



Owner's Manual

IMPORTANT:

**READ ENTIRE MANUAL BEFORE
OPERATING YOUR MAGLINER POWERED GEMINI**

Serial #: _____

Date of Purchase: _____

Revision E, February 2011 – Part # 98214

Note: For shipping purposes, the Control Cord has been disconnected from the Control Box.

Table of Contents

	Page
A. Introduction	3
B. General Safety Instructions	3
C. Caution Labels	4
D. Specifications	5
E. Models	6
1. User Controls	7-8
2. Moving Your Powered Gemini	8
3. Powered Operation	8-10
4. Ramp Usage	10
4.1 Precautions	11
4.2 Trouble-Shooting	12
5. Battery	12
5.1 Battery Life	13
5.2 Battery Box	13
5.3 Installation	13
5.4 Battery Removal	14
5.5 Battery Charging	14-16
5.6 DC Battery Indications	16-17
6. Maintenance	17
6.1 Maintenance Schedule	17-19
6.2 Tool List	19
7. Directions for Replacing Parts	19
7.1 Battery Box	20-21
7.2 Transaxle	21-23
7.3 Motor and Brushes	23-24
7.4 Brake	24
7.5 Controller Enclosure	24-25
7.6 Wheels	26
8. Replacements Parts List	27-28
9. Electrical Component Location	28-29
10. Trouble Shooting	30-33

A. Introduction

Congratulations on your purchase of the Magliner Powered Gemini! We sincerely appreciate your purchase of this product. If you have questions regarding your Magliner Powered Gemini please do not hesitate to call our customer service department at 1-800-MAGLINE (624-5463) or 989-512-1000. Please read this manual thoroughly to become familiar with safe operation and maintenance of this unit.

This manual contains information on the following:

- Operation
- Safety
- Maintenance
- Troubleshooting
- Replacement parts list
- Basic Repair Directions

B. General Safety Instructions

- The Magliner Powered Gemini should never be used with power in the two-wheel position
- Always make sure no one is in front of the Magliner Powered Gemini during use
- Always secure the load
- Always wear skid-proof, safety shoes when operating the Magliner Powered Gemini
- Never reach under the Magliner Powered Gemini when in use
- Always use a Magline-supplied battery charger to charge your battery
- Never use the Magliner Powered Gemini to transport people
- See specific safety instructions within each section
- Use extra caution on slopes or uneven surfaces

1 Year Limited Warranty

Backed by America's oldest, most experienced manufacturer of lightweight hand trucks.

Magliner products have a one (1) year warranty (unless otherwise specified) from the date of purchase against defects in workmanship and material. Any part or component, except items covered by warranties of other manufacturers, returned to the factory or service center freight prepaid by the owner, found upon examination by Magline, Inc. to be defective or the result of improper workmanship by the factory will be repaired or replaced without charge and returned to the owner freight prepaid by Magline, Inc.

Alterations of Magliner products will void any warranty or liability on the part of Magline, Inc. Magline does not guarantee product capacity if alterations are made.

Warranty exclusions are:

- Normal wear and tear on parts
- Damage resulting from abnormal load
- Damage due to abuse
- Modification to the Powered Gemini or its accessories

C. Caution Labels



CAUTION


Set voltage switch to local voltage before using



4-Wheel Position Capacity: 1,000 lbs.
2-Wheel Position Capacities (non-powered use only):
500 lbs. using standard nose plate
300 lbs. using folding arm



Operating Instructions: Make sure the charger AC voltage selector switch is set to the AC power voltage (230VAC or 115VAC). An incorrect setting will result in damage of the charger and/or batteries. The LED lights indication is on the side panel and in the manual. First, plug charger into a working wall outlet, then connect the charger to the battery outlet. Now turn the AC power ON. Leave the charger connected until battery is fully charged. If the green light flashes, check all connectors and fuse. CAUTION: To prevent risk of fire, use charger only in dry, ventilated rooms without flammable fluids or explosive gases. Do not cover charger with clothing or similar objects during the charging process. Enable free air ventilation around charger.



Caution

- Read Owner's Manual before operating
- Before using on self-contained or portable truck ramp, refer to Section 4 of Owner's Manual
- Not for personal transport
- Do not use with power in two-wheel position

HEAVY!

Support battery with both hands to avoid damage

D. Specifications

General Specifications	2 Wheel Position*	2 Wheel Position*	4 Wheel Position	4 Wheel Position
	Sr. Model	Jr. Model	Sr. Model	Jr. Model
Capacity	500 lbs	500 lbs	1,000 lbs	1,000 lbs
Max. Speed	N/A	N/A	3.7 mph	3.7 mph
Weight without battery	98 lbs	96 lbs	98 lbs	96 lbs
Weight with battery	121 lbs	119 lbs	121 lbs	119 lbs
Overall Height	62.75"	57.25"	45.00"	39.50"
Overall Width	22.75"	22.75"	22.75"	22.75"
Overall Depth	18.50"	18.50"	N/A	N/A
Usable Platform Length	N/A	N/A	51.75"	37.75"
Motor Size	1 HP	1 HP	1 HP	1 HP
Max. Obstacle Height for Casters	1.2"	1.2"	1.2"	1.2"

*Non-powered use only

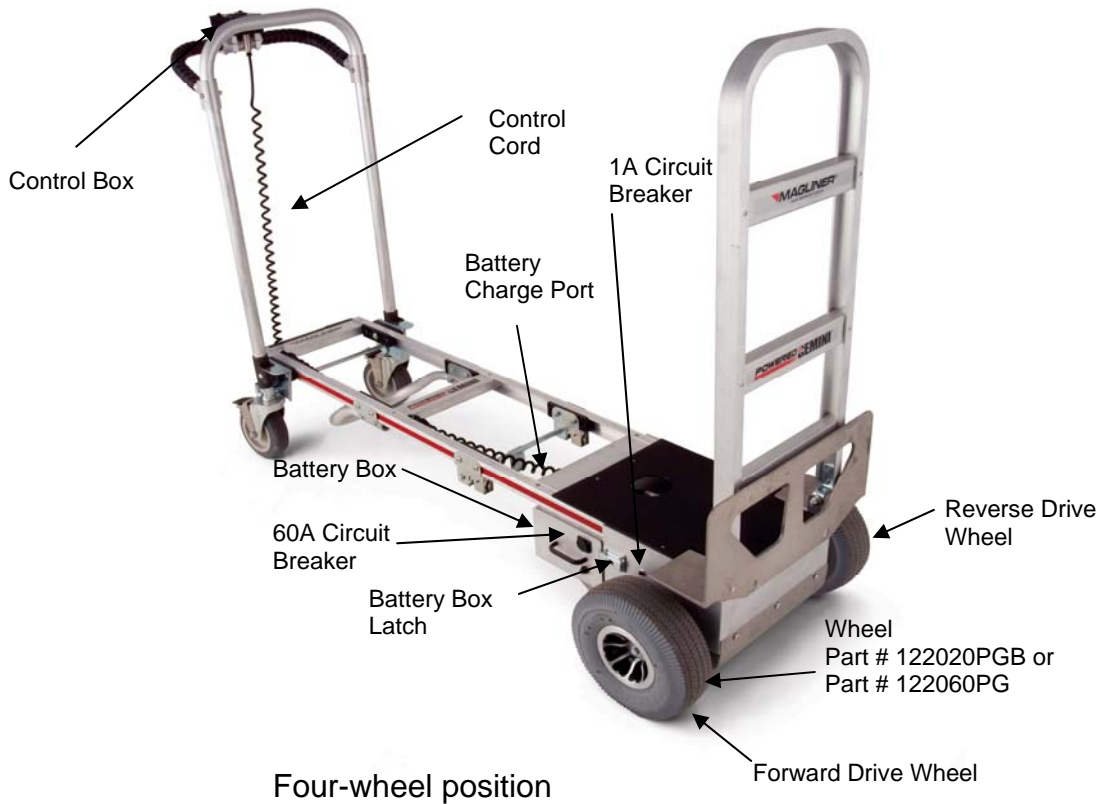
Battery Specifications

Weight	23 lbs (Battery Pack)
Voltage	24V (Two 12V batteries)
Battery Cells	Sealed Lead Acid – Maintenance Free

E. Models



Two-wheel position with part numbers (non-powered use only)



1. User Controls

Control Box

- Main Power Switch (Power for entire electrical system)
- Hi/Lo speed range switch
 - In Hi range: 3.7mph forward / 2.5mph reverse
 - In Lo range: 2.5mph forward / 2.5mph reverse

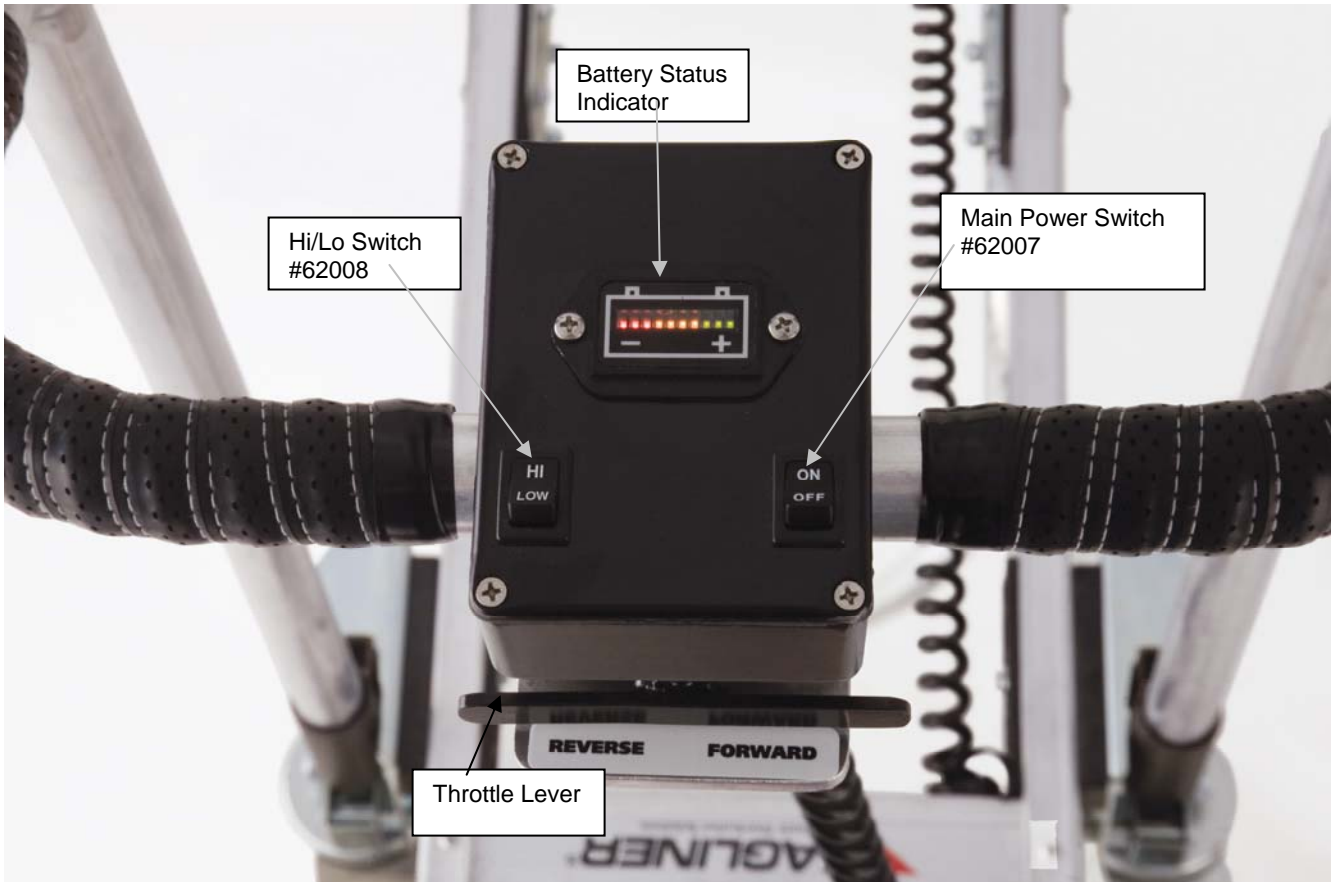


Fig. 1a

- Throttle lever (Fig. 1a)
 - This controls the direction and speed of travel
 - Depressing the **right** side will cause the truck to move **forward**
 - Depressing the **left** side will cause the truck to move in **reverse**
 - This throttle is a variable speed controller. The further the lever is moved, the faster the truck will travel.
- Battery Status Indicator (Fig. 1a)
 - This indicates the battery charge level based on the number of displayed colored bars
 - It also provides basic diagnostic information (Please see the Trouble Shooting section for a complete description)

Free-Wheel Lever (located near the left wheel) (Fig. 1b)

- This lever determines whether the wheels are engaged with the transaxle or can spin freely
- When the truck's main power switch is in the OFF position you can disengage the lever and freely move the truck around in a two-wheel position or in the four-wheel position. To do this, move the free-wheel lever forward (toward the nose of the truck) in the two-wheel position or up while in the four-wheel version. **WARNING: DO NOT OPERATE THIS TRUCK WITH POWER WHILE IN THE TWO-WHEEL POSITION!**
- To operate the truck under power in the four-wheel position, simply move the Free-wheel Lever toward the floor. This engages the transaxle gearing. Do not disengage the free-wheel lever with the Powered Gemini on a slope!

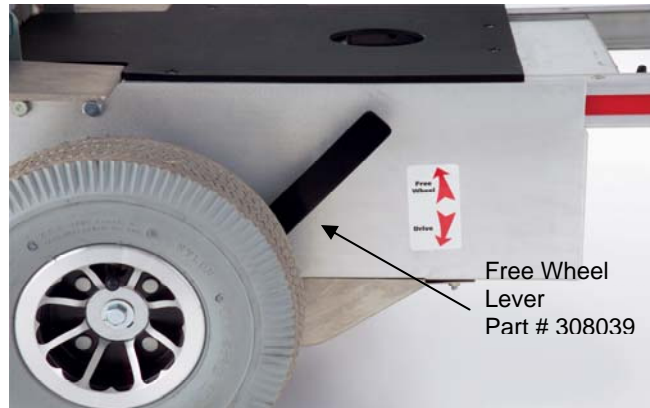


Fig. 1b

2. Moving Your Powered Gemini

When moving in the forward or reverse directions there will be an audible alarm that will sound for five seconds. This safety feature is designed to alert others in the area that the truck is moving.

It is recommended to get comfortable operating the truck with and without a load. Care should be taken with a load to become comfortable and aware of how the added weight responds to acceleration, deceleration, slopes and turning corners.

Extra stopping distance is required with a load. This is noticeably different than operating with an empty truck and especially true when operating in the Hi speed mode.

The Magliner Powered Gemini should always be operated under controlled speed mode when going up or down slopes such as inclines and slippery surfaces.

3. Powered Operation

The following is a checklist **before** attempting to operate your Magliner Powered Gemini.

- Ensure the truck is in the **four-wheel** position
- Ensure the battery pack is plugged in. (See also, Battery section on page 10)
- Ensure the free-wheel lever is in the “drive” position (toward floor)

Turn on the power by switching the Main Power Switch to the ON position

- The battery status indicator will blink and turn on after a half-second
- During the first half-second, the motor controller is performing a diagnostic check of the system

Check the Battery Status (number of illuminated bars)

- All bars = Full Charge (Fig. 2a)

Battery
Status
Indicator

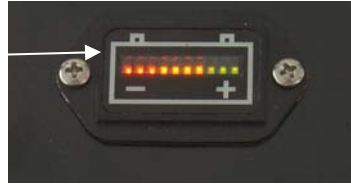


Fig. 2a

- Only red & yellow bars = battery pack needs to be charged or changed
 - Only red bars (steady or flashing) = battery pack needs to be charged or changed
- “Ready to go” (Standing in front of the user control box)
- Forward travel: Press the throttle lever on the right side of the user control box
 - Reverse travel: Press the throttle lever on the left side of the user control box
 - Battery Status Indicator: (General display messaging)
 - Steady = All is well
 - Flashing slowly = The controller is functioning properly, however the battery pack should be changed/charged as soon as possible
 - Flashing rapidly = indicates a fault has occurred

Try the following procedure:

 - 1) Turn OFF Main Power Switch
 - 2) Make sure the battery box is properly plugged in and the coiled cord is properly connected
 - 3) Check the battery condition
 - 4) Refer to the Trouble Shooting section (section 9) for further reference
 - 5) Switch the power ON again and try to operate the truck. If it continues flashing, the truck requires service

Warnings

- ✓ Read and understand this manual before using your Magliner Powered Gemini.
- ✓ Do not overload this truck. Check the capacity decal for loading weight.
- ✓ Do not transport unstable or loosely stacked loads.
- ✓ Never place any part of your body under the cart or near moving parts.
- ✓ Do not ride on or transport passengers.
- ✓ The weight of goods should be distributed evenly on the Magliner Powered Gemini.
- ✓ Be sure to turn OFF the Main Power Switch when Magliner Powered Gemini is not in use.
- ✓ Travel in low speed and with caution on slopes.
- ✓ The Magliner Powered Gemini operator must be fully capable of driving this unit safely.
- ✓ Do not attempt to operate the Magliner Powered Gemini while impaired.

- ✓ Do not operate on surfaces with impaired traction, such as on sand or sloped surfaces that might be slippery due to water, ice, or other conditions.
- ✓ Do not attempt any incline greater than 15 degrees.
- ✓ Avoid high speeds and making turns while traveling on slopes.
- ✓ When using a lift gate, turn the power switch to the OFF position and lock the caster brakes.
- ✓ When loading or unloading, turn the Main Power Switch to the OFF position.
- ✓ This truck is equipped with a failsafe electromechanical parking brake. Any interruption in the power supply will cause this brake to immediately engage and stop the truck. An unanticipated stop could pitch an ill-positioned load forward and off the cart. Always load carefully to ensure a stable stack.
- ✓ Moving the Free-wheel Lever to the “free” position will also disengage the electromechanical park brake and allow the truck to roll.
- ✓ Avoid changing direction while ascending or descending an incline, as this could cause instability.
- ✓ Never operate the Magliner Powered Gemini in water over ½” in depth or submerge the electronics in water or other liquids.

4. Use of Powered Gemini on Truck Ramps

The use of Powered Gemini on self-contained or portable truck ramps requires extreme caution and care. The Powered Gemini is capable of climbing the curb of most ramps used in these applications which could result in damaged product, damage to the Powered Gemini, and/or an operator injury. The Powered Gemini is also capable of carrying loads in excess of most ramps rated capacities. Such a condition may create ramp overloading which may cause ramp failure resulting in damaged product, damaged equipment, and the potential for personal injury. Ramps must be correctly and securely attached to the truck or trailer body. The absence of a smooth transition between ramp and trailer may cause the operator to lose control or the Powered Gemini to perform improperly.

Ramp use requires special attention to the operating environment. Inclement weather and foreign substances on the ramp may affect the performance and ability to operate safely. This is especially true in restaurant deliveries where a potential exists of substances being transferred to the ramp surface.

Battery life will be diminished when used to climb ramps fully loaded. The additional current draw will affect overall battery life. Magline recommends consideration for purchase of an additional battery pack for this application.

The following list of recommended operating methods is not intended to cover all instances or applications, but rather address general practices to consider when using a Powered Gemini in conjunction with trucks and truck ramps. Your own personal experiences and the specific terrain at each delivery site or location should dictate the specific operating methods employed.

4.1 Ramp Usage Precautions- Do's and Don'ts

Ascending

Do:

Discontinue throttle use if wheels contact side rail of ramp.

Secure load to Powered Gemini.

Speed Ranges:

Use low range when ascending with Gemini unloaded.

Use high range when ascending with Gemini loaded.

Use throttle to maintain a safe speed at all times.

Be sure Powered Gemini is aligned with ramp upon entering for ascent. This will help prevent the Powered Gemini from running off ramp when entering the ramp.

Ensure casters are aligned for forward travel.

Make sure combined weight of operator and loaded Powered Gemini does not exceed manufacturer's ramp capacity. Powered Gemini Jr. weighs 119 lbs. and Powered Gemini Sr. weighs 121 lbs.

Use extra caution in inclement weather or when the ramp may be slippery.

Be sure ramp and exit area is clear of any obstruction.

Be sure apron of ramp is flat on ground.

Make sure ramp is properly secured to truck trailer per ramp manufacturer instructions.

Be sure footwear is appropriate for inclined surfaces.

Be sure load is evenly distributed or load is more toward drive wheels (see the Models section).

Always be aware of the location of the end of the ramp.

Avoid loose or sagging bundles as they may catch on the curb ends of the ramp.

Drive wheel should always lead in direction of travel (see the Models section).

Don't:

Change direction while on ramp.

Switch to neutral freewheel while in middle of ramp.

Stop abruptly while on ramp.

Descending

Do:

Be sure transaxle is engaged before descending ramp.

Discontinue throttle use if wheels contact side rail of ramp.

Secure load to Powered Gemini.

Always use on low range.

Be sure Powered Gemini is aligned with ramp upon entering for descent. This will help prevent the Powered Gemini from running off ramp when entering the ramp.

Make sure combined weight of operator and loaded Powered Gemini does not exceed ramp capacity. Powered Gemini Jr. weighs 119 lbs. and the Powered Gemini Sr. weighs 121 lbs.

Use extra caution in inclement weather or when the ramp may be slippery.

Be sure ramp and exit area is clear of any obstruction.

Be sure apron of ramp is flat on ground.

Make sure ramp is properly secured to truck trailer per ramp manufacturer instructions.

Be sure footwear is appropriate for decline surfaces.

Be sure load is evenly distributed or load is more toward drive wheels (see the Models section).

Always be aware of the location of the end of the ramp.

- Don't:**
- Avoid loose or sagging bundles as they may catch on the curb ends of the ramp.
 - Drive wheel should always lead in direction of travel (see the Models section).
 - Change direction while on ramp.
 - Switch to neutral freewheel while on ramp.
 - Exceed the open height of the trailer when loading Powered Gemini.
 - Stop abruptly while on ramp.

4.2 Ramp Usage Troubleshooting

See Trouble Shooting in section 10.

5. Battery

Warnings

- ✓ Do not connect accessories to the battery; this will cause premature battery failure.
- ✓ Unauthorized modification could create a hazardous condition and could result in serious injury.
- ✓ Batteries contain sulfuric acid, which can burn eyes, skin, clothes, etc. Use caution! Always wear gloves when working with batteries. If contact occurs, flush immediately with water and get medical attention. Protect surfaces from battery damage by placing batteries on rubber or plastic surfaces.
- ✓ Never use a household extension cord if the charger plug does not reach the 115V outlet. If an extension cord must be used, use a three conductor No. 14 AWG (or heavier) cord with ground, properly wired, in good electrical condition, and keep it as short as possible. (AC version only)
- ✓ Ensure that the area around the battery charger and batteries is well ventilated while battery is being charged. Do not allow clothing, blankets, or other material to cover battery charger.
- ✓ To prevent electrical shock, do not touch uninsulated parts of the battery charger output connector, battery connectors, or battery terminals. Ensure that all electrical connectors are in good working condition. Do not use connectors that are cracked, corroded, or do not make adequate electrical contact. Use of damaged or defective connector could result in fire or electrical shock.
- ✓ Keep sparks, flame, and smoking materials away from batteries. Do not smoke!
- ✓ Batteries generate gases, which can be explosive. To prevent arcing or burning near batteries, do not disconnect battery charger output connector from the Magliner Powered Gemini battery charger receptacle when battery charger is operating. If the charge cycle must be interrupted, move the battery charger switch to OFF and disconnect the battery charger AC or DC connector from the power outlet, then disconnect the battery charger output connector from the Magliner Powered Gemini battery charger receptacle.
- ✓ To avoid damage to any of the battery charger connectors and their cords, disconnect by grasping the plug body and pulling it straight out of the outlet or receptacle. DO NOT pull on the cord. DO NOT twist, rock, or pull the connector sideways.
- ✓ Always use battery chargers supplied by Magline, Inc. Battery chargers not supplied by Magline, Inc. could damage your battery. Excessive charge rates from other chargers can damage or destroy batteries. Electrical arcing may result and could cause severe personal injury, explosion, or fire.

- ✓ Batteries can supply a large amount of current. Do not wear jewelry or watches when working on batteries. Take care not to connect the terminals accidentally with anything metal as severe burns could result.
- ✓ Only qualified technicians should service your Magliner Powered Gemini power supply system. Disconnect the batteries before removing, installing or servicing fuse.
- ✓ Do not use unauthorized Magliner Powered Gemini replacement parts.

5.1 Battery Life

The Powered Gemini is powered by two 12 volt storage batteries. The motor draws current from the batteries based on the amount of effort required to meet the condition at hand. The battery life is determined by the distance traveled, the load carried and the amount of incline encountered. Battery life decreases proportionally to the work performed. Reference the battery life indicator on your controller to determine the amount of charge left in the batteries prior to use.

5.2 Battery Box

The battery box contains the following (See Figs. 7b and 9a or 9b for reference):

- Two 12 volt, sealed, lead-acid, maintenance free, rechargeable batteries
- Circuit breaker
- Internal wiring harnesses
- Male terminal connector
- Charging port (24 VDC input only) – Two chargers are supplied with the truck, AC to DC and DC to DC

The battery box should be installed and removed as a unit. There is no need to open the box unless replacing a component.

5.3 Battery Installation

- a) The battery box weighs approximately 23 lbs. – please use two hands at all times.
(Fig. 4a)



Fig. 4a

- b) Use the handle to help direct the battery into the battery compartment.
- c) The heavy duty male terminal connector will mate with its counterpart after it is solidly inserted into the compartment. Some looseness of this terminal is normal and allows it to locate its mate easier.
- d) Upon installation, notice the inside configuration of the compartment and orient the battery box as needed.
- e) After installation, verify the latch is secured.

5.4 Battery Removal



Fig. 5a



- a) Only remove battery box in the four-wheel position. (Fig. 5a)
- b) Un-latch the battery box.
- c) Grab the handle and begin to pull the battery out.
- d) Use your other hand to support the trailing end of the battery box.

5.5 Battery Charging



Fig. 5b



Fig. 5c

A Magline supplied AC charger (using a common 110V domestic or 230V international outlet) or a Magline supplied DC charger is capable of safely charging your Magliner Powered Gemini battery. The DC charger plugs into a vehicle's DC outlet, while the AC version uses standard household power. The batteries can be charged while installed in or separate from the Magliner Powered Gemini. Note: If using the AC charger, please move the red switch (located next to the power switch) to the voltage that is normal to your location. Note: Your charger may have two charging modes – "Low" or "High." If this is the case, when using the DC charger the "Charging Current" (High-Low) switch must always be left in the "Low" position. Vehicle fuses will be blown if the "High" setting is selected.

Warnings:

- ✓ Use only Magline, Inc. supplied chargers capable of charging 24 VDC lead acid type systems.
- ✓ Do not expose charger to rain or snow.

- ✓ To prevent risk of fire, use the charger only in dry and ventilated rooms without flammable fluids and explosive gases.
- ✓ Do not cover the charger with clothing or similar items during charging process. Enable free air ventilation.
- ✓ Use of an attachment not recommended or delivered by the battery charger manufacturer may result in a risk of fire, electric shock or injury to persons.
- ✓ Avoid using an extension cord as it presents risk of fire and electrical shock.
- ✓ Make sure the cord is located so that it will not be stepped on, tripped over or otherwise subject to damage or stress.
- ✓ Do not operate charger with damaged cord or plug – replace immediately.
- ✓ Do not operate charger if it has received a sharp blow or has been dropped or damaged in any way.
- ✓ Do not disassemble charger.
- ✓ To reduce risk of electrical shock, unplug charger from AC main and battery outlet before attempting any maintenance or cleaning.
- ✓ Always unplug the charger before operating the Powered Gemini

AC Charger Hook Up (Part # 63004) (Fig. 5d)

- 1) Connect the charger to the AC power line and then to an AC outlet (115V Domestically or 230V Internationally)
- 2) Connect the other line to the battery box port (on the Magliner Powered Gemini)
- 3) Turn charger's power switch ON
- 4) When disconnecting, remove the DC power first by switching the power switch OFF and then disconnect the charger from the Magliner Powered Gemini

To charge battery with AC charger, plug cord into wall outlet, plug cord into battery, and turn on charger. A fully drained battery needs 2 hours to recharge fully. The LED light will illuminate to indicate one of the following:

- Solid yellow – battery is charging
- Solid green – battery has fully charged and is ready to be unplugged and used
- Flashing green indicator – the output is not connected; check all connectors, and fuses (see below).

Note: Your AC charger model may have two LED lights. If your charger has two LEDs, a solid red light indicates the power is on and will remain illuminated while the charger is plugged in to the battery and the wall outlet.

There are two operational fuses on this unit, one on each end. A spare fuse is located adjacent to the main power connection. In addition, affix the labels to the charger that came with it.



Fig. 5d

DC Charger Hook Up (Part # 63010) (12V, 20A min. socket required) (Fig. 5e)

- 1) Power on the charger. Panel LEDs light in cyclic manner.
- 2) The charger detects and charges the battery according to the charging condition of the battery automatically.
- 3) The charger is primarily in bulk charge.
- 4) Buzzer sounds whenever there is a change in status or alarm.
- 5) Charging is finished when the green LED flashes alone.
- 6) Always connect or disconnect battery when power on.

If charger fails to operate, check the onboard fuse located on the rear panel. In addition, another fuse (15A) is located inside of the plug that inserts into the cigarette lighter of the vehicle. Unscrew the metal (knurled) end. Pull out the rounded metal tip (do not lose the small spring within) and the fuse should fall out. CAUTION: Metal tip on cigarette plug can be hot upon unplugging. Please reference figure 4c and the plug shown on the right side of the picture.



Fig. 5e

5.6 DC Battery Indications

Status	Completion	Charging Status LEDs			
		Red	Red	Yellow	Green
Standby	N/A	Cyclic			
Trickle	30%	Cyclic		Off	Off
Bulk	60%	Off	Cyclic		Off
Over Charge	90%	Off	Off	Cyclic	
Float	100%	Off	Off	Off	Flash

Low Battery Voltage	Alarms	Flash	Off	Off	Off
High Battery Voltage		Off	Flash	Off	Off
Low Input Voltage		Flash	Off	On	Off
High Input Voltage		Off	Flash	On	Off
Over Temperature		Off	Off	Flash	Off

In order to understand the above chart more fully, think of the percentages as how full the charge in the battery is at the various levels.

- For example, the “Float” level defines the battery at full charge and it cannot go any higher. At this level of fullness, red and yellow lights will be off while the green light will flash, indicating this state.
- In the “Standby” level, the charge is below 30% of capacity and the lights will move from red to red to yellow to green. This will be repeated and is called cyclic or cycling through the lights.
- The “Over Charge” level does not mean the battery is over charged, it is simply at 90% capacity. At this level, both red lights will be off and the yellow and green lights will cycle back and forth.

Alarms will sound for the following conditions:

- Low Battery Voltage– Occurs when voltage level is below 10V per battery. Check battery voltage levels- voltage should read 10-15V per battery.
- High Battery Voltage Occurs when voltage levels exceed 15V per battery. Check battery voltage levels- voltage should read 10-15V per battery.
- Low Input Voltage- There is too little voltage entering the charger. See Troubleshooting Section.
- High Input Voltage – There is too much voltage entering the charger. See Troubleshooting Section.
- Over Temperature – Occurs when the charger overheats from high voltage or the environment, such as being in the sun for long periods of time. Take care to keep battery and charger out of direct heat.

Date Completed	Task
	Check for loose electrical connections (cont.)

(6) Month Recommended Maintenance

Date Completed	Task
	Check tires & nose for wear, damage or cracking (replace if necessary)
	Apply thin film of anti-seize to transaxle wheel shafts with wheels removed
	Add 1.8-2.4 cubic inches of grease to transaxle if noisy Grease type - NLGI # 0 (See Fig. 6d for zerk location)
	Check coiled control cord for any damage
	Check axle mounting bolts (2) for tightness (16-18 ft/lbs)

6.2 Tool List

The following are tools needed to properly service your unit:

- #1 Phillips screwdriver
- Short #2 Phillips screwdriver
- #3 Phillips screwdriver
- SAE hex wrench set
- Metric hex wrench set
- SAE socket wrench set
- ½" open end wrench
- Pliers
- Large flat screwdriver
- #2 square drive screwdriver
- Metric socket wrench set
- Torx T25 driver

7. Directions for Replacing Parts

The following are directions to properly replace various items. If assistance is needed, please call Magline's Customer Service Department at 1-800-MAGLINE (624-5463) or 989-512-1000.

For reference in the following procedures, please refer to the Electrical Components Locations found in section 9.

7.1 Battery Box (Fig. 7a)

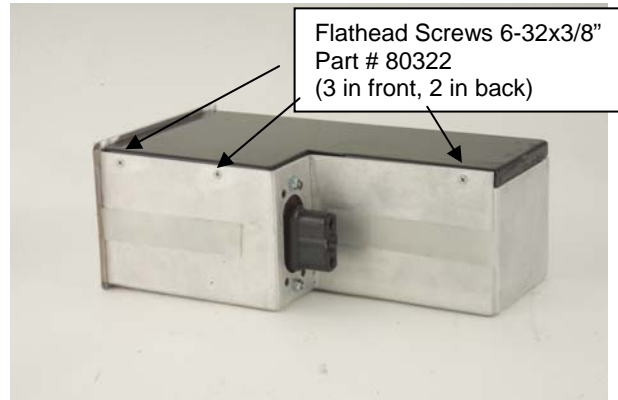


Fig. 7a

- 1) Be sure battery is removed from unit and charger is disconnected.
- 2) Remove the cover by removing the five screws located around the sides (Fig. 7a).
- 3) Disconnect a red wire from one battery before servicing any component.
- 4) The two batteries (Part # 61017) are contained by the box itself. They are removed by disconnecting the black and red leads. Tip the box until they slide out. Do not pry them out with any tool. Care should be taken as they are heavy.
- 5) The 60 amp circuit breaker (Part # 62004) (Fig. 7b) is located on the handle side at the bottom. Remove by unscrewing the thin outside nut. Then the black and red leads are disconnected via two screws.
- 6) The battery plug/harness (Part # 64004) is removed by disconnecting the two wire leads on the battery and the white disconnect going to the charging port. Next, remove the two Pan head screws 8-32 x 1" (Part # 80318), #3-48 Hex lock nuts (Part # 80671), and the #10 flat washer (Part # 80763) holding it to the housing. Please note the following two items:
 - a) One side of the plug is flat. The new plug should be installed in the same manner with the flat side toward the batteries.
 - b) When removing and installing, note the small black piece that goes around each screw in the mounting slot. When the screws are tightened, the tubes allow the plug assembly to move about slightly. This is normal. This movement allows the plug to "find" its mate when installed into the Magliner Powered Gemini. Do not over tighten screws or connector will not move freely.

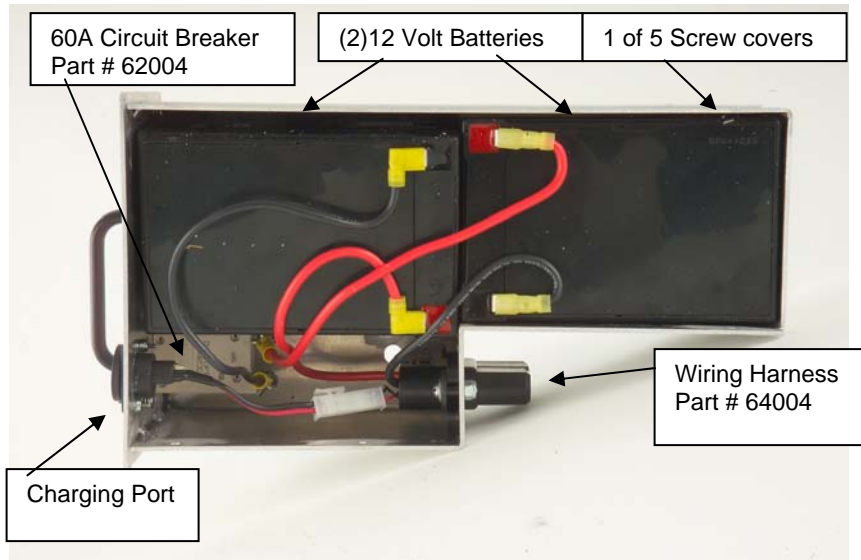


Fig. 7b

7.2 Transaxle

- 1) To remove the transaxle housing assembly (motor, gearing, driveshaft, (Part # 63001), the Magliner Powered Gemini must first be in the four-wheel position (Fig. 7c).

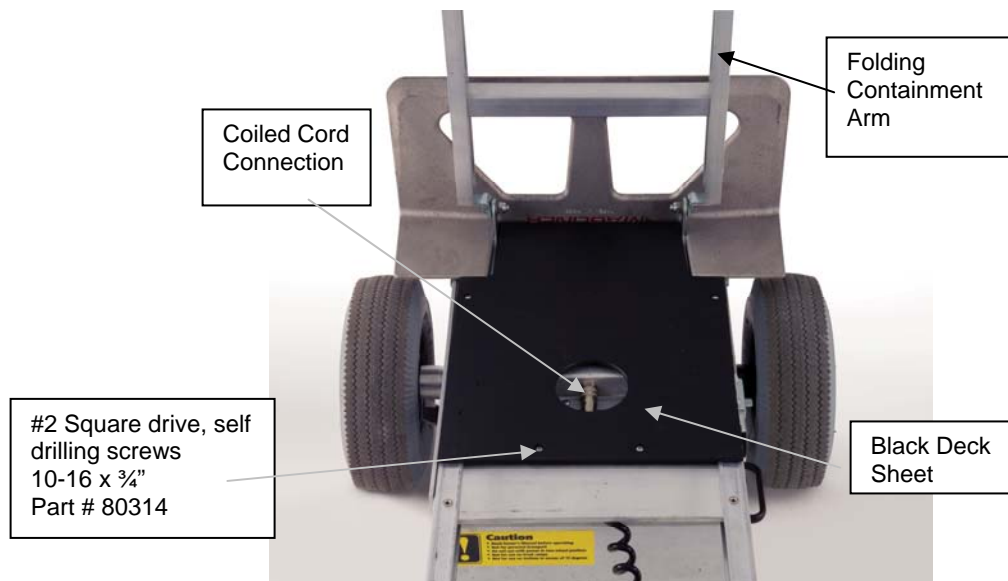


Fig. 7c

- 2) Remove the black Poly deck sheet.
- 3) Disconnect the black Control Cord from the cover by unscrewing it. This will be removed or replaced by hand only. Do not use any tools. When disconnecting the Control Cord, unscrew and pull off by the metal portion as pulling on the Control Cord could result in damage to the entire cord.
- 4) Remove the large cover held in place by threadforming screws 10-32 x 3/8" (Part # 80315). After removing the screws, tap the cover with a soft mallet to break the silicone seal (Fig. 7d). Do not pry the cover off with sharp tools. **IMPORTANT**-remove carefully as delicate wires are attached to this cover. Since removing the cover breaks the silicone seal, scrape off old silicone and apply new silicone when reassembling. Use a clear RTV type silicone.



Fig. 7d

- 5) Disconnect the white connector on the short lead wire attached to the cover's underside.
- 6) Disconnect the two power leads from the motor (Fig. 7j).
- 7) Disconnect the brake leads (the brake is located on the end of the motor). Follow that to the white connector near the controller and disconnect it.
- 8) Temporarily re-attach the cover back on with two screws.
- 9) Put the unit in the two-wheeled position to flip over with the handle and nose touching the ground.
- 10) Remove the tires (Fig. 7k).
- 11) Remove the small square cover that is located on the outside of the unit between the frame and right hand tire. This item covers the brake unit.
- 12) Remove the main cover to expose the transaxle (Fig. 7e). This is done by removing three nuts and three screws as shown. The three nuts also will need the aid of a short #2 Phillips screwdriver from inside of the battery compartment.
- 13) Remove the freewheel lever that is located next to the left wheel. It is secured with a set screw and removed with a hex wrench.

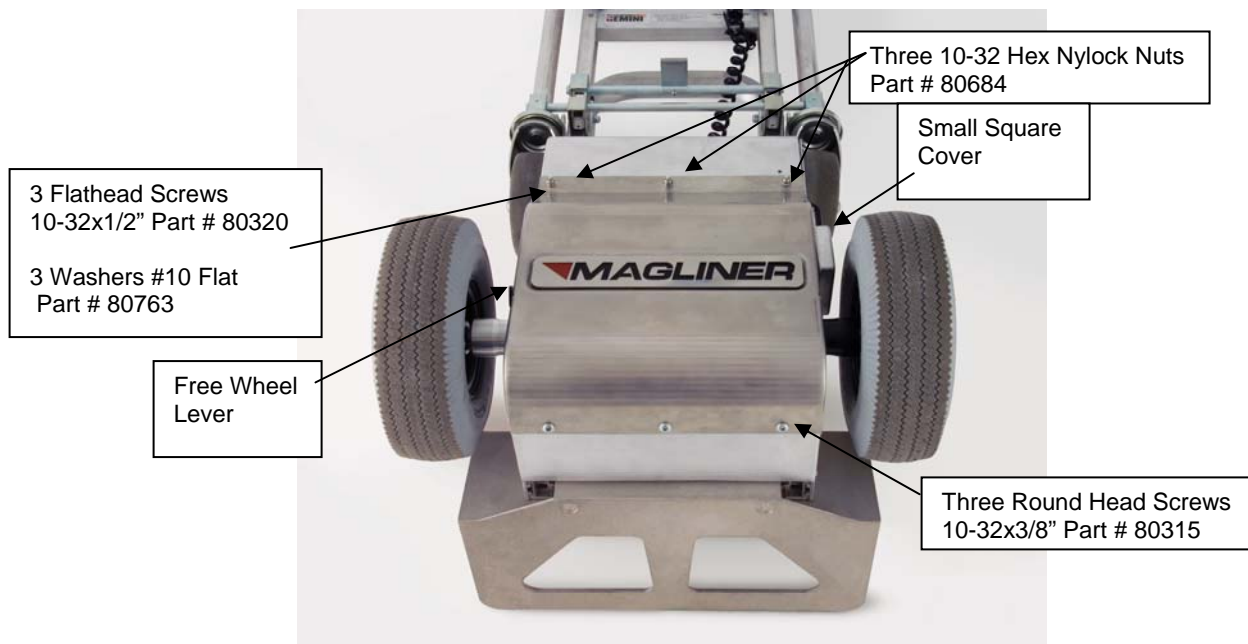


Fig. 7e

- Unbolt the unit via the zinc plated LH U-bolt, the RH screws and nuts (Fig. 7f). Lift the transaxle out and place on a clean work surface. Take note as to the location of the grease zerk fitting on the gearing portion. (Fig. 7g) More information as to the lubrication of this port is found in the maintenance section of this manual.

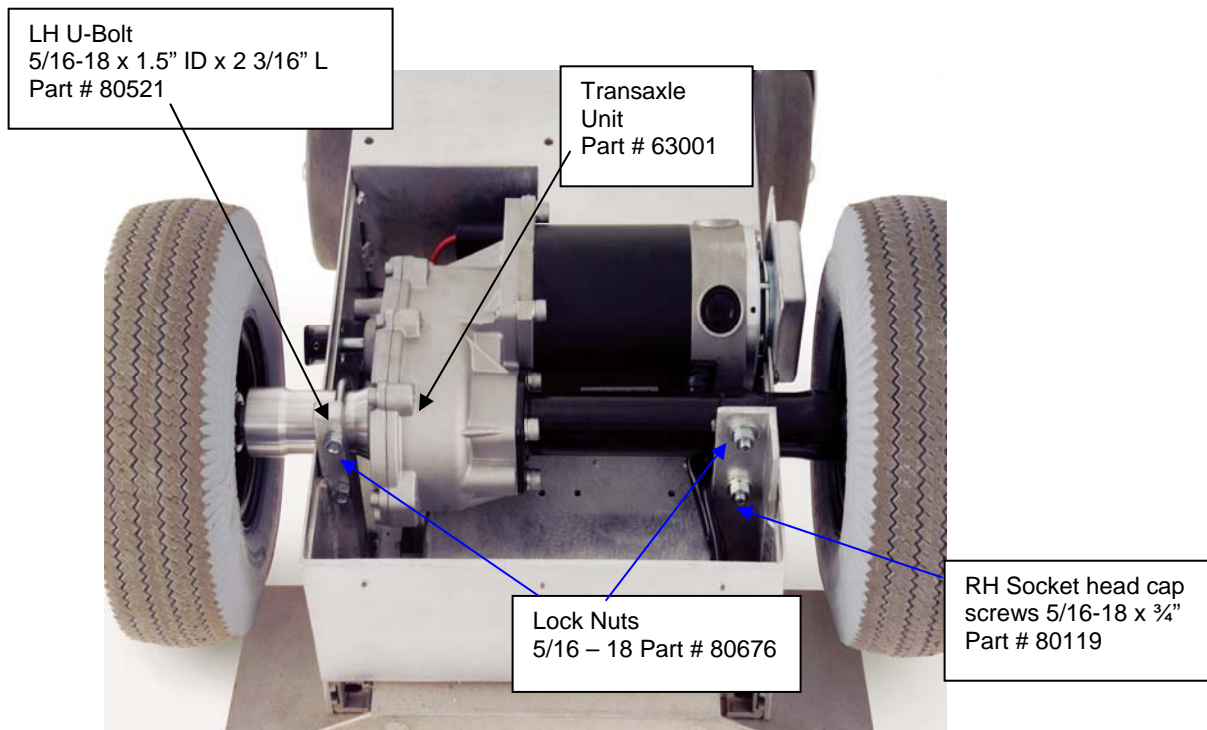


Fig. 7f

7.3 Motor and Brushes

- Remove the motor using the four metric motor cap screws as shown below. Note the position of the motor wires for reassembly. (Fig. 7g)

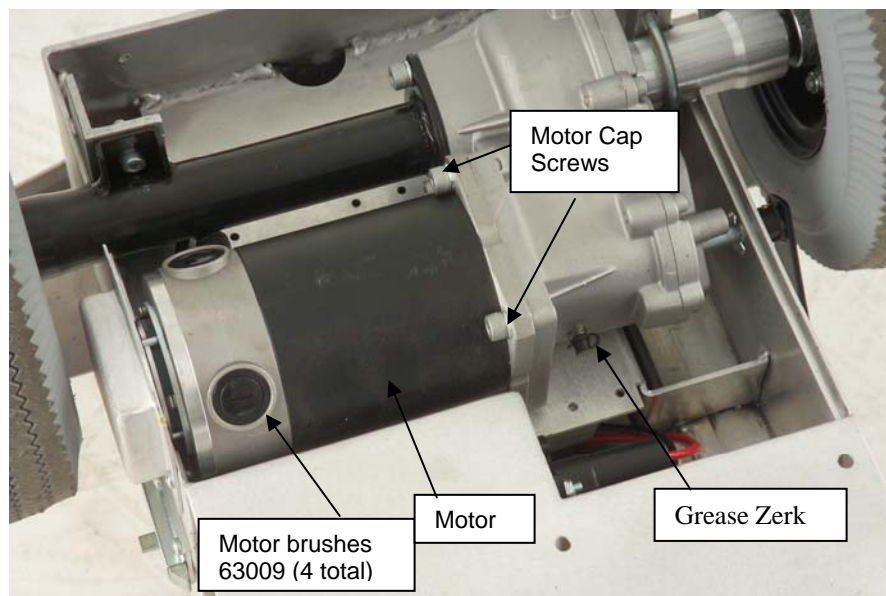


Fig. 7g

- 2) Four equally spaced brushes (Part # 63009) are located near the end of the motor as shown above. Remove the black plastic covers with a large flat ended screwdriver. Hold the cover as you unscrew because the brushes are spring loaded. Note the tangs and how they fit into the socket. Replacing the brushes should only be done if the motor is shaking abnormally or after 1,000 hours of use.

7.4 Brake

- 1) Disconnect brake lead by following lead wires, then disconnect at the white connector.
- 2) Before removing the brake, the entire transaxle must be removed from the unit as described in the Transaxle section 7.2.
- 3) To remove the brake (Part # 63008), three screws equally spaced must be removed. (Fig. 6h)
- 4) When replacing the screws, use a “removable” liquid thread locker. (Recommend Loctite 242 or the equivalent). Note position of brake wires for reassembly.

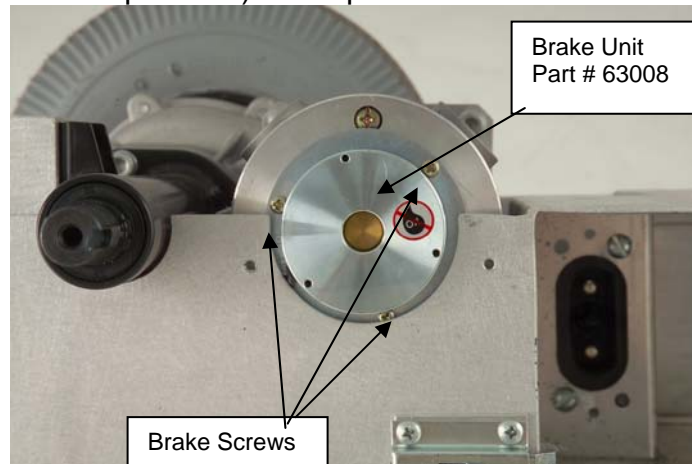


Fig. 7h

7.5 Controller Enclosure (Fig. 7j & 7k)

- 1) Be sure battery is removed from unit.
- 2) With the unit in the 4-wheel position as in Fig. 7c, remove the following (see also 7.2.1-7.2.5):
 - a) Black Poly deck sheet
 - b) Disconnect the coiled cord from the cover by unscrewing by hand.
 - c) Carefully remove the large cover because there are delicate wires connected to it.
 - d) Disconnect the wiring harness that comes from the coiled cord port.
 - e) Remove the nose and containment arm by means of the four bolts, two per side.
- 3) This enclosure houses the controller (Part #63003 Solo or # 63020 S-Drive), relay switch (Part # 62013), audio alarm (Part # 62012) and the 1 amp circuit breaker (Part # 62002). The circuit breaker is located next to the battery box latch.

- 4) Each of these components (with the exception of the circuit breaker) is secured with two screws each. The circuit breaker is attached with a thin nut accessible from the outside of the enclosure.

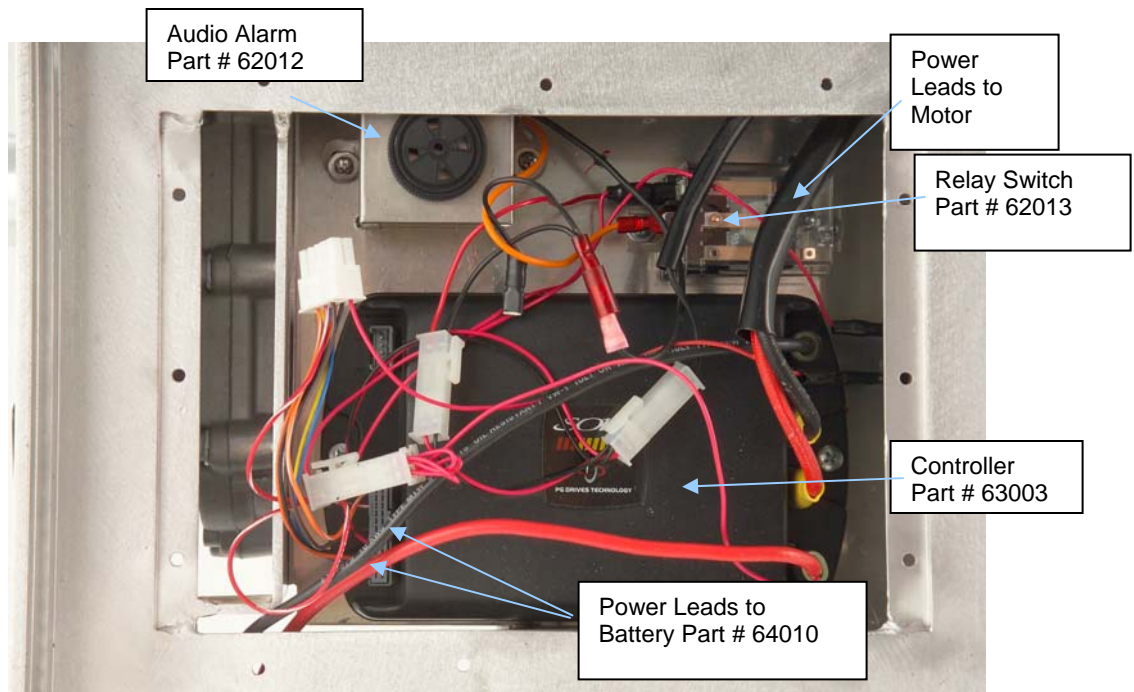


Fig. 7j Solo Controller (sold prior to March 2011)

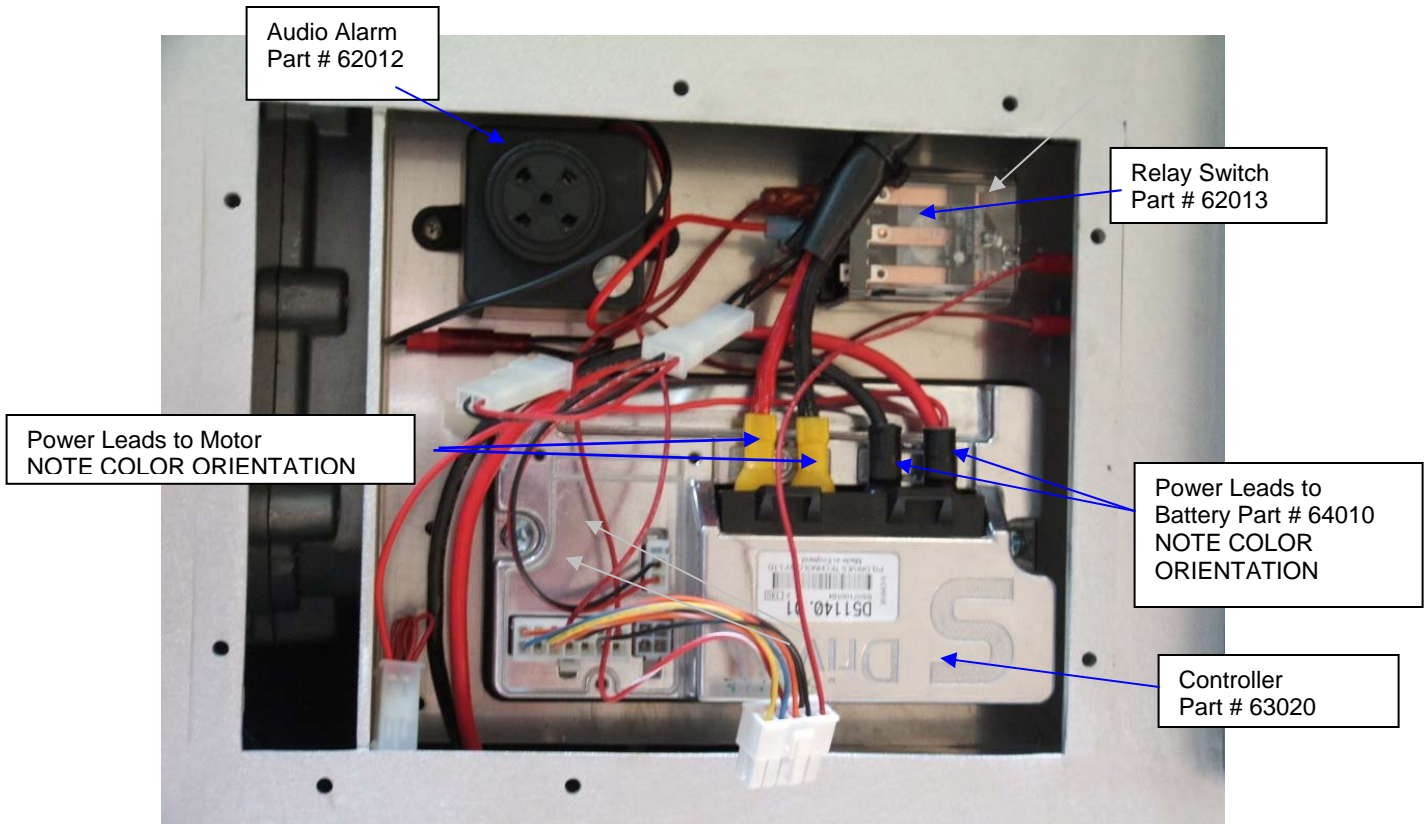


Fig. 7k S-Drive Controller

7.6 Wheels (Fig. 71)

- 1) The wheels (Pneumatic, Part # 122060PG or Foam Filled, Part # 122020PGB) are held on by a single Hex head cap screw M8 x 1.25P x 20mm (Part # 80231), flat washer and lock washer.
- 2) When removing the wheel, please note the rectangular axle mount key. This fits in a slot in the shaft and helps drive the wheel. Take care not to lose it.
- 3) Before replacing, lightly coat the axle shaft with anti-seize compound.
- 4) When replacing, bolt should be tightened to 16-18 ft/lbs.
- 5) Tire pressure should be maintained at 45-50 PSI for best performance. The tire can be filled with nitrogen or common air. (If you have foam filled tires, please disregard this step)

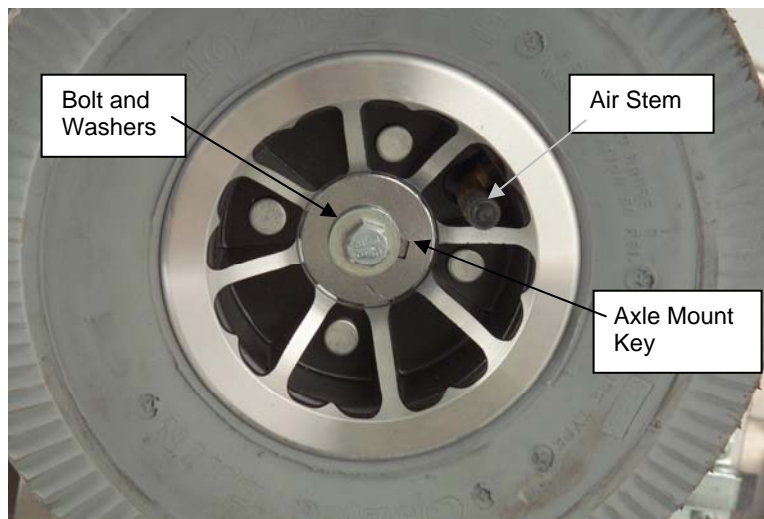


Fig. 71

8. Replacement Parts List

Please see this manual's pictures for locations of the following items:

Description	Part #
Wheel Assembly – Foam Filled	122020PGB
Wheel Assembly – Pneumatic	122060PG
Axle Mount Key	81160
Transaxle 24V	63001
Brake	63008
Motor (750 watts / 1 HP)	63002
Motor Brushes	63009
Handle Grip	308052
Handle No. 11 – Gemini Sr. only	301000
Handle Assembly – Gemini Sr.	308001
Handle Assembly – Gemini Jr.	308005
Free-Wheel Lever	308039
Caster, 6" x 2" with brake (universal right or left)	130025
Battery Adapter – United Kingdom (Photo not available)	63011
Battery Adapter – Europe (Photo not available)	63012
Folding Containment Arm – Gemini Jr.	308056
Folding Containment Arm – Gemini Sr.	308057
Nose – Type UM (7.5" x 18")	300205
Handle Latch & Lock Assembly (Sr. & Jr.)	302016
Battery (2 Required / Replace in pairs)	61017
S-Drive Controller	63020
Battery Charger, AC to DC	63004
Battery Charger, DC to DC	63010
Circuit Breaker (1 amp)	62002
Circuit Breaker (60 amp)	62004
Throttle – 24V	62006
Switch (Main Power)	62007
Switch (Hi/Lo)	62008
Audio Alarm	62012
Relay Switch	62013
Wiring Harness/Charger Port	64001
Wiring Harness/Battery Box (Red)	64002
Wiring Harness/Battery Box (Black)	64003
Wiring Harness/Battery Box (Red & Black) cable	64004
Wiring Harness Drive Housing Controller (S-Drive controller)	64017
Wiring Harness/Controller (Solo controller)	64007
Control Cord - 2 ft (with connectors)	64008

Wiring Harness/User Control Box	64009
Wiring Harness/Drive Housing	64010
Wiring Harness/ Brake-Audio Alarm (S-Drive controller)	64015
Wiring Harness/Audio Alarm (Solo controller)	64011

9. Electrical Component Location (Part numbers included)

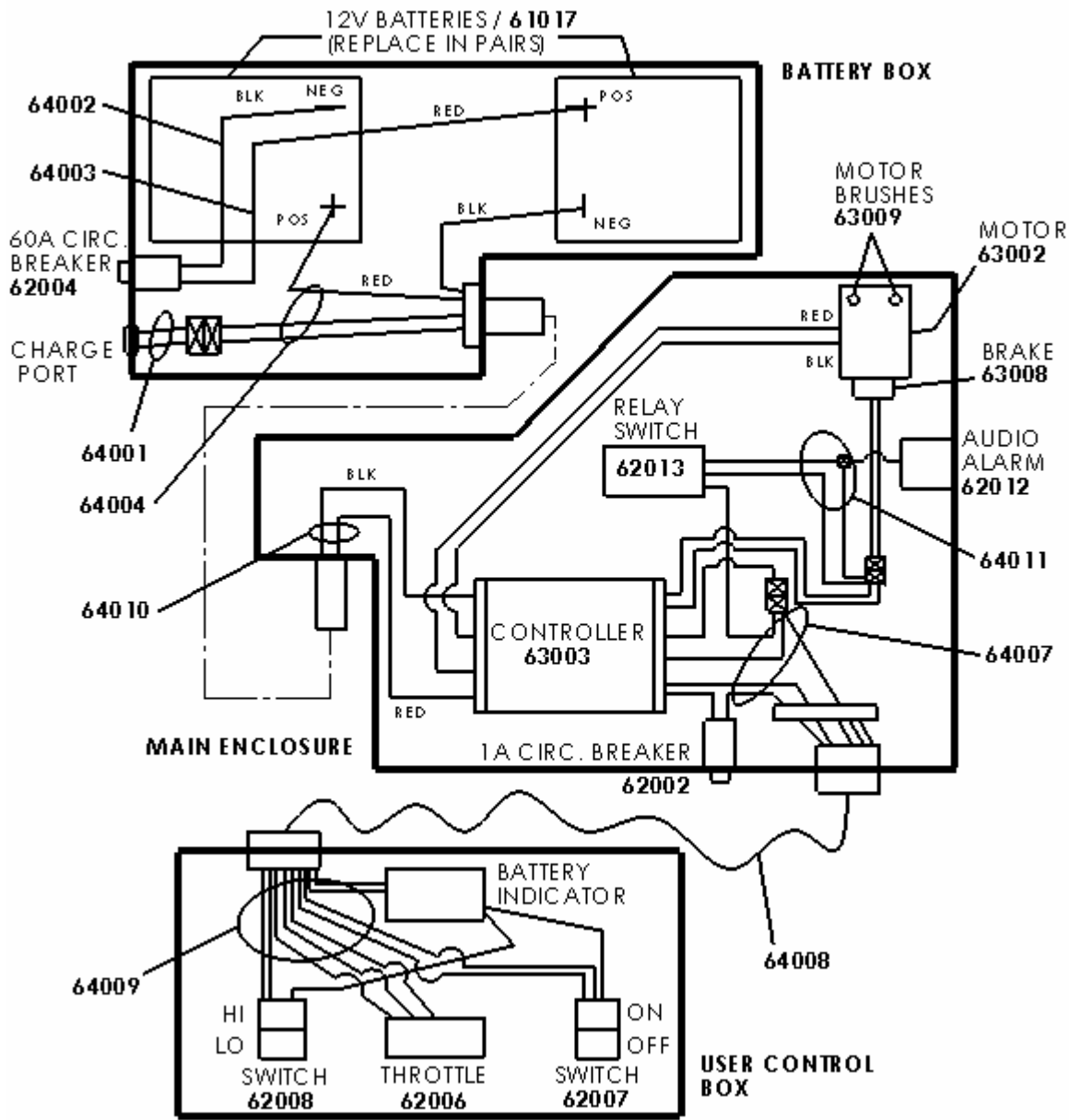


Fig. 9a

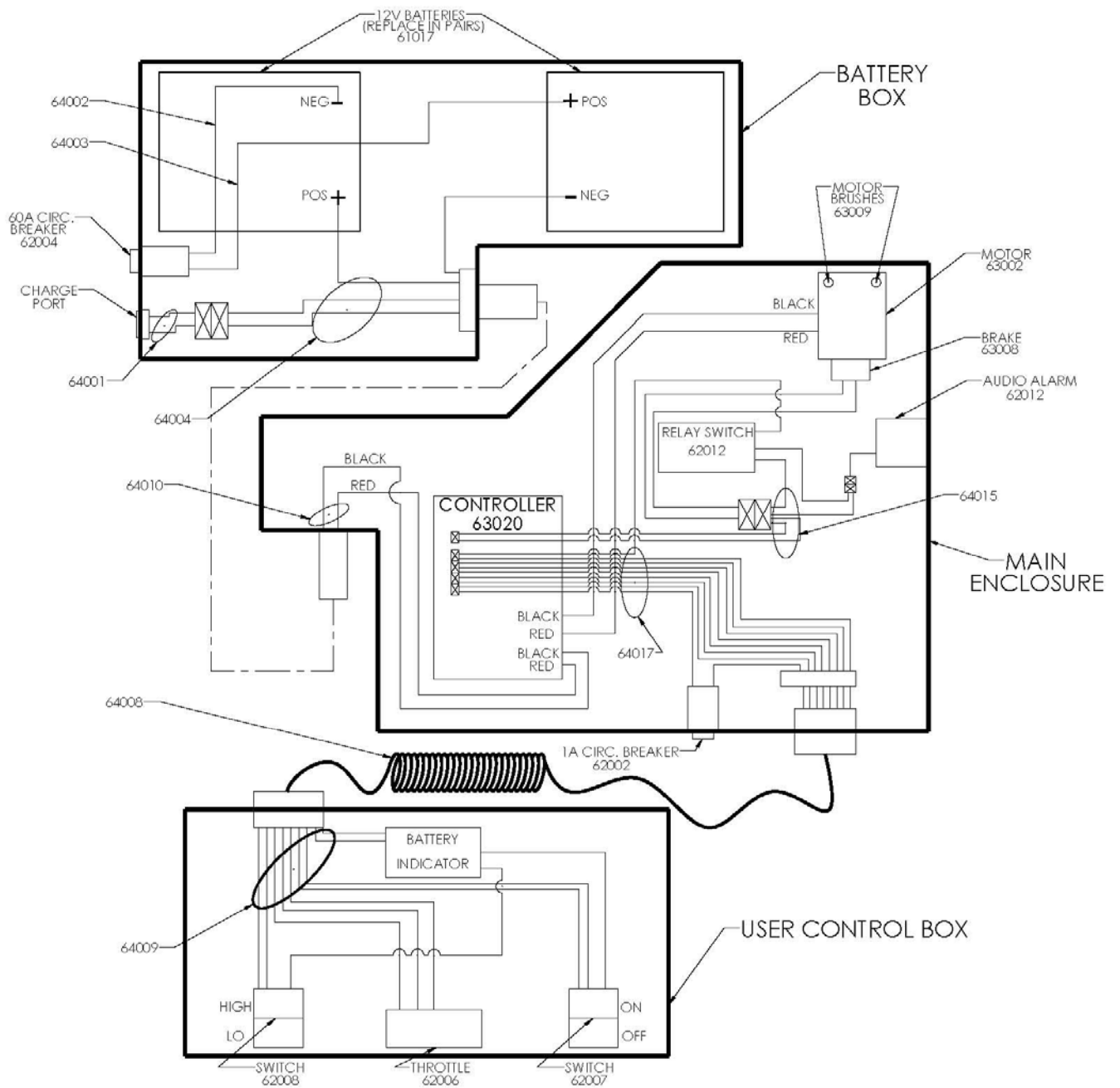


Fig. 9b

10. Trouble Shooting

Battery Indicators – The number of flashing bars (located on the control box on the handle) can indicate the cause of a fault as follows (normal lit battery level indication is found in section 4):

1 Bar =	The battery needs charging or there is a bad connection to the battery. Ensure that the battery pack is properly plugged in. If it is, try changing/ charging the battery pack.
2 Bars =	There is a bad connection to the motor. Check the motor and controller connections for looseness.
3 Bars =	The motor has a short circuit to a battery connection. Check the connections for looseness.
4 Bars =	Not used
5 Bars =	Not used
6 Bars =	Not used
7 Bars =	A throttle fault is indicated. Make sure the throttle lever is in the rest position before switching ON the truck.
8 Bars =	A controller fault has been indicated. See pages 29 – 30.
9 Bars =	There is a bad connection to the brake. Check the brake connections for looseness.
10 Bars =	Excessive voltage has been applied to the controller. This is usually caused by a poor battery connection. Ensure the battery pack is properly plugged in. If it is, try changing/charging the battery pack.

10.1 My Magliner Powered Gemini does not turn on

- A. Is the main switch turned on?
- B. Is the battery charged?
- C. Is the battery fully seated in the battery compartment?
- D. Are the battery contacts clean?
- E. Has the circuit breaker on the battery box been tripped? It will be extended further than normal and have a white ring exposed. With the unit OFF, depress the button and retry.
- F. Are both connections for the black coiled control cord properly connected?

10.2 My Magliner Powered Gemini turns on, but will not run

- A. Is the battery charged? There may only be enough charge to light readouts.
- B. Is the free-wheel lever engaged?

10.3 The battery light display is “cycling” up and down the gauge

- A. This will happen if the throttle lever was depressed when the unit was switched ON. To correct, turn the main switch to the OFF position and then switch the power ON without depressing the throttle lever.

10.4 My Magliner Powered Gemini is running slowly

- A. If the AC battery charger has a slow blink green diode, the pair of 12 volt battery cells (#61017) is most likely failing and need to be replaced.

10.5 My Magliner Powered Gemini has stopped part way up the ramp

- A. Turn controller off, wait 5 minutes, turn controller back on and back carefully down the ramp.
 B. Charge the battery.

10.6 DC Charger - Possible Symptoms and Actions:

Symptom	Recommended Action
No indicator is on or they are not in standby cyclic mode after power on	<ol style="list-style-type: none"> 1) Verify power switch is on 2) Check for blown fuse (back of charger) 3) Verify 12 volts at charger input with correct polarity 4) If charger still does not function it must be repaired or replaced.
Input low/high voltage alarm when power on	Check that the input DC input voltage is in the range of 10V-15V (10A min)
Charger still in standby mode even when the battery has been connected	<ol style="list-style-type: none"> 1) Verify output cord + & - wires are connected to correct terminals (+ wire indicated by tag) 2) Verify wiring in battery box per Fig. 9a or 9b 3) If charger still is in standby, replace batteries
Always low input voltage alarm when the charge is at bulk charge mode	1) Use voltmeter to verify 12V at input with charger operating
After battery is connected, Trickle & Bulk LEDs flash in cyclic mode for a while and low/high battery alarm rises	Check if the battery connected is 24V
After battery is connected, Trickle & Bulk LEDs flash in cyclic mode for a long time. Or it always jumps back to Trickle LED from O to F repeatedly	Aged battery with very large leakage current. Need to change the battery.
The charger always jumps back from float charge to bulk charge after it stays at float charge for some time.	<ol style="list-style-type: none"> 1) If battery box is still in truck, remove. If charger functions normally, check for damaged wires in the transaxle housing. 2) If problem persists, check for damaged wires in battery box. 3) Replace both batteries
The charger jumps to float charge after a discharged battery is connected.	<ol style="list-style-type: none"> 1) Try to set the charging current to "Low" 2) Aged battery with large internal resistance.

	Need to change the battery.
No flashing LED or only one LED is on	There is always at least one LED flashing on the panel. Otherwise, the charger needs repairing.

The DC charger is maintenance free when operated properly. It should be kept away from water and direct sunshine.

Powered Gemini Expanded Troubleshooting

Note: in most cases a wiring harness problem could cause same symptoms as an open or short circuit.

Symptom	Battery Indicator	Possible Cause	Steps
Unit will not turn on	No lights	Battery pack not installed, or failed/no connection	Check battery for 24 volts, repair or replace as necessary
		"ON" switch failed or disconnected	Check connection, check switch for continuity in ON position
		Control circuit breaker tripped or disconnected	Reset breaker (by wheel) , check connections
		Main circuit breaker tripped or disconnected	Reset breaker (on battery), check connections
		Coil cord disconnected or damaged	Make sure cord is connected and pins are not bent
Unit functions, but no battery indicator lights	No lights	Battery meter disconnected or damaged	Check connections, replace meter if necessary

Unit turns on but will not function	Normal lights when turned on, then 8 flashing	Warning chime shorted/failed	Turn off, unplug chime, re-test
		Controller wet or internal fault	Dry with compressed air if wet, replace if fault persists
		Brake or wires short circuited	Check wires, check brake resistance (30-35 ohms). Unplug brake and re-test with disconnect lever in neutral.
	Lights cycle twice, then 8 flash	Throttle blue or yellow wires disconnected, or throttle failed	Check connections, check throttle resistance & call dealer
	Normal Lights, no changes	Transaxle disconnect lever in neutral	Check lever position (unit will roll freely if lever in neutral)
	Normal Lights, no changes	Throttle orange wire disconnected, or throttle failed	Check connections, check throttle resistance & call dealer
Unit operates in low range only	Normal	Hi-Lo switch or wires shorted	Check switch, open circuit when in high range. NOTE- Reverse is always low range only!
Unit operates in High range only	Normal	Hi-Lo switch or wires failed or loose connection	Check connections, check switch to verify open circuit in hi range
Loud squeal or grinding noise from transaxle	Normal	Brake wire disconnected, or brake failed	Check connections, check brake resistance (30-35 ohms)
Chime does not function, but unit operates normally	Normal	Chime disconnected or failed	Check connections at chime and relay. Check resistance of chime