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Breeze

Maintenance Manual



Afikim Electric Mobilizer

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p/n – PRBR003

Warning

Please read this manual carefully before engaging in any maintenance operations of the Breeze. If you have any questions about the contents of this manual, please do not hesitate to call the company for clarification.

Maintenance operations should be carried out only by authorized technicians of Afikim Electric Vehicles or its representatives.

Remember - any product which does not functional properly may cause harm to either property or persons.

Warning

Electro-Magnetic Interference may cause the vehicle to perform in an unanticipated manner, endangering the user. For your safety, before using the Breeze, it is strongly recommended to read Chapter 4 "Electro-Magnetic Interference " carefully.

The serial number and manufacturer details are on a label adjacent near the cellular cabin

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Revision : 03

Product: Breeze - all models

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1.1 GENERAL AND SAFETY INSTRUCTIONS TO THE TECHNICIAN

Warnings

- 1. When handling the Breeze mechanical systems such as the motor, transaxle, wheels and electro-magnetic unit, the main supply should be disconnected by removing the battery cables in order to prevent accidental operation.**
- 2. When conducting electrical tests, elevate the rear wheels using a jack or stable block of wood. Avoid touching moving parts such as wheels and axels.**
- 3. Any maintenance operations must be carried out by a trained and authorized technician only.**

The following instructions are directed to the technician responsible for the maintenance or repair of the Breeze :

1. Always ensure that the Breeze is positioned on a straight horizontal surface, the key is removed from the key switch and the handbrake is locked in the parking position.
2. Before commencement of any operations, perform a visual examination of the Breeze for a preliminary identification of problems.
3. Before replacing or repairing front wheel, elevate the front section of the Breeze .
4. Always before operating a lifted Breeze make sure that the 2 rear wheels are free to turn , so that the scooters will not move .
5. Always before operating a lifted Breeze make sure that any person hands , legs , chains etc. are away out from possible moving parts . Also make sure that no object is placed so that when start operation of the scooter , it might move and injure anybody .
6. When a Breeze is brought for repair, the fault should be identified using the table in Chapter 2 – Troubleshooting and Repair of General Faults.
7. When a Breeze is brought for a routine check or regular maintenance work, use this chapter for information.
8. Before lifting up the scooter or any of it's parts , make sure about it's weight , And if needed ask for an assistance help . Here are Breeze main parts weight :

Part	Weight	
	Kg	lbs
Complete Breeze	130	286
Front Section	40	88
Rear Section (2 wheels)	90	198
Each Rear wheel	45	99
Battery (each)	22-24	48-53
Seat	15-17	33-37
Transaxle Power Unit	20-22	44-48



1.2 RECOMMENDED TOOLS AND REPLACEMENT ASSEMBLIES



Specific Tools:

- Standard tool box (wrenches, socket-head cap screw , hexagon keys, Phillips (crosshead) tip and/or screwdrivers, etc.)
- Voltmeter (To measure 24VDC)
- Air pressure gauge (To measure 35 psi)
- Batteries tester (under load)
- Density meter
- Valve Wrench
- Wooden blocks to elevate the Breeze during checks, maintenance and repairs:
 - ✓ 2 blocks 20-22 centimeters height to place beneath the batteries box .
 - ✓ 2 blocks 14-16 centimeters height to place beneath the foot rest area .
 - ✓ **Remark** : Always before operating a lifted Breeze make sure that the 2 rear wheels are free to turn , so that the scooters will not move .

Specific Parts:

We recommend the availability of the following set of test and repair assemblies:

- Handlebars switches – Left and Right
- Front Board
- Display Board
- Main Driving Harness Cable .
- Main Lights Harness Cable .
- Mail Supply Harnesses
- Rear Board
- Controller SOLO 130A - P&G
- Controller Control cable
- Motor
- Also it is very much recommended hold and use P&G SP-1 Programmer .

1.3 PERIODIC MAINTENANCE



Although the Breeze requires little periodic maintenance, careful compliance with pre-defined maintenance operations will reduce the probability of faults and ensure regular and smooth operation of the Breeze .

During the maintenance operations, ensure that the Breeze is firmly positioned on a flat horizontal surface, the key is removed from the key switch and the brake is locked in the parking position.

Periodic Maintenance

No.	Nature of Maintenance Operation	Frequency
1	Check air pressure/add air to tires. This operation should be performed by user after receiving instructions from the technician. See below.	Weekly
2	Check water level in batteries/add water (distilled water only!). Note! (for wet batteries only): To be performed only by the technician or the user, after receiving instructions from the technician. See below.	Once in two months or according to battery manufacturer's instructions
3	Check emergency brake. This operation should be performed by technician	Annually
4	General check for released screws, cracks and excess clearance of axles. This should be made only by trained technician .	Annually

<p>Check Tires and Air Pressure (may be performed by the user)</p>	<p>Maintaining correct air pressure in the Breeze’s tires is important to achieve a smooth ride and the stability of the vehicle.</p> <p>Checking the tires is extremely important. Perform a visual check of the integrity and appearance of the outer tires and ensure that tires are well placed along the entire circumference of the wheel rim.</p> <p>Check air pressure in the tires weekly and after any prolonged period of storage.</p> <p>Correct air pressure in PSI 35±5 (adjusted to passenger's comfort).</p> <p>Air pressure may be checked and air filled at gas station air pumps or using a manual air pump equipped with a pressure gage. Add air as necessary.</p>
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1.4 BATTERY MAINTENANCE



Faulty batteries may cause many other faults in the Breeze. Although the user should provide regular care of the batteries (recharging and filling water on wet batteries only), this is insufficient to handle all problems which may arise. A technician should perform battery density tests and load tests after recharging batteries.

Note: Checking a fully charged battery immediately after recharging may produce misleading results. Checks should be performed on a charged yet not fully charged battery or after a short travel.

<p>Regular Care of Batteries (wet only)</p> <p><u>Remark</u> : Wet Battery are not aloud for use in all markets were EN12184 and CE Mark approval are required.</p>	<p>Once every two months - water level in both batteries should be checked, or according to manufacture's instructions, if such exist.</p> <p>Check (for wet batteries only):</p> <ul style="list-style-type: none">○ Remove the seat and the Battery cover.○ Open the battery cells covers.○ Using a flashlight, check the water level in each of the battery's cells.○ Correct water level should be app. 6 mm above the plates.○ If water level is less than the required level, add distilled water only.○ After completing check, ensure all battery cells covers have been properly replaced and closed. Replace gray cover and seat. <p>Notes:</p> <ol style="list-style-type: none">1) Only distilled water should be used to fill batteries.2) Replacement of one battery necessitates the replacement of the other. The manufacture and Manufacturing Date code should be identical for both batteries.3) When using battery Dry or GEL no maintenance or check is necessary. Any how refer to manufacture's instructions.
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<p>Acid Density Test (wet batteries only)</p> <p><u>Recommended</u></p> <p><u>Remark</u> : Wet Battery are not aloud for use in all markets were EN12184 and CE Mark approval are required</p>	<ul style="list-style-type: none"> ○ Remove the seat and gray cover. ○ Using a hydrometer, check the acid concentration in each of the battery's cells. Ensure correct density (gauge indication in the green area). ○ If acid concentration is lower than necessary in a battery cell - add acid or refer to battery manufacturer agent. ○ Upon completion of check, ensure that all battery cells are closed. Replace gray cover and seat. <p>Note: Acid concentration and water level in battery chambers should be performed whenever Breeze is brought for a maintenance operation.</p>
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<p>Battery Load Test</p>	<p>This test should be performed after fully recharging batteries and a short travel.</p> <ul style="list-style-type: none"> ○ Remove gray cover and seat. ○ Disconnect all battery cables (negative and positive poles). ○ Perform the test for each battery separately. ○ Operate the Tester and check if voltage reading matches the indication of normal performance as specified on the tester display. ○ Upon completion of test, reconnect the battery cables and ensure the correct poles are replaced to their original position. Replace gray cover and seat.
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1.5 BASIC CLEANING OF THE BREEZE

(only when basic cleaning is required)



	<p>Only use a cloth, soap and water to clean the Breeze.</p> <p>Never spray a stream of water or steam directly on the BREEZE and it's systems .</p>
Preparations	<ul style="list-style-type: none"> ○ Remove the seat and gray cover ○ Disconnect and remove the batteries from the Breeze. Avoid causing short circuits when disconnecting the batteries. ○ Cover the controller and Rear Electronics box well. ○ Cover the motor and Electromagnetic brake carefully.
Cleaning	<ul style="list-style-type: none"> ○ Clean the inner assemblies, especially the base of the batteries. ○ Clean the gray cover on both sides. ○ Use a cloth and water. Do not spray water directly on the Breeze. ○ Clean the frame. ○ Upon completing cleaning, wait for all parts to dry or dry using air jets. ○ Reassemble removed parts and reconnect electric circuits and Batteries . Ensure correct assembling and reconnection. You may refer to the wiring drawings in 3.1 . ○ Replace gray cover and seat.
Test	<p>Perform a general test of all Breeze functions : forward and backward drive, change of speeds, manual operation of brakes, automatic braking and lights.</p>

1.6 - SHOCK ABSORBERS ADJUSTING TO THE USER WEIGHT

Press Stage	User Weight	
	Kg	lbs
Minimum Press - 0	80-100	176-220
1	100-115	220-253
2	115-130	253-286
3	130-145	286-340
Maximum Press - 5	145-160	340-352

Remark : To adjust the shock absorber use a standard S-Key or a simple Patent Key .



CHAPTER 2 –TROUBLESHOOTING AND GENERAL FAULTS REPAIRING



The following table specifies troubleshooting and repairs of the possible faults in the Breeze. The table suggests the recommended method to handle these faults. The table specifies:

- a. Fault Description - a description of the manifest problem resulting from the fault.
- b. Cause of the Fault - a list of all the possible causes of the fault, in decreasing order of probability of occurrence.
- c. Troubleshooting - actions to correct the fault. Each cause has a corresponding solution. If the solution does not correct the problem, refer to a different cause and action.

Note: Additional details pertaining to the repairs appear after the table.

Please do not hesitate to contact the company for additional professional assistance.

	Fault Description	Possible Causes	Troubleshooting
1	The hand brake is fully squeezed yet the Breeze does not stop	<ul style="list-style-type: none"> • Loose hand brake mechanism 	<ul style="list-style-type: none"> • Tighten the brake cable
2	Tire is flat and ride is uneven and not smooth	<ul style="list-style-type: none"> • Low air pressure • Flat tire 	<ul style="list-style-type: none"> • Add air until correct pressure is attained • Fix the flat tire
3	Unusual noises when driving	<ul style="list-style-type: none"> • Transaxle Fault • Other mechanical part fault 	<ul style="list-style-type: none"> • Replace Transaxle . • Replace part. <p>See assembling drawings in Appendix B.</p>
4	Broken Part	<ul style="list-style-type: none"> • Accident 	<ul style="list-style-type: none"> • Replace part. <p>See assembling drawings in Appendix B.</p>



INSTRUCTIONS FOR REPAIR OF GENERAL FAULTS

Manual Adjustment of Brakes	<ul style="list-style-type: none">○ Elevate front wheel and support the front section of the Breeze using wooden blocks under the footrest.○ Adjust using wrenches : Release the nut which locks the adjustment screw and turn the hexagon screw to tighten the cable. If the cable cannot be tightened using the screw, tighten the cable itself as described below. <p><u>Tightening the Brake Cable:</u></p> <ul style="list-style-type: none">○ Release the brake lever cable clamp nut in the wheel .○ Pull the brake lever while pulling downward on the cable until resistance is encountered.○ In this position, tighten the nut and ensure that the wheel revolves freely.○ Otherwise, repeat the process, but this time tight it less .
Repairing a rear wheel flat tire	<ul style="list-style-type: none">○ Using a jack or a wooden blocks, elevate the rear end of the Breeze . Remove the center wheel cover by snapping it out of it's groove with a thin screwdriver . Release the main center bolt of the wheel by using a wrench or cup 19mm.○ Using the appropriate tools, remove the tire and inner tube.○ Fix the flat tire or replace the inner tube as necessary.○ Locate and remove the cause of the flat tire (thumbtack, nail, etc.)○ Check the tire and replace as necessary.○ Replace tube and tire on rim and fill the inner tube with the correct air pressure.○ Reassemble rear wheel in an opposite order .
Repairing a front wheel flat tire	<ul style="list-style-type: none">○ Using a wooden block, elevate the front part of the Breeze. Release the hexagon nuts of the front wheel .○ Repair the inner tube similar to the way as described for the rear wheel above .○ If needed release the front brake cable as described above.○ Reassemble front wheel in an opposite order .



CHAPTER 3 - THE ELECTRIC AND ELECTRONIC SYSTEMS



3.1 MAIN ELECTRICAL WIRING DIAGRAM

To open diagrams click the File Name : [Electric daigram -](#)

[Breeze.pdf](#)



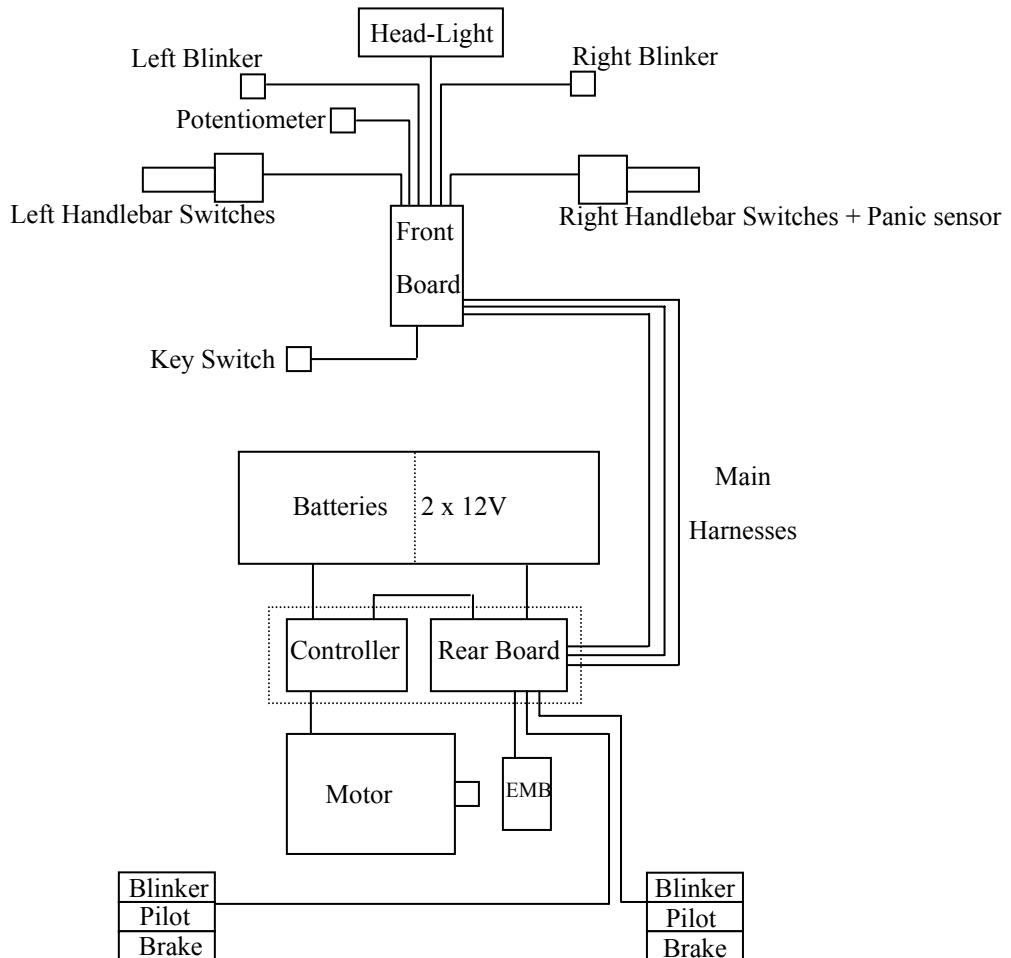
3.2 MAIN ELECTRIC AND ELECTRONIC SYSTEM

Driving and Lighting separation

In purpose to allow Maximum reliability to The Breeze , All the driving functions are fully separated from all the electric and lighting functions . Even though the 2 systems physically combined on the rear and frond board , still they are fully electrical separated .

Electric / Electronic Schematic Diagram :

The controller is responsible for all the driving functions . Front and Rear electronic boards are using as connecting junctions and contains all the other peripheral functions .



The Driving System

The driving system consist of 130A Driving controller located at the rear electronic box . The controller is connected directly to the Batteries supply (2 batteries of 12VDC serially connected). Direct connection to Breeze motor . Connection to the electromagnetic brake through the rear board. And through the rear and front boards to the speed potentiometer and key switch .

The Lighting System

The Lighting functions consist of 9 separated channels of the different lights : 1 front light , 2 front blinkers , 2 rear pilot lights , 2 rear blinkers , 2 rear braking lights .

Each one of the channels is fully controlled and protected by a separated Smart electronic power switch . In case one of the channel is short circuit the channel is shut of and all rest of the functions will continue as regularly . In both cases of short circuit or a burnt of one of the bulbs , a status signal is being activated from the specific channel and will be displayed on the Breeze Display panel .

Fuses

On each one of the Front and Rear electronic boards , the Lighting supply is protected with an automatic fuse that need no reset .

Also another automatic fuse is located on each one of the Front and Rear boards for the rest supply .

In edition a 15A Semi-Automatic fuse for the charging is in the front. Another 15A Semi-Automatic fuse for the all lighting and electronics supply is located on the rear electronics box and main 70A/80A Semi-Automatic fuse is near the Batteries .



3.3 TROUBLESHOOTING ELECTRIC AND ELECTRONIC FAULTS



3.3.1 GENERAL INSTRUCTIONS FOR ELECTRIC AND ELECTRONIC TROUBLESHOOTING

Based on the phenomena, you must identify the type of fault: travel control, lighting or general. You have 3 possible methods of identifying faults:

- 1) Status Indicator – Fault Diagnosis (If activated – [See 3.3.7](#)) .
- 2) Using the Troubleshooting tables in this manual ([See Follows in 3.3.2](#)) .
- 3) By replacing assemblies in a logical order :

If you have decided to identify faults by replacing assemblies, make any change in a logical order and inspect the effect of each change in the Breeze's operation . Start with Check of all supply connections . If replacement of an assembly does not solve the problem, replace the original assembly.

Replace the assemblies in the following order:

1. Handlebar Switches
2. Main harnesses and Wiring
3. Controller
4. Front Board
5. Rear Board
6. Motor
7. Electromagnetic Brake

If available, use the Controller Programmer SP-1 for the fault identifying . First ensure that the controller operates properly (No fault reported in Display) .

If troubleshooting fails to correct the fault, please contact the factory. We will be happy to assist you in solving the problem.

When calling the company, please prepare the following information:

- Breeze model and serial number
- Motor type
- Detailed description of the problem - which operation is faulty
- Which parts did you replace in the attempt to solve the problem?
- Client's history of fault and assembly replacements.
- Account of client's method of use.



3.3.2 TROUBLESHOOTING OF ELECTRIC FAULTS



Warnings

1. During every electric test, elevate rear tires from floor using a jack or wood blocks and avoid contact with moving parts (such as wheels and shafts).
2. Before any operation of connecting / disconnecting contacts in any of the electrical systems, disconnect the main power supply by disconnecting battery cables.
3. When reconnecting battery cables, ensure proper reconnection of poles.

The following table specified methods to locate and solve possible faults in the Breeze . The table suggests the recommended methods to solve the faults and is comprised of three columns:

- a. **Fault** - a description of the manifest problem resulting from the fault.
- b. **Cause of the Fault** - a list of all the possible causes of the fault, in decreasing order of probability of occurrence.
- c. **Troubleshooting** - actions to correct the fault. Each cause has a corresponding solution. If the solution does not correct the problem, refer to a different cause and action.

Note: Please do not hesitate to contact the company for additional professional assistance.

	Fault	○ Possible Causes	○ Troubleshooting
1	When squeezing the operating lever, the Breeze does not move or it starts and immediately stops. (User Misuse)	<ul style="list-style-type: none"> ○ Key switch is in OFF position. ○ The charging plug is in the charging socket. ○ The mechanical release handle of the magnetic brake is pushed forward and disengaged. ○ The Panic brake is operated by too strong lever force . ○ Faulty panic sensor. 	<ul style="list-style-type: none"> ○ Ensure that the key-switch is ON. ○ Disconnect the plug from the Breeze ○ Pull the lever back (or UP) to the operating position. ○ Instruct the user for the appropriate squeezing force . ○ Replace the panic sensor.
2	Main Power Green led operates but Breeze does not operate	○ Faulty Rear Board / controller /Front Board / cables or wiring cables	○ Replace faulty Board or wiring . See for proper assembling

	(Product Faults)		drawing in Appendix B.
3	Main Power Led or all display Leds are Off and Breeze do not operate	<ul style="list-style-type: none"> ○ Loose connections ○ Main 70A fuse popped out or Main Supply 15A fuse popped out. ○ Faulty Rear Board / controller /Front Board / cables or wiring 	<ul style="list-style-type: none"> ○ Check and correct connections. See 3.3.3 . ○ Reset the fuse by pressing. Do not repeat this more than twice. 70A is near the batteries. 15 A is on rear elec.box. ○ Replace faulty Board or wiring . <p>See for proper assembling drawing in Appendix B.</p>
4	Main Fuse 70A Pop Up	<ul style="list-style-type: none"> ○ Mechanical Fault ○ Excessive Load ○ Faulty Rear Board / controller /Front Board / cables or wiring 	<ul style="list-style-type: none"> ○ Test according 3.3.4 and replace Power Unit if faulty. ○ Remove Load ○ Replace faulty Board or wiring . <p>See for proper assembling drawing in Appendix B.</p>
5	Breeze operates only at low speeds or Speed switch does not cause change of speed	<ul style="list-style-type: none"> ○ Faulty speed switch ○ Faulty Rear Board / controller /Front Board / cables or wiring cables 	<ul style="list-style-type: none"> ○ Replace speed switch / assembly ○ Replace faulty Board or wiring . <p>See for proper assembling drawing in Appendix B.</p>
6	Breeze Speed seems to be too slow .	<ul style="list-style-type: none"> ○ Mechanical Fault ○ Wrong calibration of potentiometer 	<ul style="list-style-type: none"> ○ Test according 3.3.4 and replace Power Unit if faulty ○ Test and repair calibration . See 3.3.5
7	Battery Gauge blinks and the Breeze does not operate .	<ul style="list-style-type: none"> ○ See Controller Fault Code Table Below 	<ul style="list-style-type: none"> ○ Check and repair according Fault Code. See 3.3.6 and 3.3.7
8	Uneven ride	<ul style="list-style-type: none"> ○ Reduction in battery capacity ○ Faulty electrical connections ○ Faulty battery 	<ul style="list-style-type: none"> ○ Perform full charge of batteries ○ Remove gray cover and check the battery cables' connections. If connections are rusty, clean the connections with a damp cloth.

		<ul style="list-style-type: none"> ○ Excess load or too high incline ○ Mechanical Fault ○ Faulty Rear Board / controller /Front Board / cables or wiring 	<ul style="list-style-type: none"> ○ If, after recharging, battery display indicates low capacity or reaches such a state in less than one hour of operation, batteries are probably in need of replacing. ○ Remove partial load or try another way with reduced incline . ○ Test according 3.3.4 and replace Power Unit if faulty . ○ Replace faulty Board or wiring
9	One or more of the Lights or Blinkers do not operate and the relative Led in at Display is Blinking rapidly .	<ul style="list-style-type: none"> ○ Burnt Bulb or wiring misconnection . ○ Wiring or Bulb Short Circuitig 	<ul style="list-style-type: none"> ○ Check and replace or reconnect properly ○ Find and repair the shorts
10	One or more of the Lights or Blinkers do not operate	<ul style="list-style-type: none"> ○ Faulty Rear Board or Front board 	<ul style="list-style-type: none"> ○ Replace Faulty Board.
11	Direction switch does not allow change of direction	<ul style="list-style-type: none"> ○ Faulty connections or wiring ○ Faulty handlebars direction switch ○ Faulty Front / Rear Board or Wiring 	<ul style="list-style-type: none"> ○ Check and reconnect properly ○ Replace switch / assembly ○ Replace Faulty Board.
12	One of the Display Leds does not Operate , yet the Breeze is fully functioning .	<ul style="list-style-type: none"> ○ Faulty Display Board ○ Faulty connections or wiring. 	<ul style="list-style-type: none"> ○ Replace Display Board ○ Check and reconnect properly.
13	No sound is heard when horn is pressed	<ul style="list-style-type: none"> ○ Front Board Dip Switch misadjusted. ○ Faulty wiring or connections ○ Faulty handlebars button ○ Faulty horn 	<ul style="list-style-type: none"> ○ Adjust Front Board Dip Switches ○ Check and reconnect properly ○ Replace handlebars ○ Replace horn assembly



3.3.3 TROUBLESHOOTING CHARGING PROBLEMS



1	Breeze does not recharge or recharges improperly	<ul style="list-style-type: none"> ○ No voltage in the mains wall outlet. ○ Faulty connections or wiring ○ Faulty charge socket ○ Charge fuse 15A popped out. ○ Faulty charger 	<ul style="list-style-type: none"> ○ Ensure proper connection to wall outlet and that the charger led illuminates . ○ Check and reconnect properly ○ Replace charge socket assembly ○ Reset the fuse by pressing. Do not repeat this more than twice. ○ Replace charger
2	Green led operates Battery Gauge show low battery and the Breeze operates unevenly	<ul style="list-style-type: none"> ○ Batteries require recharging ○ Faulty connections 	<ul style="list-style-type: none"> ○ Recharge batteries ○ Check and connect properly
3	Breeze operates but distance of travel is too short or Breeze is unable to operate uphill with a load after full recharging	<ul style="list-style-type: none"> ○ Batteries are old or require recharging ○ Mechanical Fault ○ Faulty charger 	<ul style="list-style-type: none"> ○ Check Batteries and replace if necessary . See 1.4 . ○ Test according 3.3.4 and replace Power Unit if faulty ○ Test according 3.3.4 and replace Power Unit if faulty . ○ Replace charger



3.3.4 VOLTAGE SUPPLY MEASUREMENTS :



1. Check the Main supply voltage of the Batteries : between **Battery Negative Pole (-24VDC)** and **Battery Positive Pole (+24VDC)** .
2. Check the supply voltage of the Rear Boards : On Rear Board measure voltage on connector J7 or J9 between **Battery Negative Pole (-24VDC)** and **J7-1** or **J9-1** .
Voltage should be (~24VDC) .
3. Check the supply voltage of the Front Board : On Rear Board measure voltage on connector J7 or J12 between **Battery Minus Pole (-24VDC)** and **J7-1** or **J12-1** .
Voltage should be (~24VDC) .
4. Check Controller Main Voltage Supply : On controller between terminal B+ and B- .
Voltage should be (~24VDC) .



3.3.5 NO LOAD TEST AND DRIVING TEST

This test is very much recommended when there is a suspicion of Transaxle-Power-Unit , motor or EMB faults , or when irregular noises are coming from the Power-Unit . Also when there are complains about too short travel distance .

For these Tests Connect a DC current meter on the Battery Red Positive (+) Power wire. It is recommended to use an induction current meter (So that no physical connection is needed) . Make sure the meter wires are far away from any moving parts. The meter Range needed is up to 50 Amperes .

NO LOAD TEST

Using appropriate wood blocks lift the two rear wheels of the breeze up, so that they are free to turn without touching the floor . Squeeze the speed lever to maximum and run the breeze for 1-2 minutes before measuring . Than measure the current consumption .

The current should be between 8A to 12A .

DRIVING TEST

Drive the Breeze at full speed on level surface with a user weight of 70-80 Kg (154-176 lbs) .
Than measure the current consumption .

The current should be between 14A to 19A .



3.3.6 POTENTIOMETER CALIBRATION AND TEST



Potentiometer Tests :

1. Check **(I)-Test** that the Potentiometer operate normal as follows : Lift one of or the two Rear wheels . Use Multimeter to measure the DC Voltage Between the two Terminals of the Motor Outputs from the controller . **Squeeze the Lever Speed to maximum** . The Voltage **should be** around : **~23.5DCV** When the **Batteries** are **fully Charged** .

Remark : If this test is OK , no need to go to (7) and (8).

2. Check **(II)-Test** that the Potentiometer operate normal as follows :

Use Multimeter to measure the DC Voltage Between the **Battery Minus Pole (-24VDC)** and connector **J3** at **Front Board** Pins . The measured Voltage should be as follows :

Speed Lever Position	J3 - 1 Voltage (DC) Pot-HI	J3 - 2 Voltage (DC) Pot-Wiper	J3 - 3 Voltage (DC) Pot-Low
Released	~4.5 V	~0 V (Max 300 mV)	~0 V (Max 300 mV)
Full Squeeze	~4.5 V	~2.2 V	~0 V (Max 300 mV)

3. Check **(III)-Test** that the Potentiometer operate normal as follows :

Use Multimeter to measure the DC Voltage Between the **Battery Minus Pole (-24VDC)** and connector **J2** at **Rear Board** Pins . The measured Voltage should be as follows :

Speed Lever Position	J2 - 1 Voltage (DC) Pot-HI	J2 - 2 Voltage (DC) Pot-Low	J2 - 3 Voltage (DC) Pot-Wiper
Released	~4.5 V	~0 V (Max 300 mV)	~0 V (Max 300 mV)
Full Squeeze	~4.5 V	~0 V (Max 300 mV)	~1.3 V

Potentiometer Calibration :

If on (6) you find that Pot-HI and Pot-Low Voltages are OK ,

but the wiper Voltage is Wrong than the Potentiometer need a Calibration .

Release the Potentiometer cable stopper secure screw , tight the cable so that the potentiometer lever just start being pulled and secure it at that position .











Than recheck the Potentiometer Calibration as described in (6) and (7) and (8) .



3.3.7 STATUS INDICATOR – FAULT DIAGNOSIS



Fault Type is according number of flashing LEDS :

1	2	3	4	5	6	7	8	9	10
									
R E D			Y E L L O W				G R E E N		

Fault Type	Description
1	Low Battery Voltage
2	Motor Disconnected
3	Motor Wiring Fault
4	Parking Brake Disconnected
5	Not In Use
6	Inhibit Active
7	Throttle Potentiometer Fault
8	Possible Controller Fault
9	Solenoid Brake Fault
10	High Battery Voltage



3.3.8 PROGRAMMER SP-1 FAULT DIAGNOSIS :



Fault Code	Fault Type	Description
0002,0003	8	Possible Controller Fault
0100	8	Possible Controller Fault
0203,0204	8	Possible Controller Fault
0810	7	Throttle Fault
1400	3	Motor Wiring Fault
1500	9	Solenoid Brake Fault
1501	8	Possible Controller Fault
1502	9	Solenoid Brake Fault
1600	10	High Battery Voltage
1705,1802,1805,1B20	8	Possible Controller Fault
1D02	7	Throttle Potentiometer Fault
1E03	6	Inhibit Active
2102	8	Possible Controller Fault
2C00,2C01	1	Low Battery Controller
2D01, 3100 , 3102 , 3210-3213, 3600-3609, 360A,360B,360C,306D,360E	8	Possible Controller Fault
3B01	4	Parking Brake Off
7000,7001	4	Parking Brake Off



3.4 CONTROLLER SETUP PARAMETERS :



3.5

Controller Programming Parameters-Set-Up

For Breeze 10(TNO)&12&15(TNO) km/hr speed

Model: P&G SOLO 130 Amp rev. 5 (21-8-02)

No.	MODEL		10 Km / hr (TNO)		12 Km / hr		15 Km / hr (TNO)	
	PARAMETER		FAST	SLOW	FAST	SLOW	FAST	SLOW
1	Forward	Accl.	30	50	30	50	40	50
2	Forward	Deccl.	16	16	8	16	11 (tno-6)	16
3	Reverse	Accl.	35	35	35	35	45	35
4	Reverse	Deccl.	16	16	16	16	16	16
5	Forward	Speed	100	50	100	50	100	50
6	Reverse	Speed	40	30	40	30	40	30
7	Throttle	Pol'ty	NO		NO		NO	
8	Power Down	Timer	0 m		0 m		0 m	

No.	Enguneering Menu			
1	Current Limit		130 A	
2	Compensation - Ohio motor 10 km/hr power unit		60 mΩ	
	Compensation – Sunway motor 15 km/hr power unit		20 mΩ	
3	Hold Factor		148 %	
4	Mid. Current		0 s , 0%	
5	Brake Time		70	
6	ISO Tests		Off	
7	Inhibit Pol'ty		Inhibit : lo	
8	Bridge Hold		20	
9	Throttle Gain		500	
10	Pulse Rev. Alarm		Yes	
11	Wig wag Throttle		No	
12	Inhibit Batt..Flash (SP-1)	Low Bat Flash (iPAQ)	No (SP-1)	Flash (iPAQ)
13	Throttle D'band		3%	
14	Output Voltage		25V	
15	Tru Charge Cable		40 mΩ	
16	Tru Charge Cal		98	



3.5 FRONT BOARD ALARMS / HORN DIP SWITCHES ADJUSTING

In the Front Board you will be able to find The Dipswitch DSW1 . By changing the switches as follows , you will be able to adjust the follows Buzzer / Horn and Alarm operating :

Switch/ Position	ON	OFF	Afikim Default Set Up
1	Reverse Alarm Enable	Reverse Alarm Disable	OFF
2	Blinker Alarm Enable	Blinker Alarm Disable	OFF
3	Buzzer Enable	Buzzer Disable	ON
4	Not In Use	Not In Use	N/A



3.6 Through 3.8

Click on buttons to open the files :

3.6 SOLO 130A Controller Manual :	ma soloscooter.pdf	
3.7 True Charge Battery Gauge Manual :	ma scootertiller.pdf	
	ma trucharge.pdf	
3.8 SP-1 Programmer Manual :	ma sp1.pdf	





All types of electrically powered vehicles, such as powered wheelchairs and motorized scooters (**in this text all types will be referred to as “powered vehicles”**) may be susceptible to electromagnetic interference (EMI). This is interfering **electromagnetic energy (EMI)** emitted from sources such as radio and TV stations, amateur radio (HAM) transmitters, two-way radios and cellular phones. The interference (from radio wave sources) can cause the powered vehicle to release its brakes, move by itself, or move in unintended direction. It can also damage the powered vehicle’s control system. The intensity of the interfering EM energy can be measured in volts per meter (V/m). Each powered vehicle can resist EMI up to a certain intensity. This is called its “immunity level”. The higher the immunity level, the greater the protection. At this time, current technology is capable of achieving immunity level, which would provide useful protection from the more common sources of radiated EMI. This vehicle as shipped, with no further modification, has an immunity level of 10 V/m.

There are a number of sources of relatively intense electromagnetic fields in everyday environment. Some of these sources are obvious and easy to avoid. Others are not apparent and exposure is unavoidable. However, we believe that by following the warning listed below, your risk of EMI will be minimized.

The sources of radiated EMI can be broadly classified into three types:

- 1) **Hand-held portable transceivers** (transmitters-receivers) with the antenna mounted directly on the transmitting unit. Examples include: citizen band (CB) radios, “walkie talkies”, security, fire and police transceivers, cellular telephones and other personal communication devices. ** NOTE: some cellular telephones and similar devices transmit signals while they are ON, even when not being used.
- 2) **Medium-range mobile transceivers** Such as those used in police cars, fire trucks, ambulances and taxis. These usually have the antenna mounted on the outside of the vehicle .
- 3) **Long-range transmitters and transceivers such as commercial broadcast transmitters** (Radio and TV broadcast antenna towers) and amateur (HAM) radios.

NOTE: Other types of hand held devices, such as cordless phones, laptop computers, AM/FM radios, TV sets, CD players, cassette players and small appliances such as electric shavers and hair dryers, as far as we know, are not likely to cause EMI problems to your powered vehicle.

Powered Vehicle Electromagnetic Interference (EMI)

Because EM energy rapidly becomes more intense as one moves closer to the transmitting antenna, the EM field from hand-held radio wave sources (transceivers) are of special concern. It is possible to unintentionally bring high levels of EM energy close to the powered vehicle's control system while using these devices. This can affect powered vehicle movement and braking. Therefore, the warnings listed below are recommended to prevent possible interference with the control system of the powered vehicle.

WARNINGS

Electromagnetic interference (EMI) from sources such as radio and TV stations, amateur radio (HAM) transmitters, two-way radios and cellular phones can affect powered vehicles.

Following the warnings listed below should reduce the chance of unintended brake release or powered vehicle **movement which could result in serious injury**:

- 1) Do not operate hand-held transceivers (transmitters-receivers) such as citizen band (CB) radios, or turn ON personal communication devices such as cellular phones, while the powered vehicle is ON;
- 2) Be aware of nearby transmitters, such as radio or TV stations and try to avoid coming close to them
- 3) On appearance of unintended movements or brake release occurrences, switch the powered vehicle OFF **as soon as it is safe**.
- 4) Be aware that adding accessories or components, or modifying the powered vehicle, may make it more susceptible to EMI (Note: there is no easy way to evaluate their effect on the overall immunity level of the powered vehicle), and -
- 5) Please report to us all incidents of unintended movement or brake release and note whether there is a source of EMI nearby.

Important information

- 1) 20 volts per meter (V/m) is a generally achievable and useful immunity level against EMI (as of May 1994). The higher the level the greater the protection;
- 2) This product as delivered to you has an immunity level of 20 V/m .



Appendix A - List of Recommended Spare Parts/Assemblies :



(Part Numbers are subjected to change due to product modifications)

	Part No.
<u>Electric System and Electronics</u>	
Programmer for SOLO 130A controller , SP-1	PCBR010
Rear Board – Breeze	PCBR009
Controller P&G SOLO 130A	PCBR007
Controller Control Cable – Breeze	ASBR013
Front Board – Breeze	PCBR008
Display Board – Breeze	PCBR014
Operating Switches Right	ASBR004
Operating Switches Left	ASBR005
Panic Sensor assy.	ASBR038
Potentiometer assy.	ASBR006
Potentiometer Spring	SPBR001
Buzzer assy.	ASBR007
Charging socket assy.	ASBR009
Headlight - Breeze	ASBR028
Bulb for Headlight Breeze	ACBR006
Blinker – Front - Breeze	LMBR002
Bulb for Front Blinker - Breeze	ACBR007
Main Harness -Drive– Breeze	ASBR023
Main Harness -Lights– Breeze	ASBR024
Main Harness -Supply– Breeze	ASBR025
Automatic Fuse70A	FH00004
Automatic Fuse 15A	FH00005
Rear Light assy.	ASBR021
Bulb for Rear Blinker and Pilot Lights- Breeze	2000048
Bulb for Rear Braking Lights	1000497
Temperature Sensor for Motor	ACBR009
<u>Wheels</u>	
Front Wheel 10-3” assy.	ASBR002
Tire Front 10 – 3"	HWBR001
Inner Tube 10 – 3"	HWBR002
Right Rear Wheel 10-3.5” assy.	ASBR011
Left Rear Wheel 10-3.5” assy.	ASBR031
Tire Rear 10 – 3.5"	HWBR003
Inner Tube 10 x 3.5"	HWBR004
<u>Power unit AMT</u>	
Power unit 10 km/h assembly	ASBR069
Power unit 12 km/h assembly	ASBR070
Power unit 15 km/h assembly	ASBR071
Power unit 10/12/15 km/h (parts)	ASBR059

Power Unit ASI	
ASI Transaxle Ratio 1:17 for 12 & 15 km/hr (Not in use)	MOBR001
ASI Transaxle Ratio 1:18.75 for 10 km/hr (Not in use)	MOBR002
Sunway Motor 4.8" (2HP)-3200 RPM (for 15 km (Not in use)	ASBR036
Sunway Motor 4.8" (2HP)-2700 RPM (for 12 & 10 (Not in use)	ASBR017
Electromagnet Brake with Release Lever Breeze- (Not in use)	ASBR018
Electromagnet Brake Release Lever Breeze-Warner (Not in use)	ASBR???
Plastic Covers , Seat and Accessories	
Front Light Cover	VPBR004
Mud Guard Cover (including adhered Cellular phone Cabin)	VPBR007
Handle Bar Front Cover	VPBR002
Handle Bar Rear Cover	VPBR003
Handle Bar Top Cover	VPBR001
Hand Protector Right	VPBR008
Hand Protector Left	VPBR009
Battery Cover	VPBR006
Rear Lights Cover	VPBR005
Display Panel Sticker	STBR001
Carpet Blue	HWBR012
Carpet Pink	HWBR006
Carpet Dark Gray	HWBR015
Fuse Cover	HWBR011
Canopy hole Cover	HWBR010
Canopy hole round Cork	HWBR009
Rear Bumper	HWBR005
Seat for 160 kg (352 lbs) user (Incl. Armrests and Headrest)	SEBR001
Charger 24V	See Note (2)
<p>Note:</p> <ol style="list-style-type: none"> 1. Minimal recommended quantity is one unit of each of the above depend on models. 2. Accord. to local requirements and Approvals . 3. Part numbers can be different due to local market demands and requirements . It is very much recommended to check with customer service before ordering . 	



Appendix B - Exploded Drawings of Parts and Assemblies

In this book you can find the drawing: [FTBR999](#), [ASBR002](#), [ASBR010](#), [ASBR012](#)
[FTBR019](#), [FTBR020](#) and [FTBR028](#)



With those drawings you can find all parts.

The rest of the drawing and more you can find on CD supplied to the agencies .

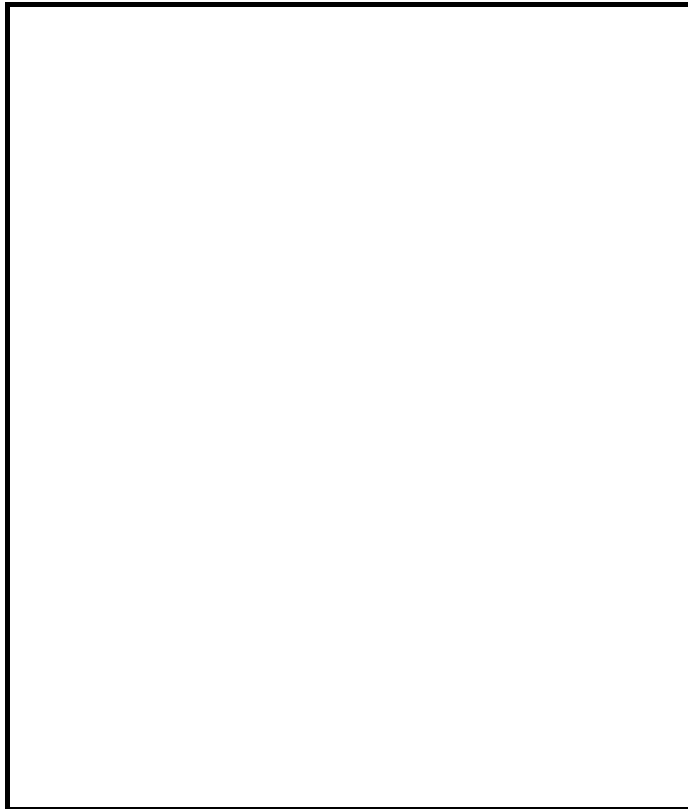
From the CD you can open the drawings by clicking on the go-to of the needed drawing.

If you don't have "Acrobat" you can find it on the Maintenance CD

4.0	FTBR999-NORWAY	Main Assembling Drawing for NORWAY	4.0 GoTo
4.0	FTBR999	Main Assembling Drawing	4.0 GoTo
4.1	ASBR001	Fork Assembly	4.1 GO TO
4.2	ASBR002	Front Wheel 10-3	4.2 GO TO
4.3	ASBR003	Handle-Bar Assembly	4.3 GO TO
4.4	ASBR004	Handle-Bar Right Switches	4.4 GO TO
4.5	ASBR005	Handle-Bar Left Switches	4.5 GO TO
4.6	ASBR006	Potentiometer	4.6 GO TO
4.7	ASBR007	Buzzer	4.7 GO TO
4.8	ASBR008	Key-Switch	4.8 GO TO
4.9	ASBR009	Charging Socket	4.9 GO TO
4.10	ASBR010	Display Assembly	4.10 GO TO
4.11	ASBR011	Rear Wheel Assembly	4.11 GO TO
4.12	ASBR012	Rear Electronics Box	4.12 GO TO
4.13	ASBR013	Rear Electronics Harness	4.13 GO TO
4.14	ASBR069	Power Unit 10 km/hr Transaxle Unit	4.14 GO TO
4.15	ASBR070	Power Unit 12 km/hr Transaxle Unit	4.15 GO TO
4.16	ASBR071	Power Unit 15 km/hr Transaxle Unit	4.16 GO TO
4.17	ASBR059	Power unit	4.17 GO TO
4.18	ASBR018	Electromagnetic Brake (old version for ASI)	4.18 GO TO
4.19	ASBR019	Seat Assembly	4.19 GO TO
4.20	ASBR020	Cover Rear Lights Assembly	4.20 GO TO
4.21	ASBR021	Rear Light Assembly	4.21 GO TO
4.22	ASBR022	Battery Cover	4.22 GO TO
4.23	ASBR023	Main Driving Harness	4.23 GO TO
4.24	ASBR024	Main Lights Harness	4.24 GO TO
4.25	ASBR025	Main Supply Harness	4.25 GO TO
4.26	ASBR026	Battery Supply Harness	4.26 GO TO
4.27	ASBR027	Clamp Apple + Indexing Plate	4.27 GO TO
4.28	ASBR028	Front Lights Assembly	4.28 GO TO
4.29	ASBR030	Main Fuse 70A	4.29 GO TO
4.30	ASBR032	Battery Red (+) wire	4.30 GO TO
4.31	ASBR033	Battery Black (-) wire	4.31 GO TO
4.32	ASBR034	Front Light Harness	4.32 GO TO
4.33	ASBR067a	Tiller assy. for left hand operation	4.33 GO TO
4.34	ASVR068a	Handle bar Assy. for left hand operation	4.34 GO TO
4.35	ASBR046	Canopy for Breeze	4.35 GO TO



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