



CleanCUBE

User Manual V2.10



This user manual is for **CleanCUBE 2** manufactured May 2020 or later.

The product's **serial number** consists of 10 alphanumeric characters with the first six showing the manufacture date.

Example: 201101AA00 (Nov 1, 2020)

Please read through this manual carefully before installing and using the product to prevent injury or damage to the product.

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1. Introduction

Thank you for purchasing the CleanCUBE!

Ecube Labs is a startup committed to develop tech-based solutions to improve efficiency and sustainability in the waste management industry. Our company is constantly striving to develop solutions and products that possess innovative designs and features that meet the requirements of our users all around the world.

CleanCUBE is designed to deliver years of reliable operation. In order to assure performance and safety for both CleanCUBE and its users, everyone involved in the installation, operation, and maintenance of CleanCUBE should review the instructions and warnings in this manual. This user manual provides general safety information, product information, installation and operation instructions, and troubleshooting.

2. General Safety Information

2.1 Safety Information

Please learn the following safety symbols used throughout this manual.

| Symbol | Explanation |
|---|--|
|  NOTE | Indicates a detail regarding operation or an additional explanation/instruction. Reading these is highly recommended |
|  CAUTION | Indicates a detail regarding operations that may lead to injury or damage if not performed correctly. Pay close attention to these cautions. |
|  WARNING | Indicates a detail regarding operations that may lead to injury or death to persons if not performed correctly. Always pay strict attention to these warnings. |

2.2 Precautionary Safety Information

To ensure user safety in operating the product, you must follow the following safety rules:

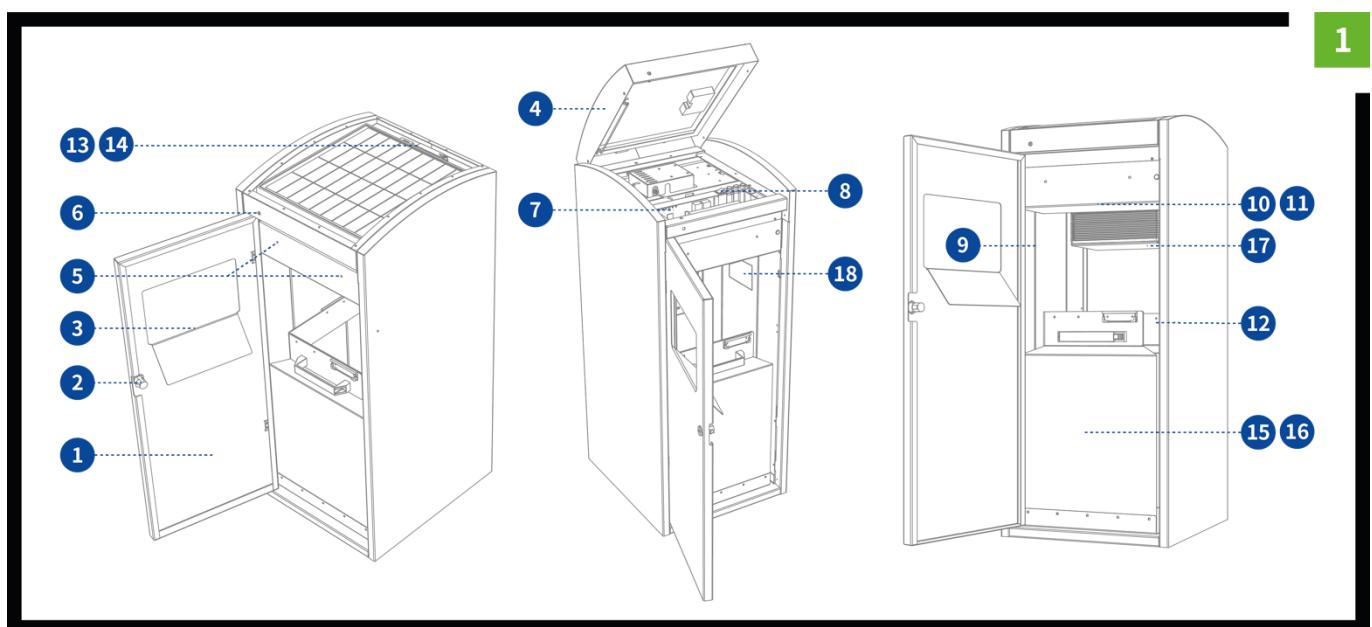
- Consult Ecube Labs before making modifications to CleanCUBE or its operating environment. Sudden or careless modifications could result in death or serious injury to people, and may result in malfunctions or operational failure of CleanCUBE.
- Never perform any service on CleanCUBE until both electrical and mechanical power has been shut off so that it cannot be restored without the consent and knowledge of the person who interrupted the power. Do not perform any service without professional knowledge.
- When performing any type of service on this product, follow the appropriate instructions listed in this manual and utilize the required tools and hardware.

3. Product Information

CleanCUBE is a solar-powered waste bin that uses an automatic on-site compactor to increase its waste capacity by up to 500%. Utilizing intelligent sensors, CleanCUBE monitors waste fill-level and operational status and provides this information to the user through CleanCityNetworks (CCN).

3.1 Product Components

Please check the key components of the product by referring to figure 1 below. The appearance and additional installed parts may differ according to product options.



| | | |
|---------------------------|--------------------------------------|------------------------------|
| 1. Front door | 7. Mainboard | 13. Communication antenna |
| 2. Front door lock | 8. Power and manual operation button | 14. GPS module |
| 3. Aperture and chute | 9. Aperture safety sensor | 15. Inner bin or wheelie bin |
| 4. Top cover | 10. Smoke detector sensor | 16. Inner bin holder |
| 5. Top cover lock | 11. Fill-level measuring sensor | 17. Compaction module |
| 6. Status indicator light | 12. Door sensor | 18. Product serial number |

3.2 Safety and Protection Features

CleanCUBE is designed with several safety features to protect the user and service personnel while using the product. These safety features are:

- **Safety sensors at the aperture:** these sensors detect objects or hands passing through the bin opening and immediately halts compaction to prevent injury.
- **Smoke detection sensor:** this sensor detects smoke inside the product. When it detects smoke, a compaction is automatically performed to suppress the fire and a notification is sent out via CCN.
- **Door sensor:** this sensor senses whether the front door is open or closed. To prevent injury, compaction is stopped immediately if the door is opened during a compaction cycle. If it detects that the door is open for longer than a set time, the compactor retracts to its original position.
- **Door and top cover locking device:** there are locking devices on the door and top cover, which only authorized personnel can access. We provide a locking device with a key or bolt depending on the product.
- **GPS module:** The GPS module can track the location of the unit and provide the unit's GPS coordinates with a certain degree of precision. The user can then identify the unit's location through CCN.

3.3 Product Status Indicator

The indicator shows the product's approximate fill-level and operational status.

| Indicator Light | Fill-level (slow flashing) | Operational status (fast flashing) |
|----------------------|----------------------------|------------------------------------|
| Green | Low fill-level | Communicating |
| Orange | Medium fill-level | Door open |
| Red | High fill-level | Smoke detected |
| 3 colors alternating | | Compacting |

The indicator light reflects the fill-level measured right after a compaction. Depending on the type of waste and how it rebounds upward after being compressed, there may be a discrepancy between the visual fill-level and the fill-level indicated by the flashing light.



NOTE

4. Transportation and Selection of Installation Site

4.1 Initial Inspection

Upon receiving the CleanCUBE, perform a visual inspection of the packaging before accepting the delivery from the shipping company. If the packaging appears to be damaged or in poor condition, unpack the unit from the packaging and inspect the unit for damage in front of a representative from the shipping company.

If there is any visible damage, mark “damaged” on the freight receipt and save an image or a video of the damage. After inspecting the unit for damage, check to see if all parts and components have been delivered with the unit.

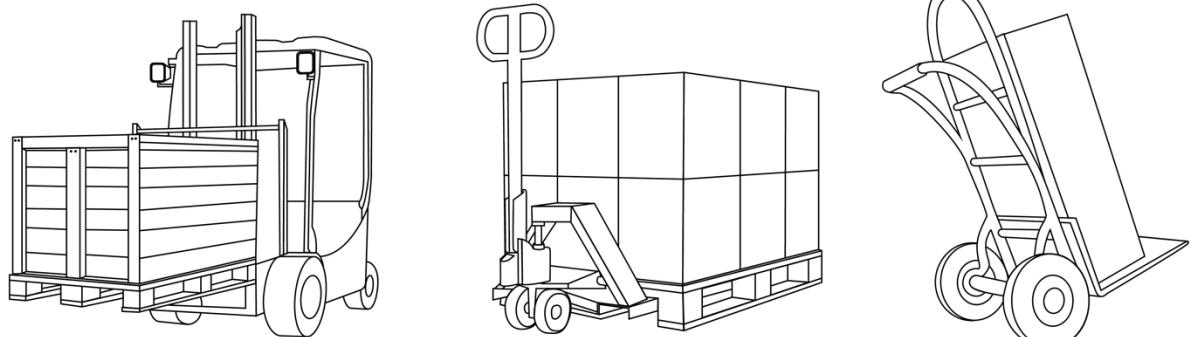
4.2 Transportation

You can use a forklift (if the unit is on a pallet) or a hand truck to move the CleanCUBE to its required installation location. If the CleanCUBE is delivered on a pallet, use a forklift to move it to the installation location. When using a forklift, ensure to adjust the forks so that they are as wide as possible while in the pallet. To ensure the safety of the unit while transporting, refer to the following directions:



The product must be carried by at least 2 persons. Due to the nature of the product – center of mass is relatively high – a small tilt can lead to a tipping-over incident. Please pay close attention.

2



- Ensure that the forks are placed fully through the pallet before lifting.
- After lifting the unit, do not make any sudden movements that may cause the unit to fall off the forklift.

- After transporting the unit to the designated location, gradually lower the unit to the ground.

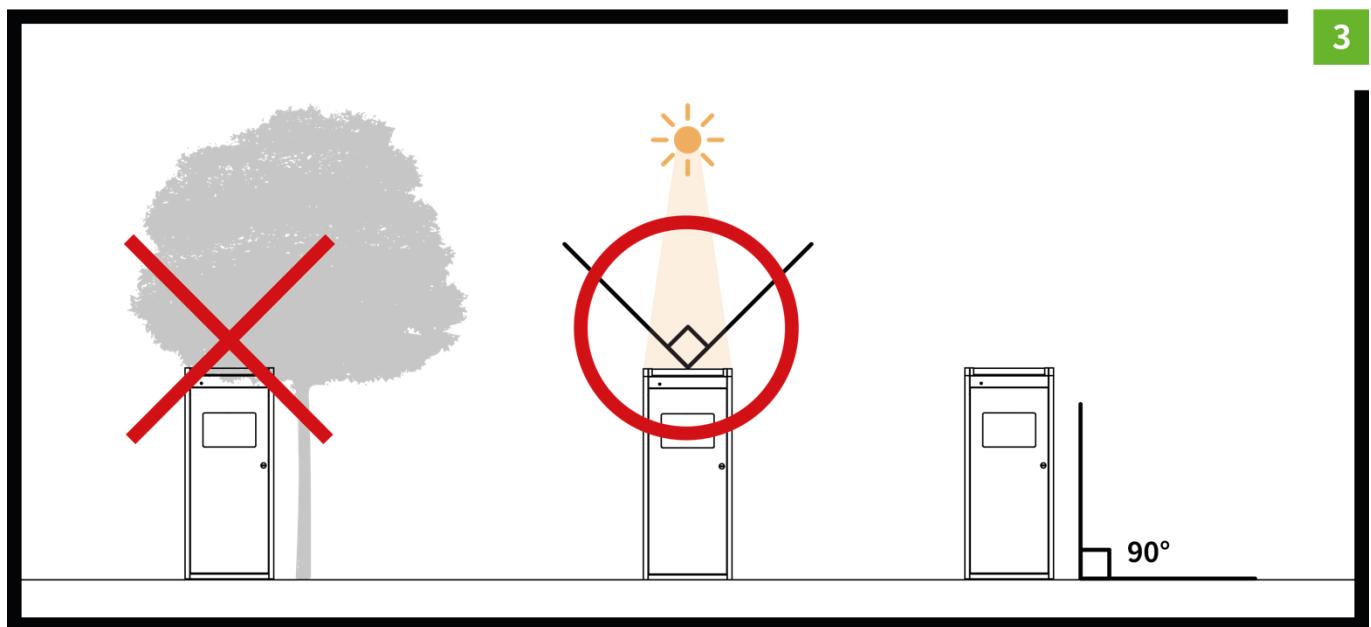
If the CleanCUBE is not on a pallet, it is recommended to transport the unit using a hand truck. Given the weight of the CleanCUBE, ensure that only hand trucks with load capacities of at least 330 kilograms (or 728 lbs) and equipped with safety straps be used in the transportation of the unit. To ensure the safety of the unit while transporting, refer to the following directions:

- If the original protective shell has been removed from the unit, cover the unit with protective padding or material before transporting. This prevents scratches and other physical damage that may occur while transporting the unit.
- Ensure that the load plate of the hand truck is entirely placed under the base of the unit before lifting.
- Place the hand truck's safety straps around the circumference of the unit. The straps should be around the bin aperture.
- Tighten the safety straps until the unit is properly secured onto the hand truck.
- Use wheel chocks to prevent accidental movement of the hand truck.
- After transporting the unit to the designated location, gradually lower the unit to the ground.

4.3 Selection of Installation Site

To facilitate installation and minimize installation time, we recommended that a site for the unit be selected prior to the delivery of the unit. When selecting a site for installing the CleanCUBE, consider the following factors for optimal performance of the unit:

- Select an open site such that sunlight can hit directly above the unit. There should be no obstructions that would prevent the unit from receiving sunlight.
- The unit should be installed on solid ground such as concrete, cement, wood, etc.
- Adjust the unit's adjustable feet so that the unit is perpendicular to the ground.
- The front of the unit should have adequate space of at least one meter so that both waste collection and unit maintenance can be performed.
- Do not select an indoor installation site unless the unit is a hybrid or AC model.
- The battery may discharge and die if the product does not receive adequate sunlight.



3

5. Installation and Initial Operational Inspection

5.1 Levelling

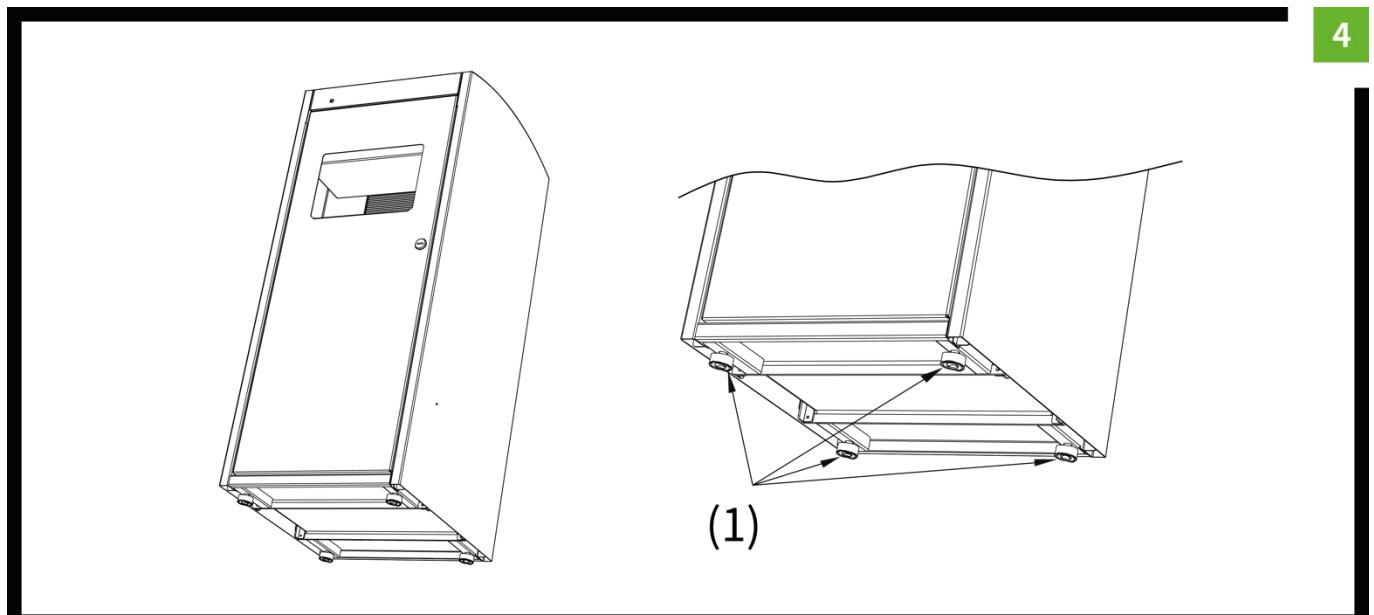
CleanCUBE has four adjustable feet that can be used to level itself on slightly uneven or sloped installation sites. After installing CleanCUBE, if the unit is tilted or slightly leaning to one side, use the adjustable feet to stabilize the unit in an upright position.



CAUTION

A minimum of two people is required to perform this procedure.

Perform the following to adjust the adjustable feet of the unit.



* (1) Adjustable feet

1. Determine which of the four adjustable feet requires adjustment.
2. To adjust the adjustable feet located on the front/back half of the unit, have one person tilt the unit towards the front/back and have another person support this tilted position.
3. Turn the adjustable feet clockwise or counter-clockwise to level the unit.
4. Gradually lower the tilted unit to the ground.



CAUTION
Using excessive force to tilt the unit may make it difficult to support the tilted position and cause it to tip over.



WARNING
Failure to level the CleanCUBE may result in an unstable unit, which may potentially lead the unit to tip over and cause injury or damage.

5.2 Connecting the Battery

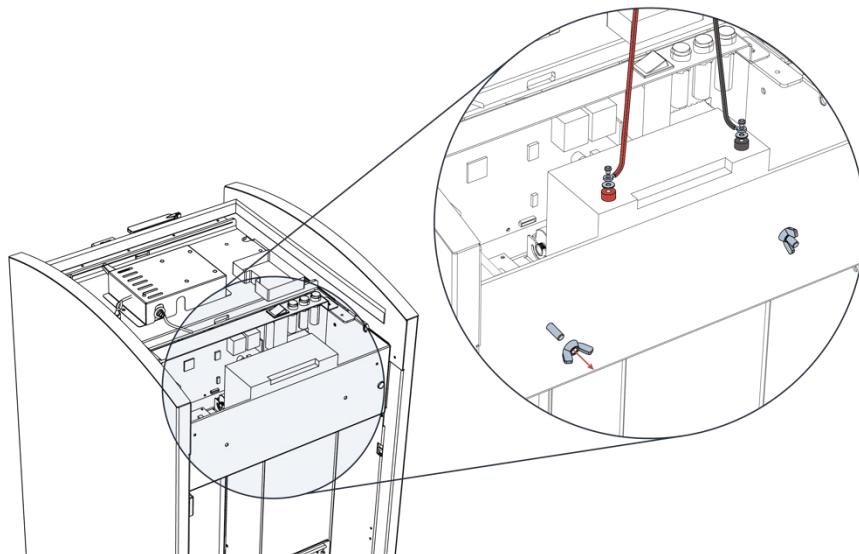
The CleanCUBE is typically shipped with its battery installed and connected. In certain exceptions it is shipped with the battery disconnected. If so, you'll need to connect the battery terminals to turn the power on:

1. Use your key to unlock and open the front door of the unit.
2. Open the top cover.
3. Once you've visually confirmed that the battery is disconnected, loosen the bolts on the battery's terminals.
4. Connect the positive (red) cable to the positive (red) battery terminal and the negative (black) cable to the negative (black) terminal. Tighten the bolts to fix the cables.



WARNING
If you mix up the positive and negative cables when connecting to the battery terminals, the product may be damaged. Please also make sure that there is no water on the battery and on your hand before performing this task.

5. Use the power switch and check that the product's power comes on.
6. Close the top cover and front door.



 **NOTE** After receiving the product, please make sure to charge the battery (via solar or AC). Long-term storage of the product without use may discharge and kill the battery. If necessary, please contact the manufacturer for assistance.

 **NOTE** When it's time for battery replacement, obtain manufacturer's assistance. when changing the battery. Inappropriate battery use may affect the product's performance.

| Product Capacity | 100L | 120L / 240L |
|-------------------------------------|---|--------------------|
| Battery Capacity | 18Ah or more | 35Ah ore more |
| Maximum Battery Size (W x L x H) | 120 x 350 x160 mm | 135 x 400 x 160 mm |
| Battery Type | Sealed lead-acid deep cycle battery 12V | |
| Maximum Size of the Terminal Socket | 6 mm | |

5.3 Turning the Power On

After installing the battery please follow the instructions below to turn on the product.

1. Open the front door and then open the top cover.
2. Locate the ON/OFF switch and turn the unit ON.
3. Wait 1~2 minutes for the status indicator light to turn on (system is booting).
4. When the status indicator light flashes green quickly, wait another 1~2 minutes (communicating).
5. After communication is complete, the status indicator light will change to a slow flash. The color will reflect the fill-level status.

5.4 Initial Operational Inspection

After turning the product on, check that the product is operating properly. Please follow the instructions below to check the basic operations

1. Open the front door and check that the status indicator light shows “door open”.
2. Close the front door and check that the indicator shows the appropriate fill-level.



The product measures fill-level after front door is opened and closed and shows different colors on the indicator according to the measured fill-level.

Follow the instructions below to perform a manual compaction:

1. Open the front door and then open the top cover.
2. Press the Down (green) button. This triggers the compactor to move down. The compactor automatically stops once it is fully extended.
3. Press the Up (blue) button. This triggers the compactor to move up. The compactor automatically stops once it returns to its original resting position.
4. Once the compactor is in its original resting position, press the Down (green) button again to trigger the compactor to move down.
5. Instead of letting the compactor stop automatically, press the Stop (red) button when the compactor is halfway down.
6. Press the Up (blue) button to move the compactor back up to its original resting position.
7. Close the top cover and front door.



Release the Up or Down buttons after pressing it. Do not hold the buttons down for an extended period of time.

6. Product Use and Maintenance

6.1 Inner Bin Use

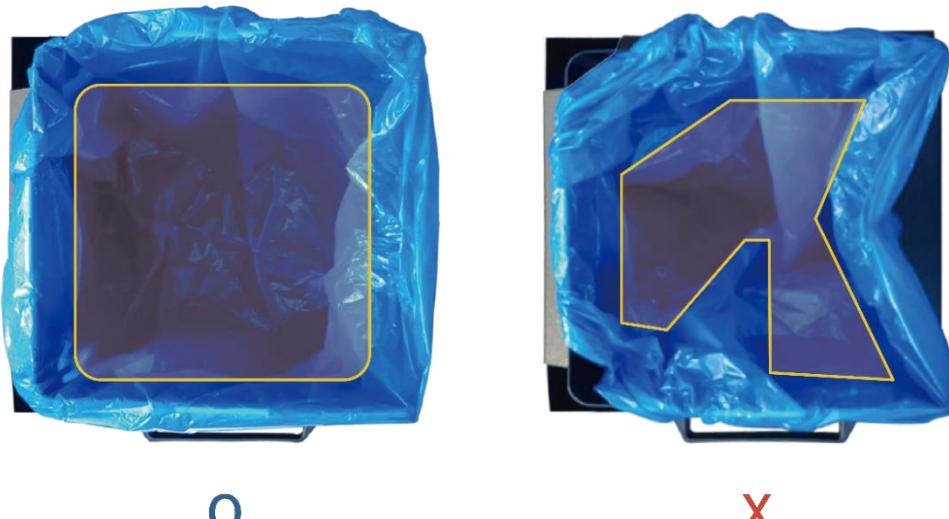
The inner bin used for the product must be placed and the bag fit appropriately for the product to operate normally and measure the bin's fill-level accurately.



If you are using an inner bin (wheelie bin) that was not provided by the manufacturer, obtain the manufacturer's assistance when placing the inner bin inside the CleanCUBE.

CAUTION Inappropriate inner bin use may affect the unit's performance and even damage the product.

The trash bag must be pushed out to all four sides. If the trash bag is crumpled toward the center, the fill-level information may not be accurate. Please push in the inner bin (including a wheelie bin) so that the handle points toward the front.



6.2 Waste Collection

Please follow the instructions below to collect waste from the product:

1. Use your key to unlock and open the front door (be sure that the unit is not performing a compaction when opening).
2. Pull out the product's inner bin (or wheelie bin) and empty it.



The waste bin (inner bin) containing compacted waste may be 3~6 times heavier than non-compacted waste. Please be cautious of injury if collections are performed manually and without machinery.

3. After collection, push the inner bin inside the unit to the edge.



The inner bin must be pushed to the designated location and if there is an object obstructing this, it must be removed. If the inner bin is not pushed in to the appropriate location, this may cause friction and shock during compaction and severely damage the product.

4. Close the front door completely and check that the door is properly closed through the status indicator light.

6.3 Visual Inspection and Cleaning

We recommend performing a visual inspection to check the product's status and clean the product regularly. Please refer to the instructions below:

- Remove dust or objects from the top cover for efficient solar charging.
- Check that the fill-level measuring sensor and aperture safety sensor are not blocked by waste or foreign objects. Remove if found.
- Check that there is no waste or any object near the compaction module that may obstruct compaction. Remove if necessary.
- Use water-based detergent or organic solvents to clean the product exterior. Do not use ammonia-containing detergent or solvent. It can damage the product's polycarbonate cover and coated ironware.
- When cleaning the polycarbonate cover for protecting the solar panel, use a soft cloth or sponge to minimize scratches or abrasion.
- When cleaning the product interior, spray water downwards, away from the product's electronics.



If you clean the product interior with high water pressure, the water may reach the product's electronics and cause a malfunction.

6.4 Quarterly and Annual Maintenance

After installing CleanCUBE, quarterly maintenance checks are recommended. Here is a checklist:

1. Check that the locking device on the front door is operating appropriately.
2. Check the leveling of the unit and change the adjustable feet as necessary.
3. Check the polycarbonate top cover for any scratches, fractures, or damage.
4. Check that there are no obstructions to the solar panel.
5. Perform a manual compaction to confirm that the unit is operating properly.
6. Check the product's status through remote inspection with the manufacturer's assistance.

7. FCC Certification

FCC Information to User

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution

- Any changes or modifications (including the antennas) to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.
- This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.