MASSIMO
ELECTRIC

MEV Electric Cart Owners Manual

Please read this manual before operating this vehicle to avoid any possible damage due to improper operation. Store this manual in a safe location for future reference.

Important Information:

Important manual information is shown in the following way:

Warning!

Failure to follow Warning instructions could result in severe injury or death to the vehicle occupants, bystanders or persons inspecting or repairing the vehicle.

Caution!

Failure to follow Caution instructions could cause damage to the vehicle.

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1. Brief Introduction

The Massimo Electric MEV Series is designed for low speed use and operation.

2. Technical Description

Model	2+2 cart	4+2 cart
System voltage	48V	48V
Motor	5KW	5KW
Seats	4	6
Max. Speed	25mph	25mph

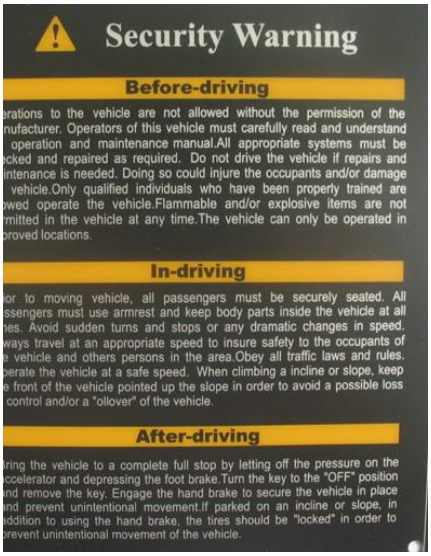
3. Important Labels

Safety and Instruction Labels.

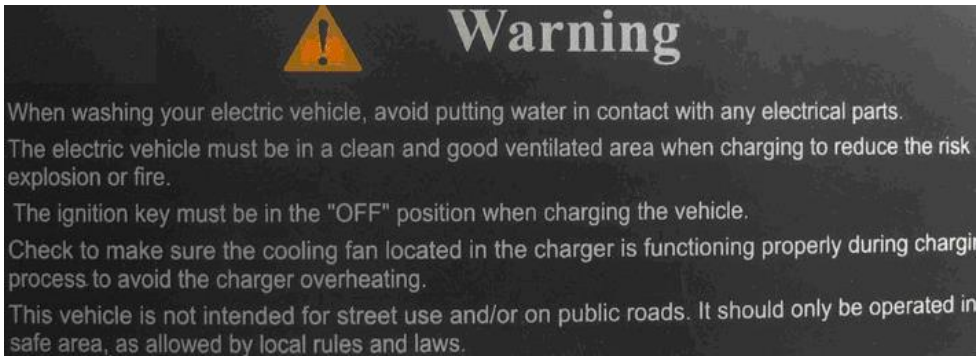
Warning!

Please read the following labels carefully before operating the vehicle, and promptly replace any labels which become unreadable or removed.

1) “Security Warning” label under the dashboard:

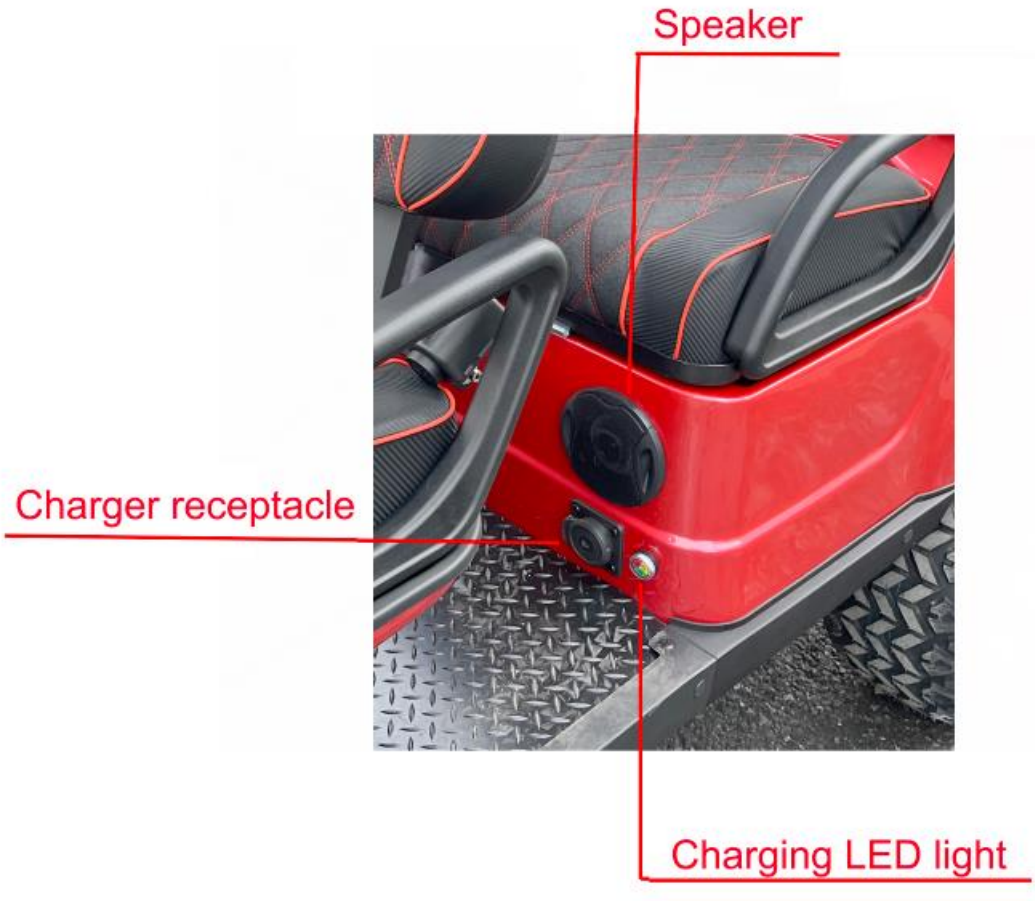


2) “Warning” lable under the dashboard:



4. Operation System

1) Schematic Figure of Operation System



2) Functions of Operating System

Power key

The power key is used to switch on the electrical system of the cart.
To engage the motor and drive the cart, Insert the key and turn it clockwise to the ON position.
To engage the 12V accessory system (including the headlight, turn signal, taillight, brake light and horns) at the

same time driving the cart, turn the key clockwise to one more position of LIGHT.
To switch the power off, turn the key counterclockwise to OFF position.

Forward/reverse switch

This switch is a three-position switch, depressing the upper part gets the golf car move forwards while depressing the lower part gets the golf car move backwards, and the middle is neutral.
WARNING! This switch must be fully depressed into the proper position, or the electric system and motor will be damaged.
NOTE: the buzzer will beep when the lower part of this switch is depressed to give warning to the people around your cart.

Accelerator pedal

The accelerator pedal is used to control the speed to move the cart. Press it down slowly to increase the speed. The car will speed up with the gradual stepping down the accelerator pedal, eventually reaching the full speed when the pedal is stepped down to the bottom. The cart slows down with the lifting of the pedal. When the pedal is fully lifted, electric brake will function, and the cart will stop.

Brake pedal

The brake pedal is used in deceleration or stopping.
1）Effective braking force is around 30Kgf. The distance to step down the braking pedal is not more than 2/3 of the overall stepping-down distance of the braking pedal.
2）Effective parking force is around (200N) 20kgf. When the parking pedal is released to its free position, the parking function is released.
NOTE: the brake pedal is combined with the park brake pedal which will be elaborated as below.

Park Brake Pedal

The park brake pedal is used in braking for parking. The park brake pedal should be engaged into parking cart whenever the cart is left unattended: press down this pedal fully, then press the upper part of this pedal and release the lower part of this pedal to lock the park brake pedal into position. This operation will make the cart stay in parking position when this cart is unattended.
NOTE: If the park brake pedal fails to be locked in the lock position, please repeat above procedure until it is locked.

WARNING!
It is prohibited to step down both the brake pedal and the accelerator pedal all together, otherwise this type of operation will damage the motor badly.
WARNING!
The park brake will automatically release when the accelerator pedal is stepped down. If the power key is in ON position, stepping down the accelerator pedal may suddenly cause the golf car to move.

Steering wheel

The steering wheel is used to control the driving direction. Please avoid any sudden and big turning.

Turn signal/Horn switch

This switch is used to switch on/off the lighting system including headlight, front turn signal, rear turn signal, taillight, brake light and horn.
1) To pull Button A rightwards to switch on the headlight, reverse this operation to switch off the headlight.
2) To finger move upwards Handle Lever B to switch on the right turn signal.
3) To finger move downwards Handle Lever B to switch on the left turn signal.
4) The middle position of Handle Lever B is neutral.
5) To pull Handle Lever B towards the driver switches on the horn.

Digital Display:
It is for showing such information as battery power, speed, range, fault, light signal, fault, etc.

Charger receptable:
It is for charging the battery with the charger.

Charging LED light:
It is for showing the charging progress and status when the battery is being charged.

Emergency light switch:
It is for switching on or switching off 4 turn signal at the same time in case of emergency.

Speaker:
It is for playing music from the digital display.

5. Operational Process

5.1 Start the vehicle

1) Select Forward or Reverse from Forward/Reverse switch.
2) Switch on Power Key.
3) Release the Handbrake lever.
4) Step down Acceleration Pedal smoothly, in this case, the vehicle starts running.

Warning!

1) If you switch on Power Key first before selecting Forward or Reverse on Forward/Reverse switch, the vehicle will not run, in this case, please switch off Power Key, then select Forward or Reverse from Forward/Reverse switch, then step down Acceleration Pedal to start the vehicle.
2) If you step the acceleration pedal before switching on the power key, the vehicle will not run. In this case, you should release the acceleration pedal first, and step it again, thus the vehicle will start running.

5.2 Stop the Vehicle

1) Step Service Brake Pedal to decelerate the vehicle until it stops completely and shift Forward/Reverse switch to Neutral position;
2) Engage the handbrake lever to park the vehicle;
3) Release the service brake;
4) Switch off all lights;
5) Switch off the power key and take out the key.

Special Note:

PMSM controller and motor are used on this cart. Once this cart is stopped on a slope with the power ON and with no operation done on the accelerator pedal, this cart will be parked itself on the slope.

5.3 Charge the batteries

Caution!

1) The charger is a kind of build-in (on-body) charger. Before you use the charger, please read the charger operation manual which attached with the charger.

2) Explosive hydrogen gas is produced while battery is charged. Only charge the battery in well-ventilated areas.

3) Before using the charger, please check if the battery charger you are getting to use is correctly rated as per your local AC electricity network.

5) Do not disconnect the DC output cord from the battery receptacle when the charger is ON, otherwise an arc could occur which may cause an explosion.

7) It is prohibited to open the housing of the charger.

8) Only qualified electrician is allowed to open the housing of the charger.

9) The charger should be stored in safe and dry room with good ventilation.

10) The charger should be packed properly if not used for long time.

WARNING! When the car is being charged, the car cannot be moved. If you want to move the car, please unplug the charger first.

Below is the charging procedure:

- **Turn off the power of the whole vehicle:**

1) When it's non-onboard charger, one set of batteries, the process is as follows:
   a) Connect charger to DC receptacle on the vehicle;
   b) Connect the charger to AC power;
   c) Turn on the charger
   d) Turn off the charger when the batteries are fully charged, disconnect the charger from AC power first, then disconnect the charger with AC receptacle;

2) When it's non-onboard charger, two sets of batteries, the process is as follows:
   a) Disconnect the two DC receptacles under the driver's seat.
   b) Connect the chargers to the DC receptacles, one charger to one receptacles;
   c) Connect the chargers to AC power;
   d) Turn on the chargers;
   e) Turn off the chargers when the batteries are fully charged, disconnect the chargers with AC power first, then disconnect the chargers with DC receptacles;
   f) Connect the two DC receptacles under the driver's seat.

3) When it's onboard (build-in) charger(s), no matter there is one set or two sets of batteries, the process is as follows:
   a) Connect the charger(s) with AC power;
   b) Turn on the charger(s);

c) Turn off the charger(s) when the batteries are fully charged, disconnect the charger(s) with AC power;

6. Rules for Safe Operation

The driver should have a good knowledge of the operation system of the vehicle and its features; meanwhile follow the rules for safe operation.

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 runs in its rated climbing ability.
- Don't overtake other vehicles at crossroad, in blind area or in other dangerous zone.

WHILE OPERATING THE VEHICLE

- Keep your entire body inside the vehicle, keep seated and holding on while the vehicle is moving.
- Do not start the vehicle until all occupants are securely seated.
- Keep your hands on the steering wheel and your eyes on the path you are going.
- Always back the vehicle slowly and watch the back carefully.
- Avoid starting and stopping suddenly.
- Avoid turning the vehicle too sharply at high speed.
- Always drive slowly up and down on the slope.
- Do not make any modification or addition which may affect the capacity or safety.
- Children are not allowed to play in the vehicle. Children should be seated between adults and protected while the vehicle is moving.

7. Maintenance

Users should do maintenance as follows, which will decide the performance of the vehicle and life:

7.1 Maintenance of Battery:

Warning:

Battery electrolyte is poisonous and dangerous, may cause severe burns, injury, etc.. Always wear protective clothing, gloves, and goggles when handling batteries, electrolyte, and charging your battery.

KEEP IT OUT OF REACH OF CHILDREN.

1) Cleaning

a. The exterior of the battery, the connection wires and bolts should always be kept clean and dry. When

cleaning, please make sure all vent caps are tightly in place. Clean the battery top with a cloth or brush and solution of baking soda and water. When cleaning, do not allow any cleaning solution, or other foreign matter to get inside the battery. This should be done every week.

b. Clean battery terminals and the inside of cable clamps using a post and clamp cleaner. Clean terminals will have a bright metallic shine. This should be done when it is necessary.

c. Reconnect the clamps to the terminals and thinly coat them with petroleum jelly (Vaseline) to prevent corrosion.

Warning:

Before you disconnect any battery cable from any terminal on the battery, please always remove the power by disconnecting the main battery cable from the controller.

2) Checking the terminals and nuts

The connection of the battery should always be kept in good condition. Please check every week on whether any battery cable terminal or nut has become loose in order to prevent any sparkle or damage to terminals. Please check every week on whether any battery cable is damaged or not, the damaged battery cable should be replaced immediately.

3) No foreign matter

Do not place any objects on the battery and do not connect the positive pole to the negative pole. This may cause a short circuit, dangerous spark or may cause damage to the battery or injury to your body.

4) Recharging

a. As long as you use the vehicle, regardless of how long you have used it, the battery shall be recharged fully on the same day. Any delay on the re-charging will cause negative effect on the battery.

Notes: the lead-acid battery does not develop a memory, so need not be fully discharged before recharging.

b. If the vehicle is going to be kept unused for a certain long time, the battery shall be fully recharged first. After that, the battery shall be fully recharged every 2 weeks.

c. When driving, the driver shall be always aware of the drop level of the battery power from the battery power meter, any drop means the battery power is diminishing. Besides, the driver shall estimate the distance needed to be taken, and recharge the battery at a proper time in case that the vehicle cannot get back to the recharging station in time for recharging.

Warning:

Please make sure the battery is recharged before the battery power meter shows 20% power is left inside the battery. Over-discharged battery will have a very short service life and will make the recharging very difficult.

Warning:

During recharging, the vehicle shall be parked in a well-ventilated area with the fill caps tightly secured. Keep far away from any flame and sparks to avoid any explosion or fire that could cause physical injury or damage to the property.

During recharging, if the vehicle is with door, please always keep the door open.

During recharging, please always lift the seat bottom to keep the battery compartment open to the air.

5) WATERING

Flooded batteries need water. More importantly, watering must be done at the right time and in the right amount or else the battery's performance and longevity suffers.

Water should always be added after fully charging the battery. Prior to charging, there should be enough water to cover the plates. If the battery has been discharged partially or fully, the water level should also be above the plates. Keeping the water at the correct level after a full charge will prevent having to worry about the water level at a different state of charge.

Depending on the local climate, charging methods, application, etc.. It's recommended that batteries be checked once a month until you get a feel for how thirsty your batteries are.

Important things to remember:

1. Do not let the plates get exposed to air. This will damage (corrode) the plates.
2. Do not fill the water level in the filling well to the cap. This most likely will cause the battery to overflow acid, consequently losing capacity and causing a corrosive mess.
3. Do not use water with a high mineral content. Use distilled or deionized water only.

Warning: The electrolyte is a solution of acid and water so skin contact should be avoided.

Step by step watering procedure:

1. Open the vent caps and look inside the fill wells.
2. Check electrolyte level; the minimum level is at the top of the plates.
3. If necessary add just enough water to cover the plates at this time.
4. Put batteries on a complete charge before adding any additional water (refer to the Charging section).
5. Once charging is completed, open the vent caps and look inside the fill wells.
6. Add water until the electrolyte level is 1/8" below the bottom of the fill well.
7. A piece of rubber can be used safely as a dipstick to help determine this level.
8. Clean, replace, and tighten all vent caps.

Caution! Never add acid to a battery.

6) TESTING

Visual inspection alone is not sufficient to determine the overall health of the battery. Both open-circuit voltage and specific gravity readings can give a good indication of the battery's charge level, age, and health. Routine voltage and gravity checks will not only show the state of charge but also help spot signs of improper

vehicle, such as undercharging and over-watering, and possibly even locate a bad or weak battery. The following steps outline how to properly perform routine voltage and specific gravity testing on batteries.

I. Specific Gravity Test (Flooded batteries only)

1. Do not add water at this time.
2. Fill and drain the hydrometer 2 to 4 times before pulling out a sample.
3. There should be enough sample electrolyte in the hydrometer to completely support the float.
4. Take a reading, record it, and return the electrolyte back to the cell.
5. To check another cell, repeat the 3 steps above.
6. Check all cells in the battery.
7. Replace the vent caps and wipe off any electrolyte that might have been spilled.
8. Correct the readings to 80º F:

Add .004 to readings for every 10º above 80º F

Subtract .004 for every 10o below 80º F.

9. Compare the readings.
10. Check the state of charge using Table 1.

The readings should be at or above the factory specification of 1.277 +/- .007. If any specific gravity readings register low, then follow the steps below.

1. Check and record voltage level(s).
2. Put battery(s) on a complete charge.
3. Take specific gravity readings again.

If any specific gravity readings still register low then follow the steps below.

1. Check voltage level(s).
2. Perform equalization charge. Refer to the Equalizing section for the proper procedure.
3. Take specific gravity readings again.

If any specific gravity reading still registers lower than the factory specification of 1.277+/- .007 then one or more of the following conditions may exist:

1. The battery is old and approaching the end of its life.
2. The battery was left in a state of discharge too long.
3. Electrolyte was lost due to spillage or overflow.
4. A weak or bad cell is developing.
5. Battery was watered excessively previous to testing.

Batteries in conditions 1 - 4 should be taken to a specialist for further evaluation or retired from service.

II. Open-Circuit Voltage Test

For accurate voltage readings, batteries must remain idle (no charging, no discharging) for at least 6 hrs, preferably 24 hrs.

1. Disconnect all loads from the batteries.

2. Measure the voltage using a DC voltmeter.

3. Check the state of charge with Table 1.

4. Charge the battery if it registers 0% to 70% charged.

If battery registers below the Table 1 values, the following conditions may exist:

1. The battery was left in a state of discharge too long.

2. The battery has a bad cell.

Batteries in these conditions should be taken to a specialist for further evaluation or retired from service.

TABLE 1. State of charge as related to specific gravity and open circuit voltage

Percentage of Charge	Specific Gravity Corrected to 80o F	Open-Circuit Voltage					
		6V	8V	12V	24V	36V	48V
100	1.277	6.37	8.49	12.73	25.46	38.20	50.93
90	1.258	6.31	8.41	12.62	25.24	37.85	50.47
80	1.238	6.25	8.33	12.50	25.00	37.49	49.99
70	1.217	6.19	8.25	12.37	24.74	37.12	49.49
60	1.195	6.12	8.16	12.24	24.48	36.72	48.96
50	1.172	6.05	8.07	12.10	24.20	36.31	48.41
40	1.148	5.98	7.97	11.96	23.92	35.87	47.83
30	1.124	5.91	7.88	11.81	23.63	35.44	47.26
20	1.098	5.83	7.77	11.66	23.32	34.97	46.63
10	1.073	5.75	7.67	11.51	23.02	34.52	46.03

7) Battery installation

Tighten the battery cables to battery terminals with torque of 95-105lbs.inch or 10.7-11.9 N.M. Make sure there is nothing else between the battery cable lug and battery terminal post.

Warning:

When working with the battery, DO NOT put wrenches or any other metal objects across the battery terminals, otherwise, an arc can occur, and it may cause explosion of the battery and physical injury.

Battery is installed or replaced only by the qualified electrician.

7.2 Maintenance of the Gear Box:

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 inside the gear box periodically (for new vehicle, change the oil after one month or accumulated running distance exceed 1200kms; change the oil again two months later, then change the oil every half a year) The oil type is 85W/90GL.

⑤ Clean the gear box before changing the oil.

Caution!

Never mix different oils.

7.3 Maintenance of the Traction Motor

① This traction motor is designed to use at the sea level not beyond 1200 meters and in a temperature between -25℃ and 40℃.

② This motor can work properly with a voltage produced by battery in series.

③ Never keep the motor running idly.

④ No explosive gas shall exist in the air.

⑤ Any mud, sand and other clinging objects shall often be cleaned away so as to provide good heat-radiation.

⑥ Check the carbon brush every three months, change the worn carbon brush and weaken carbon brush press spring.

Trouble-Shooting for Motor:

▼ **Warning:** Only Qualified Electrician Can Change and Adjust The carbon Brush and Commutator.

Item	Symptoms	Possible Causes
1	All copper plates turn black.	The pressure of brush is incorrect.
2	The commutator turns black in a certain order and in groups.	Short circuit in the commutator or armature coil; poor welding or disconnection between the commutators and the armature coil.
3	The commutator turns black in disorder.	The central line of the commutator deviates or its surface is not round and not smooth.
4	The brush wears out, turns colors and become 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 by

		wrong materials; the brush is wrong in type.
5	Big sparkles	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 big 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 become wrong.
6	The brush and its wires get hot.	Big sparkles of the brush; poor contact between brush and soft wires; small section area of soft wires.
7	The brush is noisy	The surface of the commutators is not smooth.

7.4 Maintenance of the Speed Controller

The speed controller of the vehicle is to realize the control of speed, torque and brake with smoothness, silence, high efficiency and energy-save.

• Prevent the vehicle runs way when starts. When the vehicle starts, the controller will inspect signal from the accelerator, if signal exceeds 20%, the HPD (protection unit in the controller) will prohibit the output of controller.

• When the vehicle starts, the SRO (protection unit in the controller) will effect.

The controller will self-check when the vehicle is running. If any defect inspected, the controller will stop the vehicle to protect the operator and the vehicle.

① Periodical Maintenance:

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

Please use the following cleaning procedure for routine maintenance:

1) Turn the power key to OFF position.
2) Remove power by disconnecting the battery.
3) Discharge the capacitors in the controller by connecting a load (such as a contactor coil or a horn) across the controller's B+ and B- terminals.

4) Remove any dirt or corrosion from the connector areas. The controller should be wiped clean with moist rag. Dry it before reconnecting the battery. The controller should not be subjected to pressured water flow from either a standard hose or a power washer.

5) Make sure the connections are tight, but do not over-tighten them.

NOTES: 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 shall keep discharging for a few minutes more; don't wash the electrical parts with water. It is allowed to remove dust with a brush or high–pressure air.

7.5 Maintenance of Brake System

① Step the brake pedal with a force of 30kg or so, the pedal travel shouldn't exceed 2/3 of the full free pedal travel.

② The clearance for the brake plate is self-adjusted. Under a force of around 20kgs, the parking brake handle should be fixed in one gear from 5 to 10 ratchet. When the brake handle is released completely, the brake function will stop.

③ Inspect and change brake shoe, add lubrication into the brake bearing periodically.

7.6 Lubrication of the Whole Vehicle

① Use 901 vehicle brake oil DOT3 as brake oil;

② Use 1L of 85W/90GL lubrication oil for gear box;

③ Use 1L of 90GL hypoid gear oil for the rear axle;

④ Lubrication points: a. steering gears; b. horizontal bars; c. steering ball joints; d. bearings;

7.7 Running-in of New Vehicle:

In order to guarantee the performance of the vehicle and enhance its reliability and working lift, all parts in motor should experience a certain period of running-in before the motor works with its maximum capacity, thus, each new vehicle is required to give one month of running-in time, detail procedure as per the following:

① Check the levels of oil, water and liquids carefully before running-in and fill them as requested if insufficient. The tire should meet 145R12 with the air pressure of 3.5kgf/cm^2.

② During running-in time, the speed should be limited as follows:

Current / Shift / Model	1	2	3	4
AW6142KFT	110A	60A	55A	70A

③ If possible, try your best to avoid driving on poor conditions roads.

④ Check and tighten regularly the fixing parts of each connecting points.

Notes:

1) To avoid any damage on the brake shoe, handbrake should be released to its bottom before staring the vehicle.

2) The lubricant for rear power assembly must be applied and changed as per user's manual.
3) The brake system must be adjusted once every 3 months.
4) 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.
5) 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.
6) When changing the fuse, make sure that the new fuse is right in rated current.
7) For the sake of safety, disconnect the positive pole from the battery when maintenance is done.
8) Never step the accelerator hard and frequently, which may shorten the life of the controller.
9) It is prohibited to fill any other liquids (such as battery addictives, mineral water and tap water) into the battery, ONLY the distilled water is allowed to fill in the battery.
10) Do not drive at high speed when going downhill; slow down the vehicle when turning; and remind the passengers to hold on when turning and going downhill.
11) Children are not allowed to play in the vehicle; Children should be seated between adults and vehicleed by adults when the vehicle is running.
12) Periodic Maintenance Charts

Regular maintenance is required for the best performance and safe operation of the vehicle.

Warning:

Make sure to turn off the power key and apply the park brake when you do the maintenance unless specified. If the owner is not familiar with the maintenance of this vehicle, the dealer should do the work.

1D – per day **1W** – per week **1M** – per month **1Q** – per quarter **1Y** – per year

item	Descriptions	1D	1W	1M	1Q	1Y
Battery	1. Check the liquid level. Please add the distilled water if necessary.	Y				
	2. Charge the battery	Y				
	3. Tighten the nut on the battery cable		Y			
	4. Check if the battery is over-discharged (the battery power meter flashing)	Y				
	5. Check the liquid density of the battery, standard density should be 1.275±0.005 (25℃).		Y			
	6. Check if the battery is charged fully by 3 ways: a) using the hydrometer; b) checking the battery power meter;	Y				
	7. Clean the surface of battery		Y			
Charger	8. Observe the charging status, check if the charger plug becomes hot.	Y				
	9. Clean the surface of the charger. Do not get any water inside the charger.		Y			
Controller	10. Check if all terminals are tightened properly. Please do this after the power is off.				Y	
	11. Clean the surface of the controller.				Y	

	12. Check if the solenoid is in order, checking its touching point.					Y
Motor	13. Check if any water gets in. Check if it becomes too hot.	Y				
	14. Check if the carbon brush should be replaced.					Y
	15. Check if the accelerator pedal works well and if it can be released freely and automatically.				Y	
Chassis and body	16. Check if the brake drum and the brake shoe should be replaced or not.				Y	
	17. Check if the hand brake functions.				Y	
	18. Check if the hose and tube for the brake liquid leaking.			Y		
	19. Check if the brake liquid inside the brake liquid tank is enough.			Y		
	20. Check the air pressure inside the tire, check if the tire surface is worn, check if the nuts are tightened properly.		Y			
	21. Check if the shock absorber has any oil leaking, flat or abnormal noise.			Y		
	22. Check if there is oil leaking on the gear box and the rear end.		Y			
	23. Add the lubricant inside the wheel hub, steering system.				Y	
	24. Adjust the toe-in of the front end				Y	
	25. Clean the body and seat				Y	
After above maintenance, drive the vehicle to check if the vehicle works properly.						

8. Storage

Please follow the steps as below when the vehicle is stored.

1. Check the liquid level inside the battery; recharge it fully before storing the vehicle.

Warning:

Please charge the battery once a month if your vehicle will be stored more than one month.

2. Turn the power key to OFF position, remove the key, and store the key in a safe position.
3. Engage the Handbrake.
4. Check the tire pressure to make sure its pressure is set to recommended pressure.
5. Clean the exterior of the vehicle and apply the rust inhibitor.
6. Cover the vehicle with a breathable cover and store it in a dry, safe and well-ventilated place.
7. If the vehicle is planned to store for a longer time, then please check the liquid level inside the battery once a month, recharge the battery

9. Trouble Shooting

There is no settled mode to diagnose and eliminate the malfunction of electric shuttle buss. During maintaining and checking, we suggest you first listen, then look and feel. Below is the diagnoses and

maintenance of some common malfunctions.

1) The vehicle doesn't move. Turn on power key, depress accelerator pedal, vehicle fails to move.

Malfunction	Possible reason	Troubleshooting
Turn on power key, Voltameter has no signal	1.Connector(s) in Circuit is loose or open	Tighten or connect
	2.Fuse of controller or main circuit is open	Change fuse
	3.Battery cable(s) is loose or disconnected	Tighten or change
	4.Power key is broken	Change
	5.Volatmeter is broken	Change
	6.Battery terminals connect improperly	Adjust
Turn on power key, Voltameter has signal.	1.Improper operating procedure	Operate properly
	2.Controller Failure	Check or Change
	3.Solenoid Failure	Check, repair, change
	4.Accelerator Failure	Repair or Change
	5.Motor Failure	Repair or change
	6.Parking brake doesn't loosen	Loosen parking brake
	7.Over-heat protection	Check, eliminate

2) Lose control when vehicle starts running: speed cannot be adjusted

Malfunction	Possible reason	Troubleshooting
Vehicle runs at full speed when it just starts	1.Terminals of Solenoid stick together	Check, repair
	2.Controller failure	Change
	3.Potentiometer failure	Repair, change
Vehicle stops immediately after it starts	1. Internal short of Motor	Repair, change
	2.Motor is assembled too tight or blocked	Repair, change
	3.Controller failure	Repair, change
	4.Accelerator Failure	Repair, change
Normal at low speed Weak power at high speed	1. Controller Failure	Check, change
	2. Motor Failure	Check, change
	3. Accelerator Failure	Check, change

3) Vehicle cannot change direction: vehicle can only run in the one direction

Malfunction	Possible reason	Troubleshooting
Vehicle can only run in	1. Forward/Reverse switch failure	Change

one direction	2. Controller Failure	Change

4) Possible reason and troubleshooting of the malfunction of electric shuttle bus mechanic system

System	Malfunction	Possible reason	Troubleshooting
Transmission System	Abnormal sound when running	1.Clearance of rear axle decelerating gear is too big, or the decelerating gear is broken	Adjust, change
		2.Transmission cross shaft wear out	Change
		3.Gear of transmission wear out or damage	Change
		4. Flange bearing damage	Change
		5. Motor bearing damage	Change
		6.Gear liquid is deficient or empty	Add Gear liquid
	Hard to shift gear, and/or gear shift jumps in different positions	1.Clutch cannot separate smoothly	Adjust
		2.Gear shift tightwire damage	Change
		3.Gear inside transmission case wear out	Change
		4.Orientation pin loosen	Change
Steering System	Steering heavy	1. Pressure of front tire is deficient.	Check the pressure and Inflate
		2. Screw plug of Redirector is too tight	Adjust
		3.Lack of lube in redirector	Maintain，add lube
		4. Toe-in abnormal	Adjust
		5.Clearance of tension rod ball is too big	Change
		6. Steering knuckle and master pin is not lubricating	Add Lube
		7.Steering shaft or its plastic cover wear out	Change
	Steering unstable （wheels flirt）	1.Rack of redirector wear out	Change Redirector
		2.Screw plug of Redirector is too tight	Adjust
		3.Toe-in adjust improperly	Adjust
		4.Bearing of front wheel wear out	Change
		5.Tie rod ball and joint wear out	Change tie rod
		6.Redirector loose	Tighten
Driving System	Deflected Running	1.The pressure of the two front tires is different	Inflate
		2.Toe-in is too big or too small	Adjust
		3. Tightness of the left and right drum bearing of front wheels is different	Adjust
		4.Brake of one wheel is too tight	Adjust or Change
		5.Spring shock absorber is abnormal	Change
		6.Front suspension loose	Change

	Abnormal Tire Fray	1.Tire pressure is abnormal or left and right tire doesn't be exchanged for a long time	Inflate or exchange
		2.Toe-in is improper	Adjust
		3.Drum bearing loose	Change
		4. U type Bolt of Leaf Spring loose	Tighten
		5. Rim distort, frame distort	Tighten
		6.Brake force of each wheel is different	Adjust
		7. Overexert accelerate or brake frequently	Alter operation
Brake System	Brake fail	1.Master cylinder and/or wheel cylinder damage、vitta leak oil	Check, eliminate, change
		2.Brake fluid is insufficient or empty	Add fluid
		3.Air enters into oil pipe	Let air
		4.Free travel of Brake pedal is too long or the clearance of arrester is too big	Adjust
		5.Brake drum wears out or distort	Change
		6.Master cylinder leaks oil internally	Change
	Braking deviation	1.The clearance of left brake drum shoe and right brake drum shoe is different	Adjust
		2.Oil on one arrester's brake shoe	Dispose or change
		3.tyre pressure is different	Repair or Change
		4.One wheel cylinder's piston blocks	Adjust
		5.Wheel alignment improperly	Adjust
		6.Brake drum becomes out of round	Change
	Braking drag	1.Brake pedal has no free travel	Adjust
		2.Clearance between brake shoe and drum is too small or releasing spring is disable.	Adjust or Change
		3.Piston of wheel cylinder is ineffective	Check、Change
		4.Piston of master cylinder is ineffective	Change
		5.Parking brake is ineffective	Change spring
	Braking noise	1.Shoes distort	Change
		2.Brake facing wear out	Change
		3.Eyewinker in brake system	Check, Eliminate

		4.Brake drum breach, scrape to uneven	Change

Fault code			
Fault name	**Fault code**	**Rhythm of alarm**	**Remarks**
No fault	**0**		
Wrong operation sequence(Accelerator)	**1**	**(1-2)**	The accelerator is not reset before turning on igntion
Main relay fault	**2**	**(4-4)**	Main relay is powered on
Controller overcurrent	**3**	**(4-3)**	Controller overcurrent
Controller overheating	**4**	**(3-1)**	Controller overheating
Speed sensor fault	**5**	**(3-2)**	**Speed sensor fault**
Current sensor fault	**6**	**(2-2)**	Controller current sensor fault
Capacitor precharge fault	**7**	**(4-1)**	Capacitor precharge fault
Battery undervoltage	**9**	**(2-1)**	Battery undervoltage
Battery overvoltage	**10**	**(1-4)**	Battery overvoltage
Motor overheating	**11**	**(2-4)**	Motor overheating
Accelerator fault	**13**	**(1-3)**	Accelerator signal voltage exceeds safety range
Wrong operation sequence(Gear)	**15**	**(3-3)**	The gear is not in neutral when starting

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 existent data. At the same time, our company reserves the right to alter the content of this manual and this manual is subject to change without prior notice; in addition, our company has the final say on the interpretation of this manual.