



*ELECTRIC VEHICLES*



## Owner's Manual and Service Guide

### **U-Series:**

**48U-2-DC-ADS, 72U-2-AC, 48U-HA1-DC-ADS (Cab by Curtis)  
and 72U-HA1-AC-ADS (Cab by Curtis)**

Thanks for buying the Star EV U-Series. This manual contains information you will need for proper operation, maintenance, and care of your U-Series. A thorough understanding of these simple instructions will help you to obtain maximum enjoyment from your new Star EV.

If you have any questions about the operation or maintenance of your U-Series, please consult your Star EV dealer.

Read and understand this manual completely before operating your Star EV.

This manual should be considered a permanent part of your U-Series and should remain with the vehicle when lending or resold.

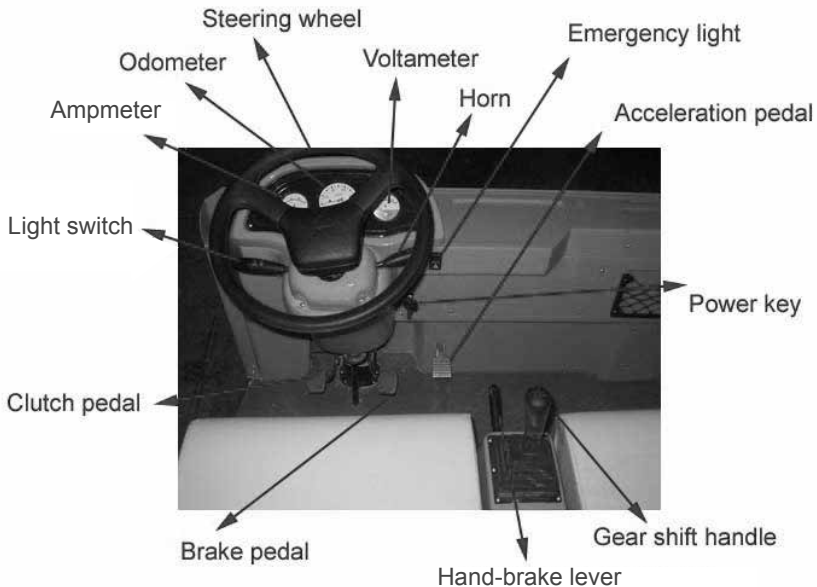
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# 1: Vehicle Specifications

	48U-2-DC-ADS	48U-HA1-DC-ADS (Curtis Cab)	72U-2-AC	72U-HA1-AC-ADS (Curtis Cab)
<i>Passengers</i>	2			
<i>Battery System</i>	Eight 6 V batteries, Trojan T-105		Twelve 6 V batteries, Trojan T-105	
<i>Motor Power</i>	6.7 hp Advanced DC motor		10 hp AC motor	
<i>Controller Power</i>	350 A Curtis programmable controller		550 A Curtis programmable controller	
<i>Top Speed</i>	19.5 mph (20-25 mph if street legal)			
<i>Total Load Capacity</i>	2200 lbs	2200 lbs	2200 lbs	2200 lbs
<i>Dimensions</i>	137" x 55" x 76" (L x W x H)	137" x 57" x 74" (L x W x H)	137" x 55" x 76" (L x W x H)	137" x 57" x 74" (L x W x H)
<i>Box Dimensions</i>	83" x 54" x 10" (L x W x H)			
<i>Weight w/ Batteries</i>	2050 lbs	2460 lbs	2300 lbs	2710 lbs
<i>Ground Clearance</i>	5"			
<i>Turning Radius</i>	13 ft			
<i>Wheel Base</i>	67"			
<i>Top Climbing Grade</i>	20%			
<i>Body Material</i>	Steel			
<i>Front Suspension</i>	Independent, coil over shock			
<i>Rear Suspension</i>	Leaf spring and shock			
<i>Steering System</i>	Rack and pinion			
<i>Brake System</i>	Four-wheel hydraulic			
<i>Tire Size</i>	155R12C, 8-ply DOT			
<i>Tire Pressure</i>	65 psi			
<i>Wheel Type</i>	12" steel			
<i>Cab</i>	Open cab with canvas top	Solid doors with slide-open windows	Open cab with canvas top	Solid doors with slide-open windows
<i>Windshield</i>	Plexiglass	AS1, DOT automotive windshield	Plexiglass	AS1, DOT automotive windshield
<i>Drive Train</i>	Direct rear drive			
<i>Voltage Reducer</i>	20 A, 48 V to 12 V reducer included		20 A, 72 V to 12 V reducer included	
<i>Warranty</i>	One year bumper-to-bumper warranty, less wear items Two year Trojan battery warranty, based on date code			

## 2: Controls



*Power key:* Controls the power supply of the whole vehicle. When the key is inserted into it and turned clockwise, it will switch on the lights, horn, and the control system; when the key is turned back, the power will be switched off.

*Acceleration pedal:* Controls the speed. It should be depressed slowly. The vehicle speeds up with the gradual stepping-down, and reaches the full speed when the pedal is stepped to the bottom. The vehicle slows down when the pedal is released gradually. When the pedal is fully released, electric brake works.

*Brake pedal:* Decelerate or park the vehicle.

*Hand-brake lever:* Parks and brakes the vehicle.

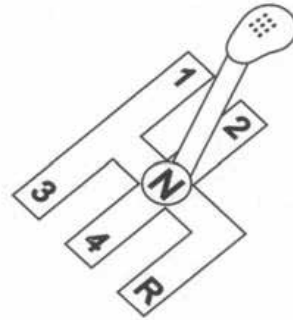
*Steering wheel:* Controls the driving direction.

*Light switch:* Controls light system, including turning signals and headlight (includes high beam and lower beam).

*Ampmeter:* Indicates the current of the working vehicle.

*Voltameter:* Indicates the voltage of the battery. It ranges from 20V to 60V from left to right, including 3 sections highlighted by Red, Yellow and Green. Green represents the battery is full in capacity. With the consumption of the power, the indicator will fall from the right to the left gradually.

*Gearshift:* There are a total of totally 5 positions. Forward shift includes 1,2,3 and 4. Reverse shift is R. It is recommended to use 1 for climbing an incline, and to use 2 and 3 for flat roads. It is not recommended to use 4 for driving.



### 3: Operational Process

1. Switch on the power key;
2. Step the clutch pedal to the bottom, select the right shift and make sure to use right speed when driving. Selection standard is to make sure that the working current of motor stays as small as possible as long as this current is enough for driving.
3. Release the brake pedal.
4. Release the clutch pedal slowly.
5. Step down on the acceleration pedal smoothly, in this case, the vehicle starts running.

**WARNING:** If you step down the acceleration pedal before switching on the power key, the car will not run. In this case, you should release the acceleration pedal first, and step it down again, then the vehicle will start running.

## ***Rules for Safe Operation***

The driver should have a good knowledge of the operation system of the vehicle and its features, and follow the rules for safe operation as stated below:

- **WARNING:** Drive the vehicle off road unless it is allowed.
- The vehicle cannot be over-loaded, otherwise the motor will be damaged, the vehicle will lose control and its life will be shortened.
- Unqualified persons are prohibited to drive the vehicle.
- Make sure this vehicle run in its rated climbing ability.
- Don't overtake other vehicles at crossroad, in blind area or in other dangerous zone.

## 4: Maintenance

### ***Battery Maintenance***

1. The exterior of the battery, the connection wires and bolts should always be kept clean and dry. If there is any electrolyte, it should be wiped off with clean cotton cloth, then it should be rinsed by clean water and made dry. **WARNING:** During this process, water is prohibited to enter the battery, otherwise, the battery will be damaged.
2. The battery must be kept in good connection. The tightening nuts for the wiring connection should be checked frequently to see if any nuts have become loose; loose nuts will result in sparks or burnt terminals.
3. Never connect the positive pole to the negative pole directly. Otherwise, it will result in short circuit, and damage the battery.
4. After discharging (despite of the time it has run and the mileage it has run), the battery must be recharged on the same day. Never postpone recharging more than 24 hours, otherwise the life of the battery will be impacted.
5. During the use of the battery, the liquid density will increase and the liquid volume decreases due to the evaporation and electrolysis of water in the electrolyte (especially in summer). Therefore, the battery should be checked periodically and the electrolyte should be added. At the end of recharging, adjust the density of electrolyte to a density of  $1.280 \pm 0.005$  (25 °C) by distilled water or dilute sulphuric acid with a density of 1.400 special for lead-acid battery; in this case, the added liquid cannot exceed

- the rated volume as specified on the battery. After this adjustment, the battery should charge for half to 1 hour to make the electrolyte uniform.
6. No foreign matter should enter the battery. Keep watering instruments clean to prevent any foreign articles from entering the battery.
  7. The driver should estimate the mileage left to guarantee that the battery has enough power to make this vehicle return to be recharged; otherwise, the battery will be over-discharged, and its life will be shortened.
  8. If the vehicle is being stored long-term, the batteries should be fully recharged before being stored. Fully recharge the batteries once every month while in long-term storage.
  9. While charging, the vehicle shall be parked in a ventilated place with the battery cover open to avoid any accident.
  10. After recharging, close the battery cover.
  11. The life of a lead-acid battery is over one year. Toward the end of its life, the battery capacity will shrink dramatically, in this case, a new battery should be used. Only Trojan batteries of the same capacity and voltage can be used in the group.
  12. Recharge the batteries once each month to make the electrolyte uniform.

### **Notes for the Use of the Charger**

The charger has an automation-oriented design and easy operation.

- Connect the power plug to a power of 110V ~ 60Hz.
- Connect the output plug to the battery.
- When above procedures have been finished, the POWER light turns on, which indicates that the output and input are in good connection. When battery is being charged, the WORK Light turns on, which indicates that the power output is satisfactory, and the charger starts working.
- There are three indicators showing how much has been charged, and the charger will power off after the battery has been fully charged.
- The charger case is prohibited to be opened during charging.
- Only an authorized electrician is allowed to open the charger's box.
- The charger should be placed in safe and dry atmosphere with good ventilation.
- During charging, the charger will switch off automatically as self-protection once the voltage does not stay within 90V-120V. The alarm light will switch on to remind the user. The charger will recover once the voltage comes to the range of 90V-120V.



## Transmission Maintenance

1. The clearance for the clutch should be kept between 2-3mm.
2. The friction plate should be changed periodically, the friction value on one side should not exceed 2mm.
3. Adjust the flatness of the platen spring plate (feeling manually): first tighten the screws diagonally, use your hand to check the flatness of the spring plate. If not flat, tighten the screws for the non-flat part.
4. Change the gear oil periodically (half year) inside the transmission case, the kerogen is 85W/90GL.
5. **WARNING:** Never mix different oils.

## Motor Maintenance

1. This traction motor is designed to use at the sea level not beyond 1200 meters and in a temperature between -25 °C and 40 °C.
2. Never keep the motor running idly.
3. No explosive gas shall exist in the air.
4. Any mud, sand and other clinging objects shall often be cleaned away so as to provide good heat-radiation.

### Trouble-Shooting for Motor

Symptoms	Possible Causes
All copper plates turn black.	The pressure of brush is incorrect.
The commutators turn black in a certain order and in groups.	Short circuit inner commutators or on the armature coil; poor welding or disconnection between the commutators and the armature coil.
The commutators turn black in disorder.	The central line of the commutator deviates or its surface is not round and not smooth.
The brush wears out or is broken.	The motor vibrates; the clearance between the brush and its holder is too big; the clearance between the brush and commutators is too big; the mica between different commutators extrudes; the brush is made with wrong materials; the brush is wrong in type.
Motor sparks.	The motor is over-loaded; the commutators are not clean, not round or not smooth; mica or some commutators extrude; the brush is not ground properly; the brush is incorrect in pressure; the brush is wrong in type; the brush is jammed in the brush holder; the brush holder become loose or vibrating; the polarity and sequence of magnetic poles is incorrect.
The brush and its wires get hot.	Sparks of the brush; poor contact between brush and soft wires; small section area of soft wires.
The brush is noisy.	The surface of the commutators is not smooth.

# Speed Controller Maintenance

The speed controller of the car is wholly imported, which adopts high frequency MOS technology to realize the speed, torque and brake control with smoothness, silence, and high efficiency.

## Periodic Maintenance

- Check if the contact between contacting point of the contactor is in good condition, check if any contact sticks or is jammed mechanically.
- Check if the micro switch in the accelerator can be switched on and off properly.
- Check if the switch for turn signal can be switched on and off properly.
- Check if all the connections between the motor, the battery, and the controller are in good condition.

**NOTE:** All above checks shall be performed under power off. Above checks shall be carried out once every 3 months; after the power key turns off, the wave-filter capacitor in the controller unit should keep discharging for a few minutes more; don't wash the electrical parts with water. Remove dust with a brush or high-pressure air.

## Trouble-Shooting for Controller

Symptoms	Possible Causes
The vehicle cannot be started.	The controller has no power: <ul style="list-style-type: none"> <li>• There is something wrong with the battery or wire connections.</li> <li>• The fuse of power connection is burnt.</li> <li>• The resistance for pre-charging is broken.</li> </ul>
	No signal is transmitted to the controller: <ul style="list-style-type: none"> <li>• The power key is damaged or its wiring become disconnected.</li> <li>• The accelerator of the pedal is damaged.</li> <li>• There is something wrong with acceleration pedal</li> <li>• The polarity diode is broken or has short cut.</li> <li>• The green wire connecting the acceleration pedal and the controller KSI is disconnected</li> </ul>
	The contacting point of the contactor sticks.
	The controller of the motor is damaged.
The vehicle can only move forward and cannot be reversed, or vice versa.	The switch is damaged.
	The inserts on the commutators are loose.
	The commutators are damaged.

## ***Lubrication***

- Use 901 car brake oil DOT3 as brake oil,
- Use 1L of 85W/90GL lubrication oil for transmission case.
- Use 1L of 90GL hypoid gear oil for the rear axle.
- Lubrication points: steering gears, horizontal bars, steering ball joints, bearings.

## ***General Maintenance Notes***

- Front parking brake should be released to its bottom to avoid any damage on the brake plate.
- The lubricant for rear power assembly must be applied and changed as per user's manual.
- The brake system must be adjusted once every 3 months.
- The electricity system must be checked once every 3 months (especially main circuit) for its fastening parts and wiring connections. Meanwhile the contactor should be checked, any defective parts should be replaced immediately. Its dust should be cleaned by low pressure air.
- The electric contactors easily become hot if their mutual contact is not in good condition, so special attention should be paid regularly to the electric contactors.
- When changing the fuse, make sure that the new fuse is right in rated current.
- For the sake of safety, disconnect the positive pole from the battery when maintenance is done.
- Never step the accelerator hard and frequently, which may shorten the life of the controller.
- It is prohibited to fill any other liquids (such as battery additives, mineral water and tap water) into the battery, ONLY the distilled water is allowed to fill in the battery.

This manual tries to be as sound and elaborate as possible in literal and figurative description as well as technical description on the basis of existing data. At the same time, JH Global reserves the right to alter the content of this manual and this manual is subject to change without prior notice; in addition, JH Global has the final say on the interpretation of this manual.

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