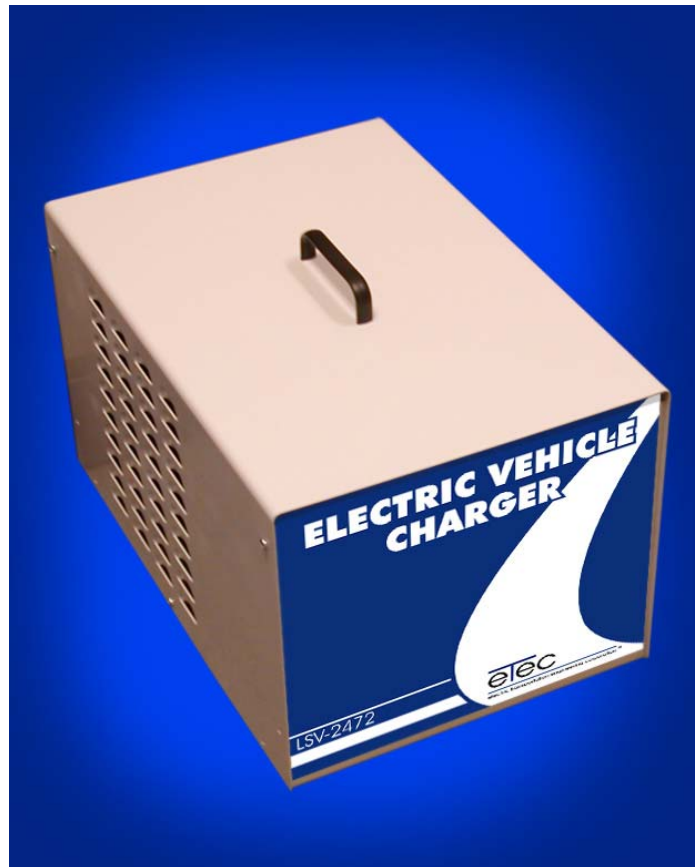




LSV-2472 Operations Manual



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1.0 INTRODUCTION

The eTec LSV-2472 battery charging system is designed as a portable, light-weight charging station to satisfy the overnight charging requirements of low speed electric vehicles.

The eTec LSV-2472 charger has been specifically designed for low speed electric vehicles to optimize the charging efficiency and maximize useful range and battery life. Utilizing the charger with the recommended charging algorithm for the batteries will ensure an extended battery life as well as superior charging every time.

This guide provides all the necessary instructions for installing and operating the eTec 2kW charger for use with your low speed electric vehicle. Please follow these instructions in the order in which they are presented in this guide.

Special warnings and precautions are included in section 2.0 and throughout this guide. Please observe them in detail to avoid personal injury and damage to the equipment.

Prior to installation, unpack the charger and position it in a well ventilated area. Thoroughly read and understand these instructions and any **DANGER, WARNING,** and **CAUTION** markings posted on the charger before installing, operating, maintaining or servicing this product.

These instructions do not purport to cover all details or variations in equipment, or to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's

purposes, the matter should be referred to eTec.

The contents of this Install and Operating Guide shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of eTec. The warranty contained in the contract between the parties is the sole warranty of eTec. Any statements contained herein do not create new warranties or modify the existing warranty.

Technical Support

In the event that the user encounters difficulties operating the charging system, please contact an eTec technical representative:

eTec

**electric transportation engineering
corporation**

430 S. 2nd Ave.

Phoenix, AZ 85003

Ph: 602-716-9576

Fax: 602-256-2606

e-mail: service@etecevs.com

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2.0 WARNINGS AND PRECAUTIONS

Symbols Used in This Guide



NOTE

This symbol indicates information about the product or the respective part of the user guide that must be observed for proper equipment use or functioning.



CAUTION!

This symbol indicates that minor personal injury or material damage can result if the prescribed precautions are not followed.



DANGER! SHOCK HAZARD

This symbol indicates death; severe personal injury or substantial property damage can result if proper shock hazard precautions are not taken. The charging circuits operate at high amperage levels.

TO PREVENT SHOCK HAZARDS

Before Applying Power to the System:

Check all components for damage, and check to ensure that there are no loose or disconnected wires, cables or mechanical connections.

Do NOT disassemble the equipment. Call a qualified service person when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.

Use of an attachment not recommended or sold by eTec may result in a risk of fire, electric shock, or injury to persons.

In the Event of a Malfunction:

Do not disassemble the equipment. Call a qualified service person or an eTec technical representative when service or repair is required. Incorrect reassembly can result in a significant risk of electric shock or fire. Unauthorized servicing of the equipment may result in voiding of the product warranty.

3.0 INSTALLATION

Hazardous voltages are present in this electrical equipment during operation. Failure to observe the safety instructions can result in severe personal injury or property damage.

The successful and safe operation of this equipment is dependent on proper installation, operation, servicing and maintenance.

3.1 Environment

The eTec LSV-2472 charger has been designed and built as an indoor charger. The charger should not be operated outdoors for this reason. Operation should be done in a large, well ventilated room free of excessive dust and excessive moisture. Failure to follow these instructions can result in equipment damage and bodily harm.

Place or locate the charger such that airflow from the vent fan is not obstructed.

3.2 AC Power Cord



DANGER! SHOCK HAZARD

Hazardous voltages are present in this electrical equipment during operation. The equipment should be disconnected from the

supply before any work is performed. Otherwise, it shall be observed that live electrical components (at hazardous voltage levels) are exposed, which presents a shock hazard.



CAUTION!

To reduce the risk of fire, use only circuits provided with at least 15 amperes branch circuit protection in accordance with the National Electrical Code, ANSI/NFPA 70.

Only professionally trained, qualified personnel should attempt to repair this equipment. There are no user serviceable parts inside the unit.

The LSV-2472 charger is factory-set at 240VAC, 60Hz single-phase input with the required minimum of a 15 amp dedicated circuit.

3.3 DC Output/Vehicle Connector

The LSV-2472 charger is equipped with a 6-foot-long cable for placement in the low speed electric vehicle fast charge receptacle. The cable should be stored such that nothing rests directly on top of the cable and it is not near any sharp edges which may slice or otherwise damage the cable sheathing. Failure to follow these guidelines can result in equipment damage and severe personal injury.

4.0 Operation Procedures

Proper care must be taken when operating any battery charger. Although many safeguards are in place to prevent electrical shock, proper care must always be taken when operating this equipment.

If for some reason the charger is not operating correctly during usage, immediately unplug the AC power cord from the wall and then unplug the DC power cord from the low speed electric vehicle. This sequence of powering the unit off will better protect against accidental electrocution.

Before every use of this product, inspect the cables for any excessive wear or cuts in the cable sheathing. Verify that the AC cable prongs are straight and secure, and verify that the charging plug is free of debris. If any of these conditions are not met, immediately discontinue use of this product and contact eTec for customer service.

This charger is intended for indoor use only, this equipment is rated for temperatures up to 120° Fahrenheit.

4.1 Battery Charging

To begin, place the charger near the low speed electric vehicle charge receptacle, leaving room for free air flow from the vent fan. Ensure that enough room is allotted for the DC cable to easily reach the charge receptacle without straining the cable and that there is no tension on the cable between the receptacle and the charger.

Next, plug in the AC power cord to the previously specified wall outlet. Make sure that there is no tension between the plug and the charger and that the cable hangs securely from the wall.



Figure 1

Making sure that the slotted portion of the connector is correctly oriented to the fast charge receptacle, insert the DC output cable into the vehicle's fast charge receptacle. The plug should fit easily into the receptacle and should require minimal force to plug in. Figure 1 illustrates the proper plug orientation for insertion into the vehicle charge receptacle.

If the cable does not easily insert into the fast charge receptacle once again check for the proper cable orientation; do not force the plug. If it still does not easily fit into the charge receptacle consult the troubleshooting portion of this manual for further steps.

Once the plug is inserted into the receptacle, ensure that there is no cable tension between the charger and the vehicle receptacle and that the cable is fully seated into the receptacle.

Immediately after connecting the charger to the vehicle, the cooling fan should begin blowing air out of the unit, and the ammeter should begin displaying measurable current within 1 minute. If one or both of these events do not happen immediately unplug the AC cord from

the wall and check the troubleshooting portion of this guide for help in determining the cause of this problem.

The LSV-2472 will charge the batteries according to the specialized charging algorithm and progress can be tracked via the ammeter. When the charging cycle is completed, the charger current will drop to zero. At this point, unplug the AC cord from the wall and then remove the DC cable from the vehicle. The charger can remain connected to the vehicle for an extended period of time to maintain a full charge on the battery. Note that the charger cooling fan will remain on during the entire time the charging plug is connected to the vehicle.

4.2 Post Charge Charger Operation

After a complete charging cycle has been completed, the LSV-2472 will periodically check the batteries to ensure that a full charge is being maintained. The charger may periodically turn back on to return some amount of lost charge (primarily due to parasitic vehicle loads and self discharge).

In order to maintain the highest possible state of charge of the battery system, it is always best to keep the charger plugged in when the vehicle is not in use. The periodic charging after the charge cycle completion ensures that the battery is as fully charged as possible and ready to use.

The charger can be disconnected from the vehicle at any point during the charge event as needed. This will not cause harm to the charger or to the vehicle. However, it is important to charge the vehicle to full on a regular basis; at least once per week. Every charge event includes a low-current finish

charge that may last up to two hours, extending the full charge time to 10 hours or more. This equalizing charge is an essential part of maintaining battery health and long life.

5.0 Charger Maintenance

The LSV-2472 charger has been designed as a maintenance- and hassle-free unit. Prior to every use, though, it is imperative that the user check both of the charging cables for excessive wear and tear.

Prior to use and with the charger unplugged the DC cable should have the rubber sheathing inspected for any cuts or abrasions. If any cuts or abrasions are present immediately discontinue use of the charger and contact eTec for customer service. Secondly, the DC plug should be inspected to verify that the contacts are clear of obstructions and that the rubber molding is free of any cracks or deformations. If there are any obstructions in the DC cable consult the Troubleshooting portion of this manual or contact eTec for customer support.

The AC cable should also be checked prior to use. Before plugging in the AC cable, verify that the rubber sheathing is free of any cuts or abrasions. If any cuts or abrasions are present discontinue use of the charger immediately and contact eTec for customer service. Secondly verify that the AC plug contacts are secured to the plug and not bent. Checking these two cables before every use will ensure safe use and ensure against product damage.

6.0 Troubleshooting

Symptom	Possible Cause
When I plug in the charger I do not see the charger current rise and the fan does not work.	<ol style="list-style-type: none"> 1. The cable may not be fully seated in the charge receptacle. Try reseating the plug into the vehicle. 2. Verify that the A/C receptacle has the proper voltage for the charger.
The charger will charge the batteries but the fan does not turn on.	<ol style="list-style-type: none"> 1. The cable may not be fully seated in the charge receptacle. Try reseating the plug into the vehicle. 2. Check the loop back wire between pins 3 & 4 on the charging receptacle
The fan turns on but no current is delivered	<ol style="list-style-type: none"> 1. Check for 24VAC between pins 1 & 2 on the charging plug with the charger plugged into the AC receptacle 2. Verify that the A/C receptacle has the proper voltage for the charger.
After plugging in the charger the charger will suddenly stop charging and the fan will turn off as well.	<ol style="list-style-type: none"> 1. Verify that the circuit breaker for the AC circuit is of the proper current for this charger. Also make sure that no other equipment is attached to the same circuit. If both of these conditions are met unplug the charger and contact eTec for customer support.
The A/C plug will not fit into the wall outlet.	The charger is delivered with a typical A/C plug for a 220VAC, 15A circuit. Other receptacle configurations are available. Check with a local electrician to replace the wall receptacle, the charger plug or both. Ensure that the circuit is properly sized for the charger load
The DC plug will not fit into the Electric Vehicle charge receptacle	<ol style="list-style-type: none"> 1. Verify that the plug is properly oriented. A keyed divot should be facing up when inserting the plug into the charger. 2. Unplug the charger completely and inspect the DC charger cable and the charge receptacle for damage or obstructions. If any damage is present on the DC charging cable contact eTec immediately for customer support.
During charging the fan will turn off or the fan does not turn at all.	If after checking to make sure that the DC cable is secure the fan still does not work unplug the charger and contact eTec for customer support.

For Service Call the ETEC Service Hotline at 1-888-383-2387