Afiscooter s

Service manual

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1. Safety instructions

1 General:

1.1.1 Technicians who are servicing the scooter should be authorized to service the scooter.

1.1.2 Technicians who are servicing the scooter should be aware and follow all safety instructions within the User Manual.

1.1.3 Technician should follow general safety instruction like using gloves, safety glasses when needed.

1.1.4 The scooter weight with batteries is about 150 kg even lifting 1 wheel is about 40 kg. Always use other people help or an appropriate lifting device.

1.1.5 When lifting always use your legs and not your back.

1.1.6 The battery weight is about 20-30 kg. The power unit weight is about 25 kg. The seat weight is about 15kg.

1.1.7 Never do any change in the product before consulting the manufacturer engineering. Remember the products are approve as they are, any change remove the manufacturer responsibility for the safety of the product.

2 Drive :

1.2.1 Technicians who are driving the scooter should be aware and follow all safety instructions within the User Manual.

3 Mechanic :

1.3.1 It is possible that a technician will need to operate the scooter when he is standing on the side, working on different assemblies.

1.3.2 When no electric power and operation needed, always Stop the power by Switch OFF and disconnecting the battery terminals.

1.3.3 Never put any part of your body under the scooter parts.

1.3.4 If necessary, first place a wood block under, to make sure no injure will happen.

1.3.5 Use standard tools. Use them according to their safety instructions.

4 Electric :

1.4.1 If necessary to operate the scooter when you are not seating on it. In such cases you should be aware to the parts that can move by power – Power unit shafts and wheels.

1.4.2 Never put your hands close to a part that is moving or turning. Be aware that your cloth will not be trapped into one of the moving parts.

1.4.3 Batteries contain a large electric energy inside. This energy can cause sparks and heat metals when short circuiting.

1.4.4 When working on the battery terminals, make sure no to short circuit between any 2 terminals. This can cause strong spars and make the tools very hot.

1.4.5 When working on the batteries, use protecting gloves and safety glasses.

1.4.6 Battery contains acid. Never open any of the battery case. If you see any liquid or Gel aside, beware of it. It might be Acid.

2. Specific Tools for technicians

- 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
- P&G SP-1 Programmer (for S-Drive, possible to upgrade old model to modified free of charge)
- Wooden blocks to elevate the Afiscooter 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 Afiscooter make sure that the 2 rear wheels are free to turn , so that the scooters will not move.

3. Specific Parts:

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

1. Front Board
2. Display LCD Board
3. Main Harnesses Cable.
4. Main Front Lights Harness Cable.
5. Main Rear Lights Harness Cable
6. Motor/Power Unit
7. Rear Light Board LEDs
8. Front Headlight
9. Controller SDrive 140A - P&G
10. Key Switch
11. Charging Socket
12. Main Supply Harnesses.
13. Charger
14. Sensors Harness
15. Handlebars switches – Left and Right
16. Main Fuse & Charging Fuse

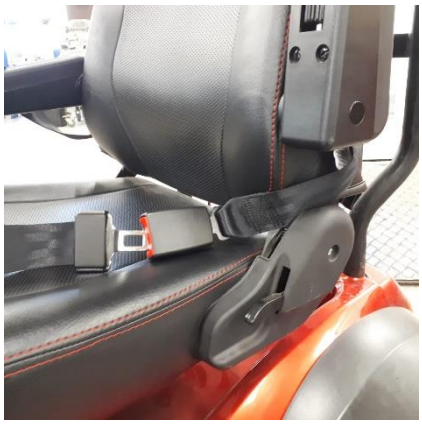
4. Options / Accessories assembling

1 An integrated canopy consisting of a polycarbonate window, a steel frame and plastic covers.
Installation instructions in appendix 1.

2 Rear box for dual seat
drawing in appendix 3

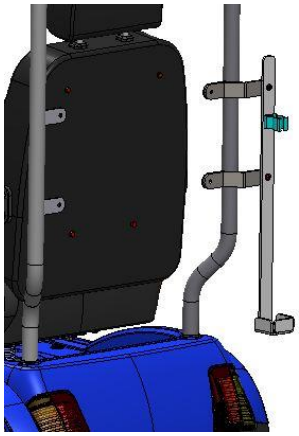
Rear box for single seat
drawing in appendix 2

3 Seat belt.
Connect to the lower screw of the armrest on both sides.
The location of the belt buckle is between the armrest and the seat.



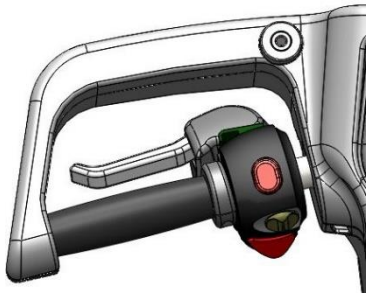
4 Connection facilities for walking sticks and crutches.

Rear frame connection device -
connects to the ears in the rear frame

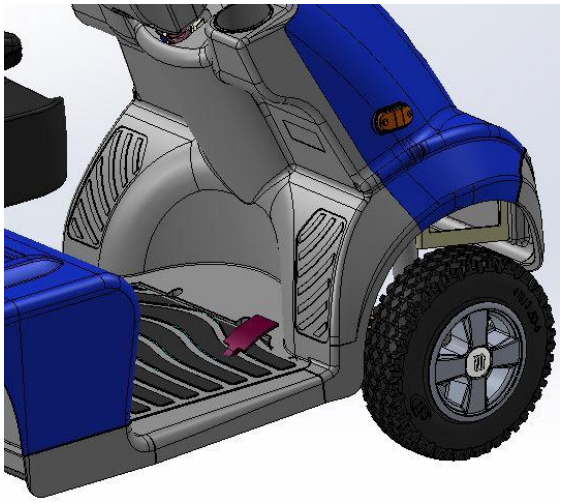


Seat connection device -
connects to the armrest screws

5 Left hand operation.

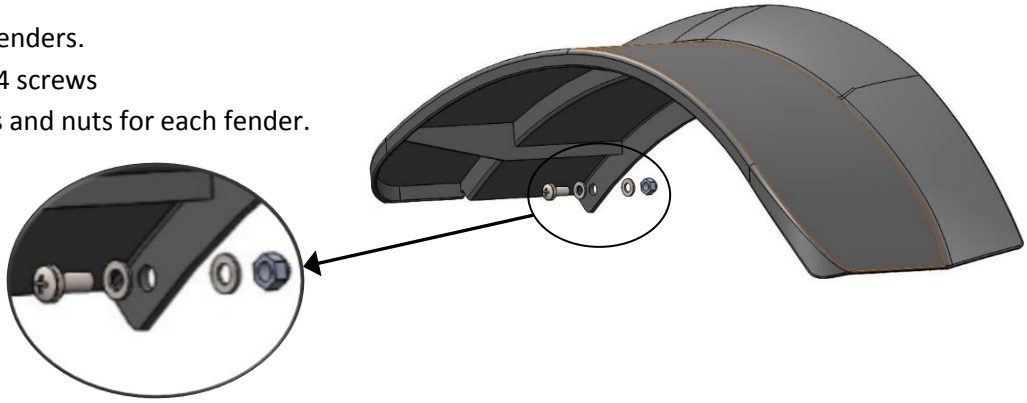


6 Foot Pedal System.
Assembly instructions
in appendix 4.



7 Golf wheels.

8 Golf wheels fenders.
Assembly by 4 screws
With washers and nuts for each fender.



9 Flexible rain cover.

10 Floor raise

Elevation for 3 wheels

Elevation for 4 wheels

11 Canopy mirror

Assemble the mirror to the bracket according to Fig. 1
Attaching the mirror to the canopy by an existing screw (Fig. 2).

Figure 2

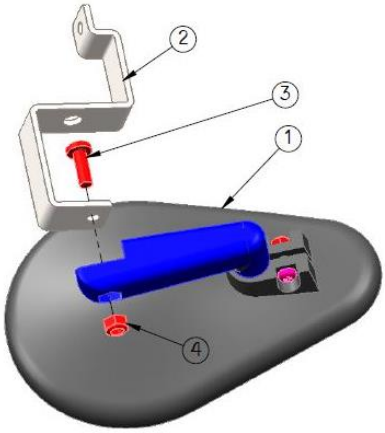
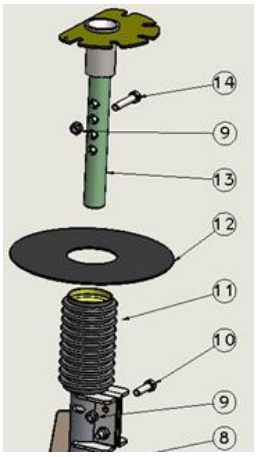
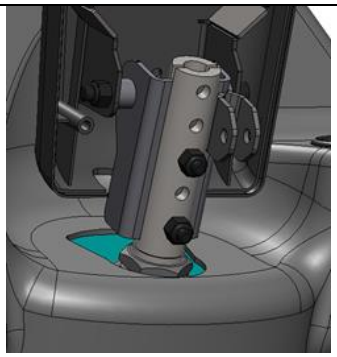


Figure 1

12 Shabbath Kit

Installation Instructions in appendix 5.

5. Mechanical Adjustments

#	Description	image	How to Adjust
1	Seat Height		Release both secure bolts (10) and level bolt (14). Change pin Level hole as required. Resecure both level bolt and secure bolt. Make sure the seat pin is parallel to the controller cover. Adjustments : 3 x 20 mm.
2	Tiller Height		Release the secure nut and screw, adjust height and resecure again the screw and the nut. Adjustments: 25 mm 1. Lower and middle holes. 2. Second and fourth holes.
3	Rear Shock absorber Load	 	Using a C Type key,  adjust the load rate by changing the Sprint pretention. Remark: The Adjust should fit the comfort of the user.

6. Front Electronics Board Setup

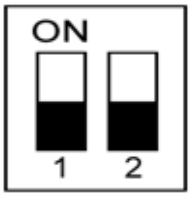
On the front board there are DIP Switches whose job is to define the operation of the buzzer in signals and faults.

Can also be adjusted via the controller by changing parameters.

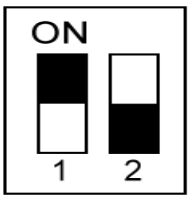
Dip Switches Setup is as follows : (Shown the Default Set Up)

switch	Operation trigger	Default	TGA Default
1	signals	OFF = close	ON = open
2	faults	OFF = close	OFF = close

Default:

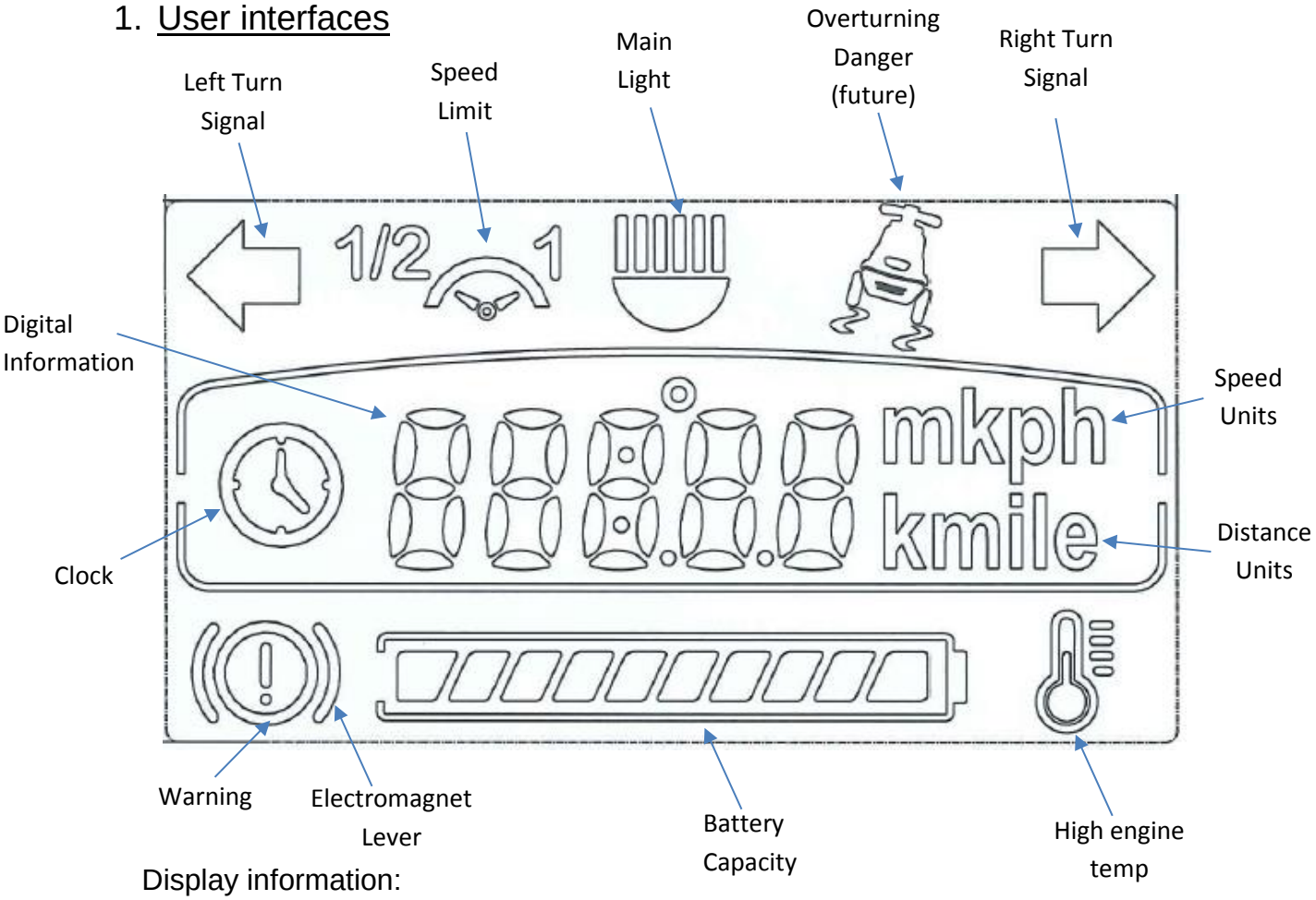


TGA Default:



7. LCD Display Set Up and User Manual

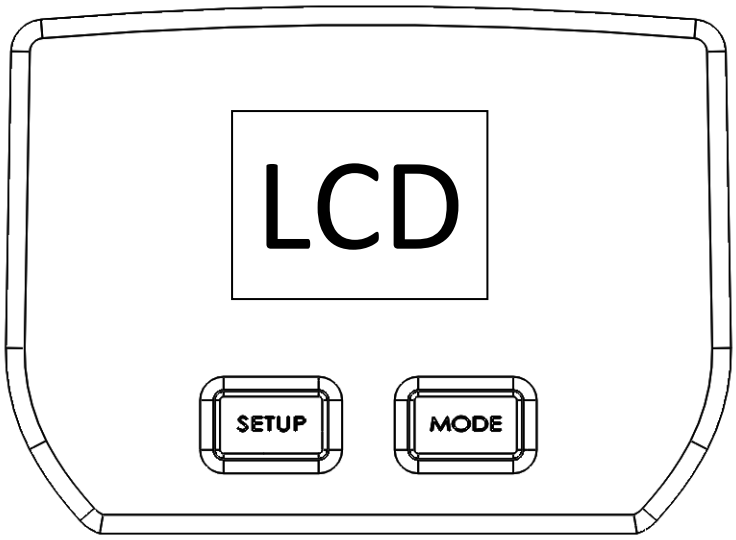
1. User interfaces



Display information:

- Right/Left turn signal: Use to show right/left Blinkers working.
- Main light: Use to show Front lights and rear Pilot lights are working.
- Digital information: Shows- Speed, Distance of Trip, Time of Trip, Time or Faults Codes.
- Speed units: Show mph (miles per hour) or kph (kilometers per hour).
- Distance units: Shows- mile (miles) or km (kilometers).
- Speed limit: half speed / full speed.
- Battery capacity: 10 Bars =full, 1 bar = empty, between is proportional.
- Warning: Indicate when error / inhibit mode.
- Electromagnet Lever: Indicate when the EMB is opened.
- High engine temp: Indicate when the motor is heated.
- Overturning danger: In this version, the Overturning danger display will not be activated.

Push buttons:



Right – Mode : Use to change between different display modes and to Reset the Distance and Time.

Left- Setup : Use to adjust the clock. As well as on and off the display lighting.

Internal LED: Can be seen only from the bottom side of the LCD board. When LCD board active – flashes to indicate OK, constantly on in charge mode.

2. Speed reading:
   This is done with the help of a magnetic sensor located on the right wheel axle. The speed reading is affected by the wheel diameter - the possibility of choosing between the wheel diameters in the parameter table.

3. Numeric view:
   Three views -
   a. Speed (mph / kph). - Resolution - 1kmh / 1mph
   b. Distance (miles / km). Resolution - 0.1mile / 0.1km
   c. Current time (HH: mm). (The clock will light up)

   Switch between modes by pressing the MODE key.
   Without automatic switching to default mode.

4. User view:

4.1 Backlight:
The backlight has two activity levels, which are determined by the user settings.
- Night Light Level - When the headlight signal is active.

- Daylight level - When the headlight signal is inactive.

A short press on Setup turns off and on the backlight.

4.2 View information:

Switching between the different types of information is done by pressing with the Mode key.

1. Hour in 24 hours / 12 hours format (can be changed in settings mode), long press on SETUP for 3 seconds (only minute and hour, no day and date, time according to time format). The clock indicator will light in this mode.
2. Travel speed in km / mile per hour (can be changed in settings mode), according to the reading from a speed sensor only.
3. Travel range in km / miles with reset option (press SETUP for 3 seconds).

• When the tool is turned on and off, the screen will always return to the last state it was in before turning off.

4.3 Settings:

Long press for 7 seconds on MODE and SETUP will put the screen in the settings mode. In this mode it will be possible to scroll between the various parameters using the SETUP button, pressing MODE will change the value of the displayed parameter. A parameter will appear as follows: P XX, where XX represents the parameter number. The last mode will be a reset mode that will look like this: Cr. turning the tool (and the screen) on and off will cause the settings screen to exit and return to the previous state the user was in. After entering a particular parameter, MODE switches between the different values of the displayed parameter, SETUP switches between the various parameters.

PARAMETER	DESCRIPTION	OPTIONS
P 01	Distance and speed display	1- kilometer, km / h (default) 2- miles, miles per hour
P 02	Temperature display	1- Celsius (default) 2- Fahrenheit
P 03	Wheel diameter	1 - 310 - Not used in this model 2 - 410 - Golf wheel 3 - 430 - Standard Wheel (Default)
P 04	Hour display	1 - 24 hours (default)

		2 - 12 hours
P 05	Daytime running backlight (headlight off)	0- Off. 1-5 - Scale of Power. (Default - 5)
P 06	Night running backlight (headlight on)	0- Off. 1-5 - Scale of Power. (Default - 2)
P 07	Battery display from the status line / algorithm on the board.	1- From the S-Drive status line. (Default) 2- According to a calculation from the algorithm in the card.
P 08	Status indicator	1 - Fault code is displayed in alphanumeric view (default). 2 - Fault code is displayed in the exclamation mark (flashing).
Cr	Reset the display parameters	Reset the parameters to default.

4.4 Fault display:
When there is a fault the comment pops up on the screen.
Fault table on page 24 Section 12.4

In a situation that the potentiometer is pressed when turn on the scooter, a signal c will appear in the status line. When this condition is detected, the last condition of the batteries must be displayed before the shutdown, until the potentiometer is released and returned to normal operation. The numeric display will show a running animation of the digit '0' from left to right on all five digits in the display in a cyclic manner, 120mSec per digit until the potentiometer is released and beyond signal a. This animation will be displayed in both modes of parameter 7.

5. Display the software version burned on the LCD:

Activating the tool using the key switch, when the Mode button is pressed, will display the software version number for about 3 seconds, and then switch to normal working mode.

8. Controller Programming And A List Of Programming Parameters

8.1 General

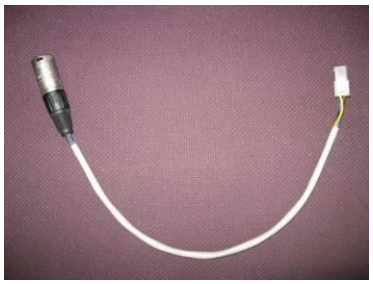
The scooter behavior while driving can be adjusted by programming the controller, for example slowing down, changing the direction of operation of the operating handle and more. Only a qualified technician may change the controller programming.

Warning: Bad programming of the controller can cause safety problems in the behavior of the scooter.

The following parameters refer to the s-drive 140 controller with sp1a manual programming.

Programming can be done through the charging socket with an adapter or directly to the programming socket in the controller without an adapter.

Note: You can also purchase a PC programming system.



Charger Socket Adapter P/N - ASS4079

Programmer sp1a P/N - PCS4002

Note: In case of any need to change a parameter that is not highlighted in the list, please contact and consult with Afikim Electric Vehicle Engineering.

8.2 Operating Instructions

8.2.1 Connect the adapter to the programmer and plug into a charging socket (the programmer starts working).

8.2.2 The up and down arrows (↑) (↓) allow the parameter to be selected.

8.2.3 To change a parameter, see the parameter in the display bar and press the "ENTER" button, then the value of this parameter appears.

8.2.4 Using the arrows (↑) (↓) you can increase or decrease the value. (In some cases a change between Off and On).

8.2.5 After setting the new value press the "ENTER" button, the scooter buzzer will beep several times (in this situation the scooter will not travel).

8.2.6 The key switch must be closed and activated in order to return the scooter to normal operation. (Some parameters value is determined in pairs).

8.2.7 Programmer returns to the list of parameters. To change another parameter repeat the previous 3 sections

8.2.8 In the engineering menu bar enter the change of engineering parameters.

8.3 List of parameters for S-Drive140 controller with power unit model CT10 / CT12 / CT15

8.3.1 Parameters for use in manual programmer:

Note:

Highlighted parameters - User customizable values can be downloaded.

Any change in parameters that are not highlighted - it is recommended to consult the manufacturer.

#	Parameter name	Parameter text	units	CT10	CT12	CT15	Explanation of the parameter
1	Forward Accel'n ?	fast	0.1s	35	40	40	Acceleration forward fast
1	Forward Accel'n ?	slow	0.1s	40	50	50	Acceleration forward slow
2	Forward Decel'n ?	fast	0.1s	14	15	14	Deceleration forward fast
2	Forward Decel'n ?	slow	0.1s	12	13	20	Deceleration forward slow
3	Reverse Accel'n ?	fast	0.1s	40	40	25	Acceleration backward fast
3	Reverse Accel'n ?	slow	0.1s	40	40	60	Acceleration backward slow
4	Reverse Decel'n ?	fast	0.1s	15	15	17	Deceleration backward fast
4	Reverse Decel'n ?	slow	0.1s	15	15	14	Deceleration backward slow
5	Max Fwd Speed ?	fast	%	100	100	100	Max forward speed fast
5	Max Fwd Speed ?	slow	%	60	60	50	Max forward speed slow
6	Min Fwd Speed ?	fast	%	50	50	30	Min forward speed fast
6	Min Fwd Speed ?	slow	%	30	30	30	Min forward speed slow
7	Max Rev Speed ?	fast	%	50	50	40	Max backward speed fast
7	Max Rev Speed ?	slow	%	35	35	30	Max backward speed slow
8	Min Rev Speed ?	fast	%	30	30	30	Min backward speed fast
8	Min Rev Speed ?	slow	%	30	30	30	Min backward speed slow
9	Invert Throttle?	inv throttle		No	No	No	Invert potentiometer
10	Sleep Timer ?	time	m	0	0	0	Sleep mode
11	Read System Log?						Reading Fault History
12	Read Timer?	elapsed	h				Reading a working hours counter
13	Engineer Menu ?						Enter the engineering menu (from here to the end)
14	Current Limit ?	min	A	130	130	130	Min. Current limitation
15	Current Limit ?	max	A	130	130	130	Max current limitation
16	Output Voltage?	output	V	24	24	24	Output voltage
17	Drive Boost ?	current	A	140	140	140	Boost current
18	Drive Boost ?	time	s	10	10	10	Boost current time
19	Drive Foldb'k 1 ?	threshold	A	110	110	110	Driver fold back current
20	Drive Foldb'k 1 ?	time	s	30	30	30	Driver fold back time
21	Drive Foldb'k 2 ?	level	%	70	70	70	Driver fold back level
22	Drive Foldb'k 2 ?	temp	ºC	80	80	80	Driver fold back temperature
23	Motor Cooling ?	time	s	120	120	120	Cool time
24	Compansation ?	motor cmp	mΩ	20	20	20	Speed compensation - resistance of the armature

25	Parameter 3?	Param. 3		130	130	130	Parameter 3 - Value-enhanced engine compensation
26	Parameter 4?	Param. 4		30	30	30	Parameter 4-Boost Delay
27	Bridge Hold?	bridge hld	cs	300	115	140	Bridge hold
28	Soft Stop ?	soft-stop		On	On	On	Soft Stop
29	Freewheel?	threshold		100	100	100	Freewheel - hold
30	Freewheel?	timeout	cs	20	20	20	Freewheel - time
31	Throttle Gain ?	gain		170	160	160	Potentiometer - gain
32	Throttle D'band ?	deadband	%	9	9	9	Potentiometer – dead band
33	ISO Tests ?	ISO tests		Off	Off	Off	ISO tests
34	Throttle Type ?	thrtl' type		2	2	2	Potentiometer type
35	Displaced Mode?	Dspl mode		1	1	1	Starting with potentiometer in position not "0"
36	Check Refs?	check refs		Yes	Yes	Yes	Potentiometer test
37	Speed Limit Pot?	pot enabled		No	No	No	Speed limit potentiometer
38	Brake Time ?	brake time	ms	650	750	1000	Electromagnetic brake -activation time
39	Brake Check?	brake check		Yes	Yes	Yes	Electromagnetic brake - Integrity check
40	Brake Alarm?	brake alarm		Yes	Yes	Yes	Electromagnetic brake - Disconnection alarm
41	Brake Light?	brake light		No	No	No	Activating braking light
42	Status Output?	type		0	0	0	Set status port for display
43	Diagnostic Flash	flesh		2	2	2	Setting up troubleshooting the display
44	Diagnostic Alarm	diag. alarm		Yes	Yes	Yes	Activating a buzzer during faults
45	Inhibit 1 Mode?	Mode		1	1	1	Set mode inhibit No. 1
46	Inhibit 1 Speed?	speed		0	0	0	Set speed inhibit No. 1
47	Inhibit 1 Latch?	latched		No	No	No	Need to restart after inhibit No. 1
48	Inhibit 2 Mode?	Mode		1	1	1	Set mode inhibit No. 2
49	Inhibit 2 Speed?	speed		0	0	0	Set speed inhibit No. 2
50	Inhibit 2 Latch?	latched		Yes	Yes	Yes	Need to restart after inhibit No. 2
51	Inhibit 3 Mode?	Mode		1	1	1	Set mode inhibit No. 3
52	Inhibit 3 Speed?	speed		0	0	0	Set speed inhibit No. 3
53	Inhibit 3 Latch?	latched		No	No	No	Need to restart after inhibit No. 3
54	Clear SystemLog	erase log					Clearing fault history
55	Clear Timer	clear timer					Reset counter working hours
56	Reverse Alarm?	Alarm		Off	Off	Off	Buzzer is activated when driving backwards
57	Pulse Rev Alarm?	pulsed		Yes	Yes	Yes	Reverse buzzer with breaks (pulses)
58	TruCharge Cable?	cable res	mΩ	60	60	60	Cable resistance for batteries
59	TruCharge Cal.?	calibration	%	100	100	100	Calibration of battery status
60	Low Batt Flash ?	flash level		2	2	2	Low battery signal on display
61	Low Batt Alarm?	Low bat. alm		Off	Off	Off	Low battery alarm
62	Back To Root ?						Back to main menu

8.3.2 Parameters for using PC software:

PC programmer	Software rev. 14.6.0

Power Unit

Parameters	**CT10**	**CT12**	**CT15**	**Explanation of the parameter**
Speed Settings				
Forward Acceleration Fast Profile (0.1 Sec)	35	40	40	Acceleration forward fast
Forward Acceleration Slow Profile (0.1 Sec)	40	50	50	Acceleration forward slow
Forward Deceleration Fast Profile (0.1 Sec)	14	15	14	Deceleration forward fast
Forward Deceleration Slow Profile (0.1 Sec)	12	13	20	Deceleration forward slow
Reverse Acceleration Fast Profile (0.1 Sec)	40	40	25	Acceleration backward fast
Reverse Acceleration Slow Profile (0.1 Sec)	40	40	60	Acceleration backward slow
Reverse Deceleration Fast Profile (0.1 Sec)	15	15	17	Deceleration backward fast
Reverse Deceleration Slow Profile (0.1 Sec)	15	15	14	Deceleration backward slow
Max Forward Speed Fast Profile (%)	100	100	100	Max forward speed fast
Max Forward Speed Slow Profile (%)	60	60	50	Max forward speed slow
Min Forward Speed Fast Profile (%)	50	50	30	Min forward speed fast
Min Forward speed Slow Profile (%)	30	30	30	Min forward speed slow
Max Reverse Speed Fast Profile (%)	50	50	40	Max backward speed fast
Max Reverse Speed Slow Profile (%)	35	35	30	Max backward speed slow
Min Reverse Speed Fast Profile (%)	30	30	30	Min backward speed fast
Min Reverse Speed Slow Profile (%)	30	30	30	Min backward speed slow
Speed Limit Pot Enabled	Off	Off	Off	Speed limit potentiometer
Operation Settings				
Sleep Timer (Minutes)	0	0	0	Sleep mode
Throttle Invert	No	No	No	Invert potentiometer
Battery Settings				
Low Battery Flash Level (Bars)	2	2	2	Low battery signal on display
Cable Resistance (milli-Ohms)	60	60	60	Cable resistance for batteries
Calibration Factor	100	100	100	Calibration of battery status
Low Battery Alarm	Off	Off	Off	Low battery alarm
Trucharge Reset Voltage Tag	255	255	255	Reset voltage reads batteries
Battery Curve Scaler	0	0	0	Battery status curve - multiplier
Low Voltage Cut-Out (Deci-Volts)	160	160	160	
Low Voltage Cut-Out Time (Secs)	255	255	255	
Inhibit Settings				
Inhibit 1 Mode	1	1	1	Set mode inhibit No. 1
Inhibit 1 Operation	Non-Latching	Non-Latching	Non-Latching	Need to restart after inhibit No. 1
Inhibit 1 Speed (%)	0	0	0	Set speed inhibit No. 1
Inhibit Mode 2	1	1	1	Set mode inhibit No. 2

Inhibit 2 Operation	Latching	Latching	Latching	Need to restart after inhibit No. 2
Inhibit 2 Speed (%)	0	0	0	Set speed inhibit No. 2
Inhibt Mode 3	1	1	1	Set mode inhibit No. 3
Inhibit 3 Operation	Non-Latching	Non-Latching	Non-Latching	Need to restart after inhibit No. 3
Inhibit 3 Speed (%)	0	0	0	Set speed inhibit No. 3
Aux Output Mode	2	2	2	Set Aux output
Inhibit 2 Aux Output	2	2	2	
General Settings				
Soft Stop	On	On	On	Soft stop
Brake Drive Time (mili-Sec)	650	750	1000	Electromagnetic brake -activation time
Output Voltage (Volts)	24	24	24	Output voltage
Status Output Type	0	0	0	Set status port for display
Diagnostic Flash Sequence	2	2	2	Setting up troubleshooting the display
Reverse Alarm	Off	Off	Off	Buzzer is activated when driving backwards
Reverse Alarm Tone	0	0	0	Set reverse alarm tone
Pulsed Reverse Alarm	On	On	On	Reverse buzzer with breaks (pulses)
Diagnostic Alarm	On	On	On	Activating a buzzer during faults
Diagnostic Alarm Tone	0	0	0	Set buzzer during faults tone
Brake Disconnected Alarm	On	On	On	Electromagnetic brake - Disconnection alarm
Brake Disconnected Alarm Tone	0	0	0	Set Electromagnetic brake - Disconnection alarm tone
Brake Fault Detect	On	On	On	Electromagnetic brake - Integrity check
Brake Light	Off	Off	Off	Activating braking light
Push too Fast threshold	100	100	100	Freewheel - hold
Push too Fast Timeout (0.01 Sec)	20	20	20	Freewheel - time
Freewheel Enable	Enable	Enable	Enable	Activate freewheel mode control
Inhibit 2 Horn Input Enable	Off	Off	Off	Inhibit buzzer input
Horn Tone	0	0	0	Set buzzer tone
Thermal Shutdown Trip	No	No	No	
Motor Settings				
Current Limit Max (Amps)	130	130	130	Max current limitation
Boost Drive Current (Amps)	140	140	140	Boost current
Boost Drive Time (Sec)	10	10	10	Boost current time
Current Foldback Threshold (Amps)	110	110	110	Driver fold back current
Current Foldback Time (Sec)	30	30	30	Driver fold back time
Current Foldback Level (%)	70	70	70	Driver fold back level

Motor Cooling Time (Sec)	120	120	120	Cool time
Current Foldback Temp (Deg C)	80	80	80	Driver fold back temperature
Current Limit Min (Amps)	130	130	130	Min. Current limitation
Motor Stall Timeout (Sec)	0	0	0	
Motor Compensation (milli-Ohms)	20	20	20	Speed compensation - resistance of the armature
Anti-Rollback Level	0	12	0	Anti-Rollback Level
Pull-away Delay (centi-Sec)	30	30	30	Parameter 4-Boost Delay
Slope Factor	500	500	500	Slope Factor
Anti-Rollback Velocity	42	0	28	Anti-Rollback Velocity
Braking Current Limit (Amps)	140	140	140	Braking Current Limit
Timed Foldback Braking Current (Amps)	130	130	130	Braking Current fold back time
Timed Foldback Speed (%)	100	100	100	Braking Current fold back speed
Enhanced Motor Compensation (Up)	130	130	130	Parameter 3 - Value-enhanced engine compensation
Enhanced Motor Compensation (Down)	300	115	140	Bridge hold
Enhanced Motor Compensation (Up) Gain	1	1	1	
Throttle Settings				Manufacturer settings only
Throttle Type	2	2	2	Potentiometer type
Throttle Deadband (%)	9	9	9	Potentiometer – dead band
Throttle Gain (%)	170	160	160	Potentiometer - gain
Throttle Operated at Power-Up	1	1	1	Starting with potentiometer in position not "0"
Throttle Reference Test	On	On	On	Potentiometer test
ISO Test Resistor	Off	Off	Off	ISO tests
Timed Throttle Invert	0	0	0	

9. Periodic maintenance Check

No.	Type of Service	Who	Frequency
1	Check air pressure in all tires.	User	Every week Air pressure: Front wheels in Afiscooter 4 wheels: 20 psi Front wheel in Afiscooter 3 wheels: 35 psi Rear wheels in all models: 35 psi Rear wheels in all Golf models: 20 psi
2	Check emergency brakes	User	Every week
3	Check normal drive and stop	User	Every Month
4	Check tires wear	User	Every Month
5	Check for missing parts and damaged parts .Use the figures #1,2,3,4 .	User	When receiving the ***Afiscooter S*** or after a long time not using it.
6	Check emergency brake	User	Every Month
7	Check secure of all screws and parts	Technician	Once a year by technician.
8	Batteries replacing.	Technician	Every 2-3 years , after about 300-400 full cycles of charge/discharge. When short travel distance and/or technician check. **Note: To Replace the batteries, the Seat and Battery Cover located under the Seat must be removed.**
9	Cleaning	User Technician	External – when needed. Internal – Once a year.
10	Check power unit	Technician	Check noise , clearance , current on surface should be 12 to 15 Amp.

11	Check Emergency Brake	Technician	Once a year.

Periodic maintenance - continue

Removing the Seat and the Batteries Cover(2)	Turn the Seat by using the lifting Lever (7.5) so that the Lever will point 45º Right or Left. The Seat can be removed only at this position. Remove the Seat (7): Hold the Seat in your two hands – one hand on the backrest and a second hand at the front lower part of the seat and lift the seat up from its pivot. **Warning**! **The seat weight is 15 Kg (33lbs).** Keep lifting with your Knees/legs and not loading your Back. Release Battery Cover (2) securing screws (2.6). Lift the Battery Cover (2) until it is released from the Seat Pivot .
Replacing the Batteries Cover(2)	The replacement of the Gray Cover is done in reverse order; MAKE SURE that the Gray Cover (2) fits onto it's place. Secure with the 4 screws (2.6).
Batteries	Batteries weight each ~23 Kg (~50 lbs) and over. Lift each battery only with the appropriate handle. Keep lifting with your Knees/legs and not loading your Back.
Tires	Correct air pressure in the tires is essential for optimal steering and stability of the ***Afiscooter S***. Check air pressure every two weeks. ±2 psi. Afiscooter Inflate to the proper air pressure: 25 4W front tires: 20±2 psi. Golf wheels tires : 20±2 psi.
Cleaning	Use only a damp cloth and mild detergent. Never use a hose for cleaning. This may severely damage the power and electronic components.

10. Mechanical Fault troubleshooting

#	Description	Probable cause	Repair action
1	Noises from front steering and suspension system	Check front suspension for clearances and secure of bolts. Check front shock absorbers.	Replace wear parts, secure bolts. Replace if needed.
2	Front suspension not functioning properly.	Check front shock absorbers.	Replace if needed.
3	Excessive wear of front tires after short period.	Wear of bushings that cause clearances in the system. Un adjusted steering system.	Replace wear parts , Adjust the steering and secure.
4	Rear suspension Noisy.	Wear in power unit absorbing Rubbers. Check for clearances and unsecured parts. Check the shock absorbers.	Replace the absorbing rubbers if needed. Secure parts. Replace shock absorbers if needed.
5	Rear suspension not functioning	Check user weight and the fit of the absorbers. Faulty shock absorbers	Replace if needed Replace if needed
6	Noise from power unit.	Wear in power unit	Check and replace power unit if needed

7	Too short distance travel between charging	Power unit wear, consume high current. Also might be noisy.	Check noise and current and replace if needed.
8	Clearances in tiller	Unsecured screws and gas piston faulty	Check scure of screws. Replace gas piston if needed.
9	Scooter does not have power or does not brake well or go to high speed downhill.	Wear in motor brushes.	Replace motor brushes.
10	Noises from motor	Wear of brushes. Faulty motor.	Check brushes and replace if needed. Replace motor.
11	Emergency handbrake does not stop	The brake cable is not tight or brake drum/disk is wear.	Tight cable and replace brake drum/disk if needed.
12	Flat tire and uneven and not smooth drive	Flat tire	Repair / replace tire's tube.

11. Control and Electronics system fault troubleshooting

12.1 General control system and Front Board Troubleshoots

The front board is the center of all peripheral functions of the scooter : Lights , Horn , Information goes to the LCD display .

Elimination troubleshoots:

The Front Board wiring connections are all quick connectors.

If you suspect the Front Board to be faulted we recommend as a quickest way to find if the Front Board is faulty, Doing by elimination – Just replace temporarily the Front Board with another working one and thus make sure if the problem is within the Front Board or somewhere else.

Check all connection of the Front Board, following the wiring diagram that can be found within this maintenance manual.

Check main and Charging fuses, located near the rear wheels.

Also always check related function switch , as example Light does not work , first check the light switch for continuity ,when is in ON position. Use the wiring diagram to figure the proper terminals to check each function switch terminals.

12.2 Trouble Shoot Table:

#	Description	Probable cause	Repair action
1	First check that Front Board internal LED flashes. If it is not Flashing.	Front Board is faulty or no power supply to the board.	Check Supply. If OK than Front Board is Faulty – Replace it.
2	If LCD is not working, check if LCD internal LED flashes. If it is not flashing.	LCD board is faulty or no power supply to the board.	Check supply. If OK than LCD board is faulty – Replace it.
3	Front light doesn't work	Front LED board faulty	Replace front LED board
		Front Board faulty	Replace Frond Board
4	Front Blinker/s doesn't work	Front Blinker board faulty	Replace front Blinker board
		Front Board faulty	Replace Frond Board
5	Rear pilot/s light does work	Rear Blinker board faulty	Replace Rear Blinker board
		Front Board faulty	Replace Frond Board
6	Rear Blinker/s doesn't work	Rear Blinker board faulty	Replace Rear Blinker board
		Front Board faulty	Replace Frond Board
7	Horn does not work properly	External Horn is faulty	Replace Horn

		Internal Horn is faulty	Replace Frond Board
		Front Board faulty	Replace Frond Board
8	Hazard doesn't work	Hazard switch fault	Check switch and repair
		Front Board faulty	Replace Frond Board
9	Reverse function doesn't work	Reverse switch fault	Check switch and repair
		Front Board faulty	Replace Frond Board
10	Electric EMB release function does not work	EMB release Switch faulty	Check switch and repair
		Front Board faulty	Replace Frond Board
11	LCD is not powered ON	LCD board faulty	Replace LCD board
		Front Board faulty	Replace Frond Board
12	No Charge start	Charger fault	Replace charger
		Charge fuse popup or faulty	Reset /Replace charge fuse
13	Travel distance very low	Charger fault	Replace charger
		Old / Weak batteries	Check Batteries / charge batteries, Replace if needed.
14	The LCD does not keep the time	LCD battery end of life (after 3-5 years of use)	Replace the LCD Battery.
15	No power or main fuse pop out	Over load Mechanical fault Fault controller Faulty power unit Short circuit occur	Try to reset 2 times. Troubleshoot the fault. Replace the controller. Replace the power unit. Find and repair short circuit.

12.3 Controller / Drive Troubleshoots

The controller is the center of all driving functions of the Afiscooter S: Speed control , acceleration , deceleration , EMB (Electro Magnetic Brake used as parking brake) , Reverse drive , Speed limiting etc. . But still the functions of the controller are all connected to all the wiring, connectors and as well the Front board, power units and batteries.

Elimination troubleshoots:
The controller wiring connections are all quick connectors.
If you suspect the controller to be faulted we recommend as a quickest and way to find if the controller is faulty, Doing it by elimination – Just replace temporarily the controller with another working one and thus make sure if the problem is within the controller or somewhere else.

Check all connection of the controller, following the wiring diagram that can be found within this maintenance manual.

12.4 Controller Fault codes using the LCD:

Count the number of flashes in the warning indicator of the LCD and see the code in the follows Table (Each cycle there is a short stop of few seconds):

1 Flashes	The battery needs charging or there is a bad connection to the battery. Check the connections to the battery. If the connections are good, try charging the battery.
2 Flashes	There is a bad connection to the motor. Check all connections between the motor and the controller.
3 Flashes	The motor has a short circuit to a battery connection. Contact your service agent.
4 Flashes	The freewheel switch is activated or the manual brake disengagement mechanism is operated. Check the position of the switch or lever.
5 Flashes	Not used.
6 Flashes	'The S-drive is being inhibited from driving. Inhibit 2 is active'. This may be because the battery charger is connected or the seat is not in the driving position.
7 Flashes	A throttle fault is indicated. Make sure that the throttle is in the rest position before switching on the scooter.
8 Flashes	A controller fault is indicated. Make sure that all connections are secure.
9 Flashes	The parking brakes have a bad connection. Check the parking brake and motor connections. Make sure the controller connections are secure.
10 Flashes	An excessive voltage has been applied to the controller. This is usually caused by a poor battery connection. Check the battery connections.

12.5 Controller Trip codes using programmer SP1 & actions to repair:

When the fault exists, connect the SP1 programmer's connector directly to the controller SDRIVE140 or to the charging socket, using a special wiring adaptor.

Trip Code	Action
A01	Quick switch ON / OFF. Switch OFF wait few seconds and ON again. Possible fault of main key-switch. If hundreds time suspect the keyswitch.
0300	Check the tiller & throttle wiring to the controller, then retest
0815	Check the tiller & throttle wiring to the controller, then retest
0A00	Check the sleep mode parameter is set correctly, then retest
0E07	Check the tiller & throttle wiring to the controller, then retest
0E08	Check the tiller & throttle wiring to the controller, then retest
1501	Check the solenoid brake's wiring & connections to the controller, then retest
1502	Check the solenoid brake's wiring & connections to the controller, then retest
1600	Check the batteries' wiring & connections to the controller, then retest Possible high voltage due to high load downhill. Possible to decrease the half speed parameter to 40% and instruct the user to drive 1/2 speed mode down-hills.
1601	Check the batteries' wiring & connections to the controller, then retest
1705	Internal faults in relay.
1E08	Check the wiring & connections to pin 4 of the programming socket, then retest
1E09	Check the wiring & connections to pin 6 of the 14 way tiller connector, then retest
1E0A	Check the wiring & connections to pin 14 of the 14 way tiller connector, then retest
2C00	Check the batteries' wiring & connections to the controller, then retest
2F01	Check the throttle is not displaced on start-up, then retest
2F01	Check the tiller & throttle wiring to the controller, then retest
3100	Battery connected whilst scooter is switched on. Turn off, wait 10 seconds, then retest

3B01	Check the motor wiring & the connections to the controller, then retest
3D02	Check the motor wiring & the connections to the controller, then retest
3D03	Check the motor wiring & the connections to the controller, then retest
3600	Internal un expected fault in the controller
4401	Internal controller fault
5300	Programmable parameter changed. Turn the scooter off, then on again, then retest
7000	Push at startup
7001	Push at drive
7C00	High temperature in the controller.
1E09	Inhibit activated. Can be caused by the electromagnetic brake lever micro switch or panic sensor.
All Others	Check all wiring & connections to the controller, then retest. Try replacing the controller.

12.6 Possible Faults symptoms and repair actions:

Symptom	Action
No power to programmer	Check the wiring & connections to the batteries, then retest
No power to programmer	Check the wiring & connections to the programmer, then retest
Scooter drives slowly	Check the controller is programmed correctly, then retest
Scooter drives slowly	Check the speed limiting function is not active e.g. seat raised, then retest
Scooter drives slowly	Check the solenoid brakes are not jammed, then retest
Status indicator does not light	Check the wiring & connections to the status indicator, then retest
Reverse alarm does not sound	Check the wiring & connections to the buzzer then retest
Reverse alarm does not sound	Check the buzzer is working correctly, then retest
Reverse alarm does not sound	Check the scooter is programmed correctly then retest
Scooter will not drive in reverse	Check the tiller wiring & connections, then retest
Scooter will not drive in reverse	Check the reverse switch is working correctly, then retest
In cases that the scooter with transaxle 12 km/hr is recoil.	Reduce the compensation parameter from 50 to 40.

Slow or Sluggish Movement

If the scooter does not travel at full speed and the battery condition is good, check the position of the speed limiting control. If adjusting the speed limiting control does not remedy the problem then there may be a non-hazardous fault.
Contact your service agent.

User Daily Checks

Throttle: With the scooter switched off, check that the throttle mechanism is not bent or damaged and that it returns to the position when you push and release it. If there is a problem do not continue with the safety checks and contact your service agent.

User Weekly Checks

Throttle: Put the throttle to the full speed forward position and switch the scooter on. The scooter should not move. show you that you have switched the scooter on with the throttle already pushed, a True Charge Trip type status indicator will display 7 Bars, whereas a single bulb (or LED) type status indicator will flash seven times sequence.
If the scooter does move, contact your service agent.
Parking brake: This test should be carried out on a level surface with at least one meter clear space around the scooter.
Switch the scooter on.

Check that the status indicator remains on, or flashes slowly, after half a second.
Go to drive the scooter slowly in the forwards direction until you hear the parking brake operate. The scooter may start to move.
Immediately release the throttle. You must be able to hear the parking brake operate within a few seconds.
Repeat the test in the reverse direction.
Cables and connectors:
Check that all connectors on the scooter are securely mated, and ensure that all cables are free from damage.

12. Mechanical assembly drawings

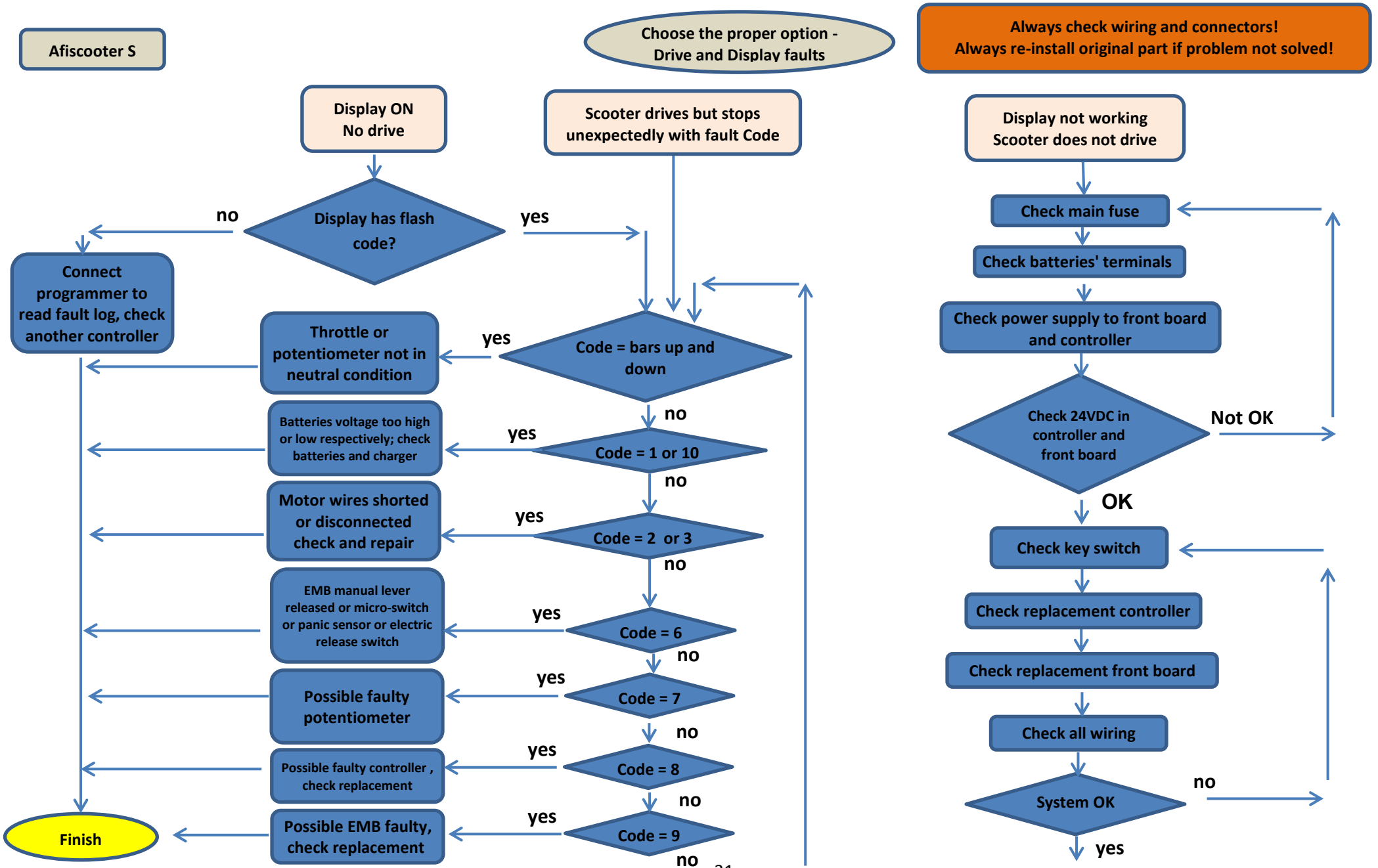
See attached assembling drawings: **Afiscooter S (4W & 3W) assembling.**

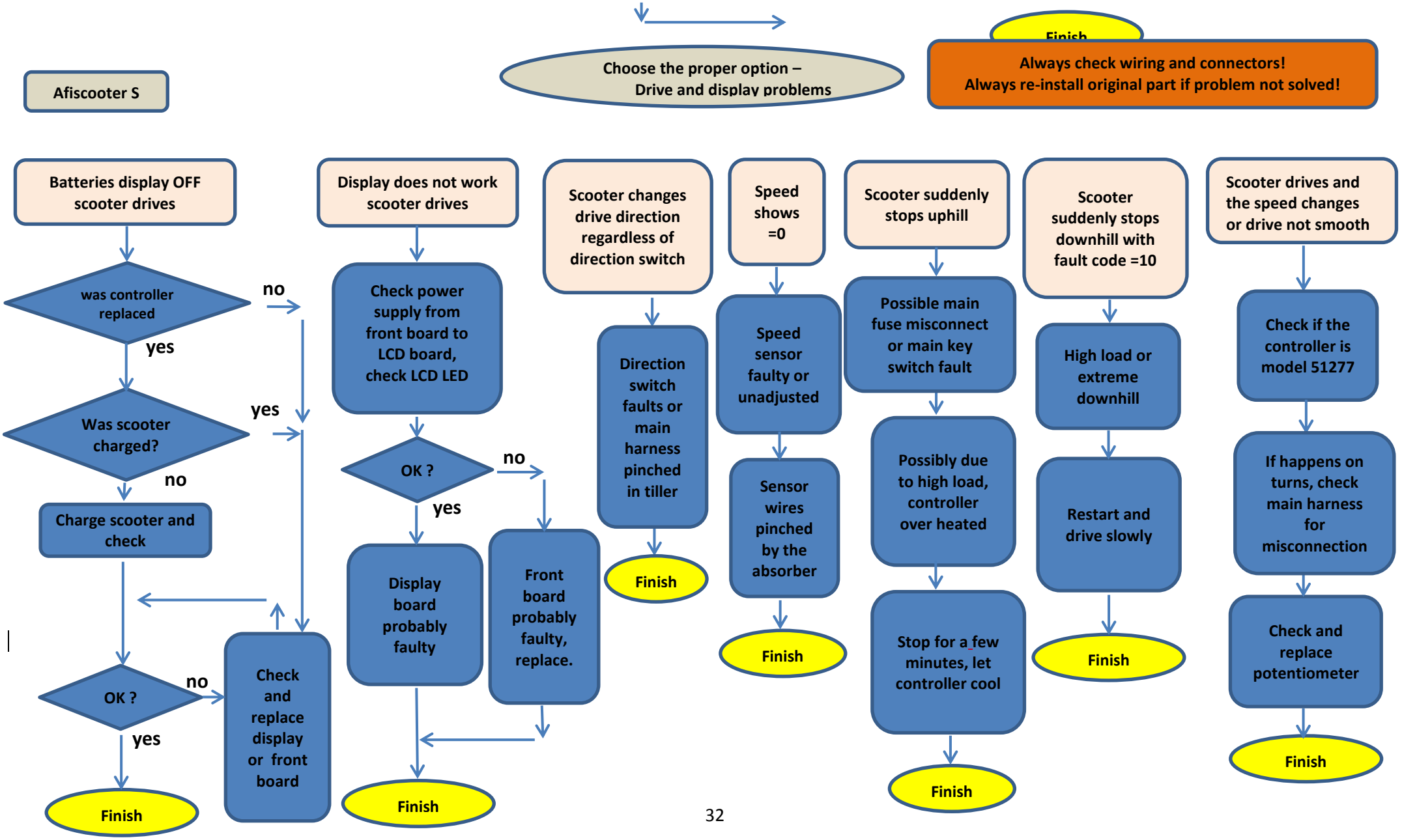
13. Quick guide troubleshoot Afiscooter S electric faults:

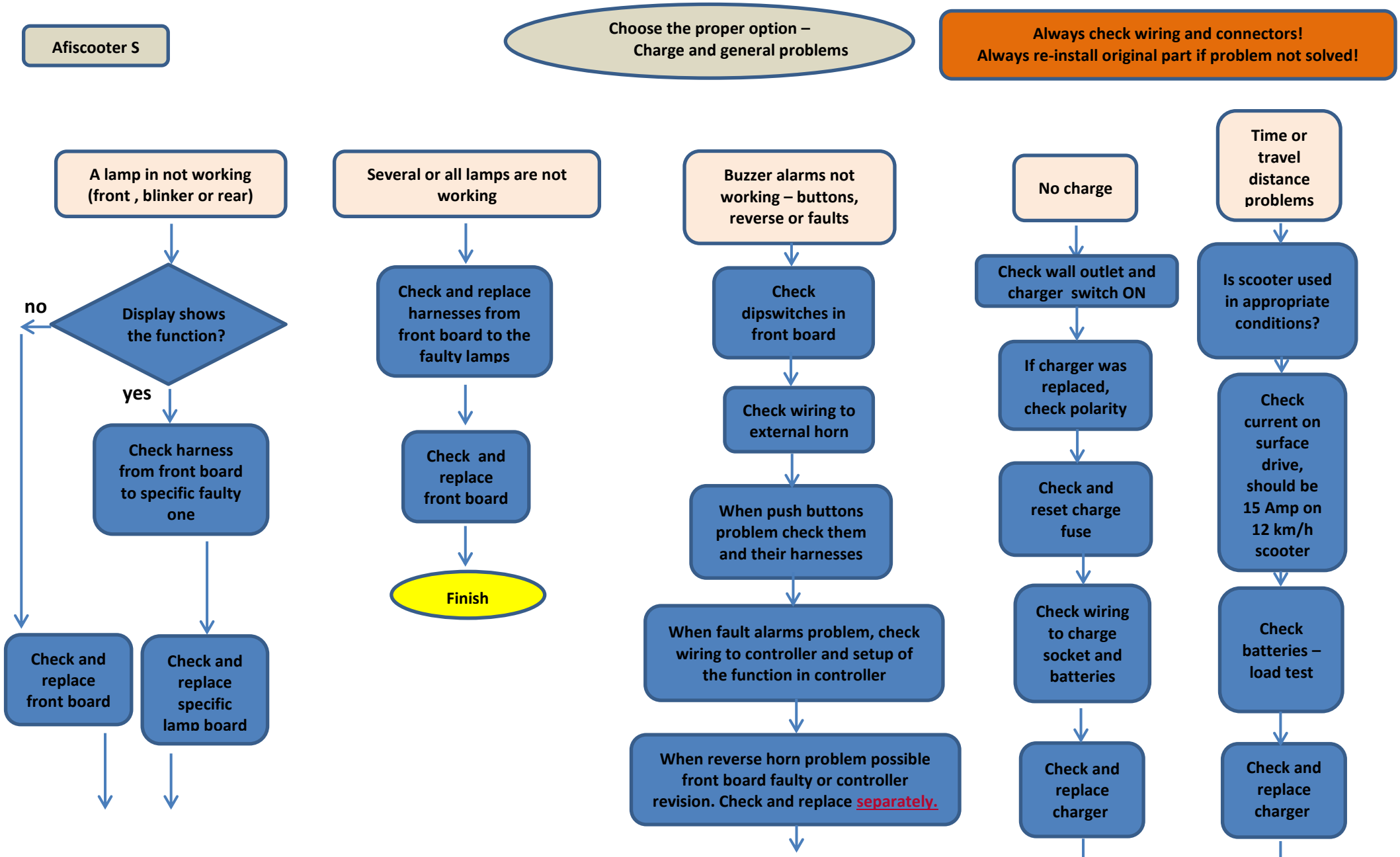
#	Description	Possible cause	Repair action
1	In all case of drive or other electric fault – light , horn etc.	Could be one of the connectors and or wiring misconnections	Check all relevant harnesses and wiring and connectors are fixed and that all terminals are in place and not released. Repair / replace if needed.
2	Display does not work and scooter does not drive	Check main fuses , front board and key switch	Replace front board or key switch
3	Display does not work , scooter drives , no flash code.	Display board faulted	Replace display board
4	Display works, scooter does not drive, flash code on LED on.	Trace the fault code according the bellow specific codes.	Continue to 5
5	Flash code 1 or 10 flashes , scooter does not drive	Batteries Low-due to bad or no charging or terminals with corrosion or not secured. / High voltage due to improper charging.	Charge batteries, check with load test, clean and secure / check charger voltage.
6	Flash code 2 / 3 flashes, scooter does not drive	Check motor for shorts or disconnections.	Replace wires or motor.
7	Flash code =6 flashes, scooter does not drive	Throttle not in neutral or inhibit condition occurred – possible EMB manual release lever or bad controller programming if was replaced.	Check wig wag lever in neutral , check EMB lever disengaged , check controller parameters.

8	Flash code = 7 flashes , scooter does not drive	Possible potentiometer fault	Check replace potentiometer
9	Flash code = 8 flashes, scooter does not drive	Possible controller fault	Check replacement controller
10	Flash code = 9 flashes, scooter does not drive	Possible EMB fault	Check replace EMB
11	Battery gauge OFF	Possible battery gauge faulted	Replace battery gauge
12	Scooter start or stop or drive not smooth	Possible controller bad program	Check controller parameters
13	In case scooter stop while driving and after restart key switch drives again	Maybe key with heavy hanging keys holder, faulted key switch, control wire / terminal misconnection.	Remove heavy keys holder, check replace key switch. Check other wires connections.
14	Driving being cut uphill, and after few minutes drives continue.	Controller protection occurred.	Check for over load the scooter of too high incline.
15	Travel distance or time is too short.	Extreme incline, battery live , faulted charger, power unit faulted.	Check use. Check battery with load test / replace if faulted. Check charger / replace if faulty. Check power unit currents.
16	Charging does not start	Check wiring and connector .check charger connection to wall, check charging fuse in charger and scooter. Check charge plug and socket. Check charger.	Reset charge fuse , replace every faulted of needed parts described.

14. Flow chart for electric trouble shoot:


Afiscooter S
Choose the proper option - Drive and Display faults
Always check wiring and connectors!
Always re-install original part if problem not solved!
Display ON No drive
Display has flash code?
no
yes
Connect programmer to read fault log, check another controller
Scooter drives but stops unexpectedly with fault Code
Code = bars up and down
yes
Throttle or potentiometer not in neutral condition
no
Code = 1 or 10
yes
Batteries voltage too high or low respectively; check batteries and charger
no
Code = 2 or 3
yes
Motor wires shorted or disconnected check and repair
no
Code = 6
yes
EMB manual lever released or micro-switch or panic sensor or electric release switch
no
Code = 7
yes
Possible faulty potentiometer
no
Code = 8
yes
Possible faulty controller , check replacement
no
Code = 9
yes
Possible EMB faulty, check replacement
no
Finish
Display not working Scooter does not drive
Check main fuse
Check batteries' terminals
Check power supply to front board and controller
Check 24VDC in controller and front board
Not OK
OK
Check key switch
Check replacement controller
Check replacement front board
Check all wiring
System OK
no
yes


Afiscooter S
Choose the proper option –
Drive and display problems
Finish
Always check wiring and connectors!
Always re-install original part if problem not solved!
Batteries display OFF scooter drives
was controller replaced
no
yes
Was scooter charged?
yes
no
Charge scooter and check
OK ?
no
yes
Check and replace display or front board
Finish
Display does not work scooter drives
Check power supply from front board to LCD board, check LCD LED
OK ?
no
yes
Display board probably faulty
Front board probably faulty, replace.
Finish
Scooter changes drive direction regardless of direction switch
Direction switch faults or main harness pinched in tiller
Finish
Speed shows =0
Speed sensor faulty or unadjusted
Sensor wires pinched by the absorber
Finish
Scooter suddenly stops uphill
Possible main fuse misconnect or main key switch fault
Possibly due to high load, controller over heated
Stop for a few minutes, let controller cool
Finish
Scooter suddenly stops downhill with fault code =10
High load or extreme downhill
Restart and drive slowly
Finish
Scooter drives and the speed changes or drive not smooth
Check if the controller is model 51277
If happens on turns, check main harness for misconnection
Check and replace potentiometer
Finish

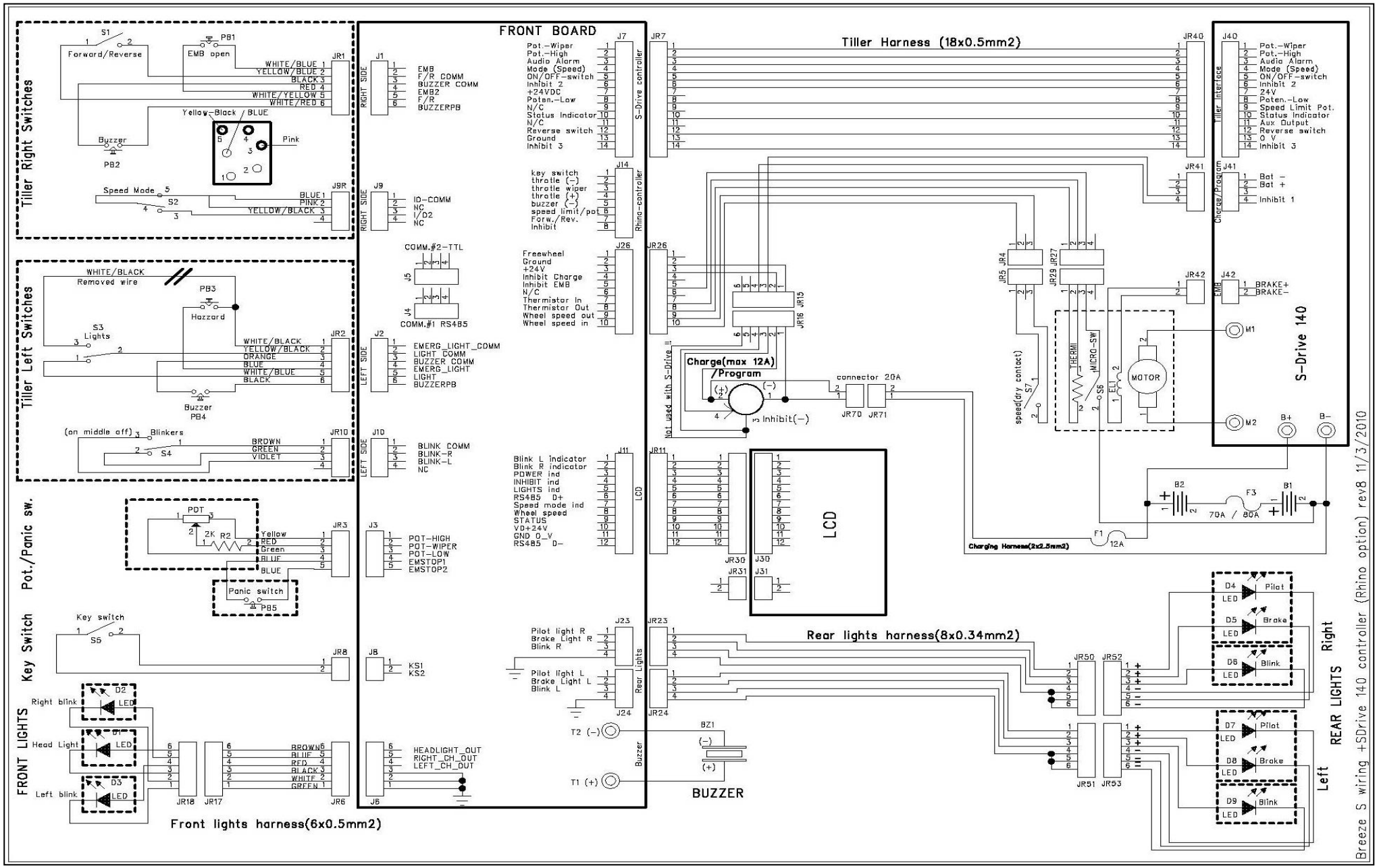

Afiscooter S
Choose the proper option –
Charge and general problems
Always check wiring and connectors!
Always re-install original part if problem not solved!
A lamp in not working (front , blinker or rear)
Display shows the function?
no
yes
Check harness from front board to specific faulty one
Check and replace front board
Check and replace specific lamp board
Several or all lamps are not working
Check and replace harnesses from front board to the faulty lamps
Check and replace front board
Finish
Buzzer alarms not working – buttons, reverse or faults
Check dipswitches in front board
Check wiring to external horn
When push buttons problem check them and their harnesses
When fault alarms problem, check wiring to controller and setup of the function in controller
When reverse horn problem possible front board faulty or controller revision. Check and replace separately.
No charge
Check wall outlet and charger switch ON
If charger was replaced, check polarity
Check and reset charge fuse
Check wiring to charge socket and batteries
Check and replace charger
Time or travel distance problems
Is scooter used in appropriate conditions?
Check current on surface drive, should be 15 Amp on 12 km/h scooter
Check batteries – load test
Check and replace charger


Finish


Finish


Finish

15. Electrical diagrams - General Wiring diagram



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ELECTRIC
VEHICLES™

Kibbutz Afikim , 15148
Tel: +972 - 4 - 6754814
Fax: +972 - 4 - 6751456
E-mail: mainbox@afiscooters.com
www.afiscooters.com

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