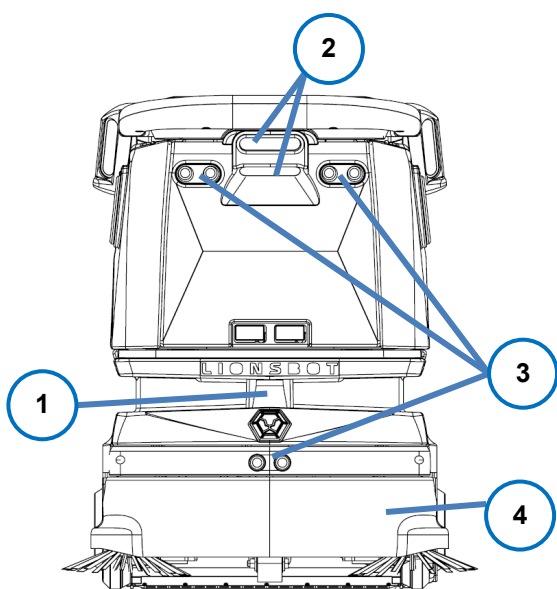
|                                                    |         |           |
|----------------------------------------------------|---------|-----------|
| Storage Temperature with Tanks and Hoses Empty     | °C      | -20 To 45 |
| Storage Humidity                                   | %Rh     | 20 To 93  |
| <b>Cylindrical Brush Motor Specifications</b>      |         |           |
| Cylindrical Brush (Number –External Ø)             | No./ mm | 2/34, 32  |
| Brush Motor RPM                                    | RPM     | 900- 1400 |
| Cylindrical Brush (Voltage – Nominal Power Rating) | V /W    | 24/1150   |
| Maximum Weight Exerted on Brush Head               | Kg      | 4         |
| <b>Side Brush Motor Specifications</b>             |         |           |
| In-Sweep Brush (Number –External Ø)                | No./ mm | 2/175     |
| Brush RPM                                          | RPM     | 190-210   |
| Brush (Voltage – Nominal Power Rating)             | V/W     | 24/4      |
| <b>Traction Motor Specifications</b>               |         |           |
| Traction Motor (Voltage – Rated Power)             | V/W     | 24/144    |
| Traction Wheel (External Ø – Tyre Width)           | mm/mm   | 140/48    |
| <b>Vacuum Motor Specifications</b>                 |         |           |
| Vacuum Motor (Voltage - Nominal Power Rating)      | V/W     | 24/150    |

- (1) Calculated based on cleaning in a straight line with no obstacles at 0.6 m/s, and is not indicative of actual cleaning performance.
- (2) Handle Bar Up.
- (3) Handle Bar Down.
- (4) Vacuum bag empty with batteries (Gross Vehicle Weight)

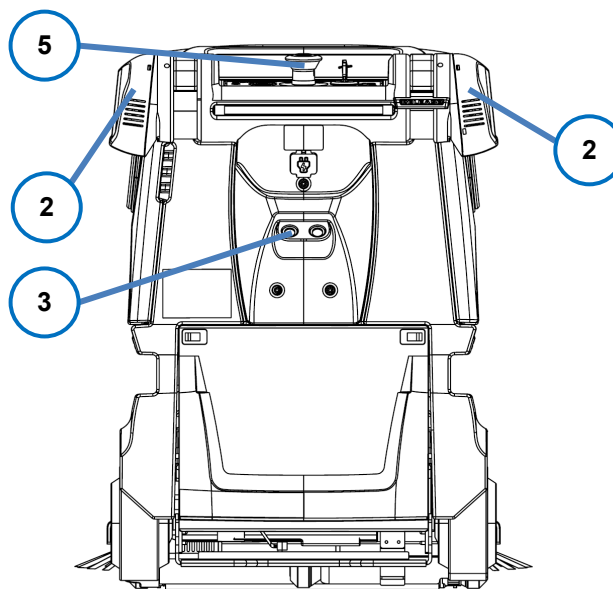


## SAFETY FEATURES OF THE R3 VAC

Distance sensors, safety bumpers and obstacle avoidance behaviours are paramount to the safety of people and objects around the R3 VAC, and the R3 VAC itself. These features are described below to better equip the user for safe and productive working with the R3 VAC.



*Fig. 1*



*Fig. 2*

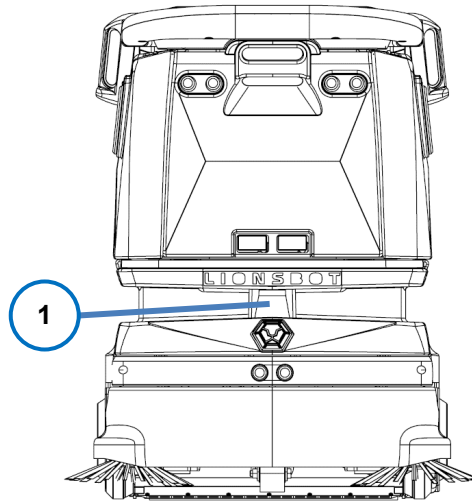
1. LIDAR
2. DEPTH CAMERA
3. SONAR

4. BUMPER
5. EMERGENCY STOP

## DISTANCE SENSORS

### 1. LIDAR

The 2D LIDAR provide distance measurements to objects or features in front of the R3 VAC. The LIDAR is located at the base of the R3 VAC above the logo (Fig. 1 - 1).



*Fig. 1*



**WARNING:** The LIDAR does not work with glass and performs poorly with reflective surfaces and black surfaces. Do not attempt to run robot autonomously in areas with glass and reflective and black surfaces.



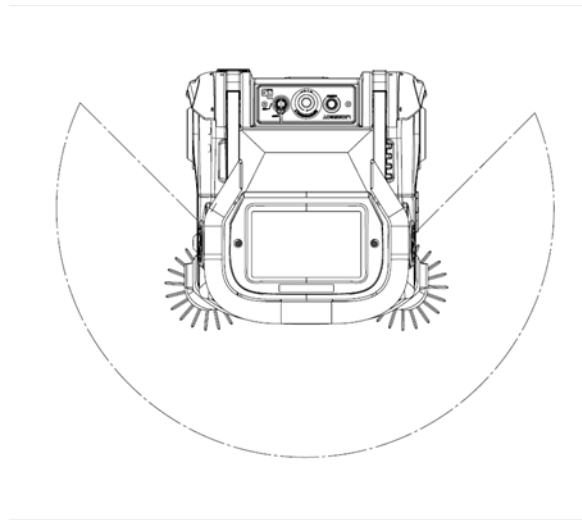
**NOTE:** As the LIDAR operates in the Infrared region, the R3 VAC can be operated at night.



**NOTE:** Diagrams below are for illustrative purposes only, not an accurate representation of performance.

The Table below and Fig. 2 illustrate the field of view of the front LIDAR.

| Technical Data                                              | Unit | Value         |
|-------------------------------------------------------------|------|---------------|
| <b>2D Lidar</b>                                             | °    | 270           |
| <b>Effective Radial Range<br/>(Distance @ Reflectivity)</b> | m@%  | 10@10 - 25@90 |
| <b>Height above ground</b>                                  | cm   | 24            |



*Fig. 2*

## 2. SONARs

The SONARs supplement the LIDARs by measuring distance to obstacles close to the body of the robot, in their line of detection. The R3 VAC is equipped with six sonars shown below.

| Technical Data                     | Unit | Value |
|------------------------------------|------|-------|
| <b>Sonar array Field of Vision</b> | °    | 20    |
| <b>Effective Range</b>             | m    | 0.5   |

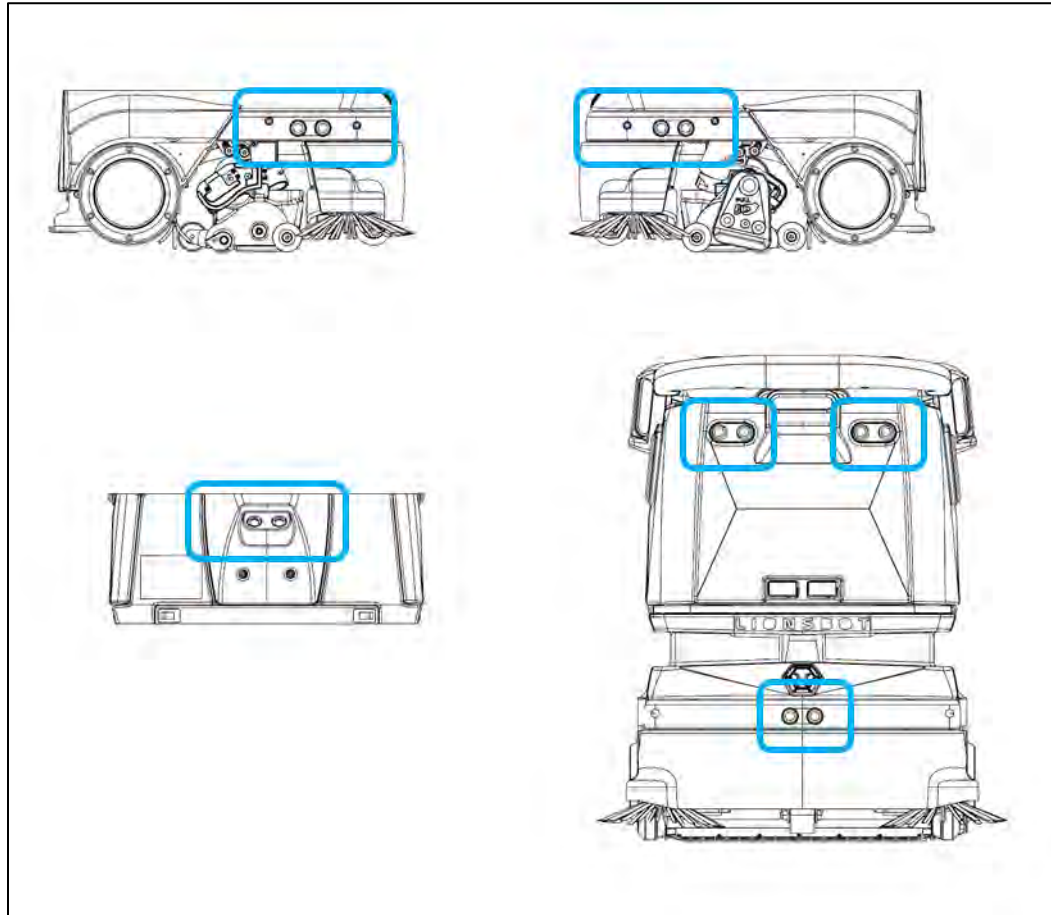


Fig. 3

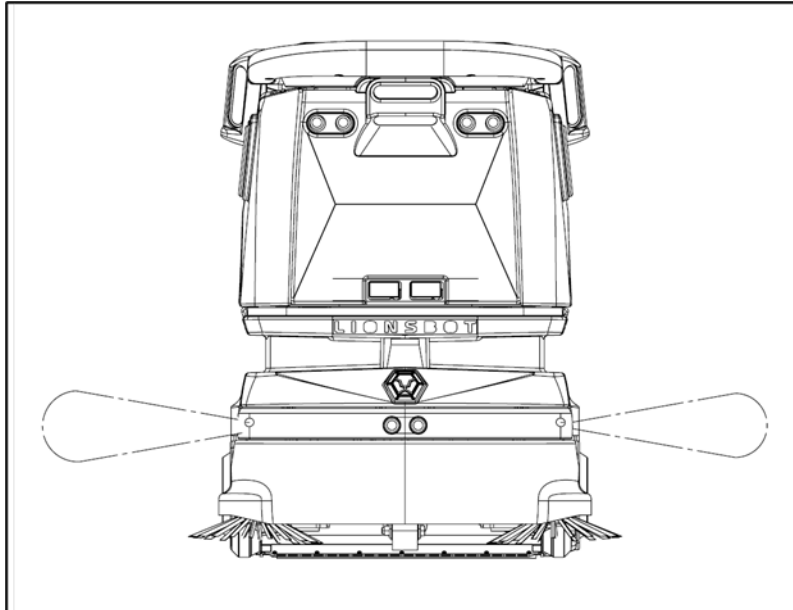


Fig. 4

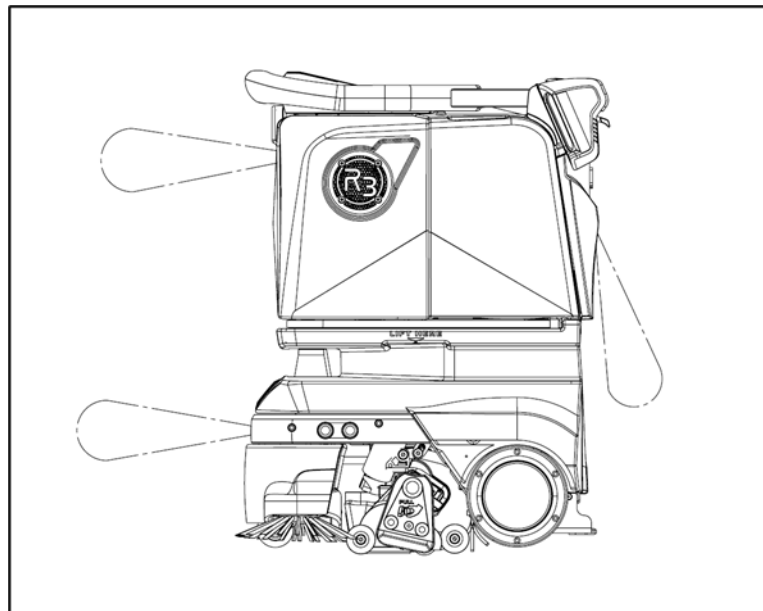
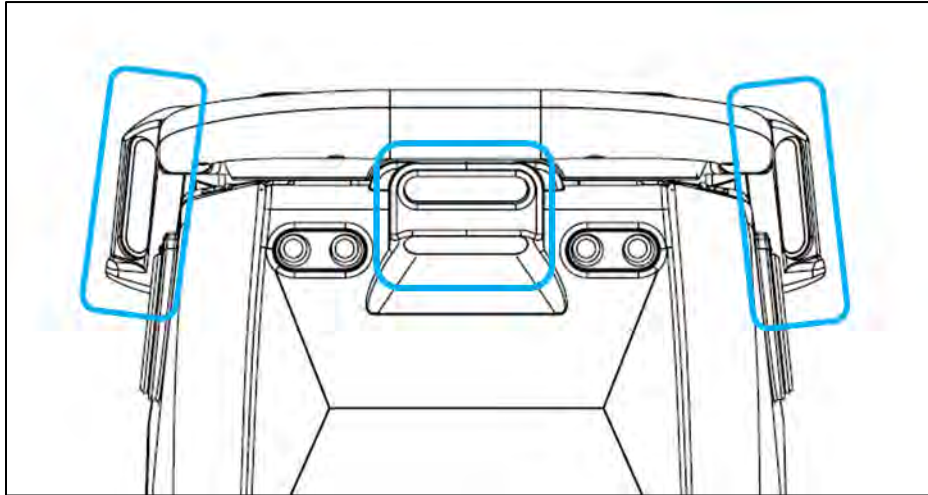


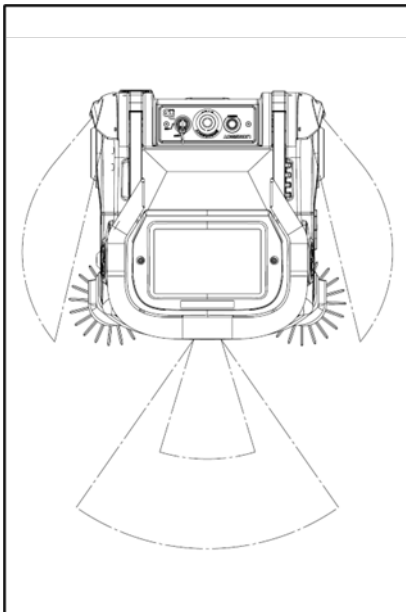
Fig. 5

### 3. DEPTH CAMERA

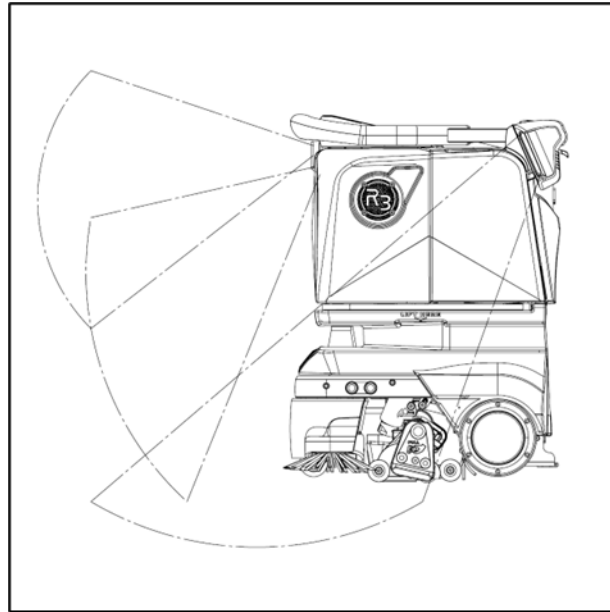
The depth camera also supplements the LIDAR in helping the R3 VAC gauge the distances to objects in front of it. It is placed on the front of the robot and sides (Fig. 7). Note that it does not record pictures of the scene.



*Fig. 7*



*Fig. 8*



*Fig. 9*

## BUMPER

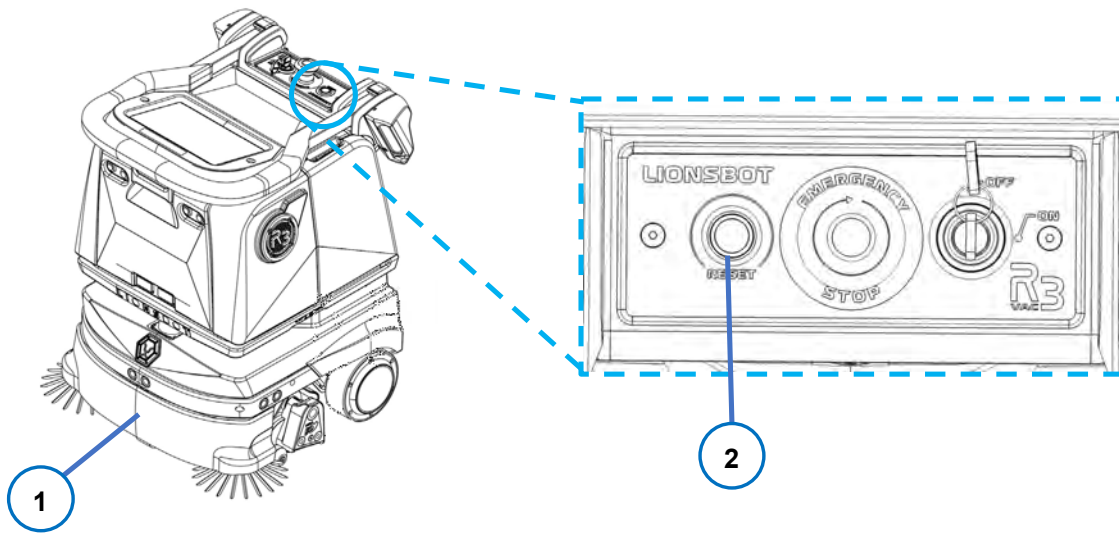


Fig. 1

The R3 VAC is equipped with a bumper (Fig. 1 - 1). The bumper will trigger when it hits an obstacle, robot will pause for 4 seconds or more before engaging obstacle avoidance mode:

### Obstacle Avoidance Mode

- All movements and cleaning processes will stop.
- The robot's lights will flash amber.
- The robot will reverse and avoid obstacle.

### (Optional) To release the R3 VAC:

1. Move the obstacle away from the safety bumper.
2. Robot will replan path of travel.
3. If path planning fails, operator must reset the robot (Fig. 1 – 2).

If the obstacles are fixed or cannot be moved (etc. wall), **Activate the ESTOP first**. Manually move the robot instead by slowly pulling it away from the obstacle before attempting to reset the robot.



**WARNING:** Do not push or tow machine for a long distance or damage may occur to the traction system.

## OBSTACLE AVOIDANCE

The robot is equipped with obstacle avoidance behaviour as an essential safety feature. When the R3 VAC encounters an obstacle, it waits to see if it moves away, and if it doesn't, the robot tries to plan a new path for its cleaning.

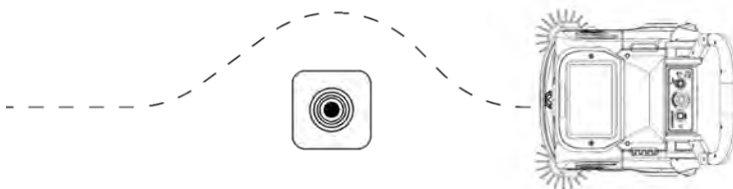


Fig. 1

## EMERGENCY STOP

The emergency stop can be activated to immediately stop all robot motion:

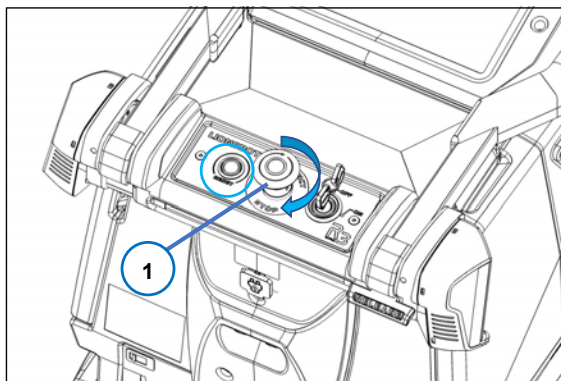
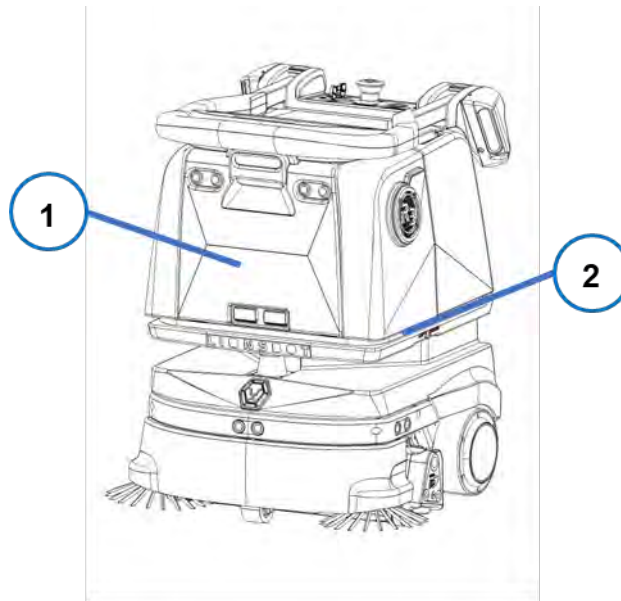


Fig. 1

### Manually through the R3 VAC:

- A red emergency button is located at the top of the robot (Fig. 1 - 1).
- Depressing this button cuts off power to the internal motors of the robot, and causes all lights on the R3 VAC to blink red.
- To resume function of the robot, gently turn the button clockwise to reset the emergency stop trigger. Press the reset button (Fig. 1 blue circle highlighted) to return the robot to a usable state.

## PERSONALITY OF THE R3 VAC



*Fig. 1*

The physical user interface of the R3 VAC – including the LED Matrix, LED light, and speakers - imparts it the personality of a friendly cleaning companion.

### LED LIGHTS

The R3 VAC is equipped with LED strip on the sides (Fig 1 – 2). The LED lights help to convey various state of the robot – for example, when the robot is under emergency stop all the lights will blink red.

### EYE PANEL

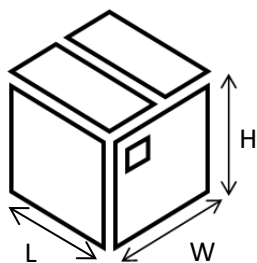
The eye panel (LED Matrix, Fig. 1 – 1) conveys the mood or emotion of the R3 VAC. The eyes appear happy, sad, or tired depending on the circumstances and state of the robot.

## RECEIVING AND PREPARING THE R3 VAC

The R3 VAC ships with the side brushes and floor tool brushes. Some accessories are also included to facilitate charging and maintenance operations.

## HANDLING THE PACKAGED ROBOT

The robot's overall packaged weight is 55kg.



|          |                |
|----------|----------------|
| <b>L</b> | <b>75.0 cm</b> |
| <b>W</b> | <b>69 cm</b>   |
| <b>H</b> | <b>71 cm</b>   |

It is recommended to keep the packaging components for future transportation needs.

## UNPACKING THE ROBOT

1. Open the crate and take off any protective packaging material around the robot.
2. Verify the package contents against the following packing list:

| ITEM                     | QTY |
|--------------------------|-----|
| <b>R3-VAC</b>            | 1   |
| <b>Cylindrical Brush</b> | 1   |
| <b>Micro-Fibre Brush</b> | 1   |
| <b>Side Brush</b>        | 2   |
| <b>HEPA Filter</b>       | 1   |
| <b>Vacuum Bag</b>        | 2   |

3. Power on the robot as described below ("[POWERING ON/OFF THE R3 VAC](#)") and push it out of the crate in reverse to avoid the risk of tipping.

## BATTERY INSTALLATION/REPLACEMENT

### For Installation and Replacement:

Contact authorized service provider or LionsBot for battery installation and replacement. See section [‘CONTACT INFORMATION’](#) or [‘DISTRIBUTER INFORMATION’](#) for contact details.



**WARNING:** Do not tamper with or attempt to replace the battery yourself.

### Installing the battery:

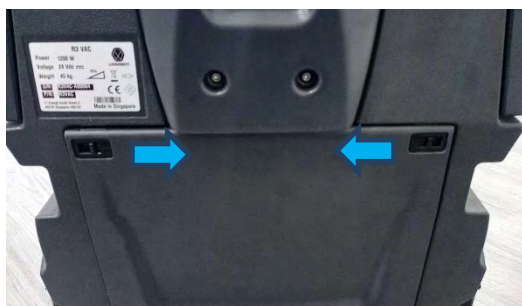
Ensure Robot is powered OFF before installing the batteries.

1. The Battery is located on the back of the robot (Fig 1).



*Fig. 1*

2. Press inwards on the panel latch, to release (Fig 2).



*Fig. 2*

3. Gently tilt out the panel (Fig. 3). Lift the panel upwards to show the battery (Fig. 4).



*Fig. 3*



*Fig. 4*

4. Slide the battery out of the chassis, to expose the power plug (Fig. 5).
5. Unplug the battery (Fig. 6).



*Fig. 5*



*Fig. 6*

6. Remove the battery (Fig. 7).



*Fig. 7*



*Fig. 8*

7. Install the new battery, ensure the power connector is on top of the battery (Fig 6).
8. Ensure all DIP switches are in the down position (Fig 8).
9. Plug in the power connector (Fig 5).
10. Slide in the battery and assembly the back panel (Fig 3).
11. Push in the back panel and ensure the latched are locked (Fig 1).

## CHARGING THE BATTERY



### Caution:

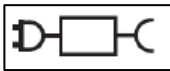
1. Only use the battery charger provided by an authorized distributor.
2. The robot charger should not share an AC plug point with any other devices.
3. Refer to disposal information for disposal of the R3 VAC and battery inside.
4. If the battery is not charging, contact the authorized distributor immediately.
5. The following actions must be carried out by qualified personnel.
6. The charger surface becomes hot while charging.



**Note:** R3 VAC does not come with on-board charger. Please use the charger provided by the authorized distributor to charge the batteries on the R3 VAC.



**Note:** Before first use, Users are advised to charge the battery to 100%.



***This symbol on the nameplate informs the user to use the robot only with the supported battery charger (Model No: GPSC-3024-LB-01)***

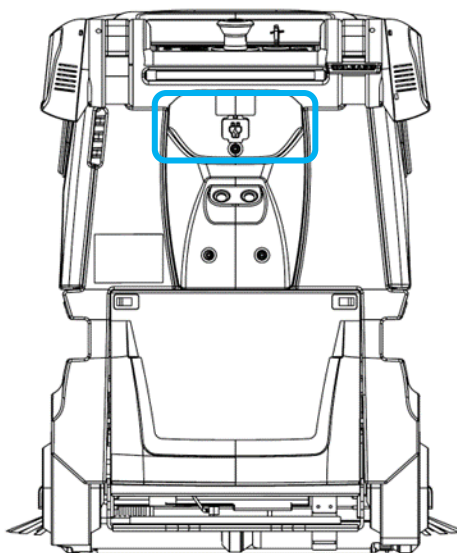


**Note:** A typical full charge cycle takes about 2 hours.

1. Charge the battery daily after usage to prevent over-drainage of the battery.
2. The R3 VAC's Battery Management System (BMS) will prevent over-drainage of the R3 VAC's battery by stopping any cleaning command when the battery percentage is below 5%.

## MANUAL CHARGE

1. The charging port (Fig. 1) is located on the rear of the robot below the switch panel.



*Fig. 1*

2. Plug a battery charger into 240V AC mains.
3. Grab the charger cable, lift the rubber cover and plug it into the charging port (Fig. 5). The cable should fit snugly; it requires some force to be inserted.



*Fig. 2*



*Fig. 3*

4. Turn the charger on. When charging, the battery charger displays a flashing RED light. A typical full charge cycle takes about 2 to 2.5h.
5. When charging is finished, the battery charger will display 100% on the LCD. Turn off the charger.



Fig. 4

**Optional:** Send the robot to Charge at the Charging Station by using the Touch Screen.



**Note:** The charging system is isolated from the robot (Fig 5).



Fig. 5



Fig. 6

## POWERING ON/OFF THE R3 VAC



**NOTE:** This power switch is cutting off positive power line from battery to rest of the circuits when power switch is at off position.

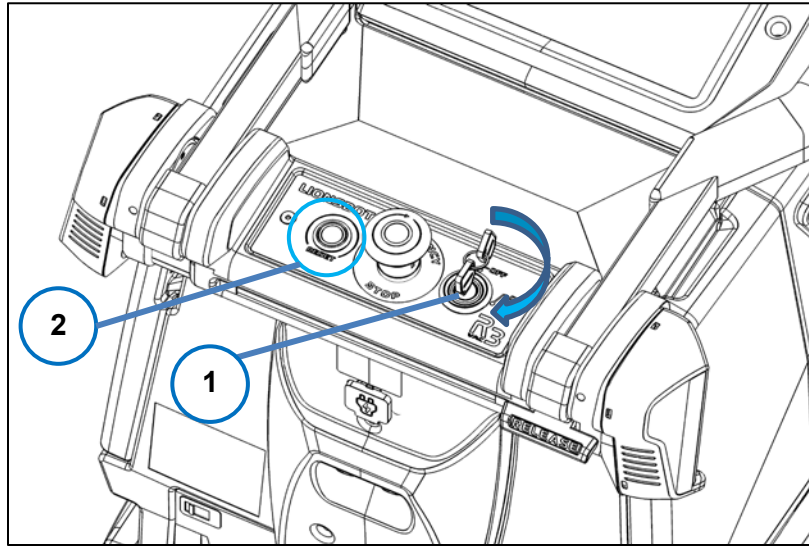


Fig. 1

### To power on:

1. Insert Key into switch as shown (Fig. 1 -1).
2. Turn the key switch to the 'ON' position.
3. The operator may remove the key from the switch.
4. Push the RESET button (Fig. 1 - 2) to the left of start panel; the robot LEDs will turn blue, and a 'start-up' sound will be heard indicating startup.

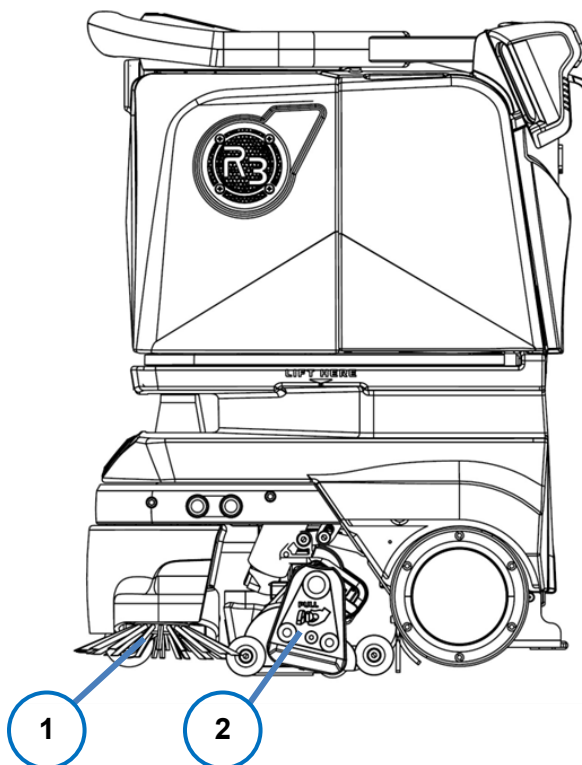
### To power off:

1. Turn the key switch (Fig. 1-1) in an anti- clockwise motion to the 'OFF' position until a 'CLICK' is felt.

## R3 VAC BRUSH FLOOR TOOL INSTALLATION / REPLACEMENT



Refer to below for instructions on Installing the floor tools. This section can also be used as reference for replacing floor tools.



1. SIDE BRUSH
2. BRUSH FLOOR TOOL ASSEMBLY

## FLOOR TOOL REMOVAL



1. The Brush Floor Tool is found on the bottom right side of the robot (Fig. 1).
2. Grab onto the blue cover and pull out the floor tool (Fig 2).
3. Partially slide out the floor tool to expose the vacuum hose (Fig 3).
4. Twist the hose (Fig 4) and lift out the hose.

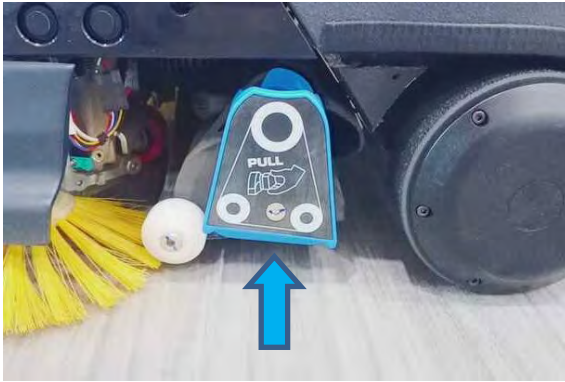


Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5

## FLOOR TOOL BRUSH REPLACEMENT



1. Place the floor tool on a flat surface (Fig 1)
2. Flip the floor tool over to show the brushes (Fig 2).
3. Pull on the knob on the microfiber brush to release it from the housing (Fig 3).
4. Remove the microfiber brush (Fig 4).



Fig. 1

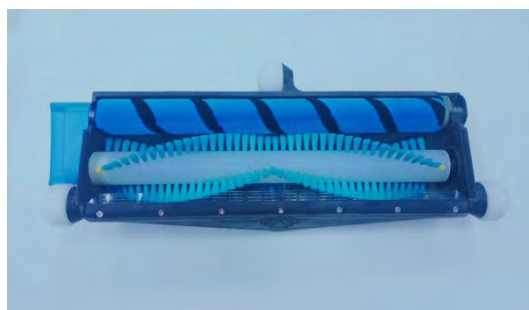


Fig. 2

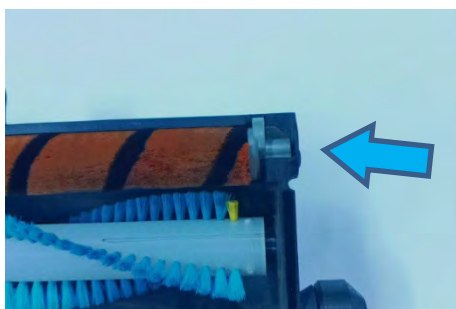


Fig. 3



Fig. 4

5. Press the roller brush towards the left and upwards to remove it (Fig 5 & 6).

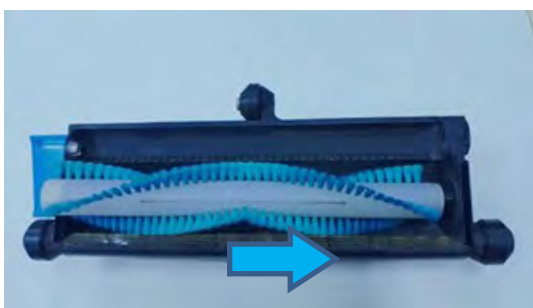


Fig. 5

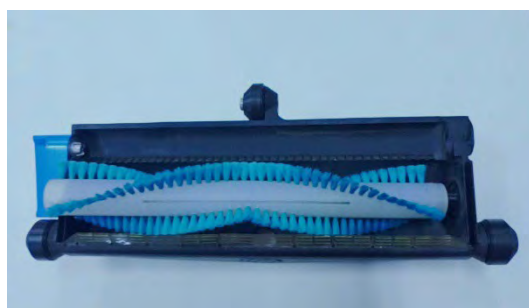


Fig. 6

6. Dispose of the old brushes.
7. Take the new brush and align it to the floor tool. The brush spring must be oriented as shown (Fig 7 to Fig 11).



Fig. 7



Fig. 8

8. Align the brush by rotating it to match the orientation of the mating feature shown in figure 8.



Fig. 9

9. Press the roller brush towards the left and downwards to assemble it (Fig 9 & 10).

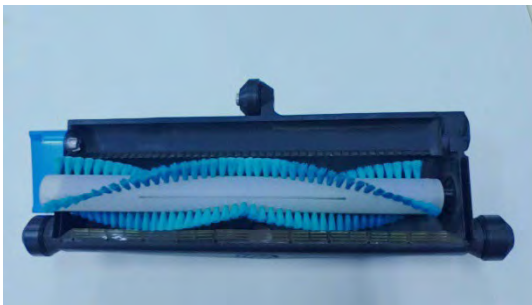
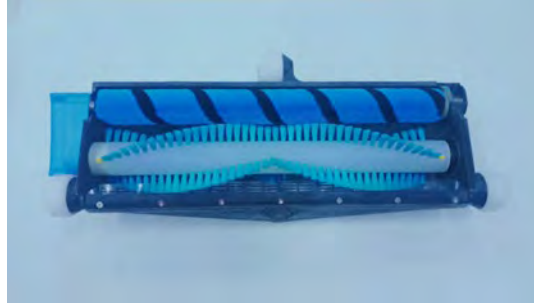


Fig. 9



Fig. 10

10. Fit in the micro fibre brush as shown in figure 4.
11. Press down on the brush to install it, the replacement process is now complete (Fig 11).
12. Install floor tool back on the robot by following instructions in ['Floor Tool Removal'](#) in reverse.



*Fig. 11*

## SIDE BRUSH INSTALLATION/ REPLACEMENT



1. Remove the bumper on the robot (Fig. 1).

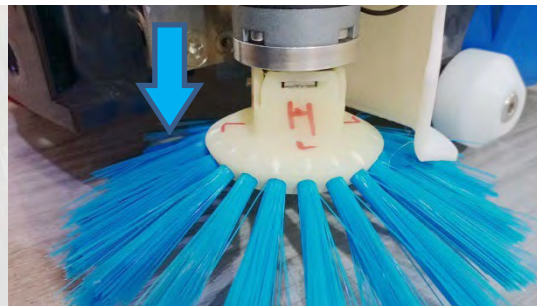


*Fig. 1*

2. On the left side of the robot, hold onto the side brush motor and push down on the side brush to disassemble. (Fig. 3).



*Fig. 2*



*Fig. 3*

3. Dispose of the old side brush.
4. Take the new side brush and align it to the motor (Fig. 4 & 5).
5. Hold the motor and push the brush up onto it until a click is heard.

6. The side brush is secured onto the motor (Fig 3).



*Fig. 4*



*Fig. 5*

7. Repeat steps 1 to 6 to replace side brush on the right side of the robot.
8. Reattach the front bumper.

## VACUUM BAG INSTALLATION/ REPLACEMENT



1. On the right side of the robot remove the tank hatch (Fig. 1) to reveal the vacuum bag (Fig. 2).



*Fig. 1*



*Fig. 2*

2. Pinch on the bag around the region highlighted and pull on the bag to remove it. (Fig. 3).



*Fig. 3*



*Fig. 4*

3. Replace the bag and install it by pinching the opening (Fig. 4).
4. Slide to opening over the vacuum dust outlet, till it bottoms out (Fig 5).



*Fig. 5*

5. The Vacuum bag has been replaced.

## HEPA FILTER INSTALLATION/ REPLACEMENT



To replace the HEPA filter first remove the tank hatch and the vacuum bag.

1. Slide the HEPA filter down to remove it.
2. To install the filter, press filter to the tank and slide up the filter housing. Use the grooves to align filter.



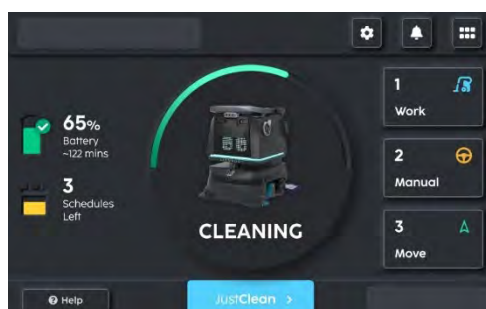
*Fig. 5*

## R3 VAC TOUCHSCREEN SETUP

The following section describes the setup procedure by using the LCD screen on the R3 VAC. The LCD screen uses the LionsTouch app.

The LionsTouch app is used to communicate to and work with the R3 VAC. Each certified R3 VAC user is assigned a unique user id and password for use with the app. The user must be logged-in to be able to interface with a R3 VAC.

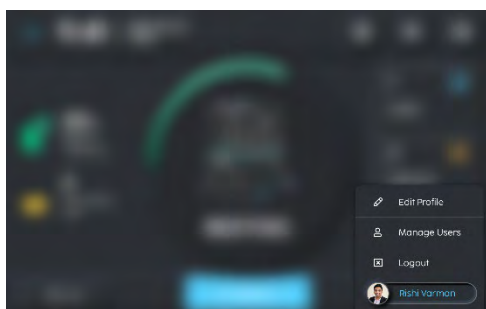
This section provides an overview of the main functions provided by the touch screen user interface, accessible through the 'Home' page, Home Menu and just clean, and manual page of the app. More details on using the R3 VAC with the available app commands can be found in '[OPERATION OF THE R3 VAC](#)'.



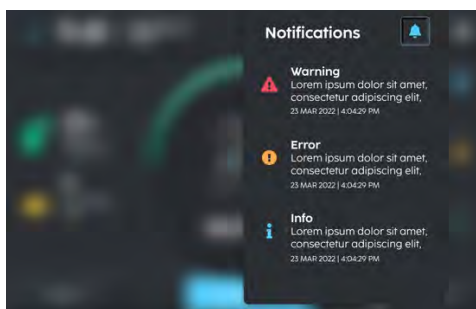
Home page



Home Menu



User Profile



Notifications

## INITIAL SETUP

The following section describes the setup procedure by using the LCD screen on the R3 VAC.

1. Turn on the R3 VAC and note the 'LOADING VIDEO' screen on the LCD (Fig. 1).
2. Scroll down and select your language (Fig. 2).
3. Read and agree to the Terms of Use and Privacy Policy (Fig. 3).
4. Enter your account name (Fig. 4).

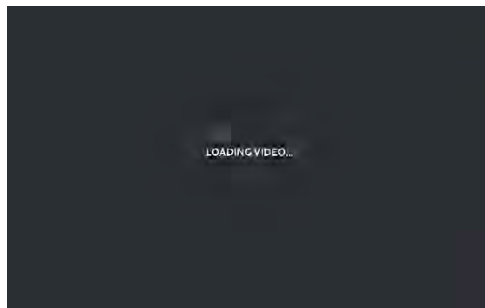


Fig. 1

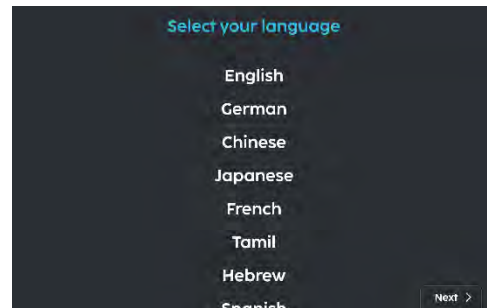


Fig. 2

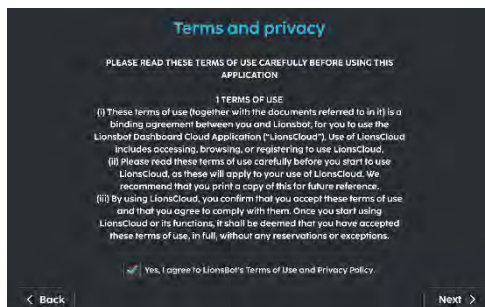


Fig. 3

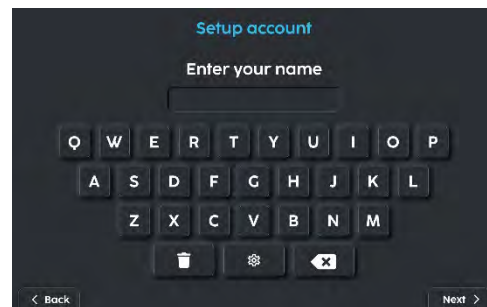


Fig. 4

5. Key in your password (Fig. 5).
6. Confirm your password (Fig. 6).

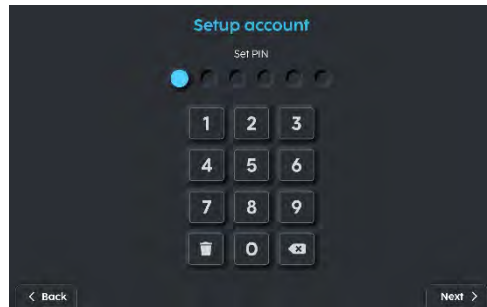


Fig. 5

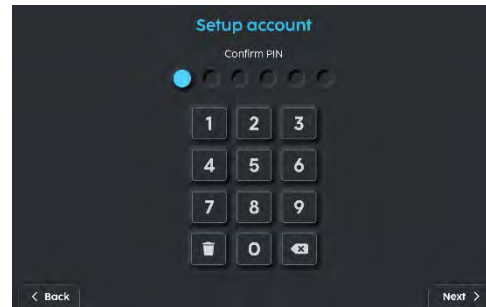


Fig. 6

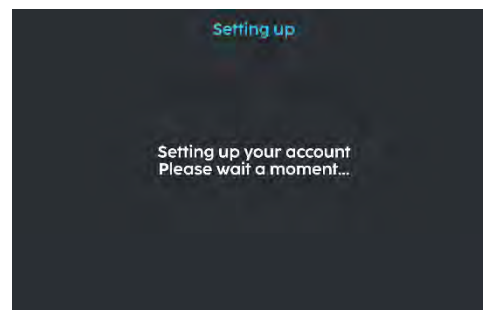


Fig. 7

7. Wait for your account to be setup (Fig. 7).
8. Read and acknowledge usage instructions (Fig. 8).
9. You may choose to [create a map](#) or go direct to the home screen (Fig. 9 & 10).



Fig. 8

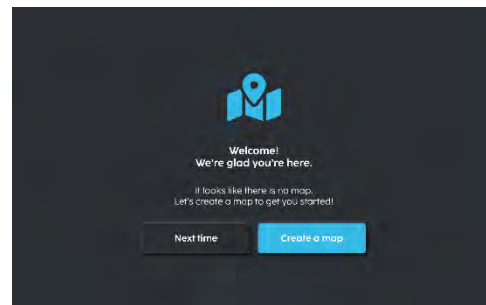


Fig. 9



Fig. 10

## LOGIN WITH LOCAL ACCOUNT

The following section describes the local account procedure by using the LCD screen on the R3 VAC after initial setup.

1. Select the local account for login (Fig. 1).
  2. Enter your 'user' name and pin. (Fig. 2).
  3. If password is incorrect try again (Fig 3).
- or
4. Scan the QR Code using the LionsTouch App (Fig 4).
  5. View the 'HOME' page.



Fig. 1

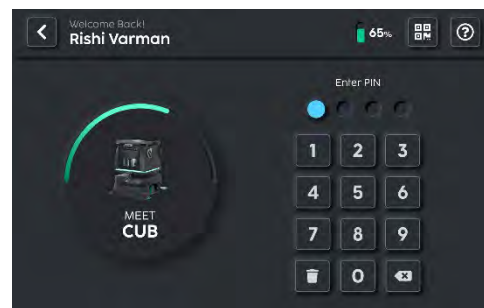


Fig. 2

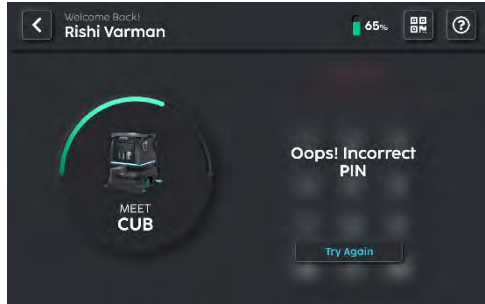


Fig. 3

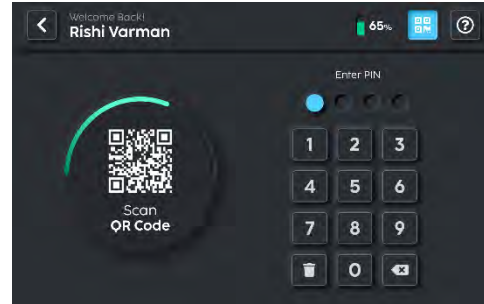


Fig. 4

## LOGIN WITH LIONSBOT ID (OPTIONAL)

The following section describes the LionsBot ID login procedure by using the LCD screen on the R3 VAC.

1. Tap on the 'LOGIN WITH LIONSBOT ID' button at the bottom of the screen (Fig. 1).
2. Key in your User name and password (Fig. 2) or scan QR code with the LionsTouch App.
3. View the 'HOME' page.

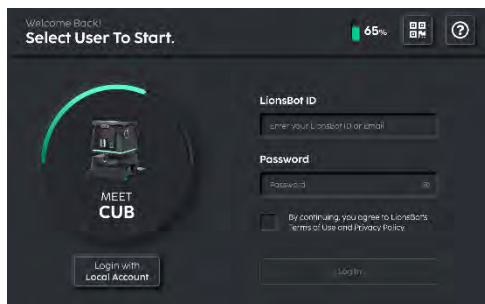


Fig. 1

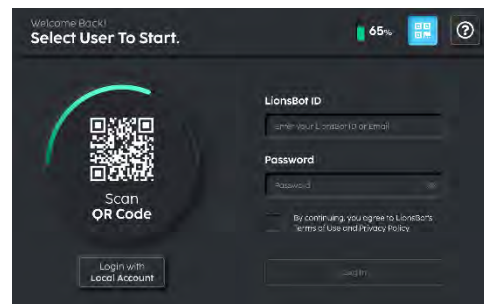


Fig. 2

## LOGIN WITH LionsTouch APP (OPTIONAL)

The following section describes the LionsTouch app login procedure by using the LCD screen on the R3 VAC.

1. Tap on the 'QR' button at the top right of the screen (Fig. 1).
2. Scan the QR Code on the LCD screen through the app (Fig. 2).
3. Enter the OTP into the app (Fig 3).

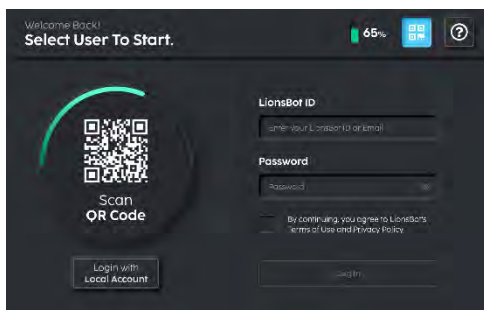


Fig. 1



Fig. 2

## USER ACCOUNT MANAGEMENT

This section provides instructions for adding/ removing users.

1. From the User menu select 'MANAGE USERS'.
2. On the 'USERS MANAGEMENT' screen select 'NEW USER'.
3. Enter the user's name and role.



Fig. 1

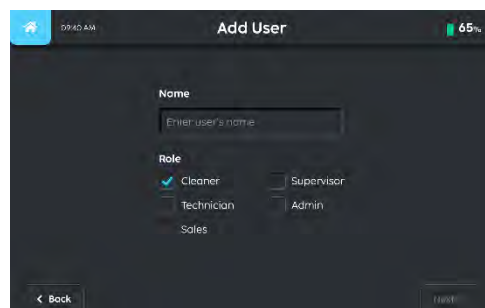


Fig. 2

4. Assign a 6-digit pin to the user.
5. Re Enter 6-digit pin.
6. Confirm User.

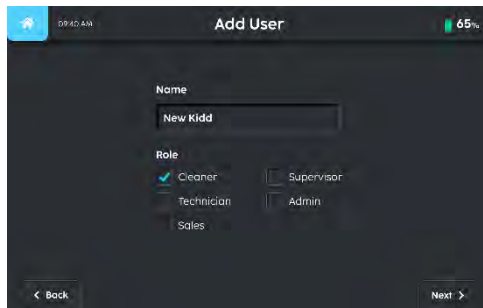


Fig. 3

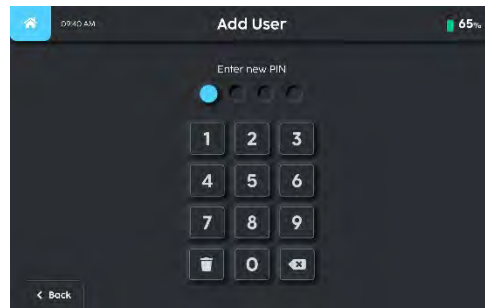


Fig. 4

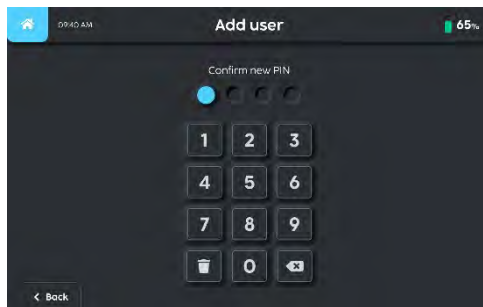


Fig. 5

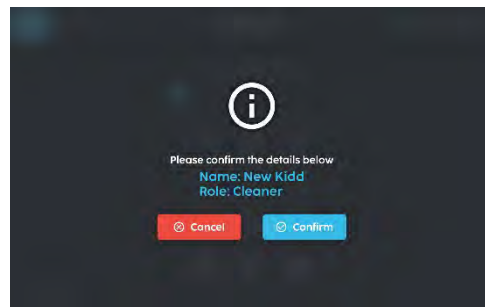


Fig. 6

7. The user account setup is complete.

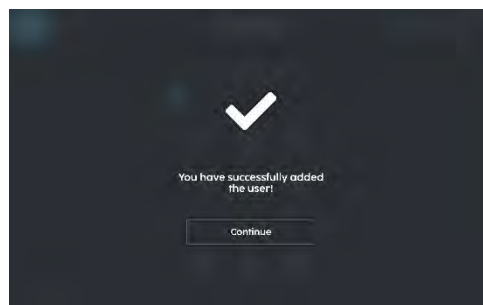


Fig. 7

### To delete a user profile

1. Select the user profile.
2. Select 'Delete user'.
3. Select 'Delete'.

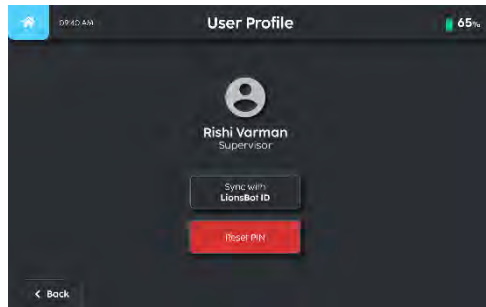


Fig. 8

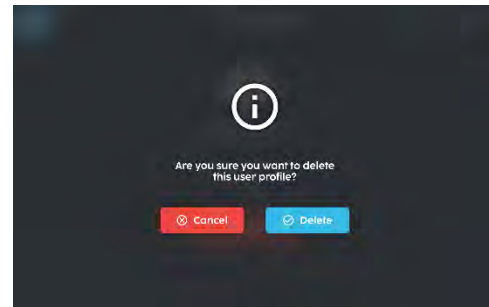


Fig. 9

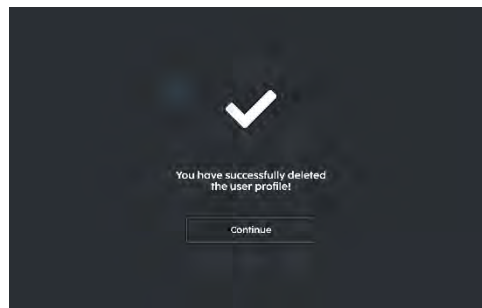


Fig. 10

## MANAGE MAPS

The following section instructs the user on how to add, change or delete the mapped environment in which R3 VAC is operating.

### Add/Create New Map

1. On the 'More Options' page, select 'Manage Maps'.



Fig. 1

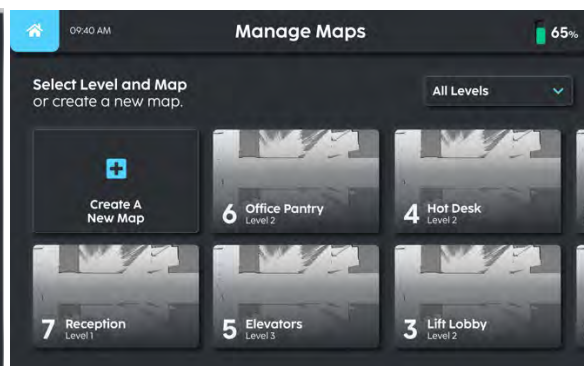


Fig. 2

2. Select 'Create A New Map'.
3. Move Robot slowly. If motion is fast robot will instruct operator to slow down.

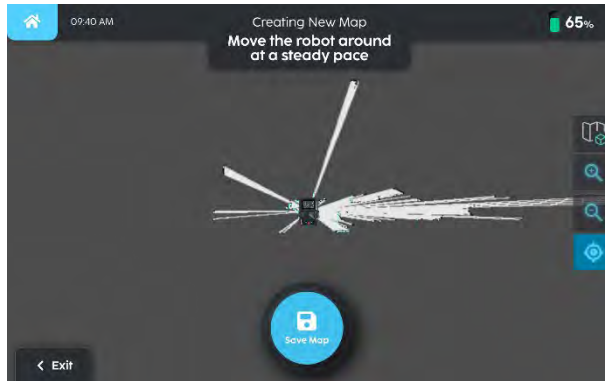


Fig. 3



Fig. 4

4. Once operator has mapped the cleaning area. The operator can save the Map.
5. Key in the map name and level, then click save.

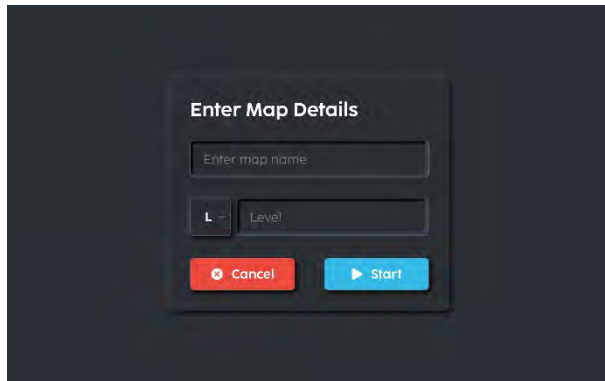


Fig. 5

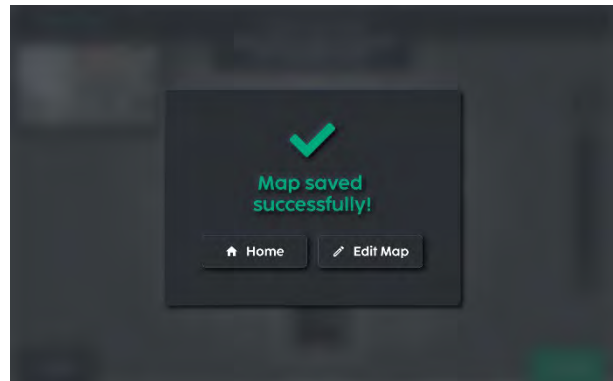


Fig. 6

## Delete Map

1. Select the map to be deleted.
2. Select delete map.

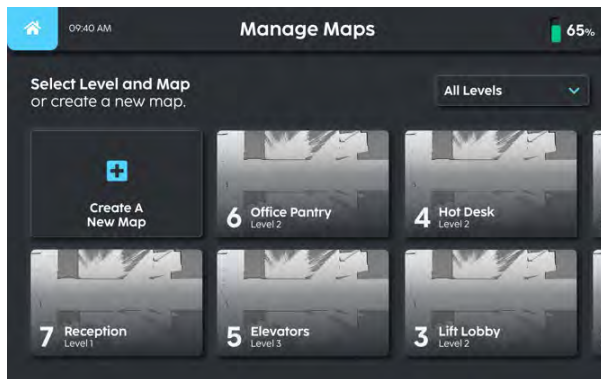


Fig. 7

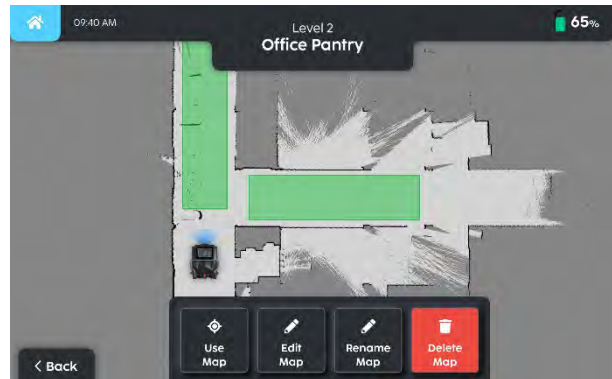


Fig.8

## Map Editor

Map editor allows the operator to add cleaning zones, restricted zones, touch-up map features, add locations, create sections and add home and dock points.



Fig.9

For More information on map editing contact LionsBot Robot Service Team.



**WARNING:** The operator must check map loaded on robot matches the physical location of the robot. The operator is to take appropriate safety measures to place barricades and cones in or near restricted zones (stairs, cliffs, lifts and escalators). Restricted Zones if any must be visible on the map.

1. Define the 'CLEANING ZONE' in the 'EDIT MAP' page (Fig 9).
2. Define the 'RESTRICTED ZONE', e.g., such as stairs and escalators.
3. Identify 'LANDMARKS' in the mapped environment.
4. Alternatively, click on 'AUTO ZONING' to zone the map.



**Note:** does not cover restricted zones.

## WORK ROBOT

The 'WORK' function is used to select the cleaning location and set cleaning settings for the location.



**Note:** Ensure the robot is localized before using this function. To select map or localize robot refer to the ['LOCALIZE THE ROBOT'](#).

1. From the home page, select 'WORK'.

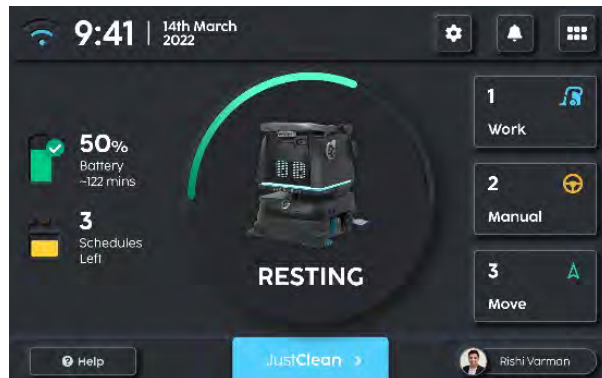


Fig. 1

## If Robot Is Not Localized

2. Set robot's location on the map and select 'START' (Fig 3).
3. Wait for the 'LOOKING AROUND' screen (Fig 4).
4. If localizations failed select 'Try Again' (Fig 5).

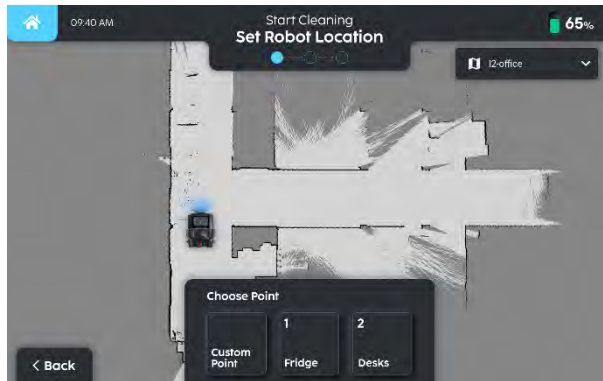


Fig. 2

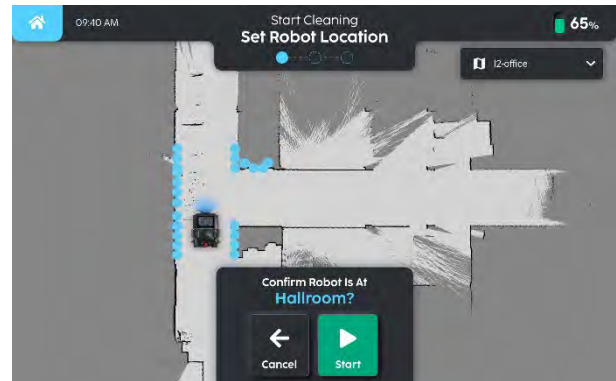


Fig. 3

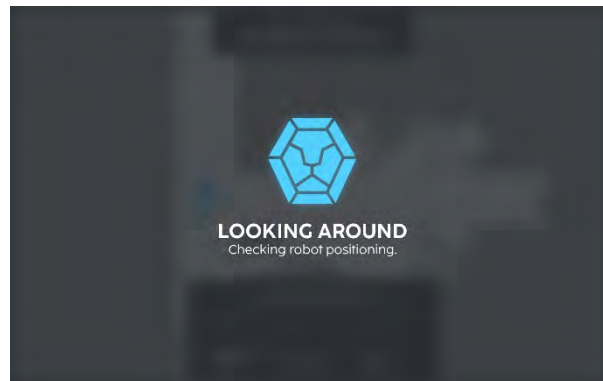


Fig. 4

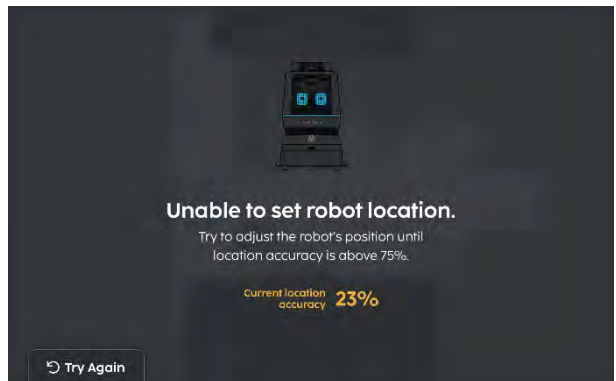


Fig. 5

If localization is not successful go to section '[LOCALIZING THE ROBOT](#)'.

## Localized Robot

5. Select the cleaning area and confirm the area (Fig 6).
6. Before confirm zone, operator may adjust cleaning settings (Fig 7).

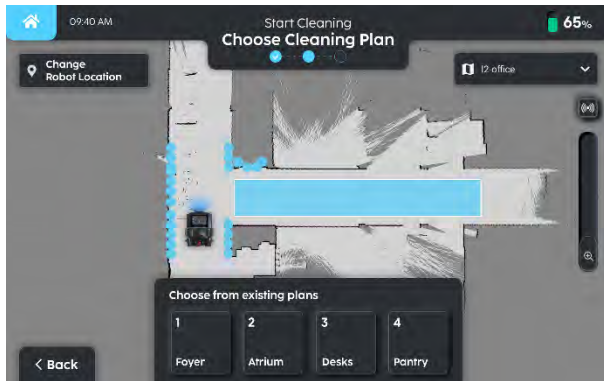


Fig. 6



Fig. 7

7. Place the handle bar down to start cleaning (Fig 8).
8. The robot shall start the cleaning operation, the operator may pause or stop cleaning at any time (Fig 9).

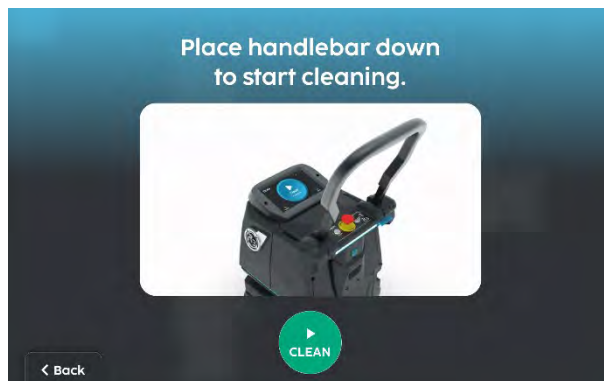


Fig. 8

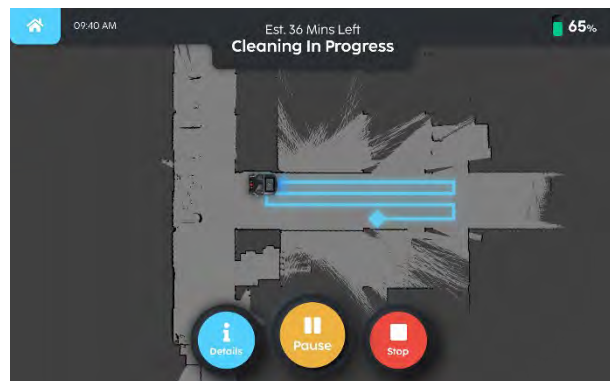


Fig. 9

9. Should there be an interruption in the process the 'Cleaning Unsuccessful' screen will show (Fig 10).
10. A cleaning report is generated after a zone is cleaned (Fig 11).

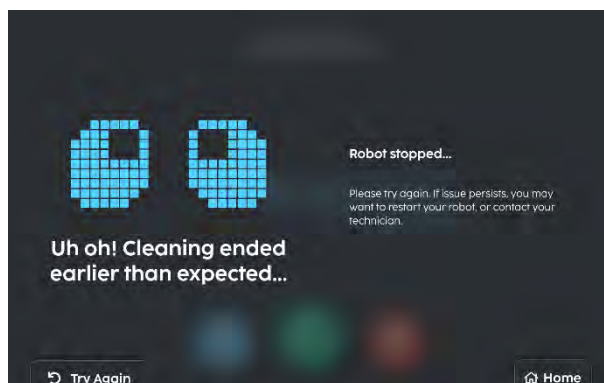


Fig. 10



Fig. 11

## JUST CLEAN

1. On the 'HOME' screen select 'Just Clean' (Fig1).
2. Select 'Guide &Clean Mode' or 'Perimeter Mode' (Fig2 or Fig 10).

### Guide and Clean Mode.

1. Move robot around cleaning area, keep robot speed steady. (Fig 3).
2. Save the map once cleaning area is complete (Fig 4 & 5).
3. Select cleaning settings and press 'START CLEAN' (Fig 6).

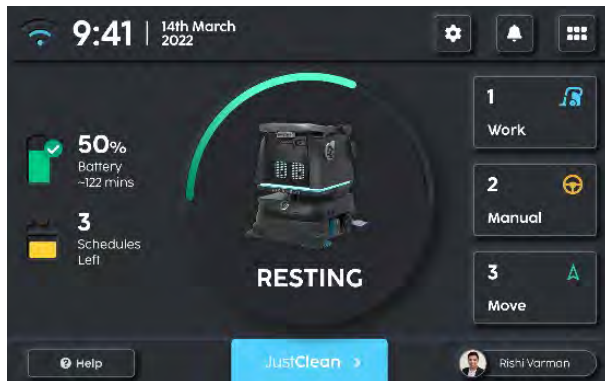


Fig. 1

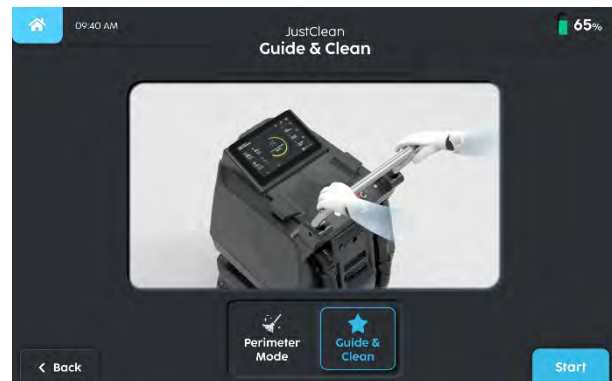


Fig. 2

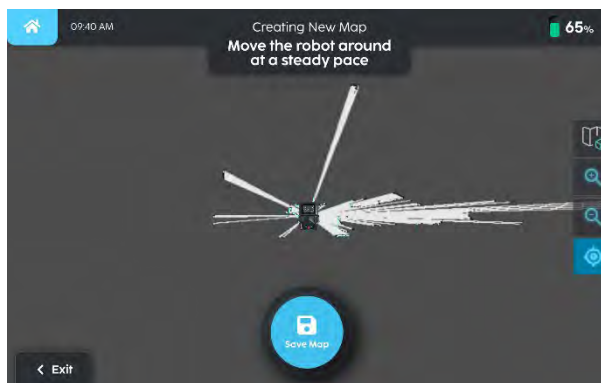


Fig. 3

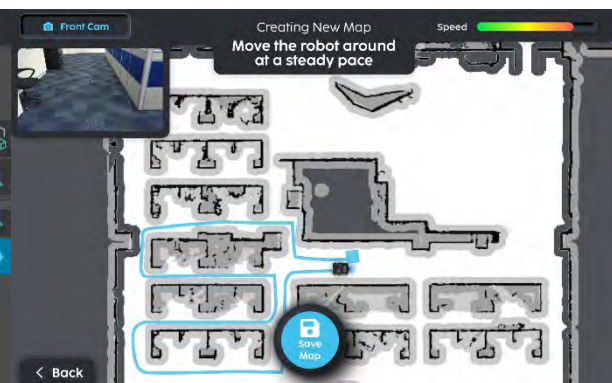


Fig. 4

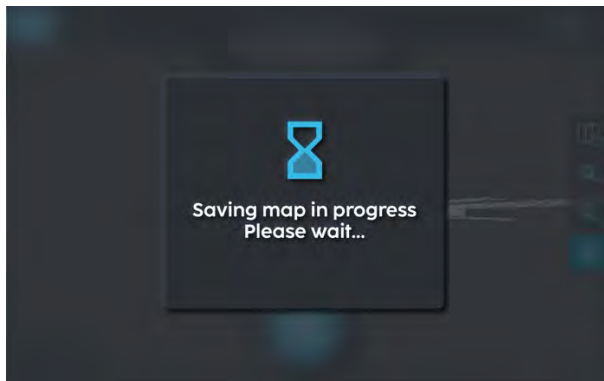


Fig. 5

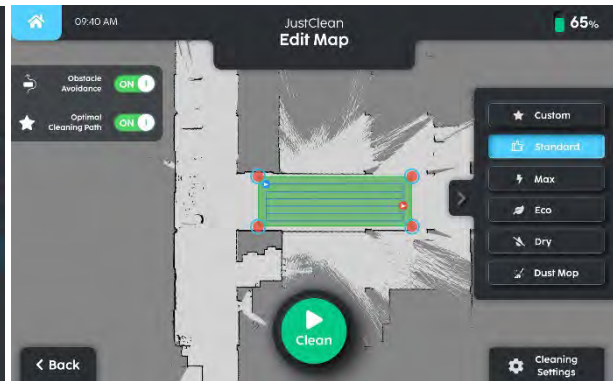


Fig. 6

4. Check if the handle bar is down, if not place handle bar in the down position (Fig 7).
5. The robot starts cleaning area (Fig 8).



Fig. 7

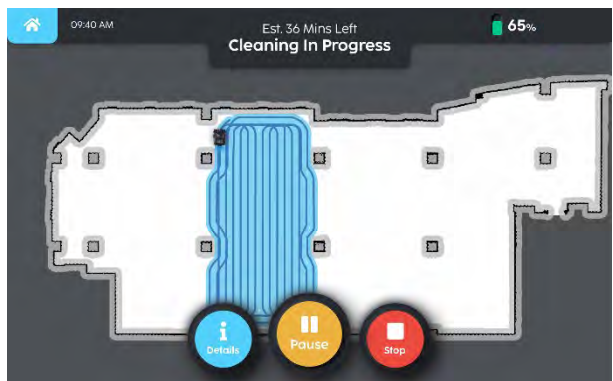


Fig. 8

## Perimeter Mode

1. Select perimeter mode (Fig 9).
2. Manually move the robot along the perimeter (Fig 10).
3. Once path is closed (Fig 11), press 'save' and map is saved (Fig 12-).



Fig. 9

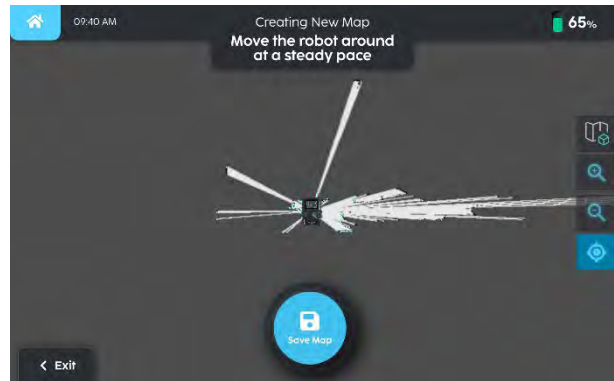


Fig. 10

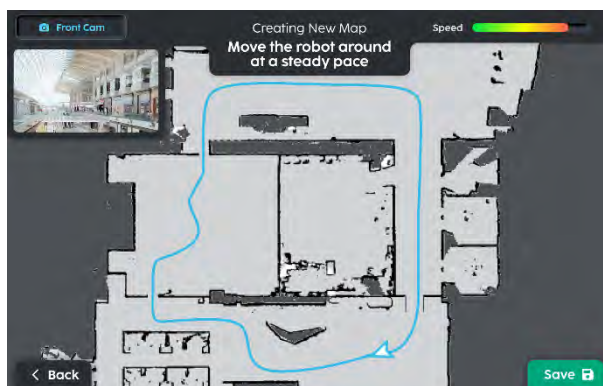


Fig. 11

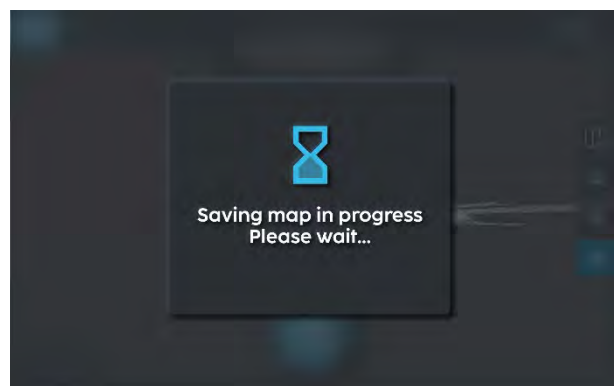


Fig. 12

4. User may adjust cleaning zones or change cleaning Setting for map (Fig 13).
5. Place the handle bar down then press 'START' (Fig 14).
6. Robot shall start cleaning operation (Fig 15).

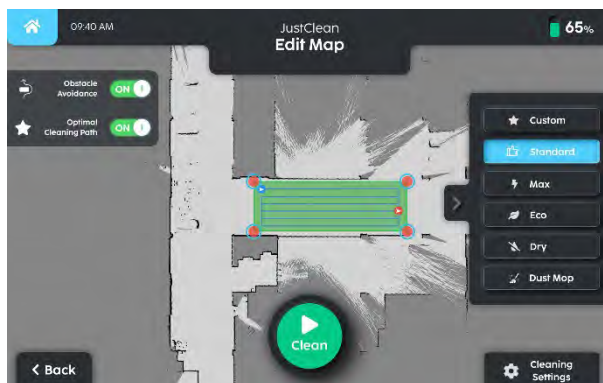


Fig. 13

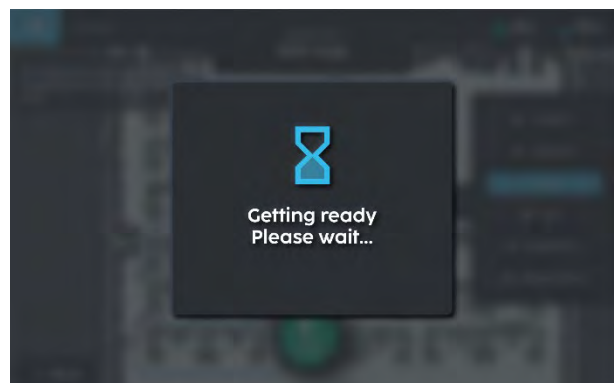
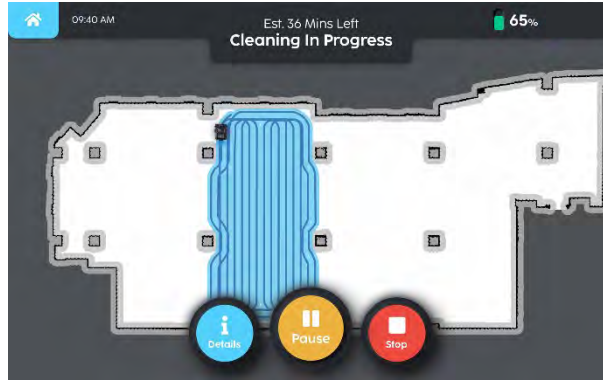


Fig. 14



*Fig. 15*

## CLEANING REPORT

A cleaning report is generated once cleaning is complete.

Go to the [REPORTS](#) section for more information.



*Fig. 8*

## MANUAL CLEAN

The following section instructs the user on how manual clean on the R3 VAC.

1. On the Home screen select the 'MANUAL CLEAN' button.
2. Select cleaning pre-sets: 'MAX', 'ECO', 'CUSTOM 1', 'STANDARD', 'DUSTMOP'.



**Note:** Ensure the Dust Mop attachment on the robot is installed before selecting the 'DUSTMOP' cleaning pre-set.

3. For custom 1 and 2 The sliders (Fig 2) controls robot vacuum suction level, brush pressure, brush speed and vacuum suction. Select your custom settings and select save.
4. After selecting your settings select the 'START' button to start cleaning (Fig 1).
5. Start cleaning.

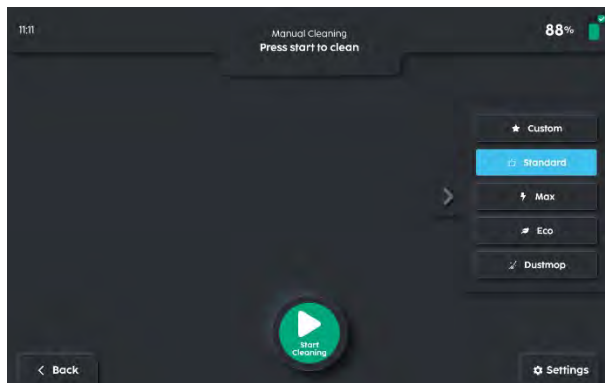


Fig. 1



Fig. 2

## SETTINGS

This section instructs the user on changing settings on the LCD screen. The setting page allows the user to change general settings, language, network and reset robot.

1. On the general settings page the user can adjust screen brightness, sound volume and screen timeout settings (Fig 1).
2. The user may change the language by clicking the language tab and scroll through the language window (Fig 2).

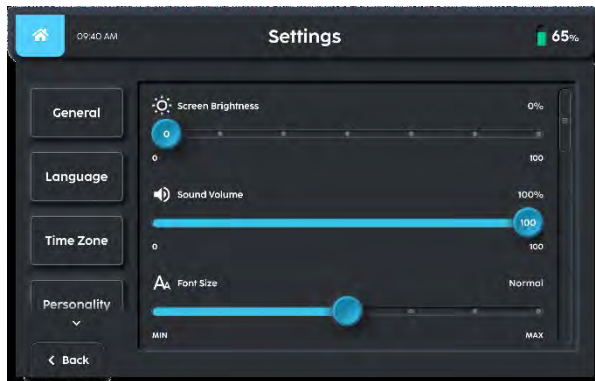


Fig 1



Fig 2

3. The user may change the operating network by selecting the 'Configure' button (Fig 3).
4. Select the network to configure or connect too (Fig 4).

## WIFI

1. Enter the network password (Fig 5).

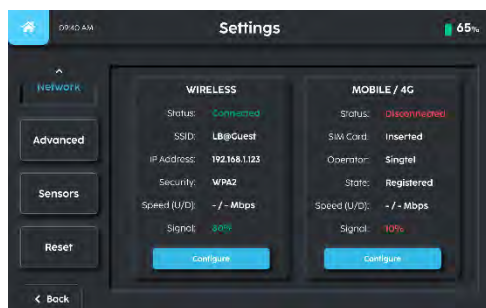


Fig 3



Fig 4

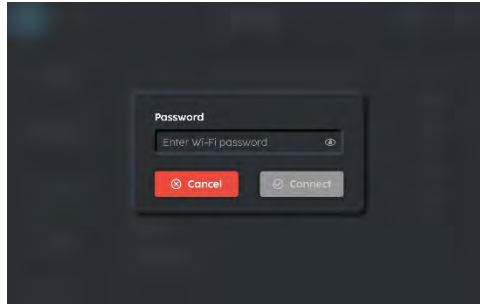


Fig 5

2. If the connection is successful (Fig 6), network change is successful.
3. Should the screen show fail to connect (Fig 7), check your network configuration and settings and try again. Otherwise contact your network administrator.

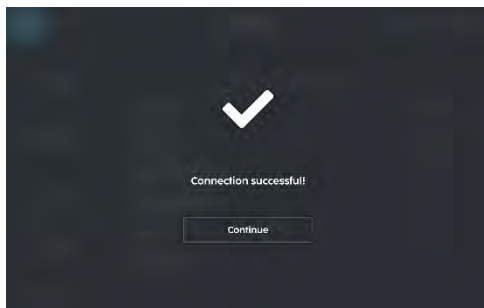


Fig 6

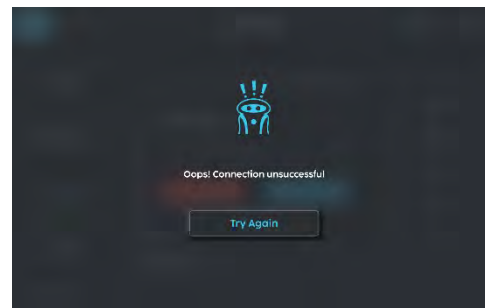


Fig 7

## MOBILE/4G

1. The operator may configure mobile/4G settings (Fig 8)

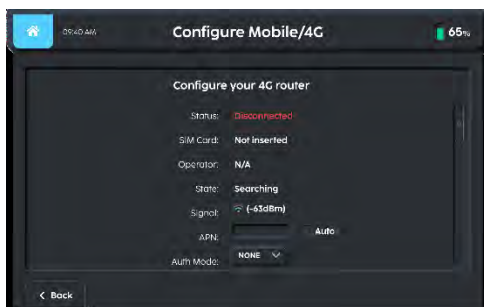


Fig 8

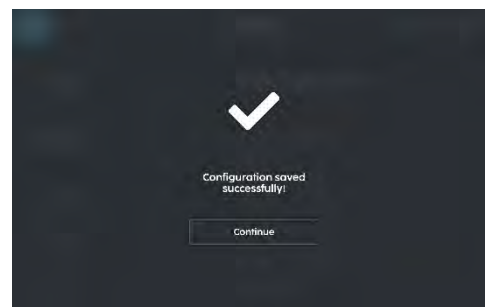


Fig 9

## RESET ROBOT

1. Select 'Reset'.
2. Enter PIN.
3. If PIN entered is incorrect, select 'Try Again'.
4. Select Confirm.

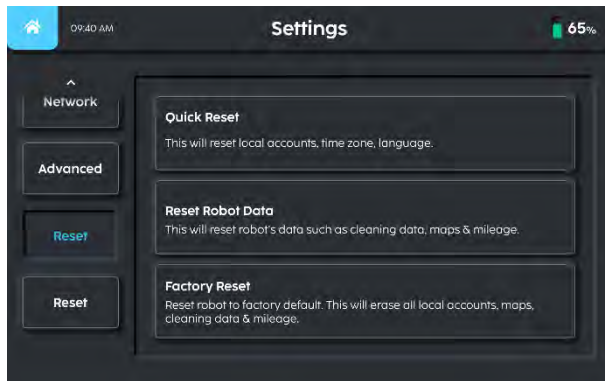


Fig 10

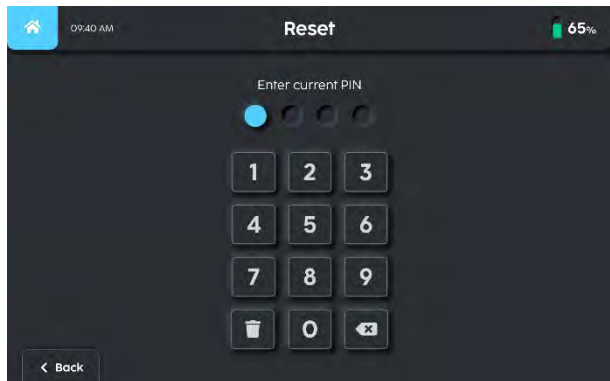


Fig 11

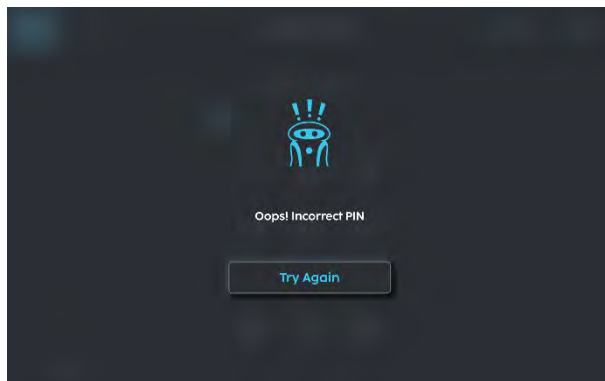


Fig 12

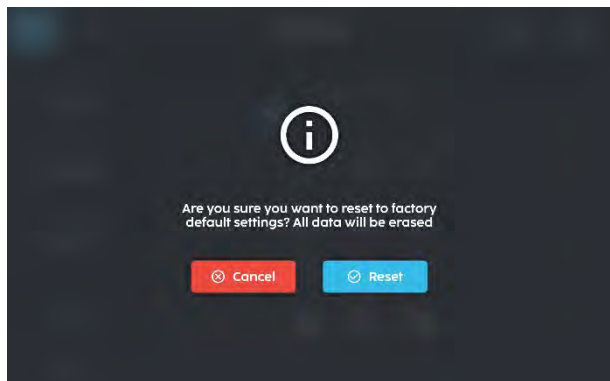


Fig 13

## REPORTS

The following section instructs the user on how to access reports:

1. From the home page click on the more options icon.
2. Select the cleaning reports icon.
3. Select the date of the cleaning report you would like to check (ticks mark out the days with cleaning reports).
4. Select the cleaning report of interest.
5. Select timeline tab for more details.

One cleaning report is generated after every cleaning operation. A report's basic cleaning data shows time, mapped area, cleaning area covered and obstacles detected.

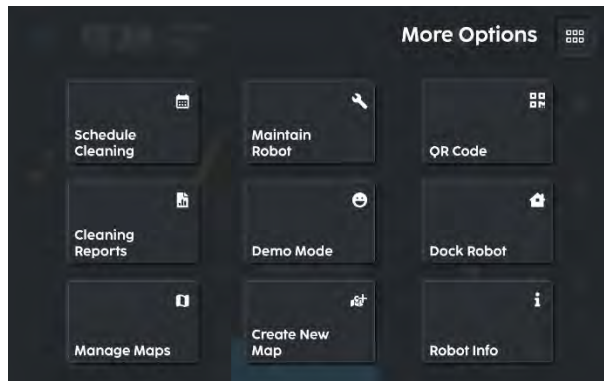


Fig 1



Fig 2

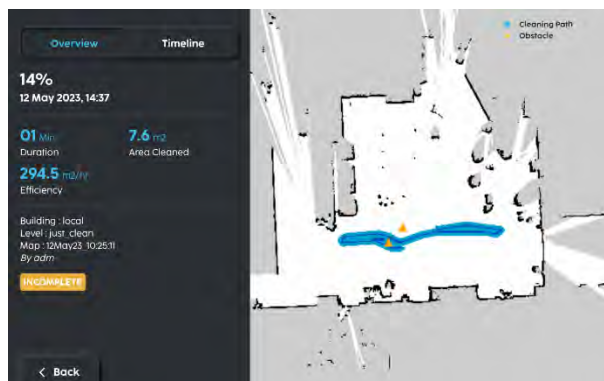


Fig 3

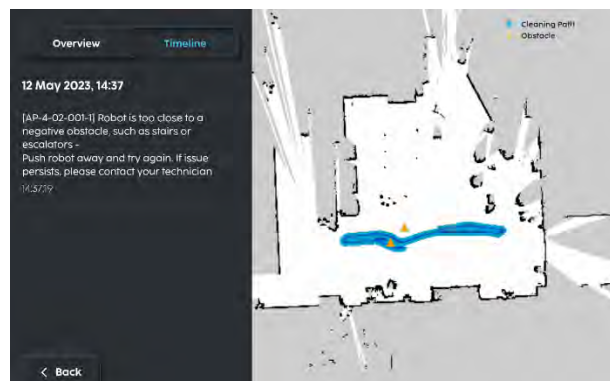
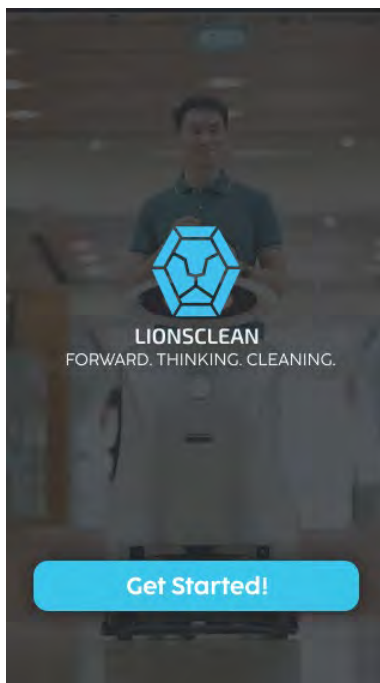


Fig 4

## LIONSCLEAN APP AND INITIAL SETUP

The LionsClean app is used to communicate to and work with the robot. Each certified Lions-Clean user is assigned a unique user id and password for use with the app. The user must be logged-in to be able to interface with a LionsBot robot.

This section provides an overview of the main functions provided by the app, accessible through the user info page, robot and facility page, and commands page of the app. More details on using the R3 VAC with the available app commands can be found in '[OPERATION OF THE R3 VAC](#)'.



*Welcome Page*

## NEW USER SETUP

Each certified Robot user is assigned a unique LionsBot ID and password for use with the app. A new user signing in for the first time will be required to update their password.

1. On the login page, enter the provided ID and password (Fig. 1).
2. Check that the correct country is selected (Fig. 2) before clicking the 'Log in' button.



**Note:** Entering a Wrong ID, Password or Country will result in an unsuccessful login, click 'try again' to return to the login page (Fig. 3).

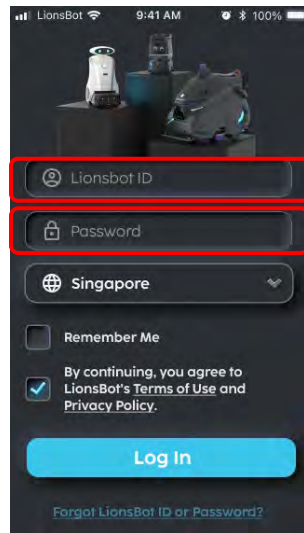


Fig. 1

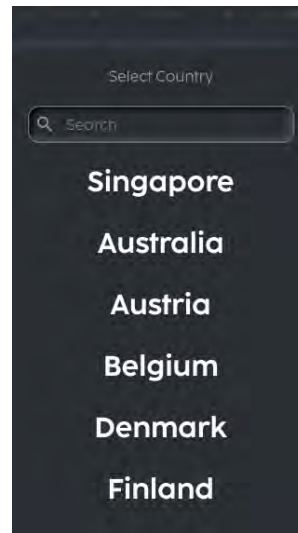


Fig. 2

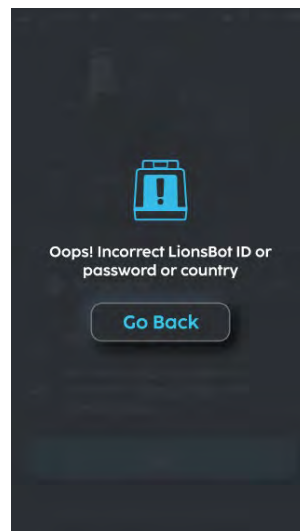


Fig. 3

3. Click on 'Continue' on the update password page (Fig.4).
4. Enter a new password (Fig. 5). New password must meet the minimum requirements to proceed (Fig. 6).
5. Confirm new password (Fig. 7).
6. Click on the 'Update' button to update password (Fig. 8).

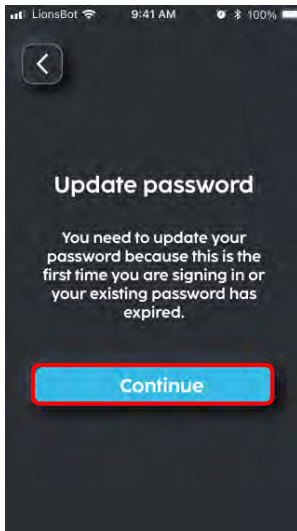


Fig. 4

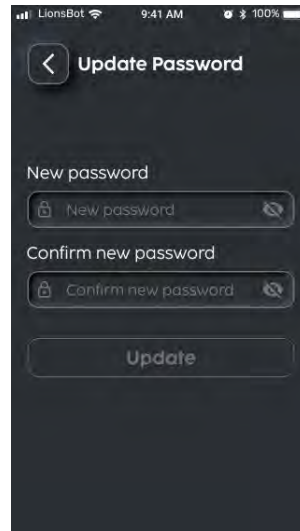


Fig. 5

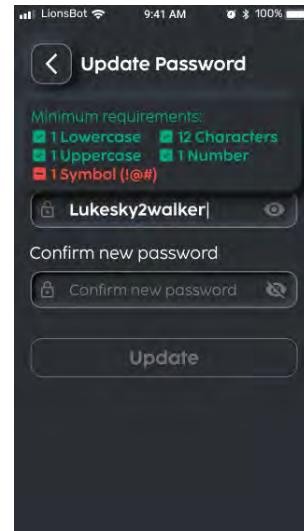


Fig. 6

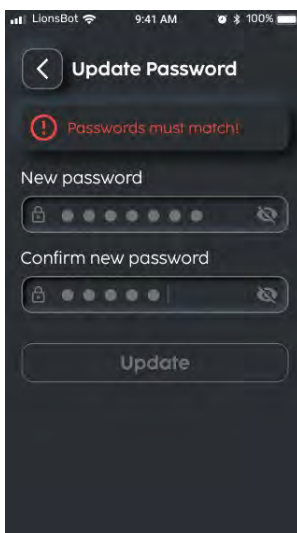


Fig. 7

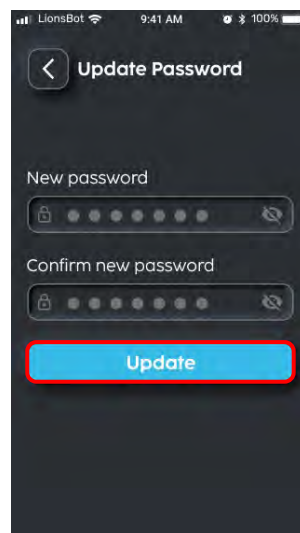


Fig. 8

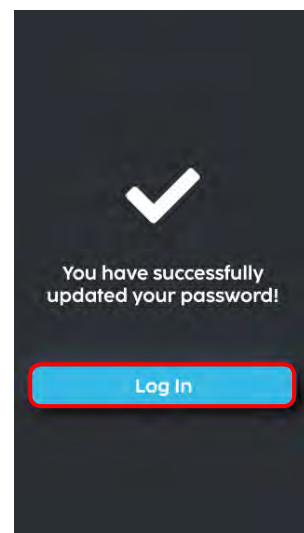
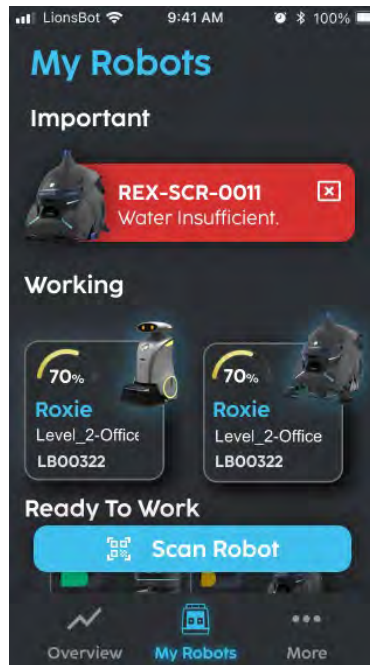


Fig. 9

## MY ROBOTS

This is the first page that appears upon user login. The 'My Robots' Page enables the user to view and manage the robots he/she is associated with.



*My Robot's Page*

To add a new robot,

1. Click on 'Scan Robot' on the My Robots Page (Fig. 1).
2. Scan the QR code on the robot (Fig. 2). Alternatively click on 'or, Enter Robot ID' to add using robot name or ID (Fig. 3).
3. The app will then prompt the user for a one-time password to be entered within 1 minute (Fig. 4). This is a 2-digit password that will be displayed on the eyes or touchscreen of the robot. Input this on the app.

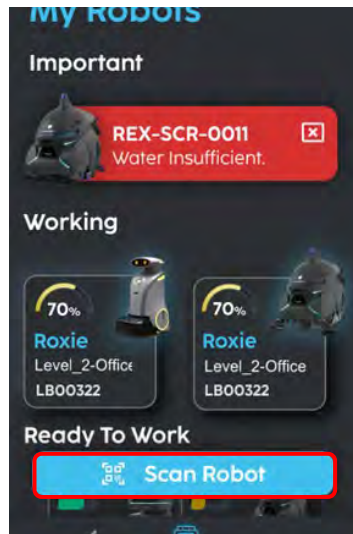


Fig. 1

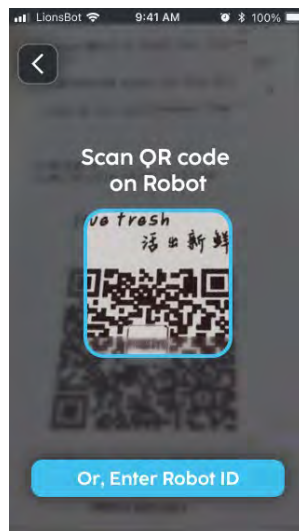


Fig. 2

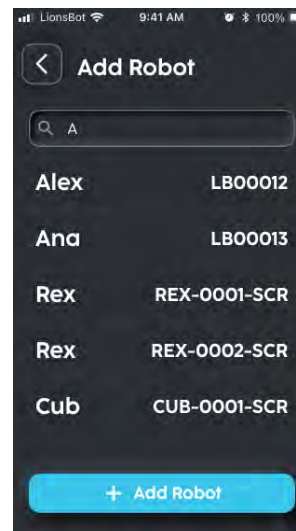


Fig. 3

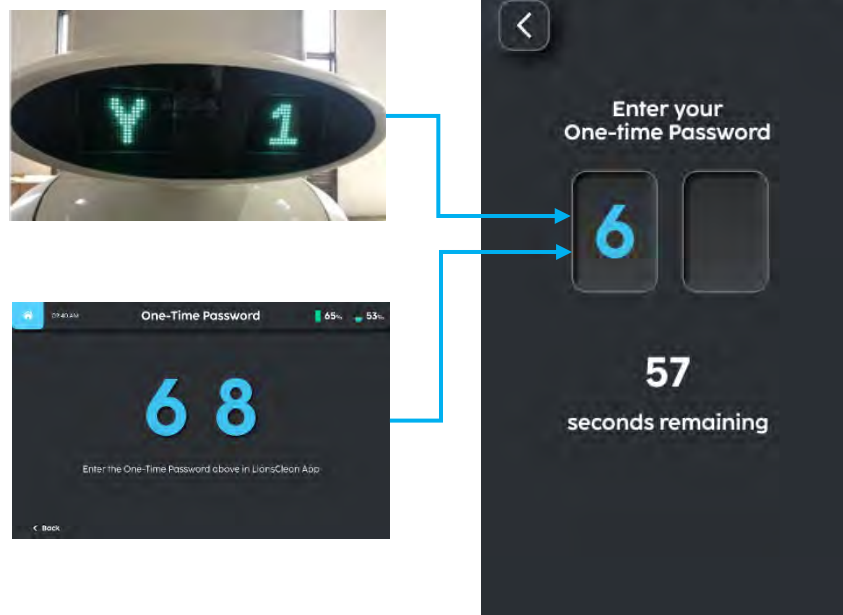


Fig. 4

## FACILITY MAP



**Caution:** A properly created facility map is key to ensuring that the Robot avoids dangerous zones in its navigation/ operation. Maps must be created through an authorized distributor by professionally trained personnel.

The LionsClean app should have a pre-created map for the areas of interest in the facility the Robot is working in. This can be accessed using the map option on the Commands page and is necessary for localization of the Robot (see '[LOCALIZING THE ROBOT](#)'). For assistance with creating/ adjusting a map, please contact an authorized distributor.

## APP COMMANDS

The app commands (Fig. 1 and 2) can be accessed by clicking on the respective robot registered on the 'My Robots' Page.

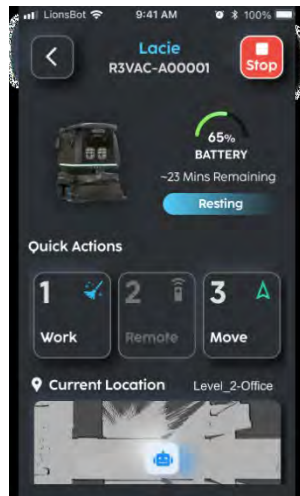


Fig. 1

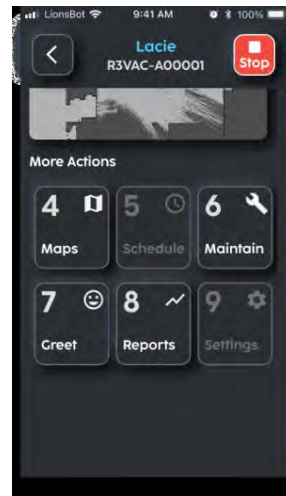


Fig. 2

## REPORTS

The reports page gives access to daily reports of the Robot operations and display their cleaning records.

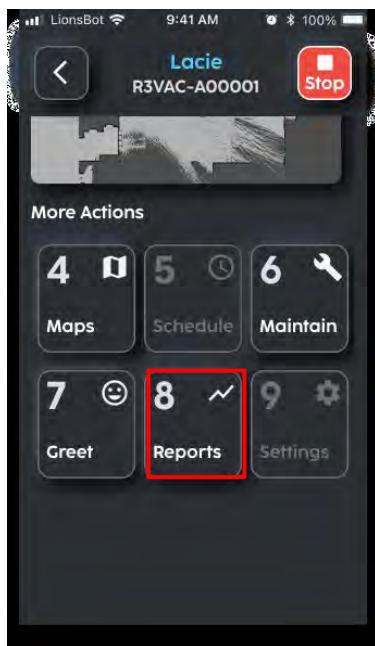


Fig. 1

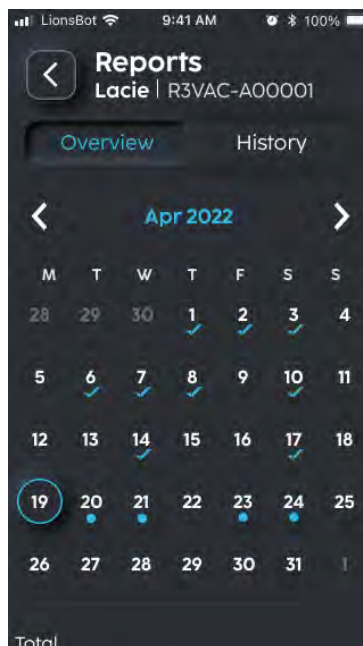


Fig. 2



Fig. 3

## FACILITY MAP



**Caution:** A properly created facility map is key to ensuring that the R3 VAC avoids dangerous spots in its navigation/ operation. Maps must be created through an authorized distributor by professionally trained personnel.

The LionsClean app should have a pre-created map for the areas of interest in the facility the R3 VAC is working in. This can be accessed using the map option on the Commands page, and is necessary for localization of the R3 VAC (see [LOCALIZING THE R3](#)). For assistance with creating/ adjusting a map, please contact an authorized distributor.

## REPORT A PROBLEM

The Report Problem page can be used to submit a problem with the Robot or LionsClean App.

1. Click on 'Report Problem' (Fig. 1).
2. Select the category of the problem encountered.
3. Fill in a description of the problem.

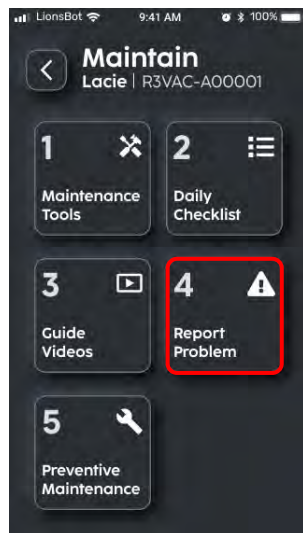


Fig. 1

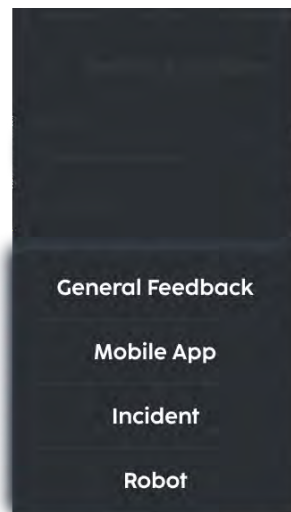


Fig. 2



Fig. 3

- Take or select a photo of the problem (Optional) (Fig. 4 and 5).

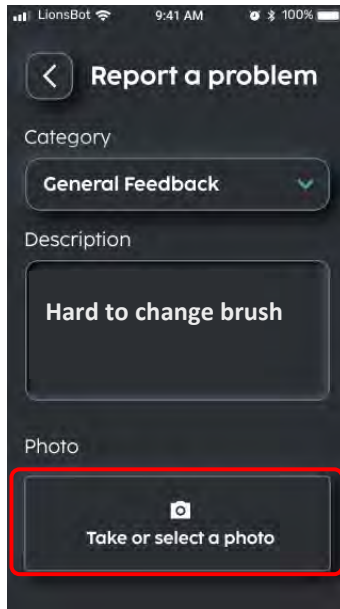


Fig. 4

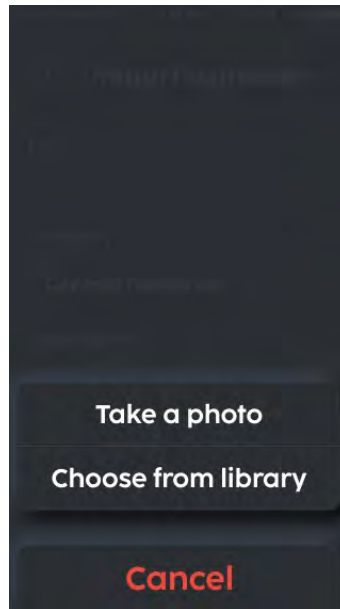


Fig. 5

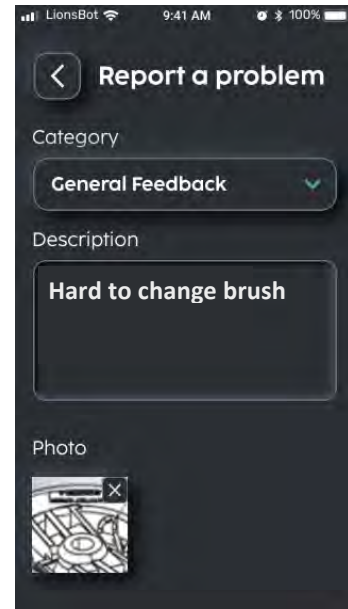


Fig. 6

- Click 'Submit' to submit the report. Click 'Continue' to return.

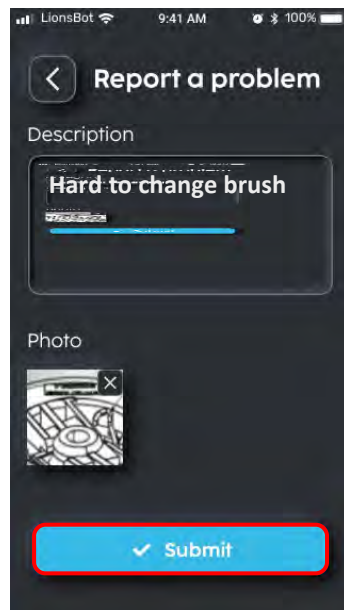


Fig. 7

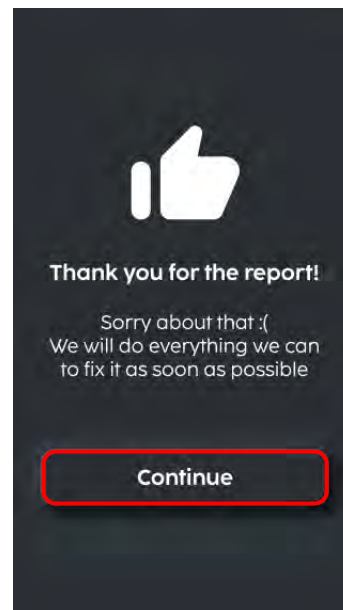


Fig. 8

## BEFORE R3 VAC USE

Power on the robot as described in the section [“POWERING ON/OFF THE R3 VAC”](#) to be able to move and operate it.

Follow this checklist of operations before beginning to clean with the R3 VAC:

- I. **Check Vacuum Bag capacity.** (Refer to [‘CHECK THE VACUUM BAG & HEPA FILTER’](#))
- II. Vacuum bag is installed properly.
- III. HEPA Filter is installed.
- IV. Battery charge level is sufficient. (Refer to [‘CHARGING THE BATTERY’](#))
- V. Safety features and devices are operating.
- VI. E-Stop button is released before cleaning.
- VII. Brakes and steering for proper operation.
- VIII. R3 VAC is localized.
- IX. R3 VAC can be moved to desired location.
- X. Brushes are mounted securely.

## TRANSPORTING THE R3 VAC OUT OF STORAGE

Follow the stipulated safety requirements (see [‘TRANSPORT’](#)) to transport the R3 VAC out of storage to the working area.

## CHECKING THE BATTERY LEVEL

1. Refer to the ‘Home’ page on the screen for the robot to check the battery level (Fig. 1)

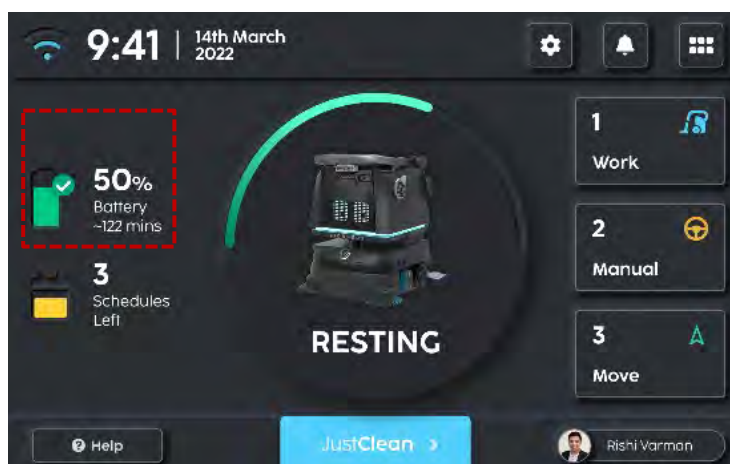


Fig. 1

## LOCALIZING THE ROBOT



**CAUTION:** Localization errors or navigation errors will happen under the following conditions:

1. Lidars' surfaces are dirty
2. Sudden loss of power to on-board computer.

The R3 VAC needs human assistance to ensure proper localization.

1. Access the map of the facility by clicking the 'Map' option on the HOME (EXPAND MENU) page (Fig. 1).

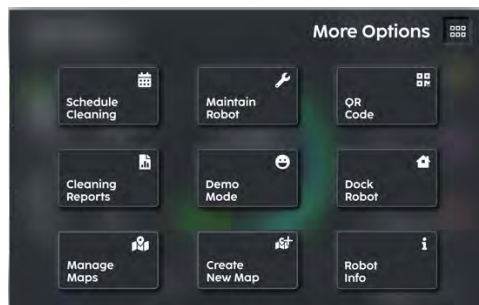


Fig. 1

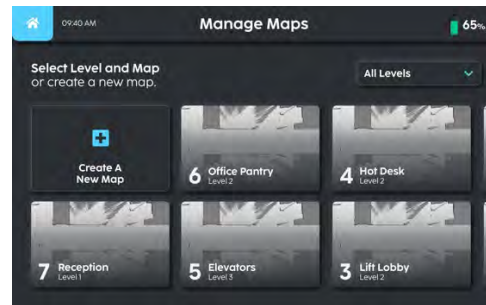


Fig. 2

2. Select the mapped area of operation (Fig 2), wait for the map to change.

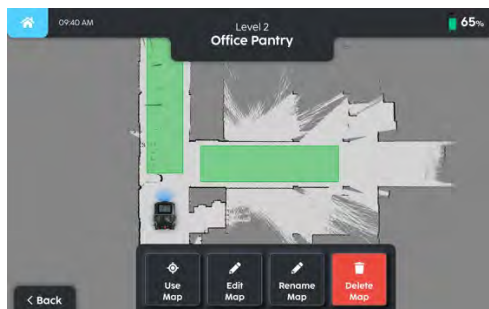


Fig. 3

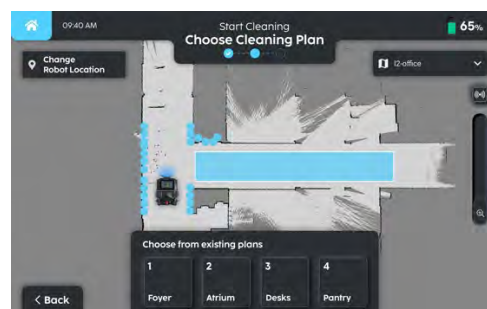
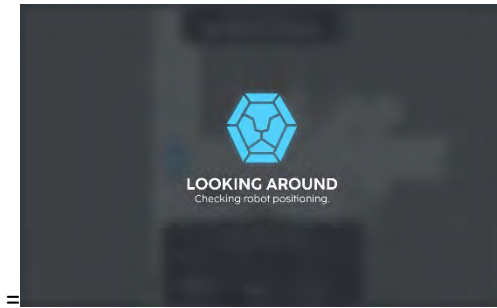
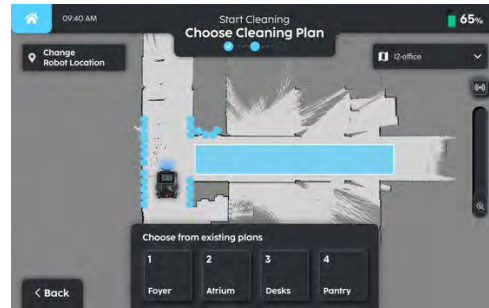


Fig. 4

3. Select the 'use map' option to change the map (Fig. 3).
4. The R3 VAC's position on the map is indicated by an arrowhead (Fig. 4). The points and segments on the map reflect the robot's vision through the LIDAR.
5. Manually move robot to a localization point selected on the map, then select the localize button. Wait for the robot to check its surroundings (Fig 5).
6. When localization is successful the robot will show on the screen.



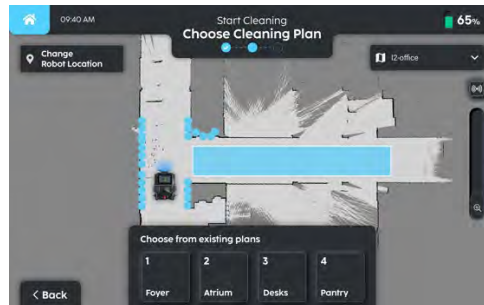
*Fig. 5*



*Fig. 6*

## VERIFICATION OF LOCALIZATION

1. With a properly localized R3 VAC, the LIDAR scan lines (indicated by red points and segments on the map) would closely match map features (displayed as black lines) (as seen in Fig. 7). If the R3's scan displayed on the app does not match the map features satisfactorily, the robot can be repositioned slightly to repeat the localization setting.



*Fig. 1*

2. Another indicator of good localization is successful point-to-point motion of the R3 VAC. Use the Move command as described in ['POINT TO POINT MOVEMENT'](#) to verify accurate movement to a set location.

## OPERATION OF THE R3 VAC

The R3 VAC can be operated through the LionsClean app or through the touchscreen.

### For LionsClean app operations:

Follow the procedure under '[R3 VAC APP AND INITIAL SETUP](#)' to get the R3 VAC running with LionsClean and to perform localization.

### For touchscreen operations:

Follow the procedure under '[R3 VAC TOUCHSCREEN SETUP](#)' to get the R3 VAC running and to perform localization.

Complete the final maintenance checklist below before beginning to work with the R3 VAC. This maintenance checklist will also appear as a reminder on the app.



**WARNING:** If either the E-stop or bumper are not found to be working as expected, do not proceed to clean with the R3 VAC and contact an authorized distributor for assistance.

- ✓ Verify the physical E-stop and LED warning light are functioning.
- ✓ Verify the bumper and LED warning light are functioning.
- ✓ Verify that the obstacle avoidance behaviour is functioning.
- ✓ Check lidar surfaces for any dirt.
- ✓ Verify that the hatch is closed.

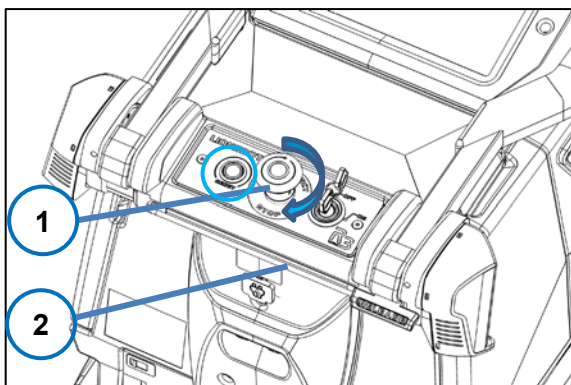


Fig. 1

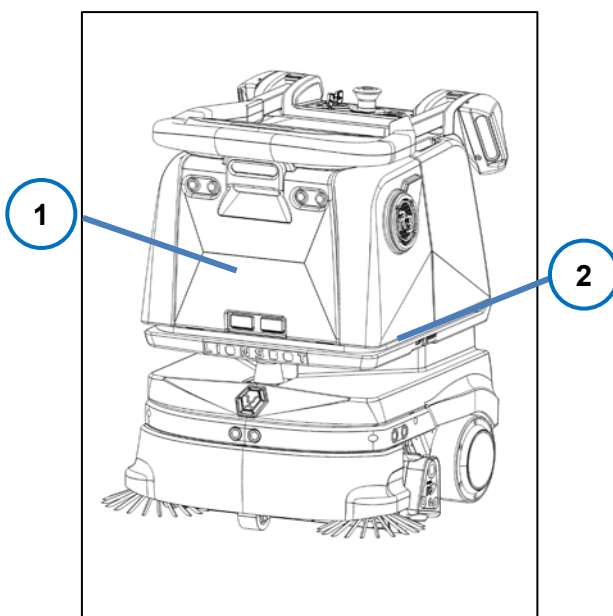
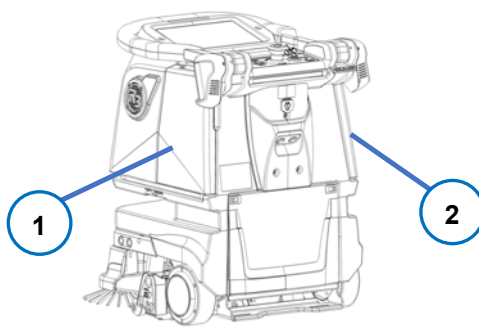


Fig. 2

1. **Verify the physical E-stop function:** After depressing the E-stop, push the robot manually to verify that the brakes have been disengaged and also verify LED lights are flashing red colour. Release the E-stop and press the reset button to verify LED lights go back to original colour.
2. **Verifying the bumper function:** In automatic, point to point travel mode depress the bumper, to verify that the robot replans the path and also verify LED lights are flashing.
3. **Verify that the obstacle avoidance behaviour is functioning:** Use the autonomous-control function of the LionsClean app with the 'Sensor On' to move the robot towards an obstacle (directly in front or on the sides) and verify that the robot avoids the obstacle.
4. **Verify Lidar surfaces are clean:** Check visually lidars surface for any dirt, dust. Wipe lidar surface with a small cloth to clean away if there is any dirt or dust on its.
5. **Verify the hatches are closed:** (Fig. 3).



*Fig. 3*

## POINT TO POINT MOVEMENT

1. Use the 'Move' option (Fig. 1) on the 'Home' page to select a point on the map (Fig. 2) for the robot to move to from its current location.
2. The Move page allows the user to select a pre-set point to move to from the bottom selection ribbon (ex. 'MCDONALDS' in Fig. 2) or provide a custom location by clicking on the map.
3. Upon confirming the selection (Fig. 3), the pause/ stop button bar appears with a pull-up banner for the move mission status, which shows the mission progress as a percentage. Expanding this pull-up banner shows more details about the specific motion (start and end location).
4. Should there be obstacles or an interruption in the process a 'UNSUCCESSFUL' page shall show. The operator may either select 'HOME', 'JUST CLEAN' or 'MOVE' functions to adjust the process.
5. Upon completion of the mission the app will display a completion page (Fig. 5).



Fig. 1

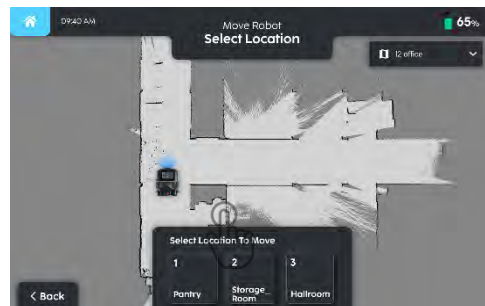


Fig. 2

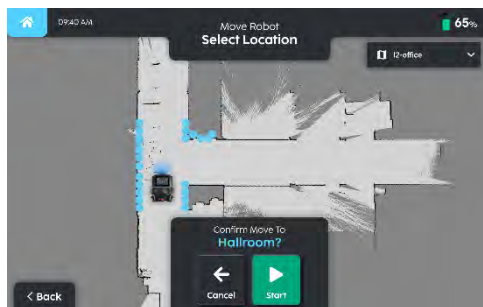


Fig. 3

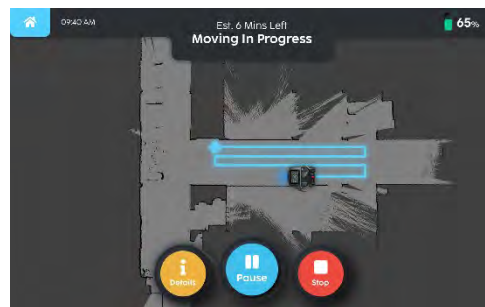


Fig. 4

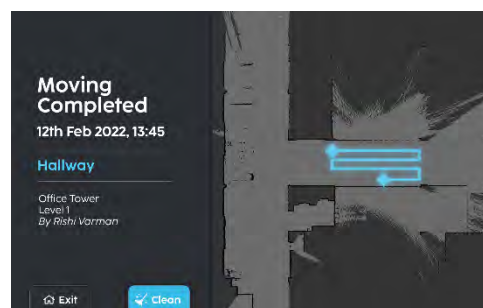


Fig. 5

## RECOMMENDED MAINTENANCE

Complete this checklist of operations after cleaning with the R3 VAC:

- ✓ Stop on a level surface.
- ✓ Clean the floor tool brushes.
- ✓ Clean the side brushes
- ✓ Optional: Replace the vacuum bag.
- ✓ Move the robot back to storage.
- ✓ Charge the robot.
- ✓ Power off the robot.
- ✓ Wipe down the outer skin of the robot, lidar covers and cameras with a dry cloth.

The following sections illustrate these recommended maintenance operations after cleaning with the R3 VAC. To begin,

1. Wipe down the robot, change out the dust bag and clean the floor tool and side brushes.
2. Power off the robot as described in [‘POWERING ON/OFF THE R3 VAC’](#).

## CLEANING THE FLOOR TOOLS

Refer to below for instructions on cleaning the floor tools.

### CLEANING THE BRUSHES

Keeping the brushes clean enables better cleaning of the floor and a longer lifespan of the brush motors. Brushes are advised to be replaced every month or as needed to get better cleaning performance. To detach the brushes for cleaning, follow these steps:



Inspect the brush bristles for wear/ abrasion resulting in shortening. As a rule of thumb, replace the brushes when the cleaning bristles have been worn down by half a centimetre, or monthly/ as needed.



Fig. 1

Check the wear status of the bristles and replace the brush if necessary.

If parts require replacement:

1. Refer to Section on '[Floor Tool Removal](#)' and '[Side Brush Installation](#)' for instructions on part removal.
2. Upon checking and cleaning the brushes, re-assemble them as described in the '[Floor Tool Removal](#)' and '[Side Brush Installation](#)' section.

## CHECK THE VACUUM BAG & HEPA FILTER



For optimal cleaning performance check the vacuum bag capacity, ensure bag is not full:

1. Inspect the Vacuum bag capacity inside the tank hatch.
2. Inspect the HEPA filter for discolouration.



*Fig. 1*



*Fig. 2*

If parts require replacement:

Refer to Section on '[Vacuum Bag Installation/ Replacement](#)' and '[HEPA Filter Installation/Replacement](#)' for instructions on part replacement.

## WIPING DOWN THE R3 VAC

1. Ensure that the robot is powered off.
2. Wipe down the outer skin of the robot using water (no harsh chemicals) and cloth.
3. Do not hose down the robot.

## STORAGE IN COLD CLIMATES

Where robot is used in environments where frosting may occur, the robot and hoses shall be emptied of fluid, to avoid cracking, bursting, and clogging of hoses caused by freezing. The robot shall be stored in a dry and warm place.

## PERIODIC MAINTENANCE

### RECOMMENDED MAINTENANCE SCHEDULE

| OPERATION                                                | AFTER<br>EACH USE | DAILY | WEEKLY | MONTHLY | ANNUALLY |
|----------------------------------------------------------|-------------------|-------|--------|---------|----------|
| Clean the Floor Tool Brushes                             |                   |       |        |         |          |
| Clean the Side Brush                                     |                   |       |        |         |          |
| Wipe Down Sensors                                        |                   |       |        |         |          |
| Wipe Down Robot                                          |                   |       |        |         |          |
| Charge the Battery                                       |                   |       |        |         |          |
| Replace Brushes                                          |                   |       |        |         |          |
| Check /Replace the Brush for Wear                        |                   |       |        |         |          |
| Check / Replace HEPA Filter                              |                   |       |        |         |          |
| Check / Replace Vacuum Bag                               |                   |       |        |         |          |
| Clean And Check Battery Terminals and Cables for Damage. |                   |       |        |         |          |
| Chassis Fastener Inspection                              |                   |       |        |         | (1)      |
| Check Seals for Wear                                     |                   |       |        |         | (1)      |
| Check Wires, Tubing and Fittings for Wear.               |                   |       |        |         | (1)      |
| Motors and Battery Inspections                           |                   |       |        |         | (1)      |
| Wheel Inspection for Wear                                |                   |       |        |         |          |

(1) = This maintenance procedure must be performed by an authorized service centre or distributor.



#### CAUTION:

1. Switch off the robot before performing any form of periodic maintenance.
2. If any loss of vacuum suction is observed, contact the authorized distributor immediately.

## RECHARGING THE BATTERY

For Battery replacement, refer to '[BATTERY INSTALLATION/REPLACEMENT](#)' section.

### AUTOMATED CHARGING (DOCKING)



**NOTE:** Docking Station needs to be registered on the robot map for automated charging feature to work. For setup instruction refer to the **R3 VAC Charging Station Operation Manual**.



**NOTE:** Robot handle bar needs to be in the down position and is localized.

1. To send robot to docking station select 'More Options'.
2. Select 'Dock Robot' (Fig 1).
3. Select the means of docking robot via Automatic or Manual Mode (Fig 2).

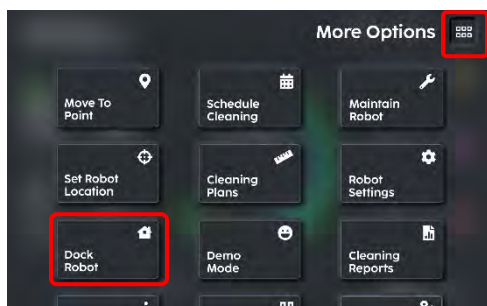


Fig. 1

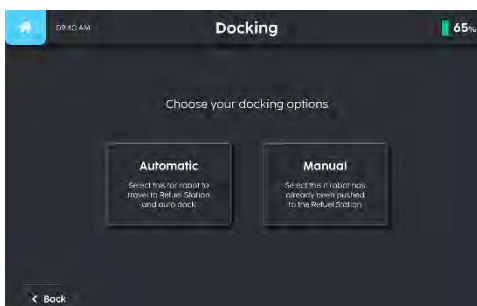


Fig. 2

### Automatic Mode

1. If robot is not localized, select a point closest to the robot to initiate localization process. (Fig 4).
2. Once Robot is localized select the docking station for docking (Fig 5).

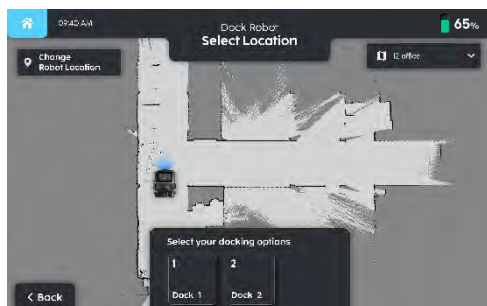


Fig. 3

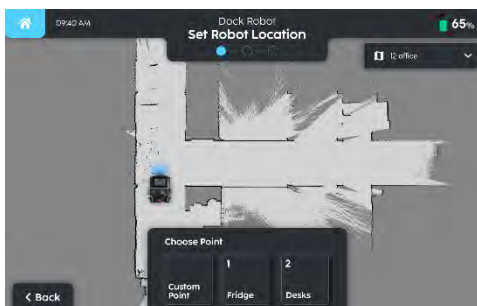


Fig. 4

3. Press 'Start' (Fig 5).

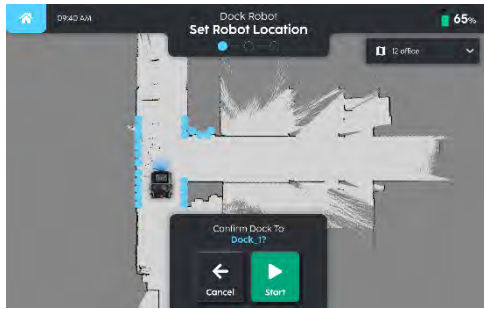


Fig. 5

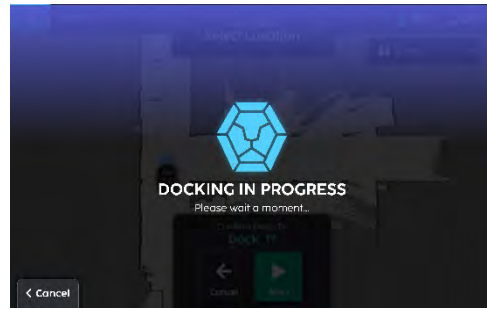


Fig. 6

4. Once the Docking process is completed the screen will turn green to reflect battery charge status (Fig 8).

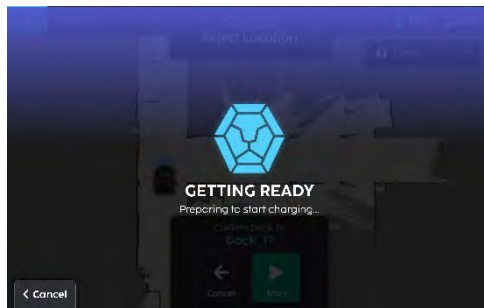


Fig. 7

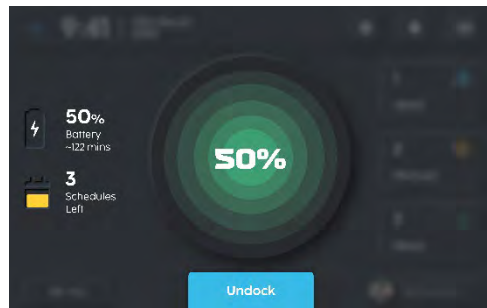


Fig. 8

5. Select the blue 'Undock' button to remove robot from station (Fig 9).

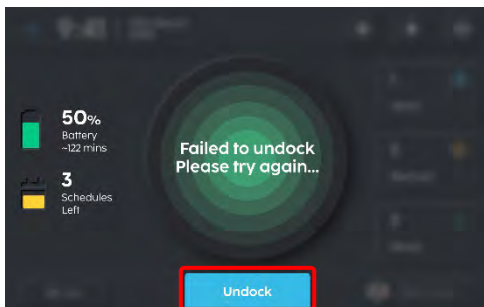


Fig. 9

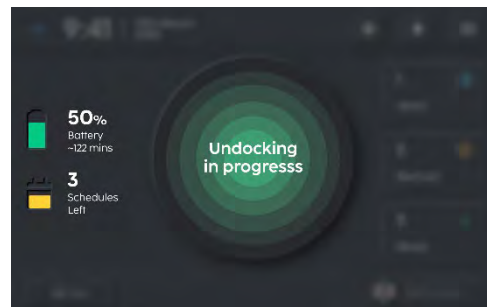


Fig. 10

6. The robot touchscreen will return to the 'Home' page once undocking is complete (Fig 11).



Fig. 11

## Manual Docking

1. With the handle bar in the open position push the robot up to the docking station.
2. Ensure docking station charging contacts are aligned to the robot charging contacts.
3. On the touch screen select 'Dock Robot' (Fig 1).
4. Select the means of docking robot as Manual Mode (Fig 2).
5. A loading screen is displayed followed by a prompt to place handle bar down (Fig 12 & 13).
6. Robot starts charging as shown in Fig 14.
7. When charging is complete. Select the blue 'Undock' button to remove robot from station (Fig 10).
8. The robot touchscreen will return to the 'Home' page once undocking is complete (Fig 11).

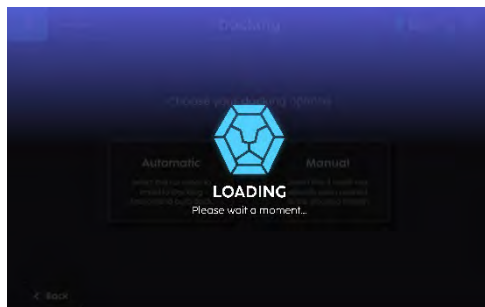


Fig. 12

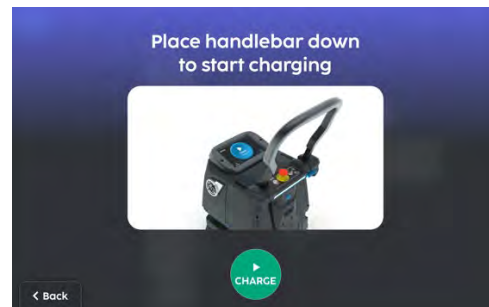


Fig. 13

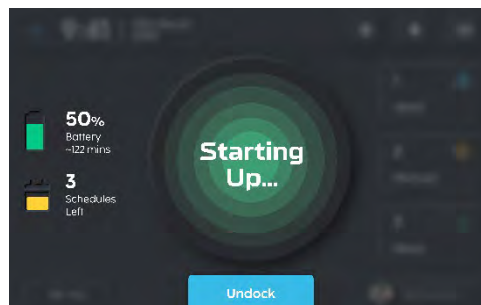


Fig. 14

## PART REPLACEMENT

### BRUSHES:

The R3 VAC is equipped with two side brushes, one roller brush and one microfiber brush generally suitable for sweeping on a variety of floor types.

Replacement components can be purchased as consumables and order codes are listed below:

| CODE        | QTY | DESCRIPTION                                                                                                 |
|-------------|-----|-------------------------------------------------------------------------------------------------------------|
| BRS-0030-C0 | 2   | R3 VAC, Conical Side Brush, OD 175mm                                                                        |
| BRS-0031-C0 | 1   | BRISTLE BRUSH                                                                                               |
| BRS-0029-C0 | 1   | MICROFIBER BRUSH                                                                                            |
| FLT-0013-C0 | 1   | VACUUM BAG                                                                                                  |
| FLT-0012-C0 | 1   | HEPA FILTER H13                                                                                             |
| PWR-0010-C0 | 1   | R3, 24V 40Ah Battery                                                                                        |
| SPT-00006   | 1   | 10pcs per pack Dust Bag                                                                                     |
| SPT-00007   | 1   | 10pcs per pack R3Vac Side Brushes 175mm White                                                               |
| SPT-00008   | 1   | 10pcs per pack R3Vac Microfiber Roller                                                                      |
| SPT-00009   | 1   | 10pcs per pack R3Vac Cylindrical Bristle Brush                                                              |
| SPT-00010   | 1   | 100pcs per pack Bulk R3Vac Microfiber Dust Bag                                                              |
| SPT-00011   | 1   | 10pcs per pack R3Vac HEPA 13 Filter                                                                         |
| SPT-00012   | 1   | 10pcs per pack R3Vac Vacuum Hose                                                                            |
| SPT-00013   | 1   | Standard Pack R3Vac 10 Dustbag with 2pcs HEPA-13 Filter Box                                                 |
| SPT-00014   | 1   | Vacuum Hose R3Vac (pc)                                                                                      |
| SPT-00015   | 1   | Standard Two Set Pack R3Vac (1 set side brushes, 2 microfiber roller brushes, 2 bristle brushes, 1 PU flap) |

## UPDATING THE MAPS

If there are permanent changes (for examples: obstacles, decorations) to the cleaning regions that may affect the robot's operation using the facility maps, the maps need to be updated immediately. Contact an authorized distributor to confirm and test a new map for operation.

## DISPOSAL

Contact an authorized distributor for the proper disposal of the R3 VAC. Before scrapping the robot, it is necessary to separate out different categories of materials for proper collection and disposal in compliance with local environmental regulations. Take particular care in handling the batteries and electronic parts.

## BATTERY DISPOSAL

It is important to dispose of the battery safely and in accordance with local environmental regulations. The battery must be removed from the robot before scrapping. Contact an authorized distributor for battery replacement. The battery characteristics are provided for reference below.

| Characteristics    | Parameter   |
|--------------------|-------------|
| Type               | LiFePo4     |
| Nominal Capacity   | 40 Ah       |
| Nominal Voltage    | 25.6V       |
| Max charge voltage | 29.0 ± 0.2V |
| Cycle Life         | >1500       |



*NOTE: dead batteries are classified as dangerous waste and as such must be delivered to an authorized body for disposal.*



**DANGER:** Following instructions can only be done by qualified personnel from distributor centre.

- 1. Battery must be removed from the appliance before it is scrapped.**

**The appliance must be disconnected from the supply mains when removing the battery.**

## TROUBLESHOOTING

The table below lists some useful troubleshooting tips for simple issues that may arise with the robot. If preliminary troubleshooting is unsuccessful, please contact an authorized distributor for assistance.

| PROBLEM                                                        | POSSIBLE CAUSE                                                               | SOLUTION                                                                                                                           |
|----------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| THE ROBOT DOES NOT START                                       | The battery is out of charge                                                 | Perform a complete recharge cycle and attempt restarting the robot.                                                                |
| THE ROBOT DOES NOT MOVE                                        | The E-Stop is triggered, indicated by red blinking lights                    | Release the E-stop and press the reset button, then wait 30s.                                                                      |
|                                                                | The safety Bumper is mounted incorrectly, indicated by amber blinking lights | Remove and reassemble bumper.                                                                                                      |
| THE ROBOT DOES NOT CLEAN WELL                                  | Brush pressure is not suitable for the floor type                            | Consult an authorized distributor for help with adjusting brush pressure.                                                          |
|                                                                | The brushes are worn out                                                     | Replace with new brushes                                                                                                           |
| DUST/ DIRT LEFT BEHIND                                         | Vacuum does not power on when cleaning                                       | Check cleaning settings for vacuum is not set to 0.<br>Restart the robot and check if vacuum starts correctly.                     |
|                                                                | Floor Tool has not lowered when cleaning                                     | Check brush settings for vacuum is not set to 0.<br>Restart the robot and check if floor tool lowers correctly                     |
|                                                                | Floor Tool hose cavity is choked                                             | Remove and clean floor tool of obstruction                                                                                         |
|                                                                | The vacuum motor is obstructed                                               | Make sure the vacuum tube is free of obstructions                                                                                  |
|                                                                | Side Brush Motors                                                            | Make sure the side brush is installed and working.                                                                                 |
| THE ROBOT MOTION IS OFF THE LOCATION SET BY THE 'MOVE' COMMAND | There is an error in localization                                            | Repeat the localization procedure, making sure the robot LIDAR scans match map features well                                       |
| USER CANNOT LOGIN TO APP                                       | Mismatched user id and password                                              | Check the user id – password combination. Password is case sensitive. Contact an authorized distributor if necessary               |
| CAN'T ADD ROBOT TO APP                                         | Either the robot or app phone cannot connect to the internet                 | Check the network connection on both the robot and phone                                                                           |
| CANNOT LOCALIZE ROBOT/ NAVIGATION ERRORS DURING OPERATION      | Wrong map settings or robots' sensor not working                             | Check map and confirm the choice of the right map and place. Check LIDAR scans match map features well; clean LIDARS if necessary. |

## CONTACT INFORMATION

Original Equipment Manufacturer for R3 VAC:

**LionsBot International Pte Ltd**  
**11 Changi South Street 3**  
**#03-02 Singapore 486122**  
Email: [hello@lionsbot.com](mailto:hello@lionsbot.com)  
T: +65 6595 4565 | DID: +65 6595 4552

## DISTRIBUTOR INFORMATION

## FIRST-AID MEASURES

### General Advice:

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid. Seek medical advice if you feel unwell. Show this safety data sheet to the doctor in attendance.

### Inhalation:

If it is inhaled, move the person to a place with fresh air and keep him/her rest in a position comfortable for breathing.

### Skin Contact:

If there is contact with skin, rinse with running water and wipe it dry. If there is symptom of inflammation, seek medical help.

### Eye Contact:

If there is contact with eyes, immediately rinse eyes with running water for more than 15 minutes. Remove contact lenses and rinse the lenses. Seek medical help if necessary.

### Ingestion:

If it is swallowed, drink large amount of water and seek medical help if necessary. Do not induce vomiting unless instructed by a physician.

## EXPOSURE CONTROLS / PERSONAL PROTECTION



### **Hands protection:**

Use rubber gloves.

### **Skin and physical protection:**

Long sleeve, long pants, rubber boots.



### **Eye protection:**

Wear safety glasses as a minimum eye protection. Conditions may warrant the use of chemical goggles and possibly a face shield. Consult your standard operating procedure or safety professional for advice.

### **Sanitary precaution:**

In the case of allergy, wash hands and face after handling.