



Agenda Item #: _____

Staff Report

City of Manhattan Beach

TO: Honorable Mayor Richard Montgomery and Members of the City Council

THROUGH: Geoff Dolan, City Manager

FROM: Leadership Manhattan Beach, Class of 2009

DATE: January 27, 2009

SUBJECT: Consideration of a solar powered trash compactor and recycle receptor donation from Leadership Manhattan Beach Class of 2009.

RECOMMENDATION:

The Leadership Manhattan Beach (LMB) Class 2009 recommends that the City Council authorize the installation and location of the solar powered trash compactor and recycle receptor, "Big Belly Solar".

FISCAL IMPLICATION:

There are no fiscal implications associated with the recommended action.

- 1 The LMB Class 2009 will provide funding to purchase a "Big Belly Solar" trash compactor and recycle station.
- 2 Public Works has confirmed there are no additional costs to maintain and service the solar compactor.
- 3 Public Works has verified that any recyclable container can be emptied with out any additional up charge.
- 4 Public Works has offered to store the solar compactor until installation.

BACKGROUND:

Leadership Manhattan Beach (LMB) is a nonprofit organization that provides a unique leadership training program to residents and friends of the city of Manhattan Beach to develop and unite community leaders. Participants increase their knowledge of the Manhattan Beach and address community challenges by implementing a project. The first graduating class was the Class of 1992.

The Class has selected a "Big Belly Solar" as the project for this year. Big Belly Solar addresses the community's goals of moving toward eco-based solutions and alternative energy sources. LMB Class 2009 mission statement is "to provide our community with an innovative, environmentally friendly, solar waste management system that promotes a cleaner, greener Manhattan Beach."

“Big Belly Solar” directly supports one of the City Councils top ten items in the 2008-2009 work plans. Specifically it relates to item # 7—community involvement in green issues. LMB Class 2009 believes the addition of the “Big Belly Solar” compactor makes a statement that Manhattan Beach is forward thinking in eco-development for the city.

DISCUSSION:

“Big Belly Solar” is new technology for an everyday activity providing awareness about an alternative energy source to facilitate a better environment.

PRODUCT SUMMARY:

The Big Belly® Solar Compactor (www.bigbellysolar.com) is a patented compacting trash receptacle that is completely self-powered. Instead of requiring a grid connection, Big Belly Solar uses solar power for 100% of its energy needs. The unit takes up as much space as the "footprint" of an ordinary receptacle—but its capacity is five times greater. Increased capacity reduces collection trips and can cut fuel use and greenhouse gas emissions. Big Belly Solar also provides cost efficiencies from labor savings, fuel cost and maintenance savings, as well as environmental benefits from reduced emissions of greenhouse gases and other pollutants. Safe, easy to use, the enclosed design keeps pests out and litter in. The Big Belly Solar resembles a book drop at the library. Big Belly Solar has already proven its worth in urban streets, parks, colleges, arenas.

Facts and figures about Big Belly Solar

- Compaction Ratio: Big Belly Solar holds up to five times the volume of ordinary trash receptacles
- Displaced Trips: Big Belly Solar can displace four out of five pick ups
- Greenhouse Gas eliminated: 80% reduction
- Capacity: Big Belly Solar can hold 150 gallons of trash
- Force: Big Belly's compaction mechanism exerts 1,200 pounds of force
- Energy Efficiency: Big Belly Solar gets 100% of its energy from the sun and uses less than 5 watt hours/day
- Locally, several have been ordered--7th & Figueroa, Venice Beach, Carlsbad, and Cal Tech Pasadena

Cost of a Big Belly Solar Unity

- Newest model \$3995.00
- With recycling unit \$4965.00
- Trash bags \$ 43.00
- Side panels for ads (optional) \$ 100.00

**Price break with 10 or more units*

FUNDRAISING:

To raise money for the project, LMB Class 2009 will be selling tickets to a cocktail party and silent auction of goods/services donated by local merchants. The event is planned for mid March. Additionally, the class will raise money from private donations, and sponsorships from corporate and local businesses.

“Big Belly Solar”, as with any other Leadership Manhattan Beach projects, will require means of sustainability long after LMB Class 2009 graduates. In order to meet this condition, LMB Class 2009 met with the Public Works staff to ensure that there will be no disturbance to the current trash collection nor is there a current need for any additions refuse fees for the solar compactor.

Public Works staff recommended the corner of 13th and Morningside Drive as a location for the solar compactor. The container will be placed and bolted on the sidewalk area.

The Tolkin Group, the Manhattan Beach Chamber of Commerce and Planet Pal (an organization dedicated to environmental awareness in MBUSD), support this project

IMPLEMENTATION:

This project is expected to be completed by May 9th 2009.

ALTERNATIVES:

The alternatives to our recommendation include other locations for the “Big Belly Solar” trash compactor:

- Manhattan Beach Pier, or
- A school site within Manhattan Beach Unified School District.

Attachments: A. “Big Belly Solar” specs sheet
B. Estimated Maintenance Schedule
C. Power point slides

BigBelly[®]
Users Manual
Model BB3



BigBelly Solar
50 Brook Road
Needham, MA 02494
888-820-0300
Int'l: +1-781-444-6002
www.bigbellysolar.com



Before attempting to service or maintain the *BigBelly*, you should read and understand the contents of this manual.

Failure to do so will void the warranty on the compactor.

The owner/employer involved in the operation, maintenance, and installation of the *BigBelly* cordless compaction system should read and understand all warning labels and the most current version of the following applicable standards:

- ANSI Standard No. Z245.2, "Stationary Compactors Safety Requirements"
A copy of this standard may be obtained from:
Environmental Industries Association
4301 Connecticut Avenue, NW Suite 300
Washington D.C. 20008
- OSHA 29 CFR, Part 1910.147, "The control of hazardous energy (lockout/tagout)"



WARNING!

Only factory-authorized personnel should perform any service or repairs that go beyond the scope of this manual.

If you need further assistance or training, please contact your distributor or BigBelly® Solar. You will be asked to provide the compactor serial number, unit location, and installation date.



CAUTION

Do not attempt to run the compactor with the front service door or top door open. This could result in harm to the machine and possible harm to users.

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Introduction

Thank you for purchasing a BigBelly Cordless Compaction System. This product is designed to give you years of reliable service and superior performance. To guarantee top performance and safe operation of the compactor, each person involved in the operation, maintenance, and installation of the compactor should read and thoroughly understand the instructions in this manual and follow all warnings.

This manual is designed to guide the user through the *BigBelly* site selection, installation, and activating the *BigBelly* for the first time, general operations, maintenance, and some troubleshooting diagnostics if needed.

Additional copies of this manual are available at www.bigbellysolar.com.

Key Components

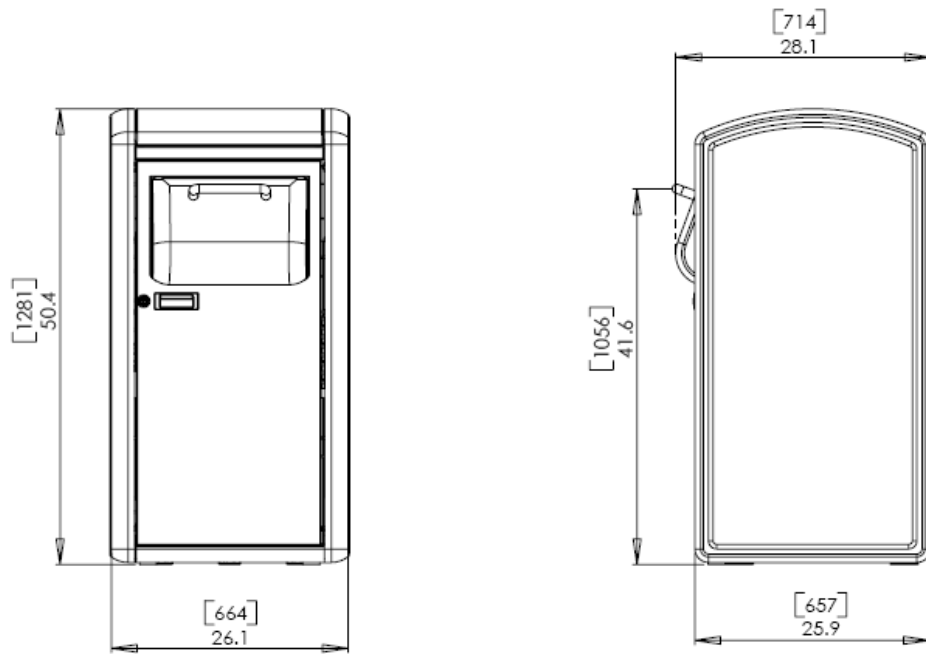
The diagrams below show key components that are referred to in this manual. More detailed diagrams are in the System Diagrams section of this manual.

Figure 1. Simple external view

Figure 2. Door open view



Product Specifications



Overall Machine Dimensions	
Height	50.4"
Width	26.1"
Depth	25.9"
Handle Height	41.6"
Weight	300 lb
System Voltage	12V
Insertion Hopper Opening	6" x 17"

Bin Features	
Bin Volume	32 Gallons

Compaction Features	
Compaction Force	1,250 lb maximum
Cycle Time	41 seconds
Motor Power	1/6 HP

Machine Safety

The *BigBelly* is designed with user safety as a top priority. Labels are placed inside the machine to indicate potentially dangerous areas, keep-out areas, and general safety hazards. Please familiarize yourself with these labels and locations.




<i>Label</i>	<i>Description</i>
	<p><i>Caution</i> Label is inside the top service compartment.</p>
	<p><i>Only trained personnel should be servicing unit. Do not proceed, as injury could occur.</i></p> <p>Label is inside the top service compartment on the electronics cover.</p>
	<p><i>Crush Hazard</i> Label is inside the top service compartment to warn of the moving compaction ram.</p>

Figure 3. Safety labels inside the *BigBelly* with top door open



Transporting the *BigBelly*

The *BigBelly* will arrive on a pallet, enclosed in rugged shrink-wrapped cardboard packaging. The unit will be bolted to a wooden pallet with a mounting bracket to be used for installing the *BigBelly*. Be sure to fully inspect the packaging before accepting the machine from the shipping company. If the packaging appears to be damaged, unwrap the machine and inspect it for damage prior to accepting delivery from the shipper. If there is any visible damage, mark "damaged" on the freight bill, and unpack the unit with the truck driver present to inspect for damage.

To unwrap the *BigBelly*, remove the shrink wrap holding the cardboard cap on the sleeve. Remove the cardboard cap and then lift the sleeve up and over the top of the machine.

The unit will arrive with two service keys attached to magnetic key chain fobs. The magnetic fobs are used to trigger manual cycles when needed (see *Running A Manual Cycle* section of this manual).

Figure 4. BigBelly service key and magnetic fob



Moving on the pallet

The *BigBelly* can be moved using a forklift or pallet jack while the unit is on the pallet. The pallet can be lifted from any side. When using a fork lift, adjust the forks to have as wide a distance as possible in the pallet. To move the unit on a pallet:

1. Ensure the forks are fully through the pallet before lifting.
2. With the machine lifted off the ground, avoid sudden movements as the machine could fall off the forklift.
3. Once in the desired location, gently lower the unit.

Removing from the pallet

The *BigBelly* is shipped secured to its pallet with a mounting bracket. To remove the unit from the pallet:

1. Open the front door with the service key and remove the plastic bin.
2. Use a 7/32" hexagonal wrench to remove the four bolts holding the machine to the mounting bracket as shown in Figure 5. Save these bolts; they will be needed for installing the machine. Also save the mounting bracket since this bracket is used to mount the unit to the ground when the *BigBelly* is installed.
3. Manually walk the machine off the mounting bracket being careful not to damage the bottom corners of the unit.
4. Remove four bolts holding the mounting bracket to the pallet using a 7/32" hexagonal wrench (see Figure 6).

***Save all bolts and the mounting bracket!
They will be needed to install the unit.***

Figure 5. BigBelly mounting bolt locations

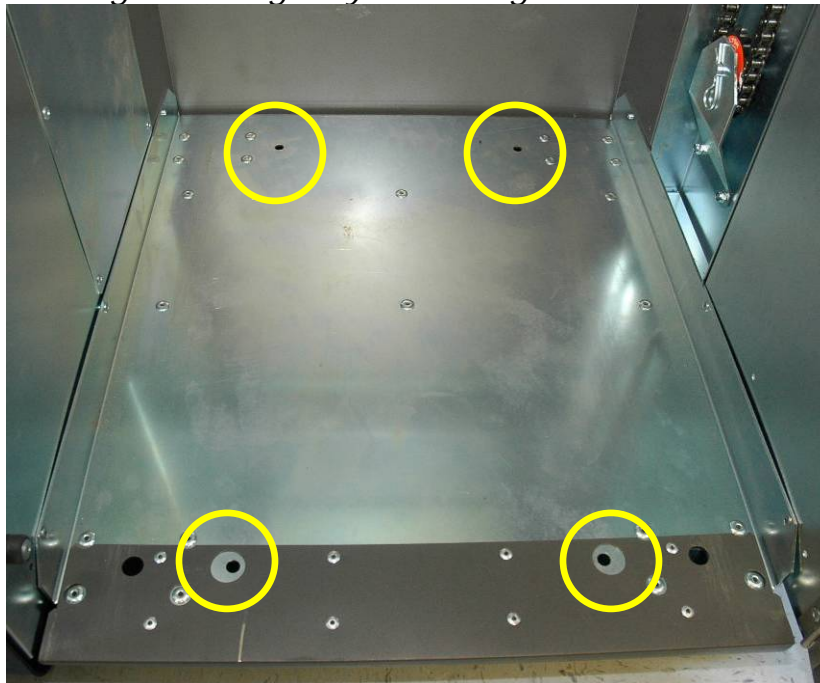
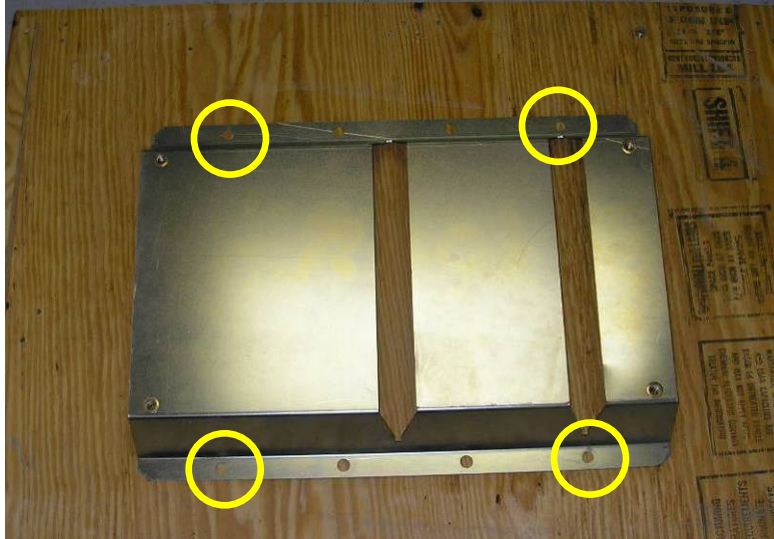


Figure 6. Ground mounting bolt holes



Moving without a pallet

With the *BigBelly* off its pallet, the unit should be moved with a hand truck. Only hand trucks with load capacities over 400 pounds and equipped with safety straps should be used to move the *BigBelly*. The *BigBelly* can be lifted from the back or either side with an approved hand truck.

WARNING: Never lift the machine from the front. This can damage the insertion hopper

To protect the powder coat finish on the BigBelly, padding should be used between the strap and the machine and between the hand truck and the machine.

To move the *BigBelly* with a hand truck:

1. Wrap padding around the unit to prevent it from being scratched during transport. Ensure the load plate of the hand truck is fully under the bottom of the machine before lifting.
2. Wrap the hand truck's safety strap around circumference of machine and tighten until the unit is secured to the hand truck. Be sure to wrap the strap below the insertion hopper.
3. When lifting, chock the wheels so that the hand truck does not prematurely roll.
4. Once the *BigBelly* is in the desired location, use the reverse of the lifting method to gently lower the *BigBelly* to the ground.

Figure 7. Transporting the BigBelly on a hand truck



Site Selection

The site for the *BigBelly* should be selected with five considerations:

1. High trash volume
2. Adequate space between trash cans
3. Solid ground (concrete, brick, wood, etc.)
4. Sky directly above the machine
5. Adequate access to the insertion hopper door and front service door (at least 36")

The *BigBelly* can hold far more trash than a traditional trash can, reducing the burden caused by peak periods of trash accumulation. As a result, the benefits of the *BigBelly* will be maximized if it is placed in a location with high trash volumes or in a remote area.

The best surfaces for the *BigBelly* are concrete, asphalt or brick. These surfaces should be as level as possible to allow the machine to be stable.

For ease of installation, BigBelly Solar recommends that a site for the unit be selected prior to delivery of the machine to minimize set up time needed. Mark the desired location so that the installation crew knows where to place the machine.

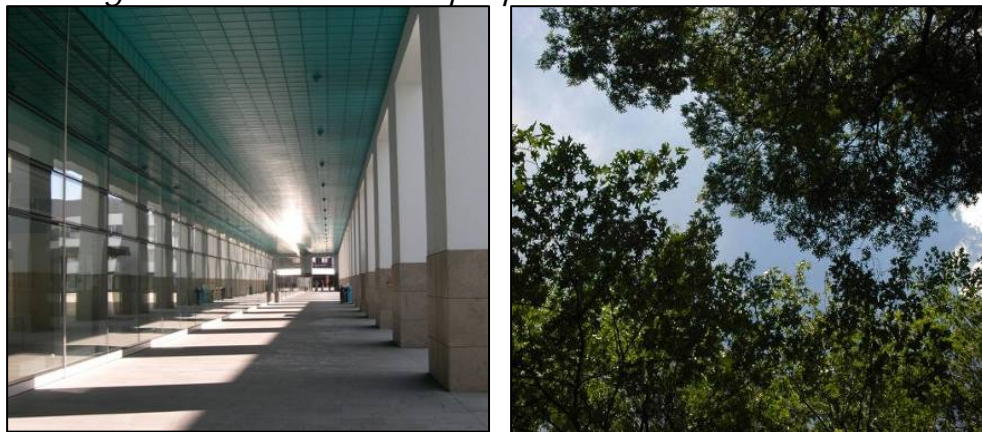
Once a high-volume area for the *BigBelly* has been selected, the specific location for the unit should be determined. The *BigBelly* is a solar powered device, and it needs to be used outdoors. The unit needs to be located where you can see a significant amount of sky directly above the *BigBelly*. The *BigBelly* should not be placed under overhangs, awnings, significant tree coverage, etc. Figures 8a and 8b shows proper installation locations for the *BigBelly*; Figures 9a and 9b shows examples of poor locations. If you have

any questions on placing the unit, please contact BigBelly Solar or your distributor.

*Figures 8.a and 8b:
Proper installation locations*



Figures 9.a and 9b: Improper installation locations



Do not place the unit under thick tree cover, overhangs or awnings. The unit needs to be placed outdoors, where a significant amount of sky is directly above the machine. Improper location of the *BigBelly* could result in a drained battery.

Be sure to leave at least 36 inches of space in front of the unit to allow access to the insertion hopper and clearance for the front service door for emptying the unit.

Installation

The *BigBelly* MUST be mounted to the ground. Without being mounted, the unit can be pushed over. For that reason, a mounting bracket has been supplied with the machine. Use the mounting bracket that held the unit to the pallet to secure the *BigBelly* to the ground. The *BigBelly* must be mounted to the ground for the warranty to be valid.

The BigBelly must be properly mounted to the ground for the unit to be covered by the manufacturer's warranty.

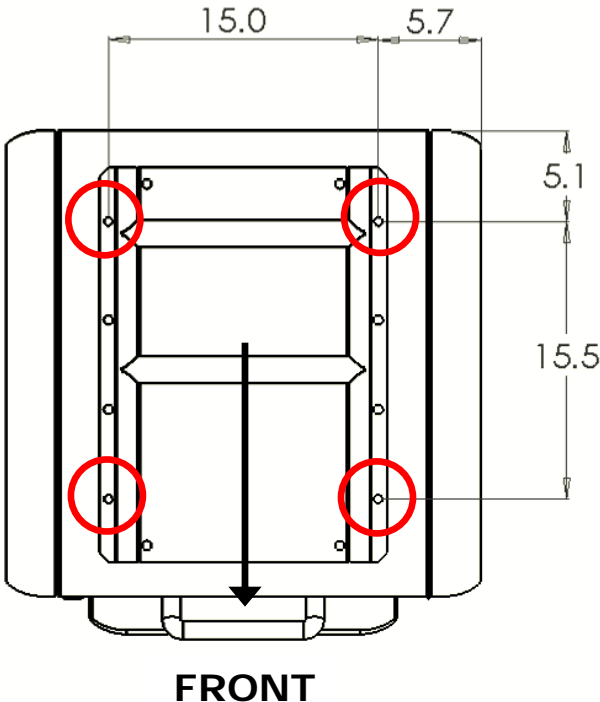
In addition to the provided bolts you will need additional hardware to mount the bracket to the ground. To secure the bracket to a concrete or brick surface, 3/8" expansion bolts are recommended. For wooden surfaces, 3/8" lag bolts are recommended.

Securing the bracket to the ground

To mount the bracket to the ground:

1. Place the mounting bracket in the desired location. Be sure the bracket is oriented in the proper direction, with the large section of the bracket facing the direction the front of the machine will face. See Figure 10 below.
2. Using the bracket as a template, drill pilot holes through the four corner holes on the bracket flange (circled in Figure 10 below) into the mounting surface. Use the proper drill bit depending on the hardware you are using and material you are drilling into. Remove the bracket, and finish drilling the holes.
3. There are four additional holes on the bracket flanges that can be used to mount the bracket to the ground if needed. These holes are a back-up and could be used if one of the corners does not secure properly or if mounting on asphalt.
4. Place the bracket on location, and fasten the bracket with a wrench and the hardware you have selected.

Figure 10. Bolt-down pattern and orientation of mounting bracket
Red: Bolt holes to mount bracket to ground



The pictures below show a typical installation into a concrete sidewalk.

Placing the bracket on the ground



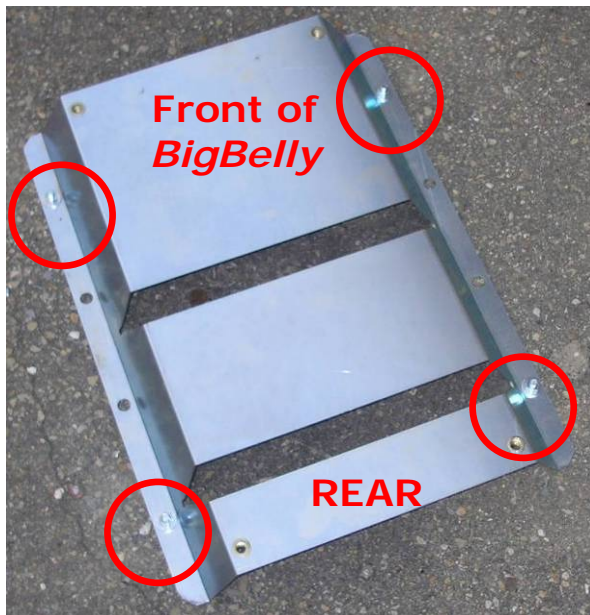
Drilling into pilot holes



Tightening the expansion bolts



Bracket mounted to sidewalk. Bolts are circled in red.



Securing the unit to the bracket

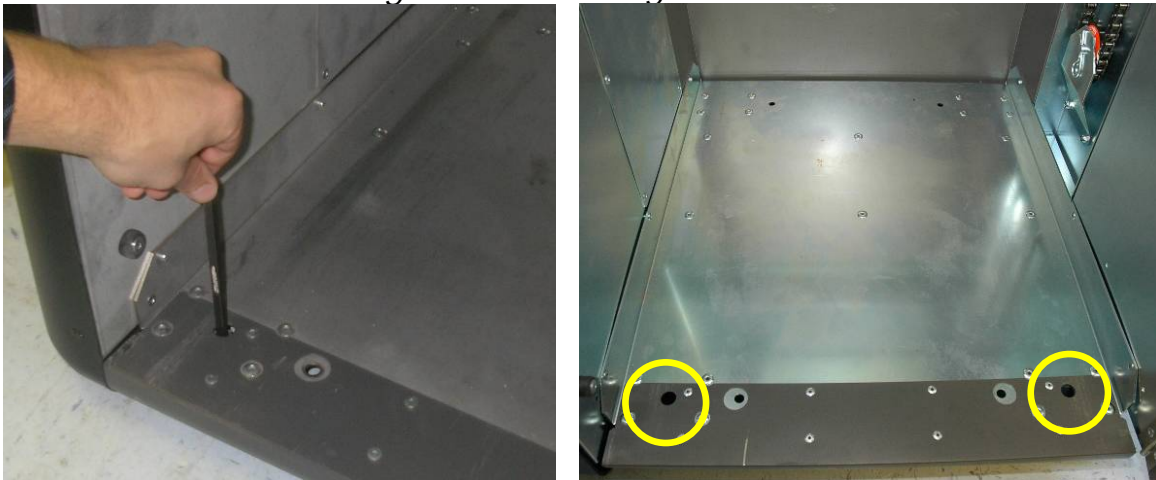
With the bracket in place, lower the *BigBelly* onto the bracket using the hand truck. The geometry of the bracket will cause the *BigBelly* to self align with the mounting holes. Be sure the front of the unit is facing the correct direction on the mounting bracket. Open the front door of the machine, remove the bin, and tighten the mounting bolts (that held the *BigBelly* to the mounting bracket during shipping) starting with the rear bolts first to secure the unit. See Figure 5.

Leveling the BigBelly

The *BigBelly* has four feet. The front two feet have leveling bolts that can help stabilize the unit once it is installed. Once the *BigBelly* is securely mounted, push on the sides of the unit to check for stability. If the machine rocks, open the front door, remove the plastic bin, and adjust the leveling bolts by using an allen wrench to stabilize the unit. The leveling bolt locations are shown below.

Failure to level the BigBelly may result in an unstable unit, potentially leading to damage or causing injury.

Figure 11. Leveling the feet



Safety Mechanisms

A variety of safety mechanisms are in place to keep the user, service personnel, and maintenance personnel safe:

- **Insertion hopper:** The insertion hopper is designed to prevent access inside the unit. In addition the hopper is sized for small litter to discourage illegal dumping. It is critical that the insertion hopper is kept clear and free of debris so its functionality is maintained.
- **Front service door:** The front door has a cut-off switch that will prevent the compactor from operating when the door is open.
- **Front service door lock:** The front service door has an automatic key lock that prevents unauthorized access inside the unit. Service personnel must unlock the front door to access the litter bin. All *BigBelly* compactors use the same front door key, so only one key is needed to service all machines.

- Top door: The top door has a cut-off switch that will stop the compaction cycle if the top door is open. Only trained maintenance personnel should open the top door to work on the machine.
- Mounting bracket: The mounting bracket and hardware secure the unit and prevent it from being tipped over.

Activating the *BigBelly*

The *BigBelly* is shipped with its power off. Once you have installed *BigBelly* in the desired location, the machine will need to be turned on. To turn on your *BigBelly* for the first time, you need to turn on the Master On/Off switch inside the top door.

Opening the top door

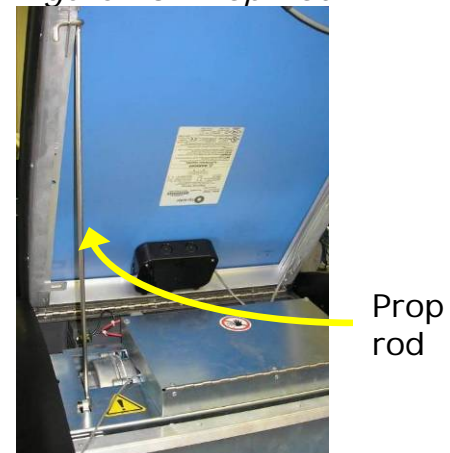
To open the top door, perform the following steps:

1. Open the front door
2. Unlock the lock in the upper left corner of the door frame
3. Hold up the corner of the top door and unlock the 2nd lock, located in the upper right corner of the door frame
4. Lift top door, using prop rod to keep it open

Figure 12. Location of top door locks



Figure 13. Prop Rod



Turning machine on or off

With the top door open, perform the following steps to turn the machine on:

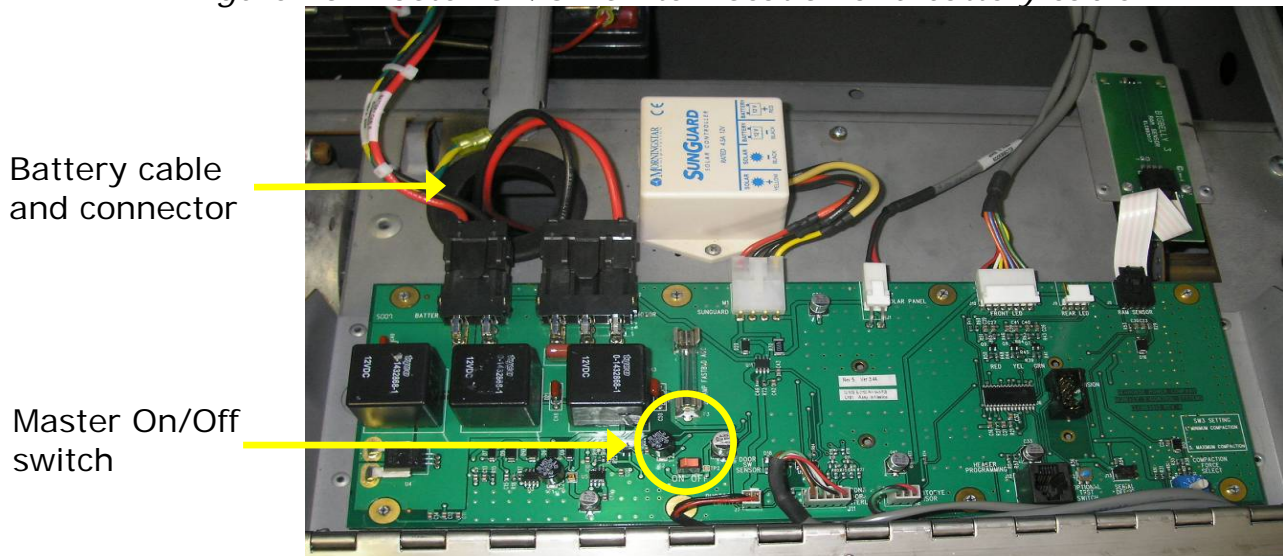
1. Open electronics box
2. Connect battery cable to board
3. Locate master On/Off switch and turn ON
4. Close electronics box
5. Verify that the three LED indicator lights on the top panel turn on for a few seconds and then begin flashing.

To turn off, repeat the previous steps, turning the Master On/Off switch OFF and verifying that the LED's are no longer flashing.

Figure 14. Electronics box, shown closed and opened



Figure 15. Master On/Off switch location and battery cable



Once the LED indicators are flashing, the machine is operational.

To close the top door; re-catch the prop rod in its location on the top door and ensure that the electrical box cover is closed. Then close the door, ensuring that both locks engage and the door is tightly locked.

Place the bin (with or without a bag) in the unit, and close the front door.

To verify that the unit is functioning normally, run a manual cycle. See the *Running A Manual Cycle* section of this manual.

Operation

Compaction Cycle Overview

Once the *BigBelly* is properly installed and activated, it is ready for use. Users open the insertion hopper and place their litter into the unit. When the insertion hopper closes, the litter falls into the plastic bin. When the waste in the bin reaches a pre-determined height, the trash height sensor automatically triggers a compaction cycle.

During a compaction cycle, the unit activates the motor. The motor moves two chains to lower and raise the compaction ram. The ram moves down to compact the waste, stops, and returns to the up-position. The ram remains in the up-position until a compaction cycle is triggered again.

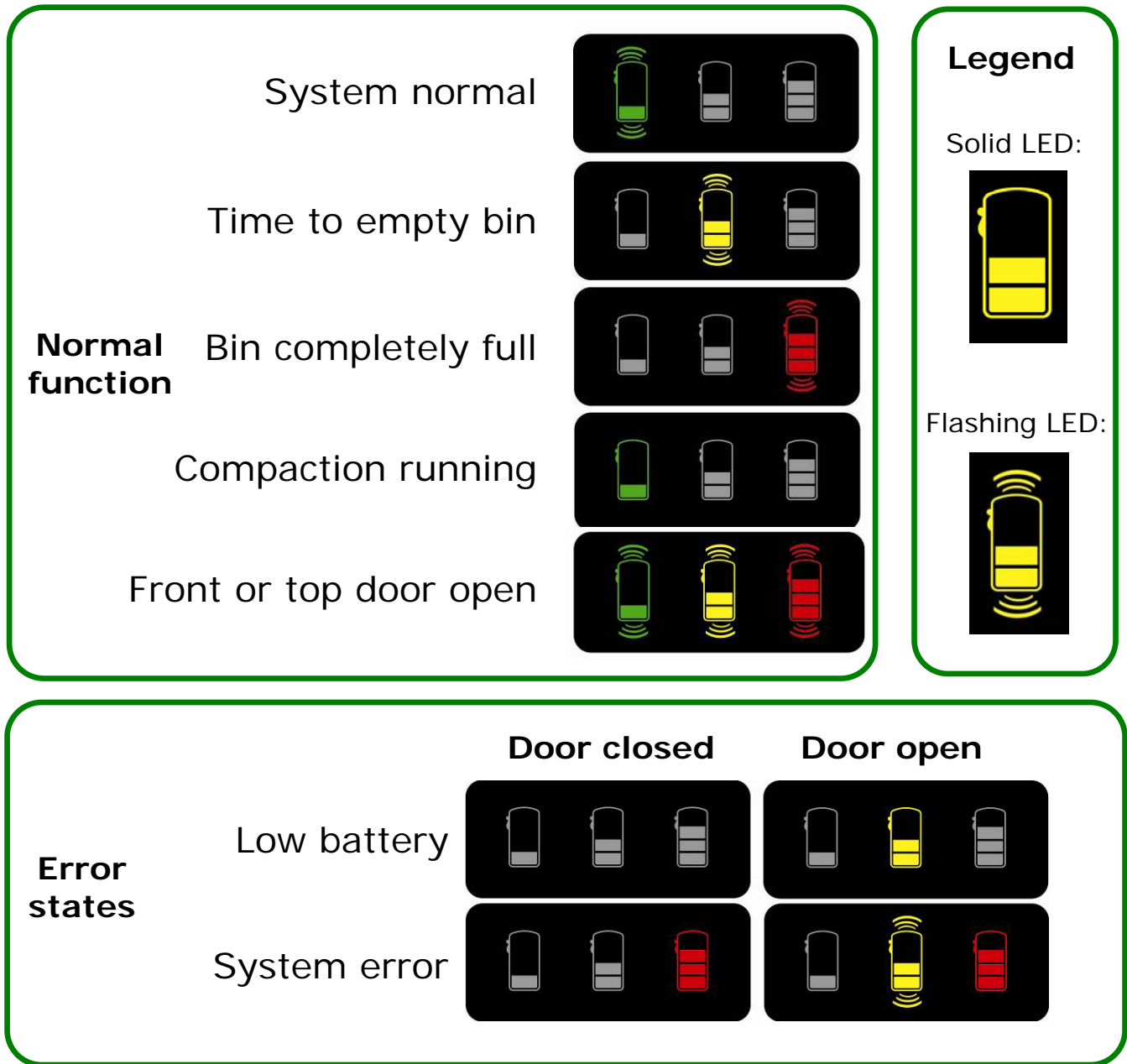
If the front service door is opened at any point during a compaction cycle, the ram will immediately stop and will remain stopped until the front service door is closed. To resume normal operation, close the front service door.

LED Indicators

The *BigBelly* has three LED lights on top center of the unit above the insertion hopper that indicate whether the bin needs to be emptied and if the unit is operating properly. The LEDs will either be solid or flashing, depending on the system status and whether the front service door is open or not.

Typically the *BigBelly* will have a flashing green LED; this indicates that the unit is operating normally. The following table summarizes the all the LED indicator scenarios and their meaning.

Figure 16. LED indicator status



Trash Removal

The flashing LEDs indicate the bin fullness:

- Flashing green LED: The bin does not need to be emptied.
- Flashing yellow LED: The bin does need to be emptied.
- Flashing red LED: The bin is over-full; the unit should have been emptied when the yellow LED is flashing. The *BigBelly* will no longer run automatic compaction cycles, and it is likely that there will be waste overflowing from the bin. In this situation, running a manual cycle before opening the front door will help make the trash more tidy to help with emptying. To run a manual cycle, see the *Running A Manual Cycle* section of this manual.

The bin can be used with or without bags. Appendix 1 lists information about bags that can be used.

To empty the trash, perform the following steps:

1. Open the front door (run a manual cycle first if the red LED is flashing).
2. Push any loose trash into the bin.
3. Remove the bin.
4. Perform a quick visual inspection (see section below). Remove any litter that may have fallen outside the bin.
5. Remove the bag or dump contents of bin directly into truck. Be sure to follow proper ergonomic procedures for waste removal since the bin can be up to 50 pounds when full, depending on the compaction setting (see *Compaction Setting* section of this manual).
6. If using a bag, replace the bag; be sure to tuck the excess over the sides, so the bag is clear of the moving parts of the compactor.
7. Place bin back in the unit, and push the bin all the way to the back of the unit, making sure the bag does not block the door latch.
8. If the bin does not slide completely into the unit, check for stray garbage that may be in the way.
9. Securely shut the front service door.
10. Verify the green LED is flashing.

**FAILURE TO SECURELY SHUT THE FRONT SERVICE DOOR
COULD RESULT IN HARM TO THE MACHINE AND
POSSIBLE HARM TO USERS.**

Visual Inspection

Whenever the service door is opened to remove the trash, it is important to perform a visual inspection. This visual inspection includes:

- ✓ Ensure no debris has fallen behind bin
- ✓ Check that trash height sensors are clear of debris
- ✓ Remove any debris in or around insertion door
- ✓ Clean off insertion hopper handle
- ✓ Close service door securely when finished

Running A Manual Cycle

Ensure both front service door and top door are closed and the unit is on.

Figure 17. Triggering a manual cycle



1. Place the magnetic fob on the top of the red (right-most) LED indicator and hold for 2-3 seconds, as shown.
2. Wait for green LED light to turn on solid; this indicates that you have triggered a compaction cycle.

Under normal conditions, the green LED will flash after the compaction cycle has ended. If there is a significant amount of trash in the bin, the yellow LED may flash (indicating it is time to empty the bin). If the trash height sensor is blocked with litter, the unit may automatically run up to 5 cycles to clear what is blocking the sensor.

Compaction Setting

On the main circuit board there is a compaction dial, that lets you adjust when the flashing yellow LED (bin is full) indicator activates. See Figure 28 for the location of the compaction setting dial. The *BigBelly* default setting is on 3. If you find that the bag or bin is not as heavy as you would like when the yellow LED indicates the bin is full, adjust the selector to a higher setting. If you would like the bin/bag to be lighter when the yellow LED flashes, turn the dial to a lower setting.

Cleaning the Unit

Routine Cleaning

For routine cleaning, especially for the outside and inside of the hopper, many standard cleaners can be used. Appendix 3 provides a list of recommended cleaners that are safe for the powder coated metal, plastic side panels, and polycarbonate bubble covering the solar panel.

To minimize abrasions and minor scratches on the polycarbonate bubble covering the solar panel, use a mild automobile polish such as Johnson's Paste Wax™, Novus Plastic Polish #1 and #2™, or Mirror Glaze Plastic Polish™.

For more thorough cleaning of the unit, both the outside of the machine and the trash area can be power-washed. The front service door opens fully to allow for easier cleaning of the trash area and hopper. Be sure the top service door is completely closed and locked before power-washing.

DO NOT power-wash the electronics located under the top service door.

Stickers and Graffiti

To remove stickers, Goo Gone™, WD-40™, or isopropyl alcohol can be effective. Test the cleaner on a small area first. Use only plastic scrapers to minimize scratches to the finish. To remove graffiti, a number of standard graffiti-removing products can be used, such as Mostenbocker's Lift Off™ and similar. Always follow the cleaner manufacturer's directions.

Scheduled Maintenance

Scheduled maintenance for the *BigBelly* should take place every 12 months. However, extra maintenance is suggested for the first year, specifically at 3 and 6 months to ensure your *BigBelly* is happy in its new home.

3 and 6 Month Maintenance

1. Detailed visual inspection
 - ✓ Ensure trash height sensors and ram are clear of debris (Figure 25)
 - ✓ Remove bin and clear any debris from behind the bin
 - ✓ Check solar bubble for damage
 - ✓ Check the exterior for scratches and rust
 - ✓ Ensure the hopper door opens and closes normally
 - ✓ Ensure hopper handle is tightly attached
 - ✓ Close service door securely when finished
2. Check the mounting and leveling of the unit to ensure it is structurally stable. Tighten the bolts or adjust leveling feet as needed.

Annual Maintenance

1. Detailed visual inspection
 - ✓ Ensure trash height sensors and ram are clear of debris (Figure 25)
 - ✓ Check solar bubble for damage
 - ✓ Check the exterior for scratches and rust
 - ✓ Ensure the hopper door opens and closes normally
 - ✓ Ensure hopper handle is tightly attached
 - ✓ Close service door securely when finished
2. Check the mounting and leveling of the unit to ensure it is structurally stable. Tighten the bolts or adjust leveling feet as needed.
3. Check the battery voltage with a multimeter. The battery should be above 12 volts. Check battery terminals for corrosion (Figure 30)
4. Ensure front service door lock is functioning properly, lubricate with Graphited Lock Fluid (Appendix 4)
5. Clean trash height sensors with a clean rag.
6. Inspect front door sensor for corrosion and damage.
7. Inspect ram sensor for corrosion and damage (Figure 28).
8. Inspect circuit board for any signs of corrosion.
9. Check for loose wires and connectors.

Every 4 Years

Replace the battery with a sealed lead acid 12V (18Ah or 20Ah) battery.

Troubleshooting

Automatic compaction cycles

Machine runs cycles or displays Flashing Red even when empty

- Trash sensor may be blocked – wipe off window that covers sensor (see Figure 25) using a Q-tip
- Connector may be unplugged – check connections shown in Figure 28
- Failed trash level sensor – replace sensor

No LEDs when door is open

- Battery not connected to main control board
- Main power turned off on control board
- Remote power turned off (s/n 170200 through 170650)
 - Use magnet to turn on remote power sensor
- Battery fuse burned – replace fuse
- Battery below 7 volts – recharge or replace batter. See Replacing The Battery (Appendix 2)

No LEDs when door is closed

Solid Yellow LED when door open; Low/Dead battery

If the battery voltage drops below the normal operating range of 12v – 14v, the *BigBelly* will not operate properly and the unit will stop running compaction cycles to conserve power. In this case all the LED lights will turn off.

If all the LEDs are off, open the front door. If the yellow LED turns on solid with the front door open, the battery level is too low.

- If the machine is not outside, put it outside in sunlight to quickly recharge.
- If the machine is already outside, check obstacles blocking the solar module from direct or indirect sunlight. Remove obstacles or move location of *BigBelly* to allow for better sunlight. Examples of obstacles are: trees, awnings, scaffolding, stickers/graffiti directly on Lexan bubble.

Solid Red LED: System Error

The *BigBelly* is equipped with some self-diagnostic capabilities to prevent damage to the machine if one component were to fail. To determine the error, you need to open the front service door. The solid red LED will stay lit, and the yellow LED will begin to flash. The yellow LED will flash a number of times, turn off for 1-2 seconds, then flash again. Count the number of

flashes on the yellow LED; the number of flashes corresponds to the following errors:

- 1 flash: The motor used too much power traveling up. Check for obstacles that could jam the compaction ram.
- 2 flashes: The software is not receiving a signal from the encoder during compaction: the encoder sensor may be disconnected or damaged.
 - Check motor and encoder connections
 - Check that encoder wheel is centered in encoder sensor
- 3 flashes: The ram traveled too far coming back home. The encoder may not be functioning properly or there may be a problem in the drive mechanism.
 - Check that both chains are connected to the compaction ram.
- 4 flashes: Cycle timeout. The *BigBelly* can not run a compaction cycle. The motor or chains may be malfunctioning.
- 5 flashes: The home sensor may not be functioning properly, causing it to see the thing the ram is home while the ram is down.

Be prepared to provide your service contact with the number of yellow flashes the unit indicates.

Front door won't stay closed or latched

Door lock may be broken – inspect and replace if necessary

What To Do if You Have a Problem

Before contacting BigBelly Solar or your distributor for service, have the following information ready:

1. The status of the LED indicators (see *LED Indicators* section).
2. Serial number (inside the front service door, as shown in Figure 18).
3. Location of the unit (e.g. city, street address, nearest intersection).
4. Compaction ram status (e.g. fully retracted, part way down, all the way down)



Figure 18. BigBelly serial number

System Diagrams

Figure 19. Simple external view



Figure 20. Simple internal view

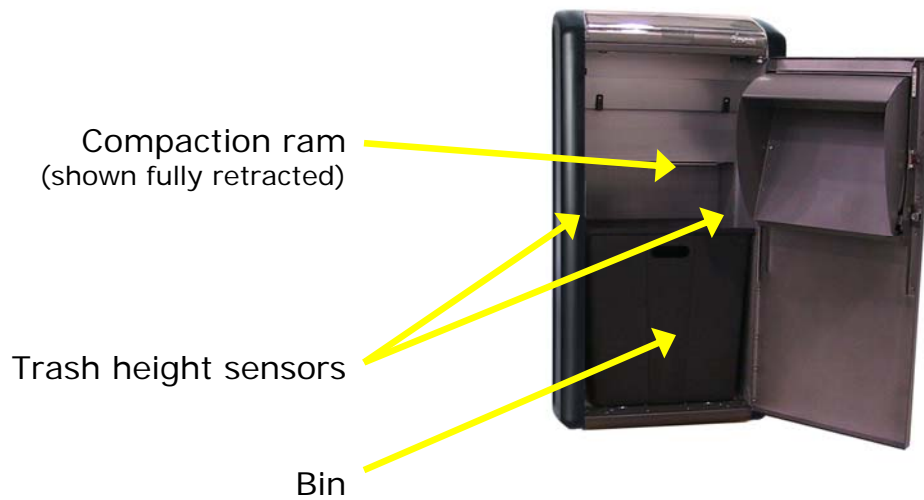


Figure 21. Top view

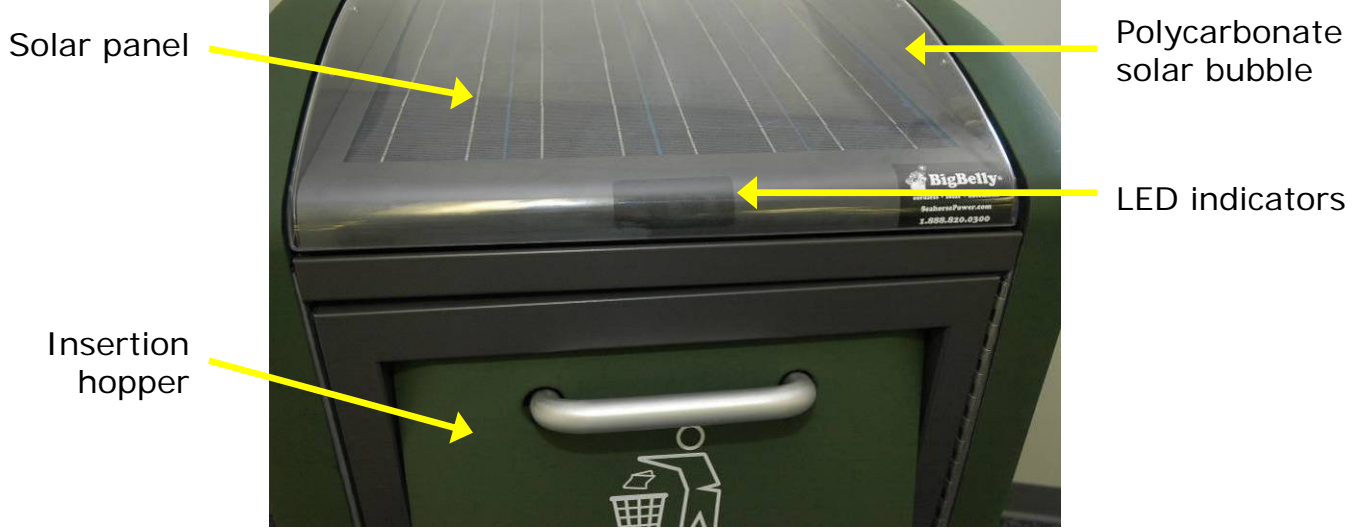


Figure 22.a, b, c: Internal view: top section

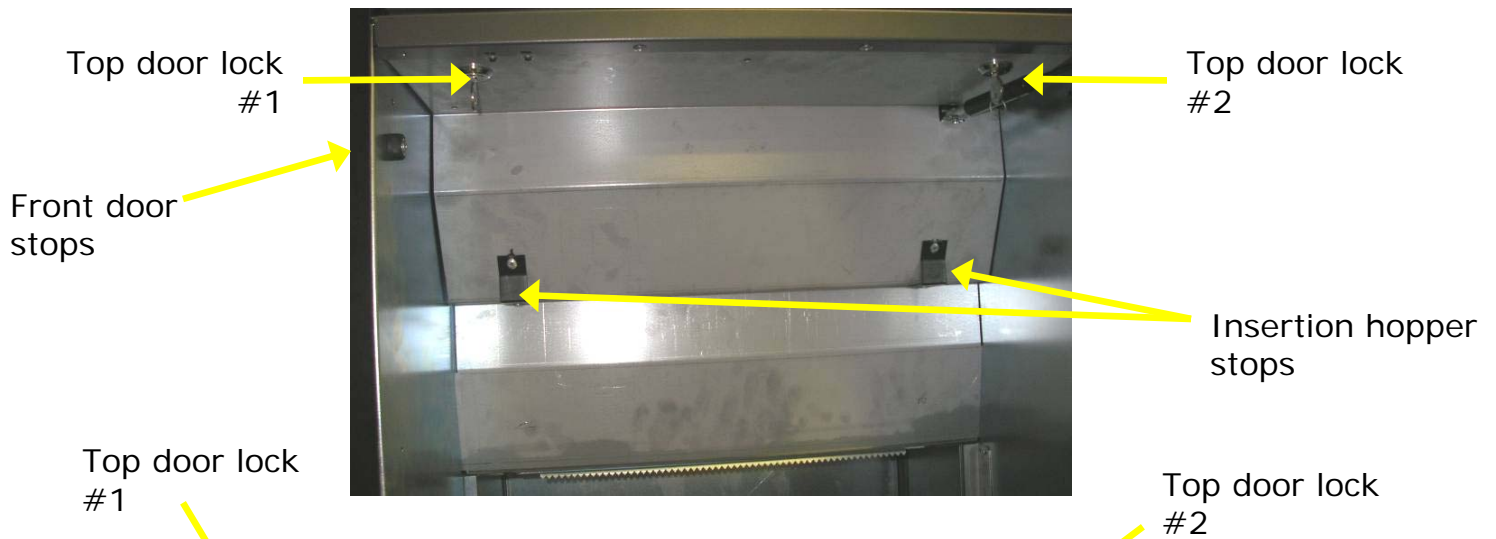


Figure 23. Internal view: bottom section

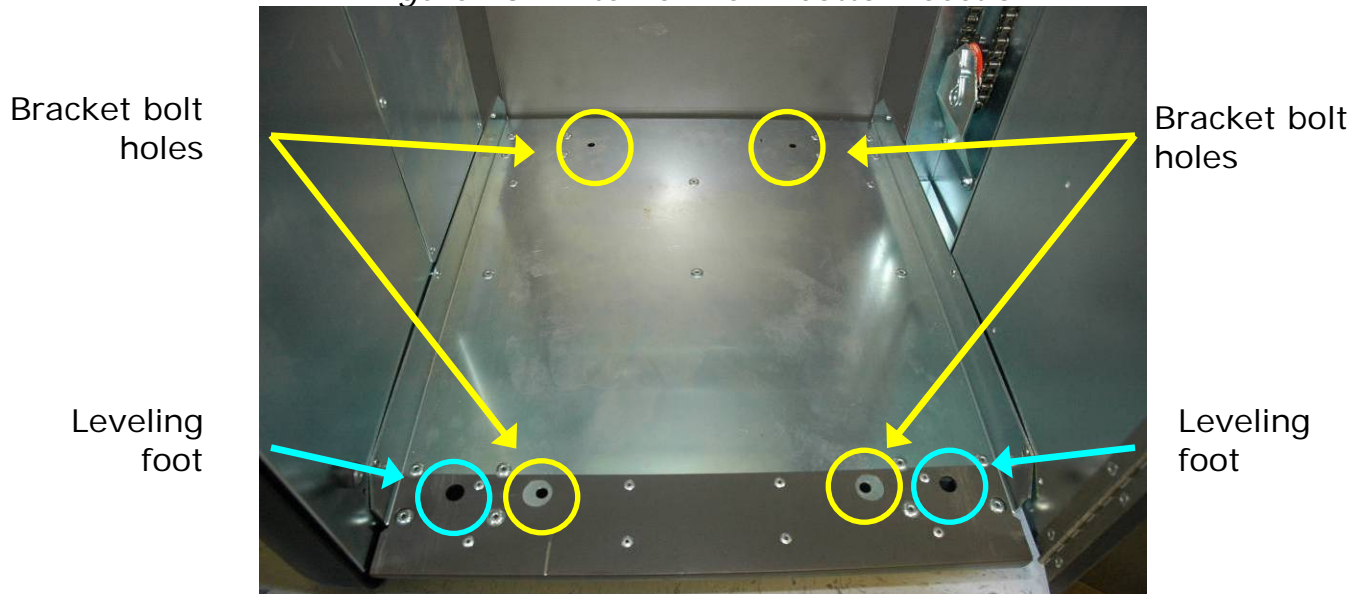


Figure 24. Internal view of drive chains

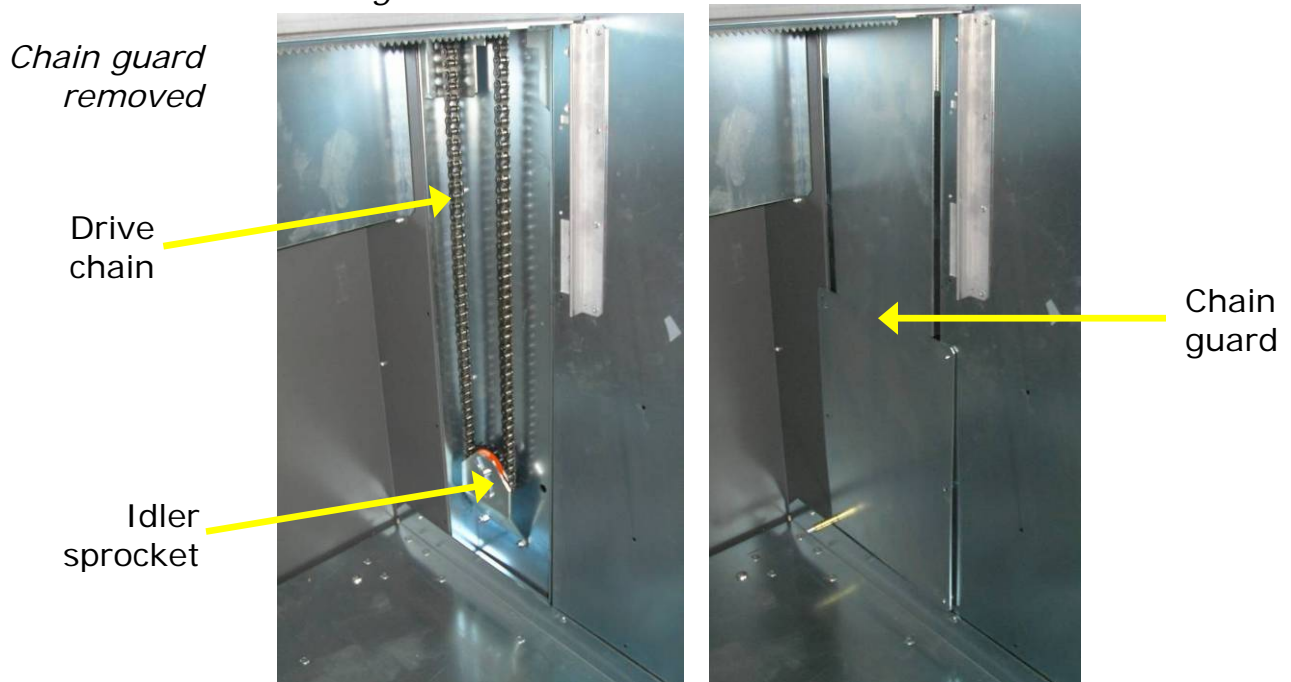


Figure 25. Internal view: trash height sensor

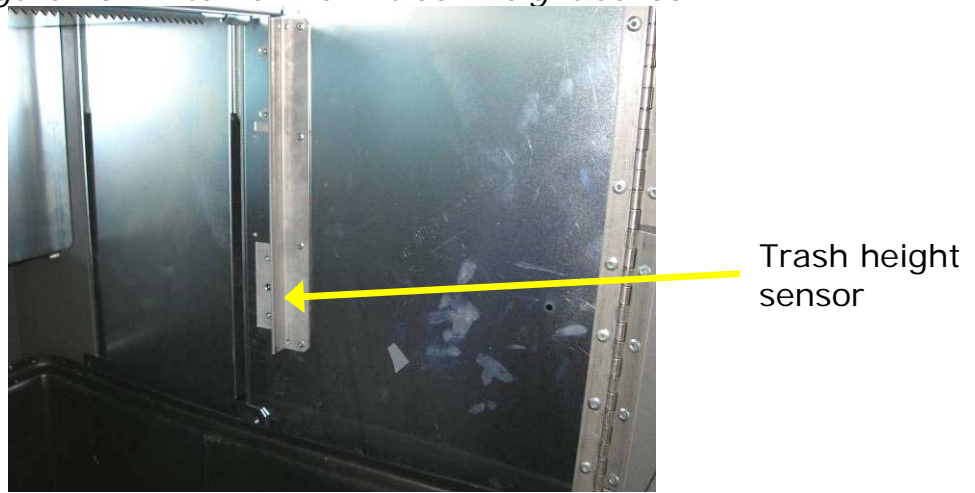


Figure 26. Top door open

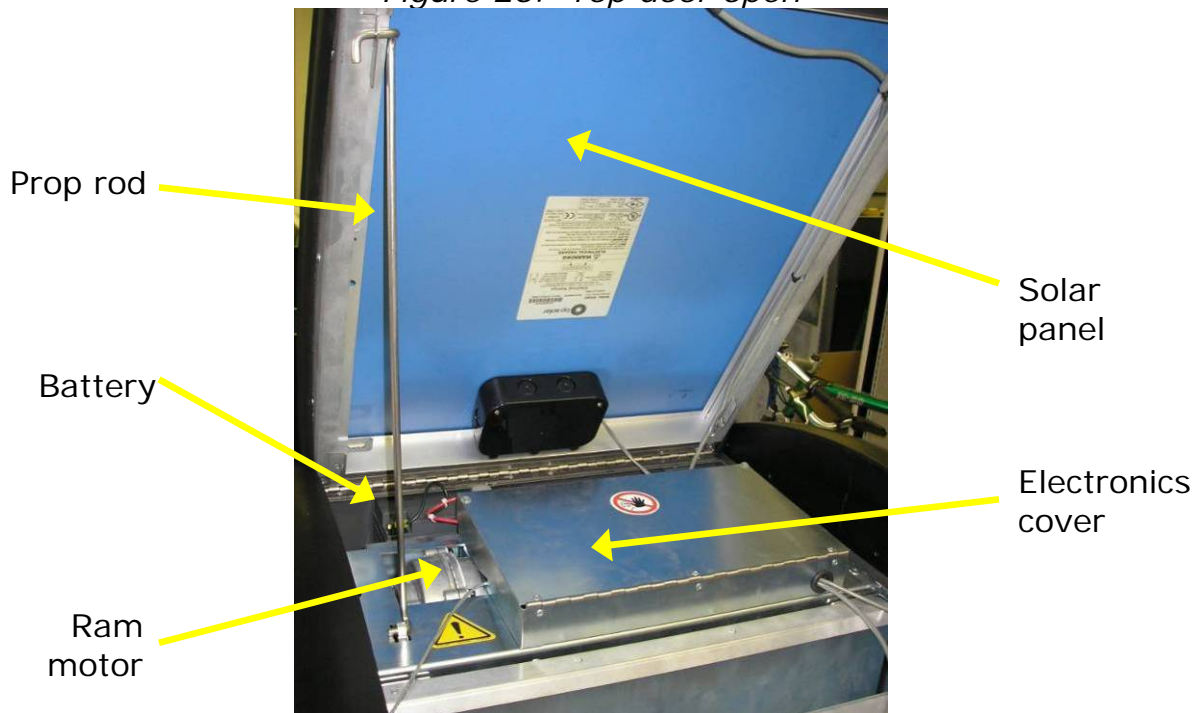


Figure 27. Top door open: electronics box

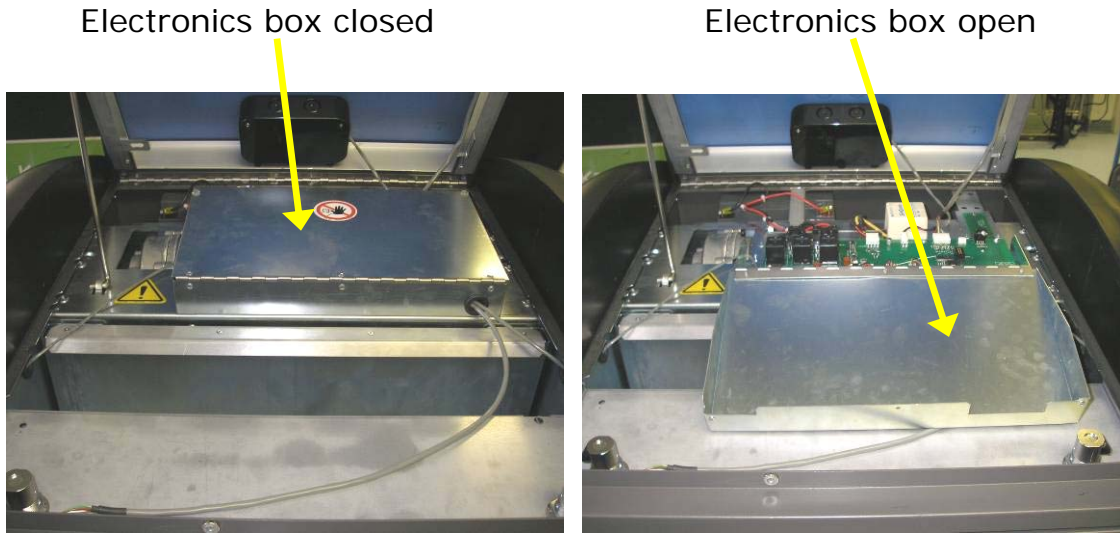


Figure 28. Circuit board detail

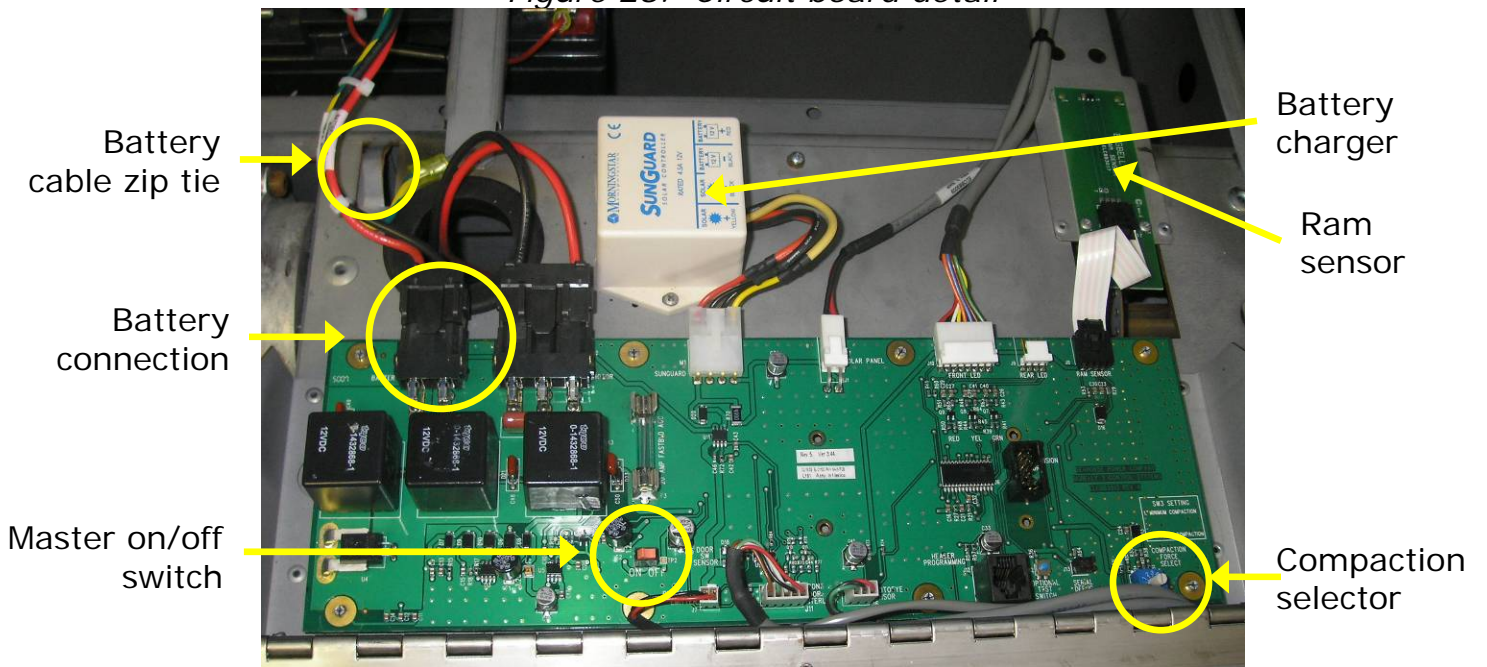


Figure 29. Top view: Front door sensor



Figure 30. Battery detail

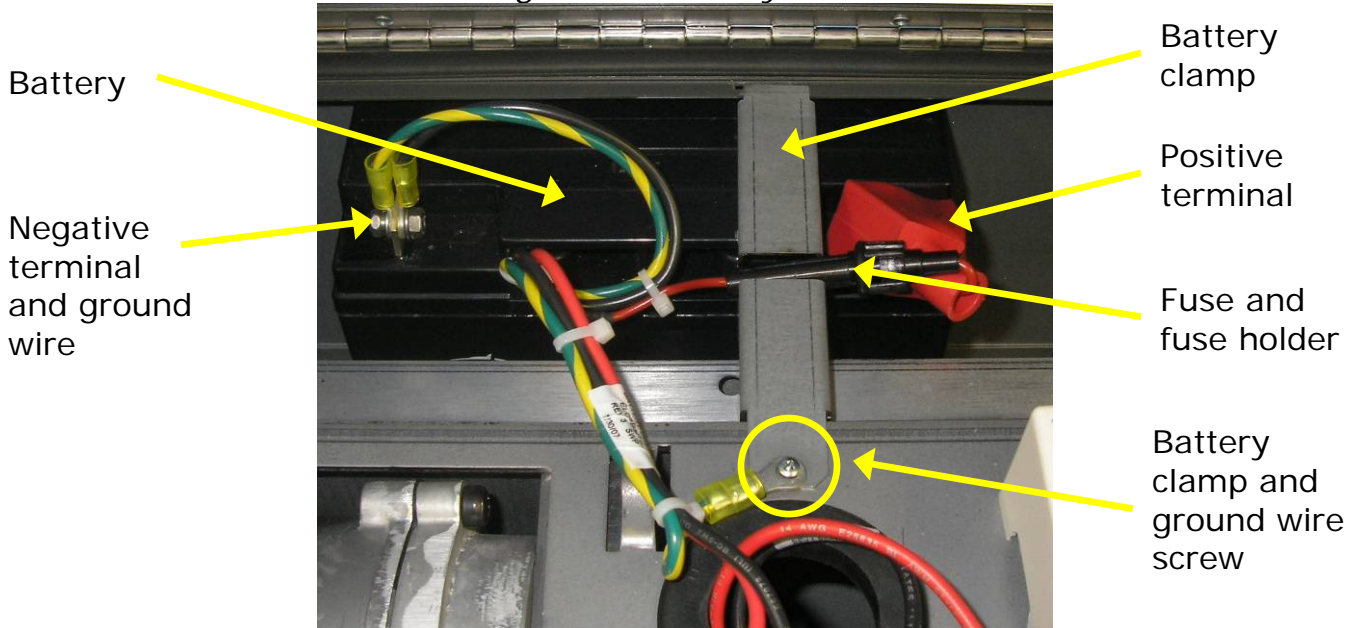
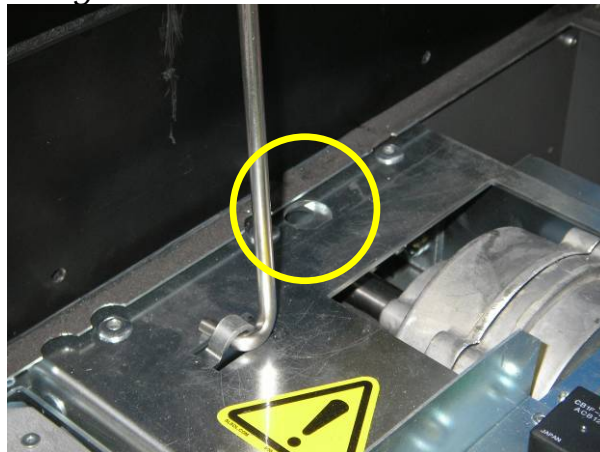


Figure 31. Chain lubrication hole



Appendix 1: Recommended Bag Specifications

Customers can obtain bags from their preferred supplier, or purchase them through BigBelly Solar.

The liner bag for the *BigBelly* bin should be at least:

- 47" wide (the bag circumference should be at least 94")
- 48" high
- 2 mil thick

BigBelly Solar offers extra-heavy duty liner bags that are highly puncture- and tear-resistant (3 mil thickness) and are 50" tall to ensure there is plenty of extra room to tie the bags closed when full.

BigBelly Solar Bag Specification
48"x50" flat seal bag Linear Low-Density Polyethylene 3.0 mil thick (color: black) Part # PA-4850-BLK

To purchase trash bags directly from BigBelly Solar or your distributor.

Appendix 2: Replacing the Battery

When replacing the battery, **only use a 12v, 18 or 20Ah sealed, lead acid battery.**

Required tools:

- 5/16" wrench
- #2 Philips screwdriver
- Zip tie
- Diagonal cutter

1. Open the front service door and unlock the two top door locks (Figure 22a).
2. Prop the top door open with the prop arm.
3. Open the electronics cover.
4. Turn off the unit with the master on/off switch on the main circuit board (Figure 28).
5. Unplug the battery connection from the circuit board (Figure 28).
6. Remove battery clamp screw (Figure 30) and save the screw.
7. Snip the zip tie holding the battery cable and dispose of the zip tie.
8. Remove the battery clamp.
9. Remove the battery.
10. With the battery out of the machine, transfer the battery wiring harness to the new battery. Fasten the red wire to the positive battery terminal. Fasten black and green wires to the negative battery terminal.
11. Place the new battery into the *BigBelly*. You may have to wiggle the battery to seat it properly.
12. Replace the battery clamp.
13. Secure chassis ground wire (green wire) under clamp screw.
14. Secure the clamp screw.
15. Reconnect the battery connection to the main circuit board, and replace the zip tie.
16. Turn the unit on with the master on/off switch. Ensure all three LEDs are flashing when the front service door is open. (see *Activating the BigBelly* section of the manual).
17. Close top door and front service door.
18. Run a manual cycle (see *Running A Manual Cycle*).

Appendix 3: Recommended Cleaning Products

Aqueous solutions of soaps and detergents, including common products such as:

- Joy™
- Top Job™
- Windex with Ammonia D™
- Formula 409™
- Mr. Clean™
- Lysol™
- Palmolive Liquid™
- Pinesol™

Organic solvents:

- Freon TF
- Butyl Cellosolve
- VM & P Grade Naphtha
- Isopropyl Alcohol

Appendix 4: Recommended Basic Tool Kit

Bits:

#1 philips

#2 Philips

T27 Tamper resistant

7/32" hex

5/16" hex

2 front door
key and
magnet fob

Hand driver

Flashlight

6"
adjustable
wrench



Diagonal
cutters

Zip ties

Digital
multimeter

Carry case



Graphited
lock fluid



Attachment B

- Passed rigorous ASTM 10-year accelerated life-cycle corrosion testing

Maintenance Schedule

	3 months	6 months	Once per year	Every 4-5 years
Visual inspection	✓	✓	✓	
Lubricate chains and hinges			✓	
Replace battery				✓

BigBelly[®] SOLAR

Single bins for waste management

- Readily moveable with a pallet jack or hand truck
- Should be installed on level, solid ground, preferably concrete
- Needs to be bolted down with provided mounting bracket and bolts (1 person, less than 30 minutes)





Bin and Hopper for waste management

Weight	300 pounds
Height x Width x Depth	50" x 26" x 26"
Bin volume	32 gallon (equivalent to 170-200 gallons uncompacted waste)
Hopper insertion opening	6" x 17"
Hopper handle height	41.6"

Made in USA

BigBelly[®]
Solar Compaction System

Product Walk-Through



External Overview



Solar Panel

The polycarbonate shield is designed to withstand the swing from a baseball bat!



Unit does not need direct sunlight

LED indicators notify personnel of bin fullness and unit status



Simply wave a magnet over the red LED to trigger a manual cycle

Insertion Hopper



- Designed for safety: prevents access inside the unit
- Rubbish can be thrown away even during a compaction cycle
- Sized to prevent illegal dumping
- Keeps rubbish neatly contained
- Keeps out pests, birds, and rain
- ADA-compliant handle height (42")

Hopper is available with a bear- and raccoon-proof latch for locations with wildlife

Side Panels



- Made of rugged ABS plastic
- Scratch-resistant
- Rust-proof
- Bright silk-screened graphics
- Standard color:
 - Black (90% post-consumer recycled content)
- Custom colors available
- Advertising panel available

Removal Door

- Security key access
- Durable powder coating over galvanized sheet metal
- Full-length door gives easier access inside the unit
- Air-spring keeps door open during emptying
- Safety sensor prevents compactions while door is open



Internal Overview

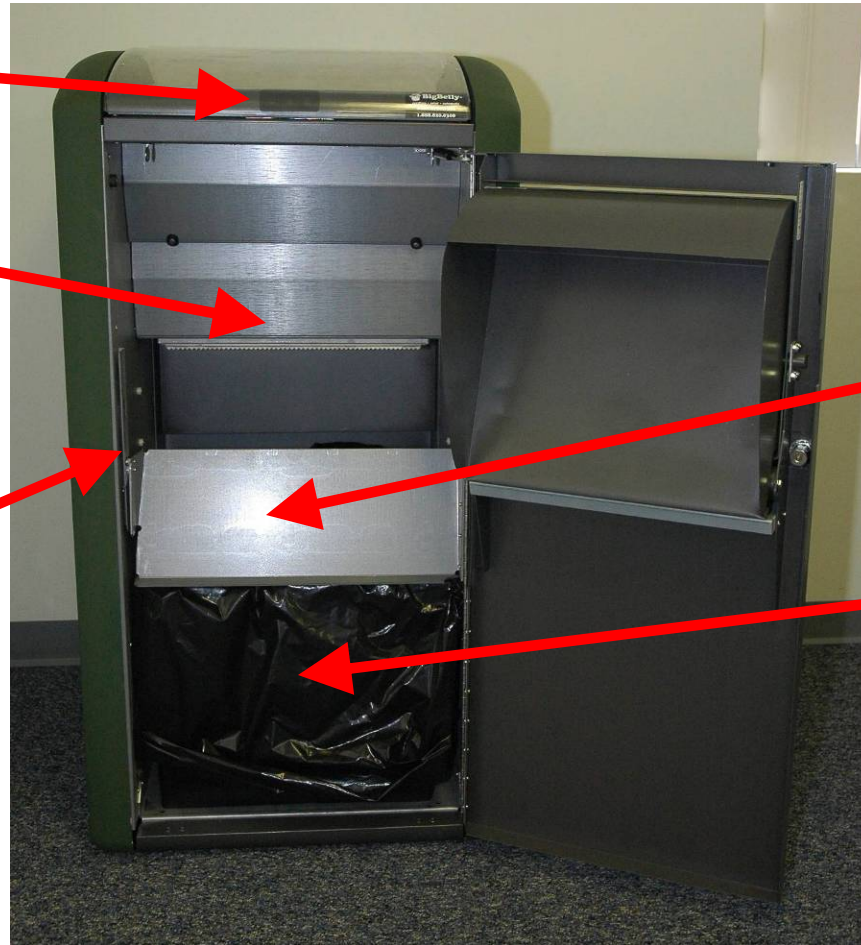
Power & electronics

Compaction ram

Electronic eye senses waste level

Front baffle

Leak-proof bin

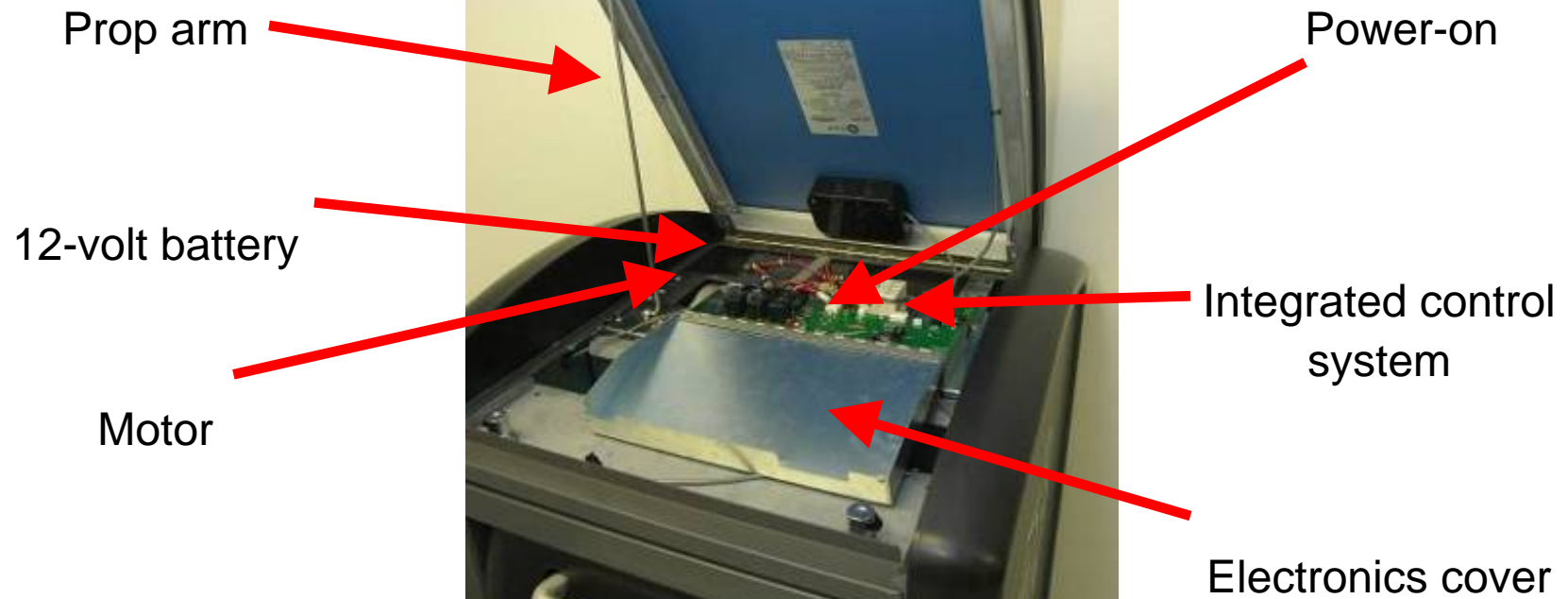


How it Works



1. Litter falls into bin
 2. Electronic eye senses height of litter and automatically triggers compaction when needed
 3. Ram compacts waste into bin, making room for more
- Reduces litter to 25% of its original volume
 - Litter can be thrown away during a compaction cycle

Power & Electronics



System Sensors



LED Notification System

Flashing green: System operating normally

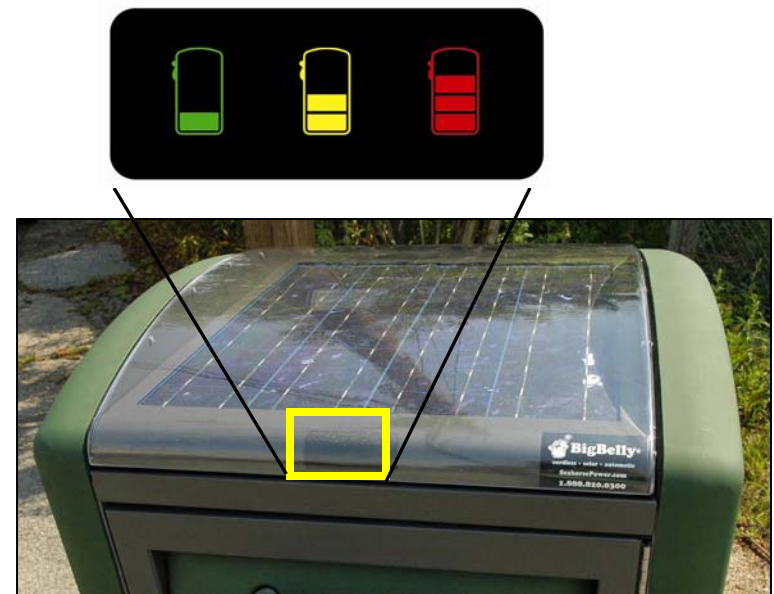
Flashing yellow: Unit is nearly full and needs a pick-up

Flashing red: Unit is completely full and will not run additional compaction cycles – must be picked up immediately

Solid green: Running a compaction cycle

Solid yellow: Low battery (when door open)

Solid red: System error





Bright ideas for waste management

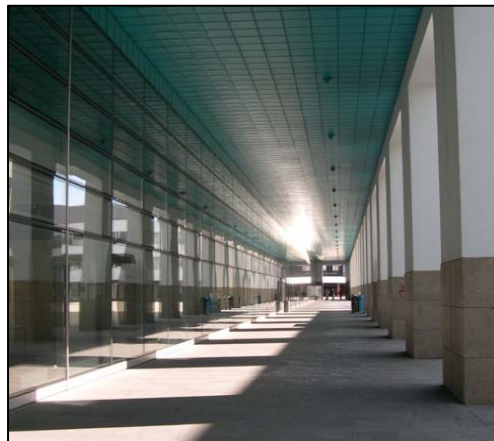
Unit Placement

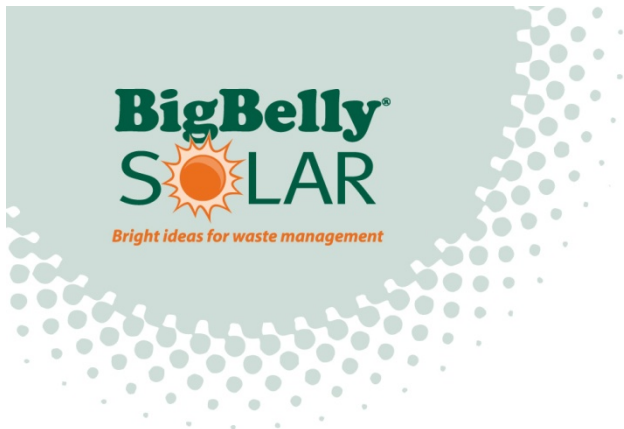
- *BigBelly* does not require direct sunlight
- *BigBelly* will function in indirect sunlight (shaded areas)
- Unit needs to be placed where you can look up and see sky
- Unit can not be placed under overhangs or dense tree cover

Proper Placement



Improper Placement





Long Life & Low Maintenance

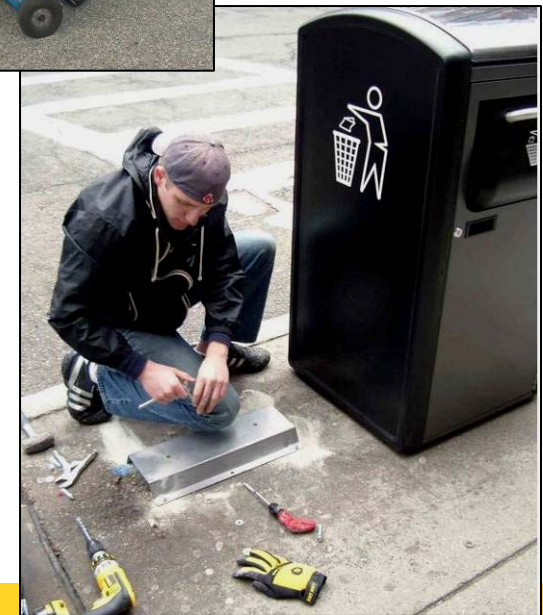
- Passed rigorous ASTM 10-year accelerated life-cycle corrosion testing

Maintenance Schedule

	3 months	6 months	Once per year	Every 4-5 years
Visual inspection	✓	✓	✓	
Lubricate chains and hinges			✓	
Replace battery				✓

Transportation & Installation

- Readily moveable with a pallet jack or hand truck
- Should be installed on level, solid ground, preferably concrete
- Needs to be bolted down with provided mounting bracket and bolts (1 person, less than 30 minutes)





Bright ideas for waste management

Physical Specifications

Weight	300 pounds
Height x Width x Depth	50" x 26" x 26"
Bin volume	32 gallon (equivalent to 170-200 gallons uncompacted waste)
Hopper insertion opening	6" x 17"
Hopper handle height	41.6"

Made in USA



Web: www.bigbellysolar.com

Phone: 1-888-820-0300

International: +1-781-444-6002