

**Model ES-1-48**  
**Electric Trackless Train**

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**Operation & Maintenance**  
**Manual**

**Roundhouse Trackless Train Co., LLC.**

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## INTRODUCTION

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### GENERAL OVERVIEW AND INTENDED USE

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The model ES-1-48 is a low speed ride for both children and adults capable of towing up to 4 passenger cars. Each car can hold 4 persons for a total weight of 550lbs. Although all ages are welcome to ride, children under the age of 6 should be accompanied by an adult. All passengers must remain seated at all times while train is in operation.

Boarding or exiting the train must be done only once the train is parked and not moving. Child safety latches are provided on each car door, however these do not ensure doors cannot be opened by riders, and therefore the driver/operator must bring train to a complete stop should any passenger attempt to exit or enter a moving train.

This train is designed to be operated on a hard, level surface either indoors or in dry, clement weather conditions with temperatures above 40 and below 90 degrees. Never operate the train on slopes or hilly terrain.

### WARRANTY INFORMATION

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#### **NOTICE TO PURCHASER – 180 DAY LIMITED WARRANTY**

Roundhouse Trackless Train Co., LLC. warrants to the original purchaser that this amusement ride shall be free from defects in material and workmanship under normal use and service for a period of **180 days from the date of purchase**. Subject to the terms and conditions noted in this **Limited Warranty**, we shall, at our option, repair or replace at no cost to the original purchaser any part covered by this **Limited Warranty** during the applicable warranty period. Transportation charges on parts submitted for repair or replacement under this **Limited Warranty** must be borne by the purchaser. No parts will be accepted for return without an approved Return Parts Authorization generated by the Roundhouse Trackless Train customer service department.

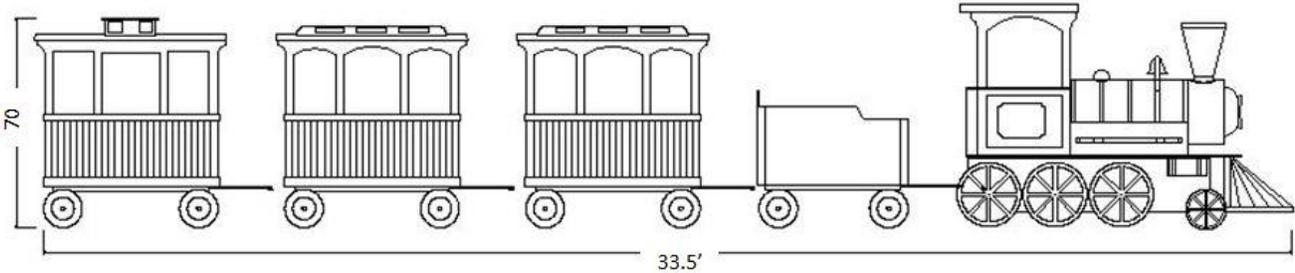
This Roundhouse Trackless Train **180 Day Limited Warranty** is your exclusive remedy; however, this warranty is void or does not apply to any unit that has been tampered with, altered, misused, or abused. Your warranty does not cover minor mechanical adjustments which are not due to any defect in material or workmanship. All repair, maintenance, and upkeep are the responsibility of the owner of the amusement ride.

This **Limited Warranty** is effective for the time period stated above and subject to the conditions provided for in this policy. **There is no other Express Warranty. Implied warranties, including those of merchantability and fitness for a particular purpose are limited to 180 Days from purchase, or to the extent permitted by law; any and all implied warranties are excluded. Liability for consequential damages under any and all warranties are excluded to the extent exclusion is permitted by law.**

CAPACITIES AND SPECIFICATIONS

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**ES-1-48**



**Locomotive**

Power	48volt DC Series Motor
Battery	8- 6 volt 220ah fla
Run Time	12-15 hrs avg.
Charge Time	6-8 hrs avg.
Speed	8mph max, optional regulation to 4mph
Turning Radius	9'
Height	70"
Width	40"
Length	105"
Weight	1,250lbs
Standard Accessories	Bell, whistle, headlamp
Additional Options	Smoke, PA System, custom paint, graphics

**Coal Tender**

Frame	Steel 4 wheel independent steering
Accommodation	2 padded bench seats
Access	Front open access
Capacity	Up to 6 children up to 550 lbs total
Turning Radius	9'
Connection	Fork and pin style with 3/8" safety pin
Length	48"
Width	33"
Height	52"
Standard Options	4 wheel tight turn steering, padded seats

**Cars/ Caboose**

Frame	Steel 4 wheel independent steering
Accommodation	2 padded bench seats
Access	20" swing door with safety lock
Capacity	Up to 6 children or 4 adults or combination of up to 550 lbs
Turning Radius	9'
Connection	Fork and pin style with 3/8" safety pin
Length	60"
Width	34"
Height	68"
Standard Options	4 wheel tight turn steering, padded seats, safety locks

## **WARNING!**

**IMPROPER USE OF THIS VEHICLE CAN RESULT IN PERSONAL INJURY.  
ALLOW ONLY QUALIFIED, COMPETENT PERSONS TO DRIVE AND  
MAINTAIN THIS TRAIN**

### **OWNERS INFORMATION:**

This manual is written for several different models. Some features and options may not be on your specific unit. These instructions are written for a person with some mechanical ability. Like most service and operation manuals, not all steps are described. Steps on how to loosen or tighten fasteners are steps anyone can follow with some mechanical ability. Read and follow these instructions before you use the unit.

### **KNOW YOUR PRODUCT:**

If you understand the unit and how the unit operates, you will get the best performance and your customers will have an enjoyable and safe experience. As you read this manual, compare the illustrations to the unit. Learn the location and the function of the controls. To help prevent an accident, follow the operating instructions and the safety rules. Keep this manual for future reference.

***The responsibility of the owner, driver and operator is to follow the instructions below.***

1. Carefully read and follow the rules of safe operation.
2. Follow the assembly instructions (if assembly is required).
3. Inspect the unit before each use.
4. Make sure the operator and driver of the unit know how to correctly use all features.
5. Operate the unit only with guards, shields, lap seat belts and other safety items in place and working correctly.
6. Correctly adjust the unit.
7. Service the unit only with authorized or approved replacement parts.
8. Complete all maintenance on the unit.

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## SETUP

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### ASSEMBLY OF TRAIN

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The model ES-1-48 is fully assembled, charged and ready to run upon delivery. The cow-catcher was removed for shipping and attaches to the front of the train. During any transportation of the train be sure to remove the cow-catcher to prevent damage.

### CONNECTION OF CARS.

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## WARNING!

FAILURE TO PROPERLY COUPLE THE HITCHES COULD LEAD TO RUNAWAY CARS THAT MAY RESULT IN INJURY. ALWAYS CHECK HITCH CONNECTION PRIOR TO EACH RIDE

### Hitch Pin

Each car utilizes a tongue and fork connection system and must be securely fastened properly to ensure all cars stayed attached. The tongue from the leading car must be between the fork of the trailing car, and the pin must be inserted fully through both connections. Secure the pin locking clasp once the connection has been made. See the [Daily Pre-Ride Checklist](#) for a photo of the proper hitch pin coupling.

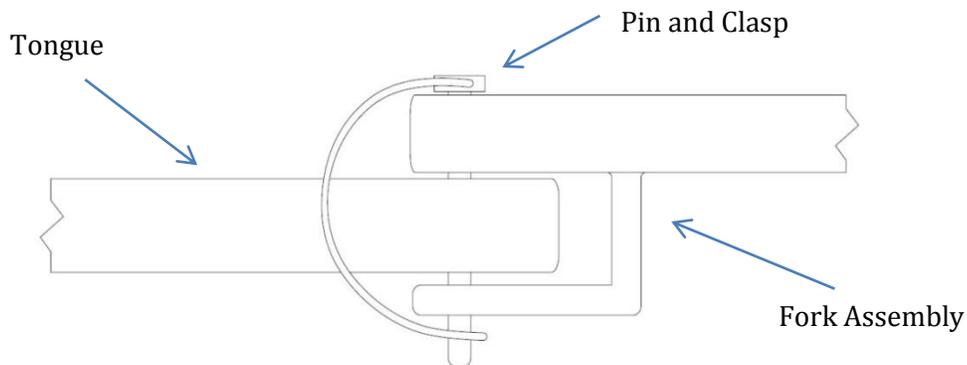


FIGURE 1-HITCH PIN CONNECTION DRAWING

## **Electrical**

For trains equipped with the optional PA system and wired speakers, each car will be equipped with an electrical connector that will plug into the receptacle of the leading car. Cars can be placed in any order. Plug must be rotated so that the guide will fit into the receptacle.

Periodic cleaning of the receptacle may be necessary to ensure good electrical contact. Spray both the receptacle and plug contacts with an electrical cleaner solution and wipe dry.

For plugs that are difficult to attach, lightly coat the outer plug and receptacle with WD-40.

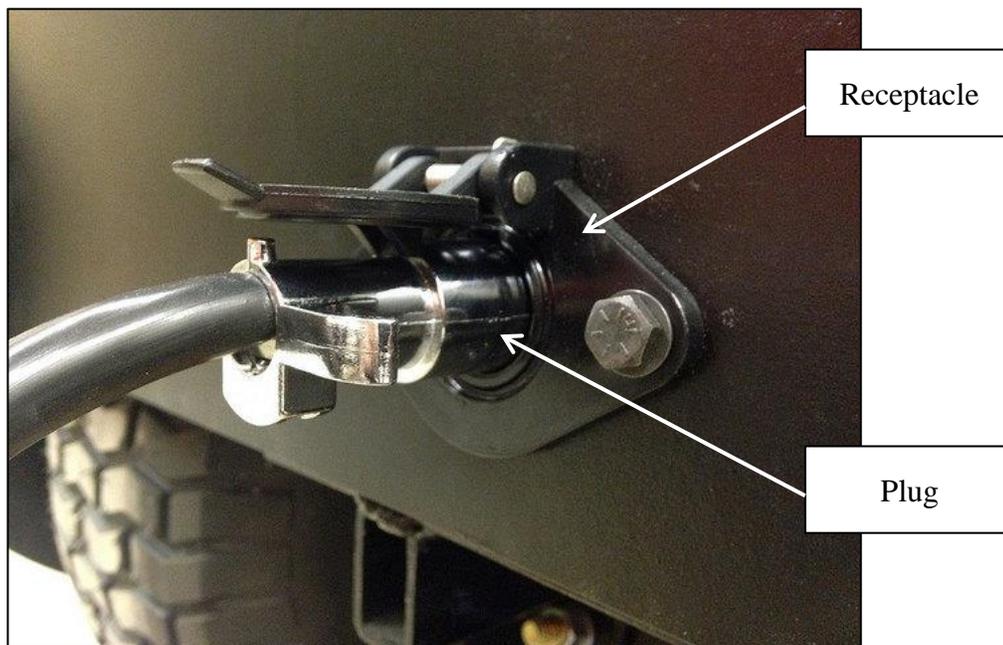


FIGURE 2- ELECTRICAL CONNECTION

## OPERATION

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### GENERAL NOTICE

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## WARNING!

ALL OPERATORS MUST BE INFORMED OF THE PROPER RIDE CHECKLIST  
AND PERFORM REQUIRED INSPECTION PRIOR TO EACH RIDE

### **IMPORTANT:**

The driver should be instructed and familiar with all operating procedures and instructions BEFORE accepting passengers.

The driver should perform the pre-operation inspection check list daily BEFORE accepting passengers as well as perform the inspections during daily operational break time. If the unit is transported to multiple sites on a single day, the operator should perform the pre-operation check list BEFORE accepting passengers at each new site.

When the unit is not in operation, and the driver is not seated or positioned at the drive unit, the motor should be turned off and the key removed.

The driver should always be familiar and aware of his surroundings, passengers, and environmental conditions. If any of these are deemed a concern or become unsafe, the driver should cease operation of the unit.

## **OPERATIONAL REQUIREMENTS**

- Read, understand and follow all instructions in this manual on the unit before operating.
- Only allow responsible adults, who are familiar with the instructions and who have been trained in the operation of this unit, to operate this unit.
- Clear the operating area of objects such as rocks, toys, debris, ropes and wires, electrical extension cords, etc., which could become entangled in the drive unit or towed vehicles or could cause a trip hazard with riders entering or exiting the unit.
- Operate the unit in an area that is clear of other vehicles, people, pets or other moving objects.
- Watch for traffic when operating near or crossing roadways.
- Operate the unit in a consistent and repeatable manner. Do not change momentum quickly, do not swerve or zig-zag. Slow down before turning.
- Never leave a unit unattended with the key in.
- Turn off all accessories or power units when transporting or not in use.
- Operate only in daylight or good artificial light.
- Do not operate the unit in the rain, snow, fog, or any electrical and lightning storms.
- Do not operate the unit while under the influence of alcohol or drugs or when very tired.
- Do not operate this unit if you are taking drugs or other medication(s) which can cause drowsiness or affect your ability to operate this unit.
- Do not operate this unit if you are mentally or physically unable to operate this unit safely.

## DRIVING

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To operate the vehicle: After the batteries have been fully charged, turn the ignition switch to the on position. Verify battery level should be at 100%. Place the reverser switch in the “forward” position and lightly depress the accelerator pedal. To stop, gently release the pedal and the vehicle will automatically come to a stop.

**CAUTION:**

**ATTEMPTING TO DRIVE THE TRAIN IN REVERSE WHILE COUPLED WITH PASSENGER CARS WILL RESULT IN COLLIDING WITH THE CARS AND/OR SURROUNDING OBJECTS. ALWAYS DISCONNECT ALL CARS PRIOR TO REVERSE OPERATION.**

Always slow when making corners, and ensure you have a clear path in the direction you wish to travel. Our cars are designed to tightly track behind the path of the locomotive, but excessive tight turning near objects may result in one or more cars crossing the path of the object. Always use caution when making turns and consider your surroundings.

Always turn the power key switch to the off position when not in use. Remove key to prevent operation by unauthorized drivers.

**CAUTION:**

**ONLY QUALIFIED, ADULT OPERATORS WHO UNDERSTAND THE SAFE OPERATION AND INTENDED FUNCTION OF THIS VEHICLE ARE ALLOWED TO DRIVE.**

**MINIMUM DRIVER REQUIREMENTS: 60” TALL AND 100LBS IN WEIGHT.**

Immediately stop vehicle and shut power key switch to off if vehicle drives uncontrollably, erratic, or unexpectedly.

## SAFETY LATCHES

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Each car is equipped with a child safety latch that helps prevent riders from opening doors during rides.

To operate, depress the hidden button on the underside of the latch to release the catch.



FIGURE 3-SAFETY LATCH

### **CAUTION:**

**SAFETY LATCHES DO NOT COMPLETELY PREVENT OPENING OF CAR DOORS BY THE RIDERS. USE CAUTION AND WATCH FOR PERSONS ENTERING OR EXITING THE TRAIN WHILE IN MOTION AND STOP IMMEDIATELY**

## DAILY PRE-RIDE CHECKLIST

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*Daily inspection to be performed prior to first ride:*

### Cars

- Inspect hitch pin coupling for proper connection
- Inspect draw bar for loose or missing hardware
- Inspect tires for proper pressure
- Inspect wheel steering linkage for loose or missing hardware
- Inspect door latches for proper operation and closure
- Inspect seatbelts for proper operation
- Inspect wheel pins to ensure wheels are securely fastened



FIGURE 4-PROPER HITCH PIN COUPLING

### Locomotive

- Check battery water level. Ensure water is above battery plates
- Check voltage meter for proper voltage (should be > 80% charged)
- Test operate accelerator and brakes to ensure proper operation
- Check headlight, bell and whistle operation

## SAFETY FOR OPERATORS

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- Be sure you understand the use and function of controls, signal systems and safety devices.
- Be familiar with the ride manufactures manual.
- Inspect and test the entire ride before each operating period.
- Stop the ride when any unusual noise or condition develops. Do not operate the ride until your supervisor has inspected and repaired the ride.
- Remain in control of the ride at all times. Never allow an unauthorized person to operate this ride.
- Do not operate this ride at unsafe speeds or load beyond its capacity.
- Be alert when the ride is operating for an emergency stop.
- Be aware of changing weather conditions. Do not operate this ride during high winds or electrical storms.
- Persons that appear to be ill or under the influence of alcohol or drugs should not be allowed on the ride.
- Be sure the riders fit the ride. Children should meet the minimum size requirements. Adults must fit safely and comfortably in the seat.
- Safety belts, lap chains or safety bars must be properly secured before starting the ride.
- Patrons waiting for the next ride must be kept outside of the fence or away from the moving ride.
- Ensure patrons remain seated until the ride comes to a complete stop.
- Know the location of the closes First Aide Station and fire extinguisher.
- Any incident, no matter how small, must be reported to the supervisor at once.

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## CARE AND MAINTENANCE

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### CLEANING

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The surface of the train body is coated with a gloss enamel and easily cleaned with either soap and warm water. For quick cleaning during ride session, lightly spray Windex on the soiled surface and wipe off with a soft cotton towel.

The floors in the cars are covered with a durable vinyl that is easily wiped off with soap and warm water, or for more stubborn stains use a mild liquid degreasing formula such as 409 cleaner and a cotton cloth.

Car seats are of a cushion vinyl and can be cleaned with soapy water. It is advisable to coat the seats in a protective covering such as Armor All or similar vinyl cleaner/protectant.

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### SCRATCH REPAIR/TOUCHUP

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Touchup paints have been provided with your train and allow for easy and quick recoating of paint that may get scratched or rubbed off. We recommend applying with a foam brush by gently dabbing the paint onto the surface.

Deeper scratches and gouges can be repaired with a wood filler, sanded, then painted.

Filler Use instructions:

1. Area must be clean, dry and free from dirt and grease.
2. Scoop a small amount of filler onto the putty knife. If filler is dry and is not soft, rejuvenate with water, stirring well.
3. Apply the mixed paste immediately to the area to be repaired. Spread on a thin layer followed by sufficient product to fill the gap. Slightly over-fill to allow for sanding down. Work quickly as the mixture remains workable for about 10 minutes at room temperature. (To fill deep holes, spread on 1/8 inch thin layers one at a time until the hole is filled.)
4. Wait at least 30 minutes to sand, plane or file.
5. Clean the area free of dust, then paint to match color.

**COMPREHENSIVE MAINTENANCE SCHEDULE**

<b>Schedule</b>		<b>Each Ride</b>	<b>Daily pre-ride</b>	<b>Monthly</b>	<b>6 months</b>
<b>Locomotive</b>	Check brake operation	✓			
	Inspect tires		✓		
	Check battery voltage level	✓			
	Clean battery terminals			✓	
	Check battery lugs			✓	
	Check battery water level		✓		
	Check wheel lugs			✓	
	Check all fasteners			✓	
	Check for safe clearance for operation	✓			
	Grease all fittings				✓
<b>Passenger Cars</b>	Check hitch pin	✓			
	Check steering linkage			✓	
	Check door latches	✓			
	Check tire pressure (24psi max)		✓		
	Ensure all passenger seated and secure	✓			
	Check tire wear			✓	
	Check axle pin		✓		
	Grease wheel bearings				✓
	Grease steering pin arm			✓	
	Check hitch bar locknut			✓	
Check all fasteners			✓		

FIGURE 5- COMPREHENSIVE SCHEDULED MAINTENANCE CHART

**WARNING!**  
**KEEP ALL MOISTURE OUT OF BATTERY AND  
ELECTRICAL COMPARTMENT.**



**Note: Please refer to the SCO charger manual  
for detailed battery charging procedure**

***Read and understand all information pertaining to battery  
care and maintenance before operating your vehicle***

New batteries should be given a full charge before use.

New deep cycle batteries need to be cycled several times before reaching full capacity (50-125 cycles, depending on type). Capacity will be limited during this period

Battery cables should be intact, and the connectors kept tight at all times. Always use insulated tools to avoid shorting battery terminals. Regular inspection is recommended.

Vent caps should be correctly installed and tight during vehicle operation and better charging.

Batteries should be kept clean and free of dirt and corrosion at all times.

Monthly check all battery connections. Ensure all connections are tight and free of corrosion.

Batteries should always be watered after charging unless plates are exposed before charging. If exposed, plates should be covered by approximately 1/8" of electrolyte (add distilled water only). Check electrolyte level after charge. The electrolyte level should be kept 1/4" below the bottom of the fill well in the cell cover.

Water used to replenish batteries should be distilled or treated not to exceed 200 T.D.S. (Total Dissolved Solids...parts per million). Particular care should be taken to avoid metallic contamination (iron).

For best battery life, batteries should not be discharged below 80% of their rated capacity. Proper battery sizing will help avoid excessive discharge.

Avoid charging at temperatures above 120 degrees F or ambient, whichever is higher. Deep cycle batteries need to be equalized periodically. Equalizing is an extended, low current charge performed after the normal charge cycle. This extra charge helps keep all cells in balance.

Actively used batteries should be equalized once per month. Manually timed charger should have the charge time extended approximately 3 hours. Automatically controlled charger should be unplugged and reconnected after completing a charge.

Replacement battery(s) should be of the same size, age and usage level as the companion batteries. Do not put a new battery into a pack which has 50 or more cycles. Either replace all new or use a good used battery(s).

Periodic battery testing is an important preventative maintenance procedure. Hydrometer readings of each cell (fully charged) gives an indication of balance and true charge level. Imbalance could mean the need for equalizing; is often a sign of improper charging or a bad cell. Voltage checks (open circuit, charged and discharged) can locate a bad battery or weak battery. Load testing will pick out a bad battery when other methods fail. A weak battery will cause premature failure of companion batteries.

As batteries age, their maintenance requirements change. This means longer charging time and/or higher finish rate (higher amperage at the end of the charge). Usually older batteries need to be watered more often...and their capacity decreases.

Lead acid batteries should be brought up to full charge at the earliest opportunity. Avoid continuously operating batteries in a partially charged condition. This will shorten their life and reduce their capacity.

Extreme temperatures can substantially affect battery performance and charging. Cold reduces battery capacity and retards charging. Heat increases water usage and can result in overcharging. Very high temperatures can cause "thermal run-away" which may lead to an explosion or fire. If extreme temperature is an unavoidable part of an application, consult a battery/charger specialist about ways to deal with the problem.

Inactivity can be extremely harmful to all lead acid batteries. If season use is anticipated, we recommend the following:

Completely charge the battery before storing.

Remove all electrical connections from the battery, including series/parallel connectors.

Store the battery in as cool a place as possible. However, do not store in a location which will consistently be below 32 degrees F. Batteries will discharge when stored, the lower the temperature the lower the self-discharge.

When not in use, boost every two months.



Do not operate your vehicle if battery level falls below 25%. Permanent damage may result.

Proper care and maintenance of your batteries will ensure the longest lifespan and optimal performance. Always maintain water levels above battery plates with clean, diluted water

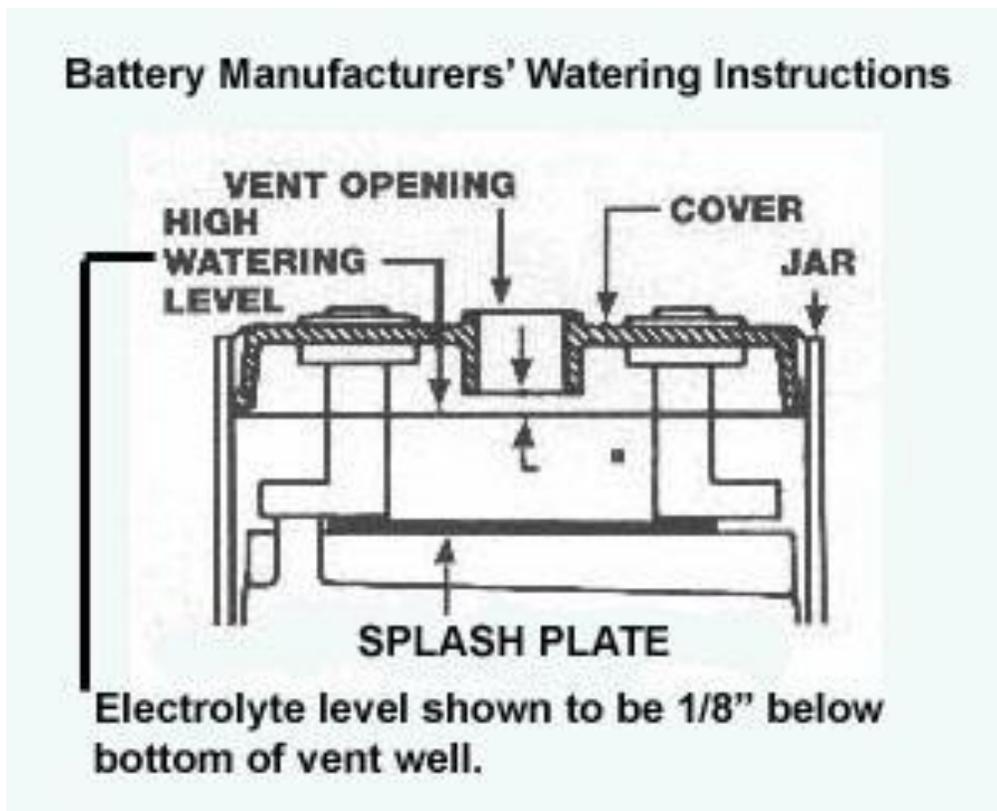


FIGURE 6- BATTERY WATER FILL DIAGRAM

**CAUTION:**

EXTREME HEAT OR COLD CONDITIONS CAN DAMAGE OR DIMINISH THE LIFE OF YOUR BATTERIES. ALWAYS OPERATE VEHICLE IN TEMPERATURES ABOVE 35 DEGREES AND BELOW 95 DEGREES.

## FASTENERS, GREASE FITTINGS AND ALIGNMENT

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Monthly inspect all fasteners (nuts, bolts, screws, turnbuckles) on each car. Check to ensure all fasteners are tight with the appropriate size wrench. Check steering mechanisms to ensure fasteners are secure but mechanism moves freely.

### Cars:

Alignments of the steering wheels are set at the factory and typically need not be adjusted. However if alignment is needed, loosen the locking nuts on each turnbuckle connecting rod and spin connecting rod to align wheel. Using a straight edge, check position of each front wheel to ensure it is aligned with the rear wheel while the hitch bar is extended straight ahead. Once aligned, be sure to securely tighten the locking nuts to the turnbuckles.

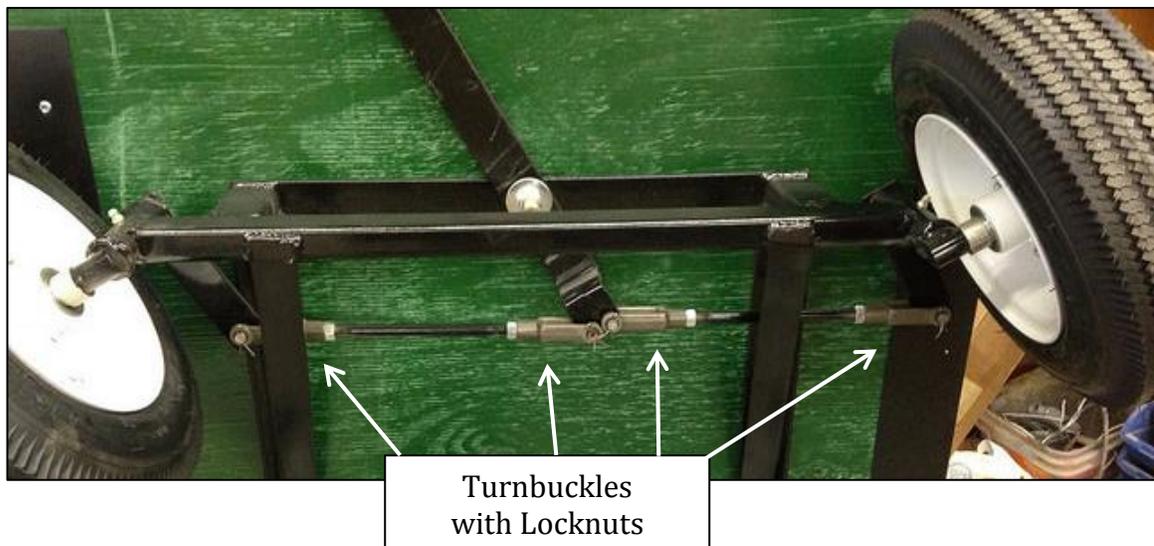


FIGURE 7- WHEEL ALIGNMENT

Each wheel has a grease fitting located on the outside hub of the wheel. Grease wheel once every 3 months. Additionally, there is a grease fitting on the steering arm pin of each front wheel of the 2-wheel steering cars, and on all for steering pin arms of the 4-wheel steering cars. Grease the steering pin arms once every month.

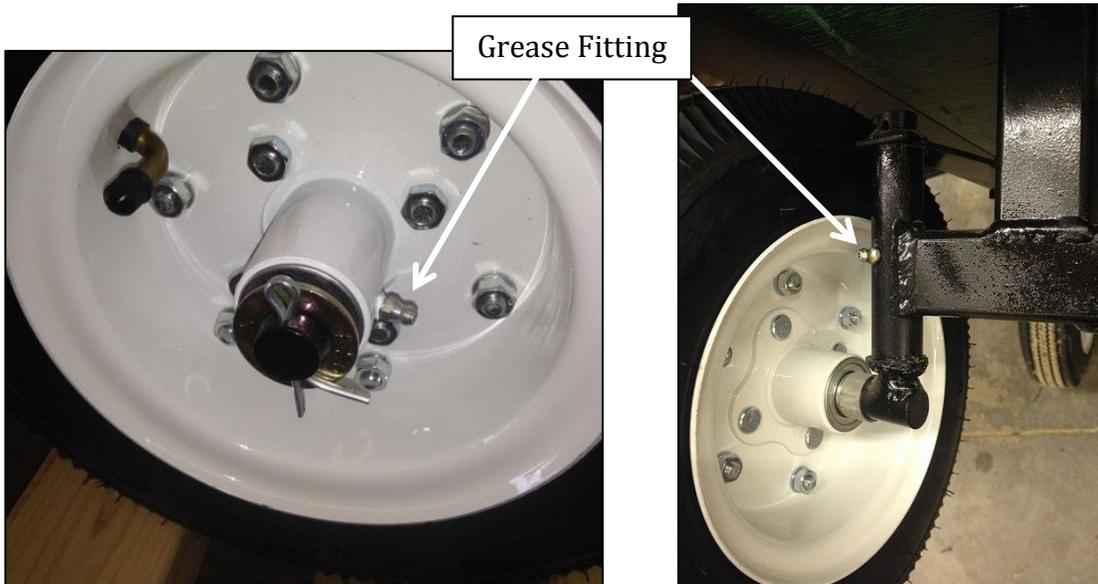


FIGURE 8- GREASE FITTINGS

Each car has a locknut on the hitch bar located under the front end of the car. Periodic inspection of this locknut is critical to the safety of the riders. Check that the locknut is tight but loose enough to allow movement of the hitch bar.

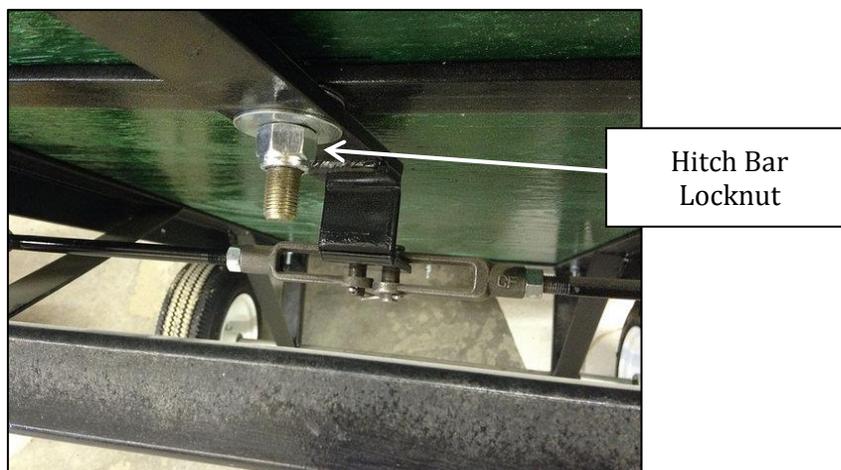


FIGURE 9- HITCH BAR LOCKNUT

**Locomotive:**

Monthly check wheel lugs for tightness on all wheels. Inspect tire wear for proper and even wear, and abnormal cupping or wear patterns. The wheels hubs of the locomotive must be removed and packed with grease every 2 years.

Tire pressure plays a large role in extending the life of the battery charge by reducing rolling resistance. Check tire pressure monthly. Inflate to a max 65psi. Visually inspect tires daily for signs of low pressure such as squatting or bulging.

Always replace tires with tires of the same dimension.

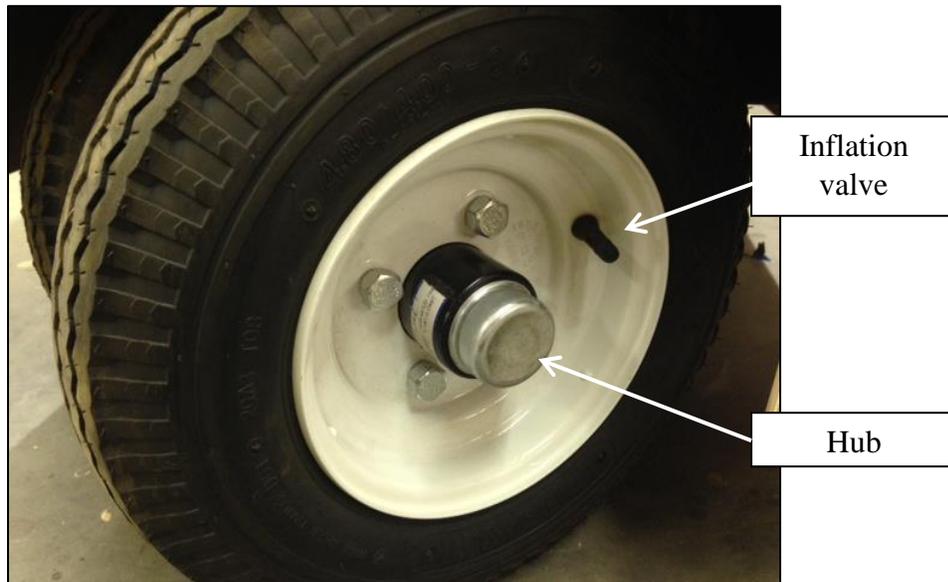


FIGURE 10- LOCOMOTIVE WHEEL

## WHEELS AND TIRES

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Proper inflation and condition of all wheels will not only provide a safe and comfortable ride for you passengers, but also reduce rolling resistance and increase the run time of the locomotive. Always inspect wheels and tires for inflation pressure and wear condition before each riding session. Grease zirks are located on each wheel hub and should be greased every 6 months. Grease zirks are also located on the steering pin axle of the car frame and should be greased every 3-6 months.

**CAUTION:**

**OPERATION OF THIS VEHICLE WITH UNSTABLE, IMPROPERLY INFLATED OR DAMAGED WHEELS OR TIRES MAY RESULT IN THE TIPPING OF ONE OR MORE CARS AND PERSONAL INJURY**

Periodic inspection of the wheels should consist of:

- Check inflation pressure, verify at 24psi max
- Check tire tread wear, verify even wear, no damage to tire, tread greater than 1/16<sup>th</sup> inch
- Check bearing by lifting car and rocking wheel looking for excessive wobble or loose fitting wheel on axle shaft. Spin wheel to ensure free movement on bearings
- Check all nuts on wheel housing for tightness
- Check that axle pins are secure and in good condition

## Tire Specifications and Information

	Wheel Size	Max Inflation Pressure
Locomotive	4.80/4.00-8	60psi
Cars	4.10/3.50-6	24psi

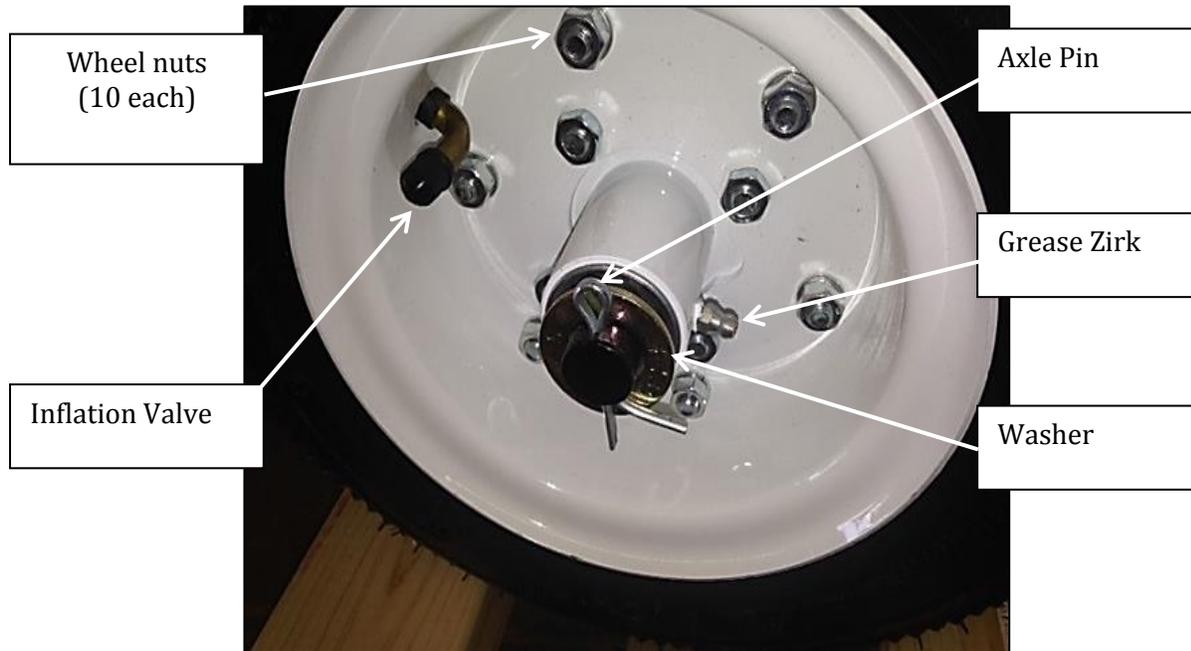


FIGURE 11- CAR WHEEL REFERENCE

## BATTERY CHARGER INFORMATION

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**REFER TO THE BATTERY CHARGER MANUAL FOR COMPLETE INFORMATION REGARDING THE COMPLETE CHARGING PROCEDURE OF THE BATTERIES**

The ES-1-48 electric train is equipped with a state of the art deep cycle battery charger designed to quickly and efficiently charge and maintain proper voltage levels within the batteries. Please read and understand the battery charger manual for optimal performance.

### Charging Tips:

1. Charger requires a 20amp 115vac grounded power source. If using an extension cord, provide a 12guage or larger cord with grounded line.
2. Charge batteries before they drain too low. New batteries especially should be conditioned by charging them frequently after short runs. Never let your batteries drain below 20% charge.
3. Charge batteries to full capacity when charging. Depending on the amount of discharge, this may take up to 8 hours charge time.
4. Charge batteries in a cool, dry environment. Never let moisture contact the batteries, electrical components, or wiring.
5. Always check battery leads and wiring for signs of corrosion and immediately clean the corroded area with a good electrical contact cleaner.
6. Batteries can drain when stored and not used so frequently charge the batteries even if not used.



## QUICK START INSTRUCTIONS:

Check for any damage before proceeding. Read all instructions.



Connect red lead to battery positive, black to negative. Plug charger into AC power. The charger will display the profile it is set to, and the LED will flash red. By the descriptions, verify it matches your battery type. If not, disconnect a battery lead, and go to programming section.



After displaying the profile for a few seconds, the LED will turn solid red, and display 02 on a discharged battery. The time it spends there depends on how deeply discharged it is, it may be hours before it starts to move higher.



As the cycle progresses, the display indicates the progress. Here the cycle is 34% complete.



When the cycle is 80-82% complete, the LED turn yellow.



Shortly after the cycle reaches 99%, the cycle terminates and displays CC "Charge Complete". The LED will be solid green if the charger shuts off, or it will flicker, if set to maintain. The flickering is the charger regulating on and off.

- **NOTE:** The charger can be left on in the maintain mode indefinitely without harm to the batteries.
- Remember, the percent of charge showing on the display refers to the progress of the charge cycle, not the capacity of the battery(s).
- Any time during the cycle the "BATTERY VOLTAGE" button may be pushed for a reading. On units where the voltage is over 100, add a 1 in front of the two numbers
- On units having a fan, do not operate the charger if the fan does not come on at start up.

OTHER DISPLAYS: See trouble shooting section for further explanation



When AC power is applied, but the charge leads are not connected to the battery, or if connected reverse, A red/green alternating LED.



Error is displayed at the end of a cycle and a green/yellow alternating LED if a minimum voltage is not reached in the time given. See trouble shooting for more info.



If your charger is programmed for Lithium Ion batteries the display will read "FC" Final Charge instead of 80%

To discontinue charging, unplug AC power.

### EQUALIZATION:

When using multiple batteries in a series string, cells become uneven during charge and discharge cycles. At least once a month perform two charge cycles back to back, this will give a chance for cells that are lagging behind to catch up, and is important to overall battery performance. NOTE: This only needs to be done when using **F2**, **F3**, **F4**, settings, and a gassing/absorption setting of **d0** or **d2**.

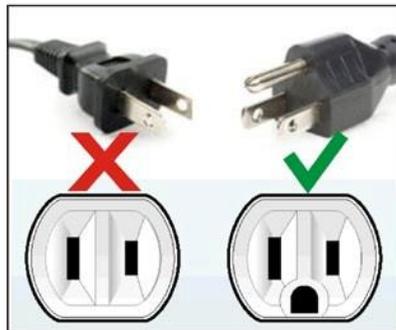
**⚠ SAFETY INFORMATION AC WIRING:**

Before making AC connections, refer to the requirements on the charger ID label. If your charger is not equipped with an AC plug, *for example, a 230 volt charger*, have a qualified electrician install one.

To reduce the risk of fire, use this charger only on branch circuits that are protected by a circuit breaker or fuse, and that are adequate to carry the power drawn by the charger. All wiring should be in accordance with the National Electric Code, ANSI/NFPA 70, and all local codes and ordinances.

This battery charger must be grounded to reduce the risk of electric shock. 117 volt chargers are equipped with a grounding type plug,

230 volt chargers are shipped without a plug. Have a qualified electrician install a properly grounded 3 wire plug.



**DO NOT USE THIS CHARGER ON A TWO POLE UNGROUNDED OUTLET OR ATTEMPT TO BREAK OFF THE GROUND PRONG FOR USE ON A RECEPTACLE OR EXTENSION CORD NOT HAVING A GROUND.**

If an extension cord must be used, make sure it is in good condition. Use a three conductor cord no smaller than the size being used on the charger, and keep it as short as possible. The use of an improper extension cord could result in a risk of a fire or electric shock. Locate all cords so that they will not be stepped on, tripped over, or otherwise subjected to damage or stress.



### OTHER SAFETY INFORMATION

Do not use charger if it shows signs of physical stress, or if DC output leads or connector feel hot when used.

Do not disconnect the DC output clamps, or connector from the batteries when the charger is on. The resulting arcing could cause the batteries to explode.

Failure to unplug AC power before moving or driving equipment will result in damage to cords, plugs and receptacles.



### BATTERY SAFETY & CARE INFORMATION

Always wear protective eye shields and clothing when working

with batteries. Batteries contain acids which can cause bodily harm. Do not put wrenches or other metal objects across the battery terminal or battery top. Arcing or explosion of the battery can result. Do not wear jewelry when working around batteries. Arcing can cause severe burns.

The tops of the batteries and battery hold downs must be kept clean and dry at all times to prevent excessive self discharge and flow of current between the battery post and frame.

With wet cell batteries, maintain the proper electrolyte level by adding water when necessary. Never allow the electrolyte level to fall below the top of the battery plates. Electrolyte levels fall during discharge and rise during charging. Therefore, **to prevent**

**the overflow of electrolyte when charging, add water only after the batteries have been fully charged, or just enough to cover the plates if discharged.** Old batteries require more frequent additions of water than do new batteries.

Do not over discharge batteries. Excessive discharge can cause polarity reversal of individual cells resulting in complete battery failure. Re-charge batteries as soon as possible after a deep discharge, but not if they are warm, allow a cooling down period.

Provide adequate ventilation when charging batteries. Chargers can ignite flammable materials and vapors. Do not use near fuels,

grain, dust, solvents, or other flammables.

Do not charge batteries in excessively hot temperatures; wait till the cool of the evening.

#### **PRE CHARGE INFORMATION:**

Mount the charger in the desired location. Allow space for the

charger to dissipate heat, it will get hot while in use. Do not seal the charger in an air tight compartment. Do not cover the charger with any material. **NOTE:** The OB models are *NOT* water proof, they are water resistant. This means they cannot withstand immersion, or continuous exposure from pressure washers, or heavy rain.



Connect the red charge lead to battery positive, black to negative. But before, make sure the battery pack is of the same voltage rating of the charger. If you are unsure, count the number

of cells on the battery pack and multiply by two. This figure should be the same as the DC voltage rating of the charger. (*see ratings label on charger*) Charging a battery with a lower voltage rating than the charger will cause damage to batteries, charger, and can create an explosive atmosphere.

#### **DRIVE LOCKOUT OPTION:**

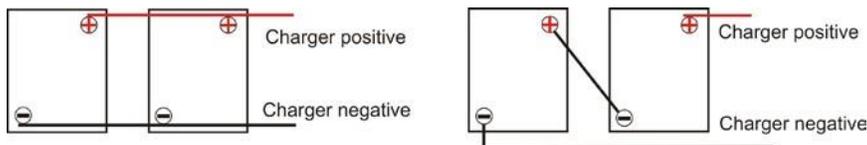
If your charger has an extra pair of small wires with a connector,

spade terminals, or just bare wires, it has this option. These wires connect to your equipment if it has this feature. The purpose is to disable the drive mechanism of the equipment when the charger is plugged in so it cannot be moved and cause damage to the AC cord and receptacle. **These wires do not have to be connected for the charger to work.**

 Make sure the AC cord, DC output leads, terminals, connectors, or clamps are all in good working condition. Do not use the charger if there are any signs of stress or damage, or if

wires are cut or have damaged insulation. Using this charger with any of these symptoms could result in a fire, property damage, or personal injury. Have a qualified service person make the necessary repairs. Repairs should not be made by people who are not qualified.

Illustration of series and parallel battery connections:



### Parallel

When batteries are connected in Parallel the battery amp hour capacity is additive and the voltage remains the same.

*Example:* two 180 amp hour

12 volt batteries would equal

12 volts and 360 amp hour capacity

### Series

When batteries are connected in Series the voltage is additive and the battery amp hour

capacity remains the same.

*Example:* two 180 amp hour

12 volt batteries would equal

24 volts and 180 amp hour capacity

### **REPROGRAMMING:**

There are 5 charge profiles, and 5 programming adjustments that can be made to the profiles.

#### **The profiles are:**

**F1** is a single stage float profile generally used for gel and starting type batteries. There are no adjustments available to this profile.

**F2** is a two stage profile for deep cycle wet cell batteries. Bulk charging, a gassing cycle, then termination.

**F3** is a three stage profile for deep cycle wet cell batteries. Bulk charging, a gassing cycle, and maintenance.

**F4** is a three stage profile for AGM batteries. Bulk charging, absorption cycle, and maintenance

**F5** is for Lithium ion batteries and must be pre-programmed at the factory.

#### **The adjustments are:**

**d0** standard gassing/absorption cycle. Applicable to most applications

**d1** shortened gassing/absorption cycle. For frequent shallow discharging, or frequent recharging of batteries with very little discharge. Suitable for opportunity charging.

**d2** lengthened gassing/absorption cycle. For batteries requiring long gassing/absorption cycles. **US Battery**, and **Full River** are two brands that benefit from longer charge cycles.

**r0** when set to the **F2** profile, charge will terminate, and will not monitor the battery.

**r1** when set to the **F2** profile, charge will terminate, and the battery will be checked weekly, if the voltage falls to a predetermined

level, the charger will recycle and bring the battery(s) back up.

**To change the profile:** *Be firm and deliberate when pressing the button.* Disconnect one charge lead. Plug the charger into AC power. Press and hold the “Battery Voltage” button. The display will flash the current setting. Press the button repeatedly, and stop at the desired profile. The display will stop flashing and remember the setting. Unplug AC power, and reconnect the battery. When powered back up, the display will flash the changed setting, and the charge cycle will begin.

**To change the adjustments:** Follow the above procedure, except press the button twice to enter the **d** menu, press the button a third time and hold to set the display flashing and to make a change. To change the **r** setting, press the button three times to enter the **r** menu, then a fourth time, and hold to set the display flashing and to make a change. A reprogramming video is available at [quickcharge.com](http://quickcharge.com) on the Select-A-Charge pages.

### **TROUBLESHOOTING**

<b>Symptom</b>	<b>Cause</b>	<b>Corrective Action</b>
When plugged into AC power the LED flashes red/green, and a 0 on display.	Connected reverse to battery, or not connected to battery.  Break in DC cord, or connector.  Battery too dead to	Correct polarity, or connect to battery.   Have a qualified person make repair.
When plugged into AC power the display does not come on.	No AC power.	Check circuit.  Check extension cord for breaks or damage.

When I put a volt meter across the output of the charger there is no power coming out when I plug it in.	The charger must be connected to a battery to turn on.	
The batteries don't receive a full charge. On wet cells, the specific gravity will not rise to a full reading after the charge has completed.	The charger is too small for the battery.  The charge profile is not set correctly.  The cycle needs more time.	Check that the charger's output is about 10% of the amp hour rating of the battery.  Recheck the setting. If in doubt, contact us.  Set gas/absorption to <b>d2</b> .
On start up, the LED flashes red/yellow.	Charger and battery voltage mismatch.	Connect the charger to a battery(s) with the same voltage rating.

When powered up the LED is solid red with a yellow flash, and displaying 02.	The battery is very low, and the charger is in a slow charge phase until the voltage rises to a safe level before full turn on.	Leave connected, it may take hours, but if the voltage rises even a little bit, it should recover, and turn the charger full on. <i>(Do not allow your batteries to deep discharge, it is the number one cause of premature battery failure.)</i>
The charger blows it's fuse, or branch circuit fuse/circuit breaker as soon as it's switched on.	Charger is shorted.	Contact factory.

<p>The charger blows the branch circuit fuse/circuit breaker a short while after being switched on.</p>	<p>The branch circuit is too small.</p>	<p>Relocate charger to a branch circuit with a heavier rating, or remove other loads on the circuit.</p>
<p>Batteries use water, get hot, or smell.</p>	<p>One or more dead cells.</p> <p>Profile not set correctly.</p>	<p>Replace batteries. If charging in a series string, it is best to replace all the batteries rather than mix new with old.</p> <p>If shallow discharging, check that the gassing/absorption profile is set to <b>d1</b></p>
<p>After a full charge, the batteries die quickly</p>	<p>The batteries are sulfated.</p>	<p>Sometimes batteries can be recovered. Leave the charger on for some hours, if the voltage falls and the current begins to rise, it is a good sign they can recover under normal charging.</p>

<p>The cycle ends with Er showing, and a green/yellow flashing LED.</p>	<p>An incomplete cycle. The batteries did not reach minimum voltage requirements, and the charger bulk timed out</p>	<p>The batteries are too big for the charger. The batteries have defective cells, and cannot make minimum voltage.</p> <p>NOTE: An occasional short cycle is not a problem. Just unplug the charger and plug back in to complete the cycle.</p>
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## **QUICK CHARGE SCO Battery Charger**

### **“LIMITED WARRANTY”**

Quick Charge Corporation warrants the SCO line of chargers for three (3) years from the date of purchase. After the warranty period, chargers returned to the factory for repair will be charged a minimum rate of \$25.00. Charger will be returned, freight and repair charges, C.O.D. unless other arrangements have been made. This warranty covers all defects in manufacture and

performance, provided the unit is operated in compliance with manufacture's operating instructions.

For repairs to be made at the Quick Charge factory, a charger and/or component(s) should be sent, freight prepaid to Quick Charge at:

Quick Charge Corp.

1032 S.W. 22nd St. Oklahoma City, OK. 73109

Quick Charge, will at it's option, repair or replace the charger or component in question. The repaired item will then be returned, freight prepaid by Quick Charge. This warranty is void if the charger or component have been altered, changed, or repaired by anyone not authorized by Quick Charge, or if the charger or component, have been subjected to misuse, negligence, or harsh environmental conditions. (Except those chargers designed for such conditions)

If returning the charger to the factory is not practical, replacement parts may be shipped to the customer for field repair at no charge. On parts such as circuit boards, the customer will be required to return the board suspected to be defective to Quick Charge, freight prepaid. If such defective parts are not returned, the customer will be invoiced for the repair parts. Field repairs are made at the user's own risk. "Authorization" by Quick Charge to repair refers to maintaining the warranty only. Quick Charge assumes no responsibility or liability for field servicing, and shall not be responsible for incurred travel or labor charges.

Quick Charge corporation shall not in any event be liable for the cost of any special, indirect or consequential damages to anyone, product or thing. This warranty is in lieu of all other warranties expressed or implied. Quick Charge neither assumes nor authorizes any representative or other person to assume for us any liability in connection with the sale of this product.