

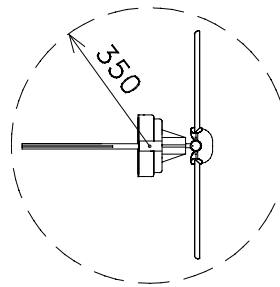
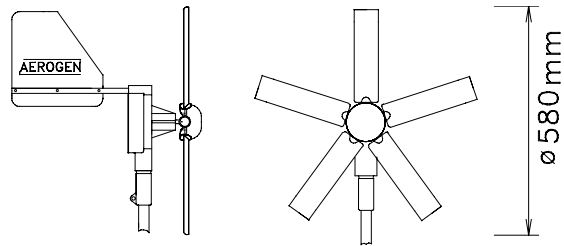
# AERO2GEN OWNERS MANUAL

CE

LVM 212 : 12 Volt    LVM224 : 24 Volt

## PARTS CHECK LIST

- 1 : Generator (M6 grub screw fitted)
- 1 : Tail Tube
- 1 : Tailfin
- 1 : Fan Hub Bossed
- 1 : Fan Clamp Plate
- 5 : Fan Blades
- 8 : M4 X 20 Stainless Steel Screws
- 8 : M4 Stainless Steel Nuts
- 5 : M4 Stainless Steel Washers
- 1 : Instruction Leaflet
- 1 : M5 x 30 Hex. Bolt with Spring Washer
- 1 : M5 Nyloc Nut
- 5 : Plastic Hub Retaining Washers
- 1 : Hub Cover
- 2 : Male push-fit connectors
- 2 : Male push-fit connector covers
- 2 : Female push-fit connectors
- 2 : Female push-fit connector covers



PLAN VIEW

WEIGHT 5 Kg.

## Guarantee

Thank you for purchasing this product. It has been manufactured to exacting standards and LVM Limited guarantees that should any defect in materials or workmanship occur within ONE YEAR of the date of purchase we will repair or replace the defective part free of charge. Damage caused by misuse, failure to follow instructions, negligence, and modification or transit damage will not be warranted.

LVM Limited will not be liable for any loss of revenue or any consequential loss or damage to property or persons from any cause whatsoever.

Retain your purchase invoice, as it will be needed in the event of a warranty claim.

## What is Not Covered –

- Damage due to lightening
- Damage due to improper installation
- Damage due to improper wiring
- Damage from flying debris causing blade damage.

Please read the manual thoroughly. If you have any questions please contact us at –

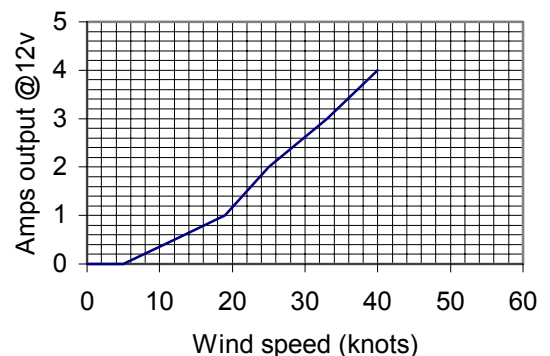
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LVM Technical web site [www.lvm.ltd.dial.pipex.com](http://www.lvm.ltd.dial.pipex.com)

## Aero2gen Performance



Note: Amps output of a 24v model will be half shown above

MOUNTING

This Aero2gen is fitted with an aluminium bronze mounting adaptor which is designed to clamp onto a tube diameter of

1" (25.4mm)

LVM manufactures several mounting kits in marine grade stainless steel details of which are shown below. A minimum turning radius of 350mm should be allowed when selecting a position to mount the Aero2gen.

Great care should be taken to site the unit to avoid personal injury from the rotating blades.

When constructing a mounting system for the Aero2gen make sure it can withstand the weight of the generator together with the additional wind forces shown in the table opposite. If the Aero2gen is to be mounted on a yacht/boat care should be taken where to position it, as the Aero2gen will always produce a very slight electrical vibration whilst charging. This noise will obviously be greatly amplified if mounted on a very hollow section of a yacht/boat.

RADIO / RADAR / DECCA / SAT.NAV. INTERFERENCE

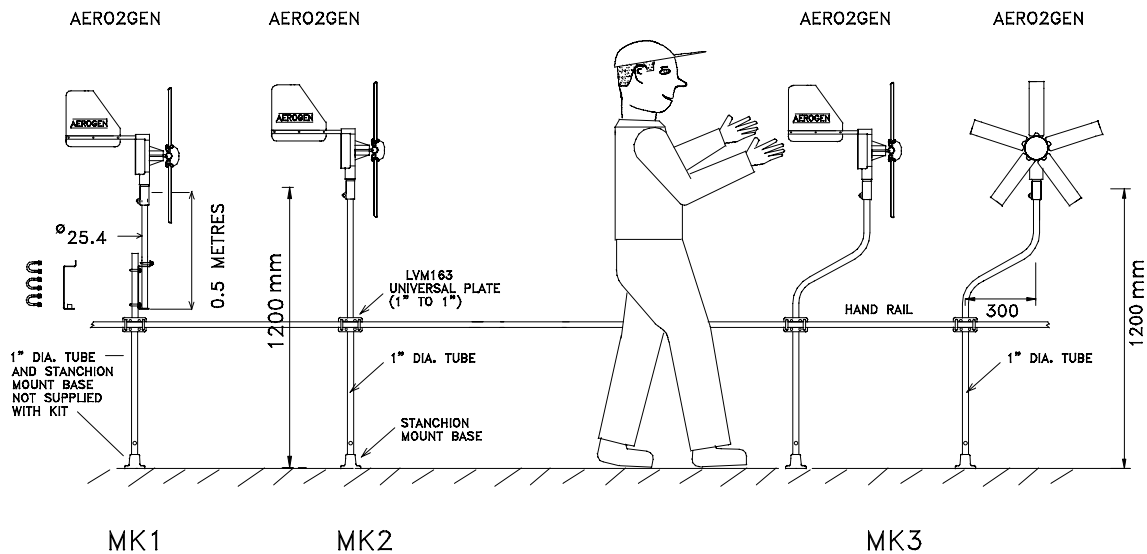
The Aero2gen should be mounted at least 1 Metre from any form of aerial to avoid air born interference. The output cable from the generator together with the dump regulator cables, if fitted, should be routed at least 1 Metre from aerial cables. It is most important, particularly on yacht installation, that the negative (-) return cable to the battery is clean and fully tightened. The safety cable fitted around a yacht/boat is tensioned by a bottle screw or turnbuckle and this cable has been known to cause interference. The remedy is to rope tension or use an insulated connector.

Description of wind	Mean velocity in knots	Force Lbs	Force Kg
Gentle breeze	9	0.4	0.16
Moderate breeze	13	0.8	0.4
Fresh breeze	19	1.6	0.75
Strong breeze	24	2.9	1.4
Moderate gale	30	4.5	2.1
Fresh gale	37	6.8	3.1
Strong gale	44	9.7	4.4
Whole gale	52	13.2	6.0
Storm	60	17.6	8.0
Hurricane	68	22.7	10.3

MIZZEN MAST MOUNTING – See page 6

DRAWING SHOWING THE COMPARATIVE HEIGHT OF A PERSON (6 foot tall) AGAINST THE AERO2GEN MOUNTED ON A MK1, MK2 AND MK3 MOUNTING KIT.

A2KITS



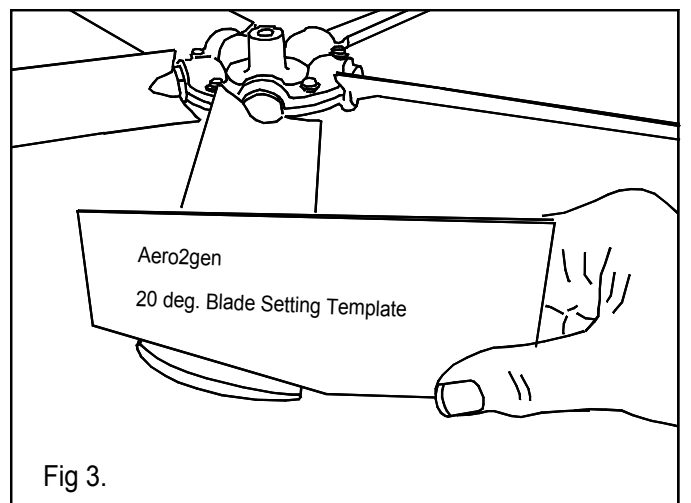
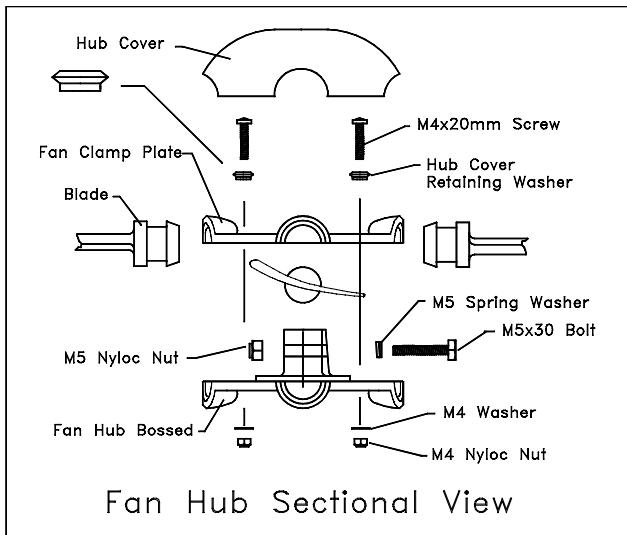
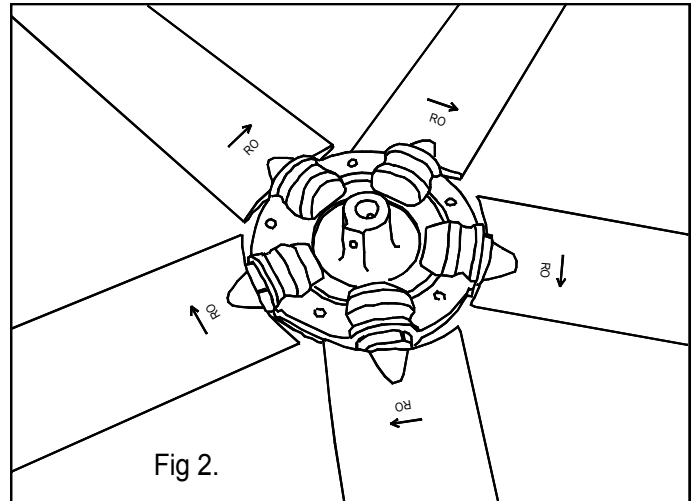
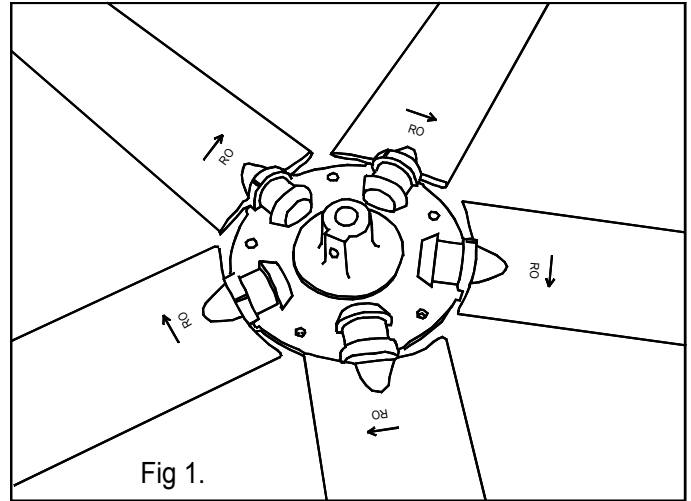
## ASSEMBLY

### FAN BLADE ASSEMBLY

The best way to assemble the fan is to lay the fan Bossed Hub on a flat surface, blade sockets and boss upwards, then insert the 5 blades concave side (hollow side) upwards. **See Fig.1.** Then place the Clamp Hub on top, locating the blades in the sockets. Insert the 5 off M4 X 20 screws, M4 Nyloc Nuts, Black Nylon Hub Cover Retaining Washers and M4 Washers (see Fan Hub Sectional View below) and at this stage only tighten the nuts sufficiently to lightly grip the blades. See Fig. 2.

Then using a piece of cardboard cut to the shape of the Aero2gen 20 deg. Blade Setting Template on page 4. set each blade tip angle as shown in Fig 3. When all the blades are set correctly fully tighten M4 nuts.

NOTE: Do NOT install the fan assembly until the Aero2gen is mounted.



# Aero2gen

## 20 deg. Blade Setting Template

### TAIL UNIT

Attach the tail fin onto the tail tube using the M4 X 20 mm long screws and nuts.

### ELECTRICAL DATA

Aero2gen output cable colour Code - The White output wire with the RED sleeve fitted is POSITIVE (+) The White wire with the Black trace down its length is NEGATIVE (-)

Wire Rating - The output wires of the Aero2gen may require extending. Electrical systems lose energy from the resistance of the wire size used. The larger the wire size the smaller the loss, however larger cross sectional area wire can be costly and in some cases more difficult to source. The following table shows recommended wire sizes, they are based on a 3% and 5% energy loss at an average wind speed of 25knots. It is recommended a minimum wire size of 2.5 sq mm be used.

Single Wire Length

	0 – 5 Metres		6 – 10 Metres		11 – 20 Metres	
Voltage Drop (%)	3%	5%	3%	5%	3%	5%
12 volt Aero4gen	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	4.0 mm <sup>2</sup>	2.5 mm <sup>2</sup>
24 volt Aero4gen	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>

Useful wire cross sectional area mm<sup>2</sup> conversion to AWG

2.5 mm<sup>2</sup> = 14 AWG      4.0 mm<sup>2</sup> = 12 AWG

If the Aero2gen is connected directly to the battery terminals we recommend a 5 Amp fuse for 12V Models and a 3 Amp fuse for 24v Models is fitted in the red (positive) wire from the generator to the battery, so that if a dead short occurred it would prevent serious damage to the wiring and the generator.

The white cable with the RED sleeve fitted is connected to the POSITIVE + terminal of the battery. The white cable with the BLACK trace down its length is connected to the NEGATIVE – terminal of the battery.

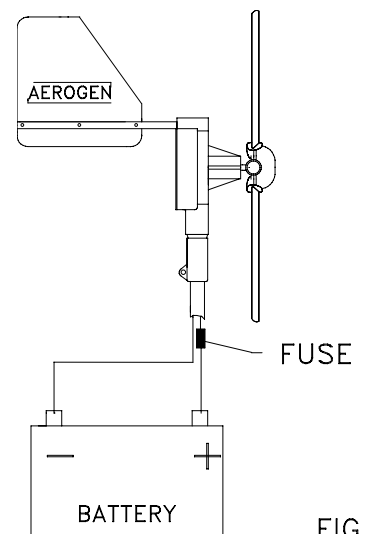


FIG.4

## VOLTAGE REGULATION

The output wires of the Aero2gen can be connected directly to the terminals of the battery that requires charging, as shown in Fig 4., however, if the terminal voltage of the battery is not continually monitored for over voltage (14.2v for 12v batteries) and (28.4v for 24v batteries) the battery can be seriously damaged. Fitting an LVM voltage regulator will protect the battery from becoming over charged. You may well have chosen a voltage regulator when purchasing the Aero2gen, but we would recommend you look at page 13 SELECTING THE CORRECT LVM VOLTAGE REGULATOR to make sure you have purchased the correct unit.

You may also consider installing an ammeter, voltmeter or an amphour meter – all are available from LVM, part number as follows - (LVM66) 0 –5A Ammeter, (LVM69) 0-15v dc Voltmeter , (LVM200) Digital Amp Hour Meter

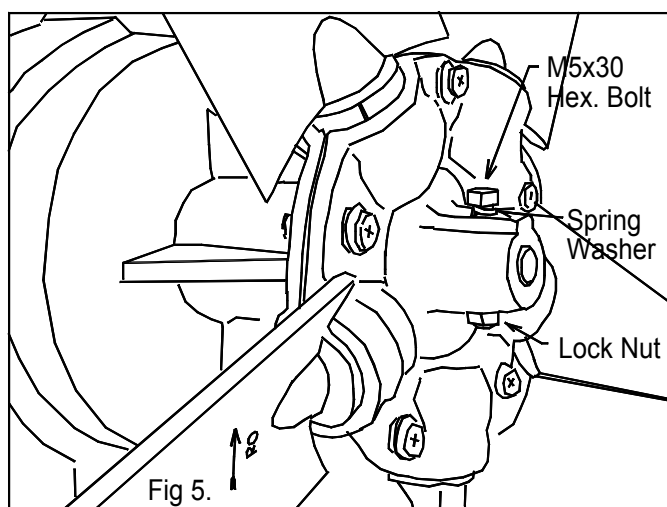
## INSTALLATION

### PLEASE FOLLOW THESE PRECAUTIONS DURING INSTALLATION

- Choose a calm day.
- Have someone available to help during installation.
- Do not install the blade assembly until the generator is mounted.

Whilst initially installing the generator, or carrying out future maintenance, it is important that the fan assembly is stationary.

1. Attach the push - on connectors and covers supplied to one end of your output cable. Observing polarity plug them into the generator's output connectors.
2. Thread the output cable carefully through the centre of your mounting tube. If the bottom of the tube is not accessible a hole must be drilled to enable the cable to be brought out. Be sure to leave enough slack in the cable so that if necessary the generator can be removed.
3. Locate the generator on top of your mounting tube, and then fully tighten the M8 clamp bolt nut on the adaptor.
4. The tail assembly can now be inserted into the hole at the top of the generator ensuring that the tailfin is positioned vertically and tighten the M6 grub screw.
5. Fitting the fan blade assembly onto the main shaft of the generator. Grease fan hub bore, and then fit the fan onto the generator main shaft (fan hub boss outwards). Align the M5 clearance hole in the fan hub boss with the M5 tapped hole in the main shaft. Fit the M5 spring washer under the head of the M5 x 30 long hex bolt. Insert the bolt through the M5 clearance hole in the fan hub boss and fully tighten it into the main shaft, fit the M5 Nyloc nut to the end of the M5x30 bolt, which protrudes, from the boss and fully tighten. See Fig 5. The white hub cover is then clipped into position.
6. The output wires are then connected to the battery. See Fig.4 The white cable with the RED sleeve fitted is connected to the POSITIVE + terminal of the battery. The white cable with the BLACK trace down its length is connected to the NEGATIVE – terminal of the battery.



**Note: Do NOT reverse the connections from the generator to the battery (ie. Generator Positive to battery Negative and generator Negative to battery Positive). Doing this will damage the rectifier and void your warranty.**

**WARNING** THE AERO2GEN SHOULD NOT BE ALLOWED TO RUN OPEN CIRCUIT. IN HIGH WINDS HIGH VOLTAGES WILL BE PRODUCED: THE SUPPRESSION CAPACITOR CAN BE DAMAGED: THE FAN WILL TURN FASTER SUFFERING UNNECESSARY STRESS

## MAINTENANCE

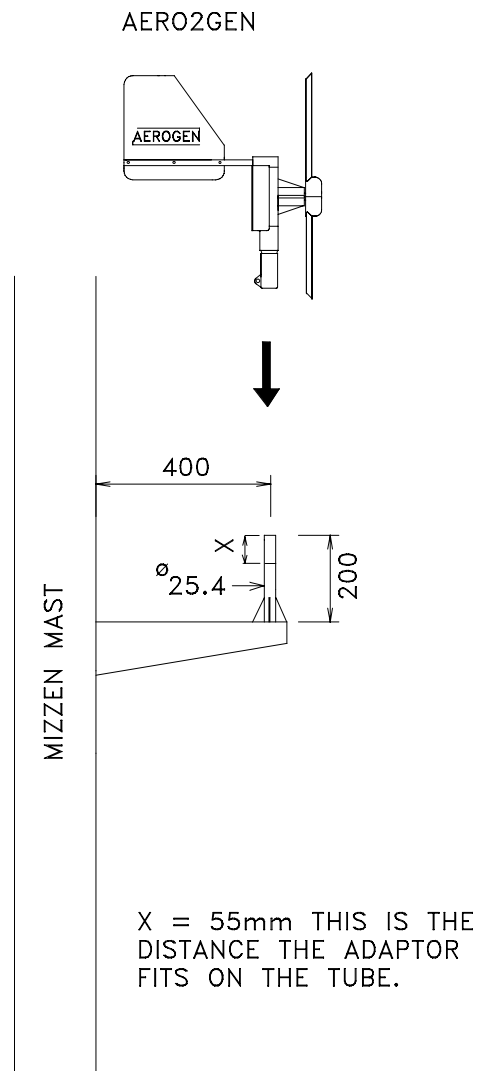
The Aero2gen is designed to operate for long periods without needing any maintenance. The life of the generator and its performance will be enhanced if periodic inspection is carried out. For personal safety reasons before carrying out any inspection make sure you stop the generator from rotating.

The following should be checked every 6 months.

- Check blades for damage and replace if necessary. Do not use the generator with damaged or unbalanced blades. This will cause unnecessary wear and possibly damage to the main bearings.
- Check the fan hub assembly for tightness.
- Check the mounting adaptor and your mounting system for tightness.
- Check all external electrical connections for tightness and corrosion.
- Wash down the generator with fresh clean water to remove debris and salt deposits that can build up.

If you experience a problem with your Aero2gen contact LVM to determine the nature of the problem, LVM will send you replacement parts and instructions needed to repair the generator. In the event that the generator is returned for repair/service you will be notified of the cost for carrying out the work and will incur the transport costs.

## KEY DIMENSIONS WHEN CONSTRUCTING A MIZZEN MAST MOUNTING



## STOPPING AEROGENS

FILE BRAKE4

Your Aerogen is designed for continuous operation and to withstand storms. However, you may wish to stop the fan assembly from turning and then secure it with rope if violent storms are forecast as flying debris can cause blade breakage.

You can stop or slow down the fan assembly from turning manually or electrically.

### MANUAL STOPPING

The Aero4gen and Aero6gen tailfin has a hole into which should be fixed a small rope loop. The unit can then be pulled out of the wind using a hook attached to a long handle. The blades will slow down. They should then be firmly secured with rope.

### ELECTRICAL STOPPING

A double pole on/off/on switch should be fitted as shown in the wiring diagram below. This will short circuit the Aerogen output and the fan assembly will stop or slow down considerably. You should then firmly secure the blades with rope. The switch can be left in the parked position whilst the blades are secured.

**WARNING – THE BRAKE SWITCH SHOULD ONLY BE USED TO STOP/SLOW DOWN THE FAN ASSEMBLY PRIOR TO SECURING WITH ROPE – IT SHOULD NOT BE USED AS A PERMANENT PARKING MECHANISM.**

The Aerogen should always be stopped and the blades secured, its output disconnected from the battery or regulator before carrying out maintenance working on it.

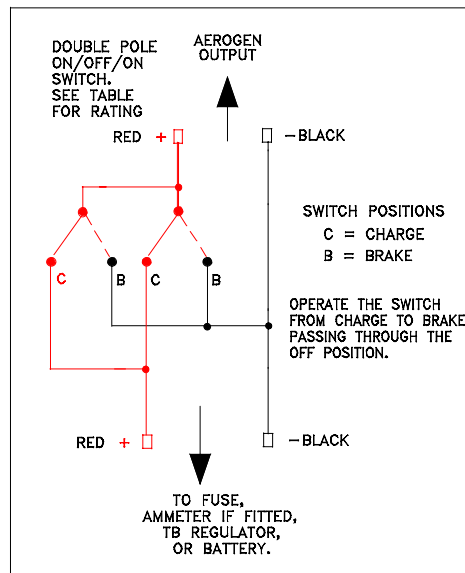
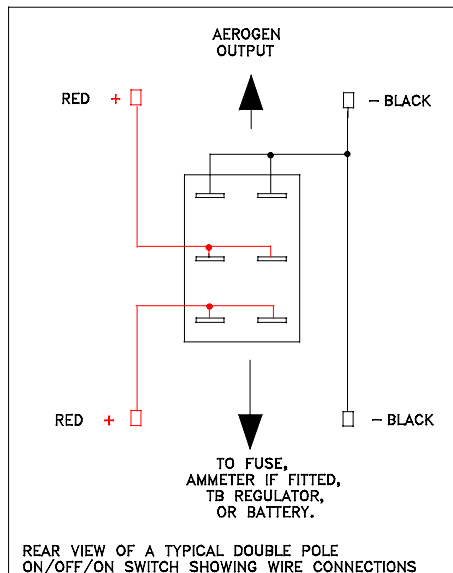
#### NOTE 1.

NEVER SIMPLY SHORT THE AEROGENS OUTPUT WIRES WITHOUT FITTING A DOUBLE POLE ON/OFF/ON SWITCH AS BATTERY CABLES COULD BE SHORTED BY MISTAKE. SERIOUS PERSONAL INJURY COULD RESULT, AND EQUIPMENT DAMAGED.

#### NOTE 2.

THE ON/OFF/ON SWITCH MUST NOT BE LEFT IN THE OFF POSITION. THE OFF POSITION IS ONLY REQUIRED TO GIVE THE SWITCH CONTACTS GOOD ELECTRICAL SEPARATION.

## BRAKE SWITCH WIRING DIAGRAM



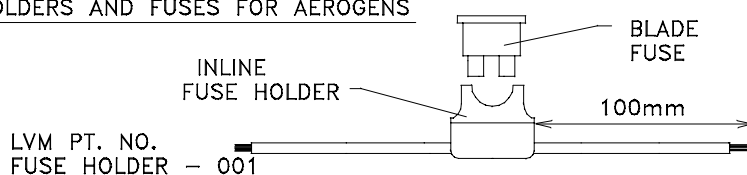
### SWITCH RATING TABLE

AEROGEN MODEL	RATING
212	5A @12V DC
224	3A @24V DC
412	15A @12V DC
424	10A @24V DC
412F	15A @12V DC
424F	10A @24V DC
612	20A @12V DC
624	15A @24V DC
612F	20A @12V DC
624F	15A @24V DC

NOTE – A BRAKE SWITCH MUST ONLY BE USED IN THE AIR MODE WHEN FITTED TO THE AQUA4EROGEN. NEVER FIT A BRAKE SWITCH TO AN AQUAGEN IN WATER TOW MODE.

A 20 AMP DOUBLE POLE ON/OFF/ON SWITCH SUITABLE FOR ALL AEROGEN MODELS  
LVM PT. NO. SWITCH-020

### FUSE HOLDERS AND FUSES FOR AEROGENS



FUSE	RATING	LVM PT.NO.
5 Amp		FUSE - 005
15 Amp		FUSE - 015
20 Amp		FUSE - 020
30 Amp		FUSE - 030

LVM LTD. AEROGEN HOUSE, OLD OAK CLOSE, ARLESEY, BEDS, SG15 6XD. 01462 733336 FAX. 01462 730466

## AERODGEN PARTS LIST



## TROUBLE SHOOTING

The AERO2GEN is design to give many years of reliable service as it contains really only two moving parts and one electronic component; they are the permanent magnet disc magnets, the slipring brush assembly and a rectifier. The only parts that can wear are: Main bearing ball races, pivot shaft ball races, and the carbon brushes which make contact with the sliprings. For safety reasons fan blades are designed to brake off if by accident an arm or hand is caught in the fan.

### SIMPLE TEST

A simple test to prove there is an output voltage from the generator can be carried out whilst the generator is in it's working position. Disconnect the generators output cable from the battery, or the TB regulator if fitted. With the fan turning in the wind and the two output leads open circuit, allow the fan to build up speed, then touch the two output leads together (shorting them) the fan should noticeably slow down and act as a brake. If this does not happen, check that your extension wire connection from the actual generators output cables are not corroded or have become disconnected. If there is a fuse fitted in the output cable check it has not blown.

The above test can also be carried out by turning the generators main shaft by hand (any direction) to check the braking action.

Note: Although the instruction sheets supplied with the generator warns you not to run the generator in an open circuit condition the tests can be carried out safely at wind speeds of up to 20 knots.

(The reasons we do not recommend generators be left in an open circuit condition is that at very high wind speeds the suppression capacitor maximum voltage may be exceeded and destroyed.

The following tools and equipment will be needed to carry out tests and repairs to the generator.

A multimeter which can read 0 - 100 volts DC, measure resistance, have a diode test, and a continuity (buzzer test).

Pozi drive screwdriver.

Circlip pliers.

Soldering iron and solder.

Hammer.

Piece of hardwood, and a brass rod 12mm diameter X 250mm long or similar.

For pivot bearing replacement, a bench vice will be required.

### MEASURING OUTPUT VOLTAGE

With the generator in its operating position, disconnect the generators output cable from the battery or the TB regulator if fitted, and attach a multimeter set on 0 - 100 volts dc range to the two output leads.

The following open circuit voltages should be obtained at the wind speeds shown below. It is most important that the wind speed is measured at the same height the wind generator is mounted.

12v Model

6 knots = 12v 10 Knots = 25v 15 knots = 42v

24v Model

6 knots = 24v 10 Knots = 50v 15 knots = 84v

If you have a lathe or some other means of turning the main shaft at a known RPM a 12v model produces 0.04v per rev. and a 24v model 0.08v per rev.

If no voltage is present, check that your extension wire connection from the actual generators output cables are not corroded or have become disconnected. If there is a fuse fitted in the output cable check it has not blown. Check output voltage again at the generators actual output cable. If there is still no voltage output, go to the instructions and tests listed under heading NO OUTPUT.

### REDUCED OUTPUT

Check blades are set at the correct angle, and the concave side (hollow side) of the blade faces the wind.

### NO OUTPUT

Remove the generator from mounting, taking off the tailfin and fan assembly. Remove the brush cover (4 off screws).

A component called a rectifier that converts the single phase A/C output voltage of the stator into D.C volts is mounted on right hand side of the slipring housing.

Unsolder the two output wires from stator which are attached to the centre terminals of the rectifier marked ~. No need to remember which order or terminal they come from, as they can fit on any of the two centre terminals.

Using a multimeter set on resistance measurement (ohms) check the resistance of the two output wires from the stator. They should read 11.3 ohms 12v model, 44.0 ohms 24v model.

### **CHECKING A/C OUTPUT VOLTAGE OF STATOR**

Set the multimeter to read A/C volts, attach test leads to the two stator output wires then turn the main shaft of the generator by hand (any direction) small voltage should be indicated on the multimeter.

Check the stator and suppression capacitor does not look burnt or overheated. Check tightness of stator retaining screws. If at any time the generators output leads have ever been connected to battery terminals the wrong way round, or the generator has been struck by lightning then the rectifier will have been damaged.

### **RECTIFIER TEST**

Readings taken of a Good Rectifier.

Set a multimeter to diode test, then check: -

1. Unsolder the wires from the rectifier.
2. Attach the red test lead from multimeter to the + plus terminal of the rectifier, attach the black test lead to the - negative terminal. RESULT No Reading.
3. Reverse the test leads i.e. attach the red test lead to the - negative terminal of the rectifier then the black test lead to the + plus terminal. RESULT 0.8 - 0.9 volts
4. Connect the test leads to the two centre terminals of the rectifier. RESULT No Reading.

Readings taken of a Faulty Rectifier.

1. Unsolder the wires from the rectifier.
2. Attach the red test lead from multimeter to the + plus terminal of the rectifier, attach the black test lead to the - negative terminal. RESULT 0 Volts
3. Reverse the test leads ie. attach the red test lead to the - negative terminal of the rectifier then the black test lead to the + plus terminal. RESULT 0 Volts
4. Connect the test leads to the two centre terminals of the rectifier. RESULT 0 Volts

If in doubt about the condition of the rectifier, replace with a new one. Re-solder the two stator output leads to the centre terminals of rectifier.

Set the multimeter to read DC. volts. Attach the red test lead of the multimeter onto the + plus terminal of the rectifier, then the black test lead onto the - negative terminal. Turn the main shaft of the generator by hand (any direction) this should indicate a voltage on the multimeter. Re-solder Red and Black DC. output leads from the rectifier. Refit brush cap assembly using silicone sealant.

### **CHECKING SLIPRINGS AND BRUSHES**

Remove the brush cover assembly (4 screws). Hinge back brush cover assembly leaving the red and black wires attached.

Check the condition of the sliprings and clean them if necessary.

Check the carbon brushes are clean.

Set a multimeter to continuity check (buzz test).

Check there is continuity between the top carbon brush and the positive + terminal of the rectifier, then check there is continuity between the bottom carbon brush and the negative terminal of the rectifier.

Check there is continuity between the top slipring and the generators output cable with the RED sleeve fitted.

Then check there is continuity between the bottom slipring and the generators output cable with the BLACK trace down the cable.

If no continuity is found on one or both output leads, check the soldered joint on the slipring. Resolder if necessary.

Set multimeter to read 0-15 volts DC connect test leads of multimeter to the brushes top brush is (Positive +) bottom brush is (Negative -) turn generator main shaft by hand in any direction. If a voltage is present then refit brush cover using silicone sealant. Attach the test leads of the multimeter to the output wires of the generator, then turn main shaft again to check a voltage is present.

### **KNOCKING/SCRAPING SOUND ONCE PER REVOLUTION**

Whilst the generator is in it's working position, check that the M5 bolt and locking nut which retains the fan assembly to the main shaft is fully tightened. Also check tightness of all other fasteners on the fan assembly, mounting adaptor and tailfin.

Remove rear cover and check the condition of the outer disc magnet, it may be rubbing on the stator. Inner main bearing could be worn, check for axial and radial movement. Check the tightness of the 7 off M3 stator retaining screws, this can cause a noise if slightly loose.

### GENERAL MECHANICAL CONTINUOUS NOISE

Remove fan and check axial and radial play in the main front bearing. Remove rear cover and check inner main bearing in the same manner. If large amount of play is found replace main bearings.

Follow instructions listed REPLACING MAIN BEARINGS.

### GENERAL ELECTRICAL VIBRATION NOISE

It is normal for the Aero2gen to produce a very slight electrical vibration whilst charging. This noise will be greatly amplified if the Aero2gen is mounted on a very hollow section of a yacht/boat. If mounted directly over sleeping quarters it may well be necessary to stop the Aero2gen at night.

Well-known methods that can reduce vibration noise are listed below.

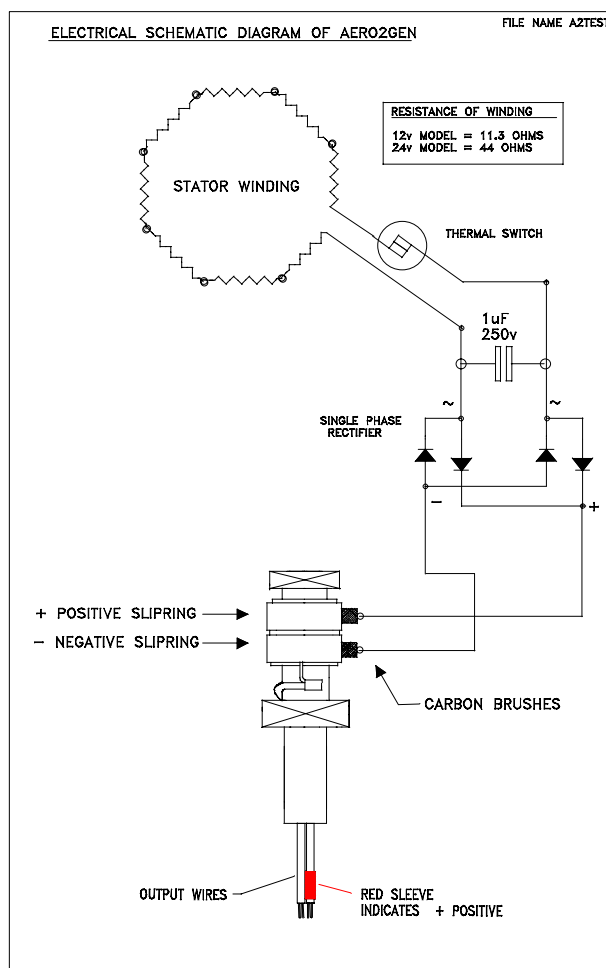
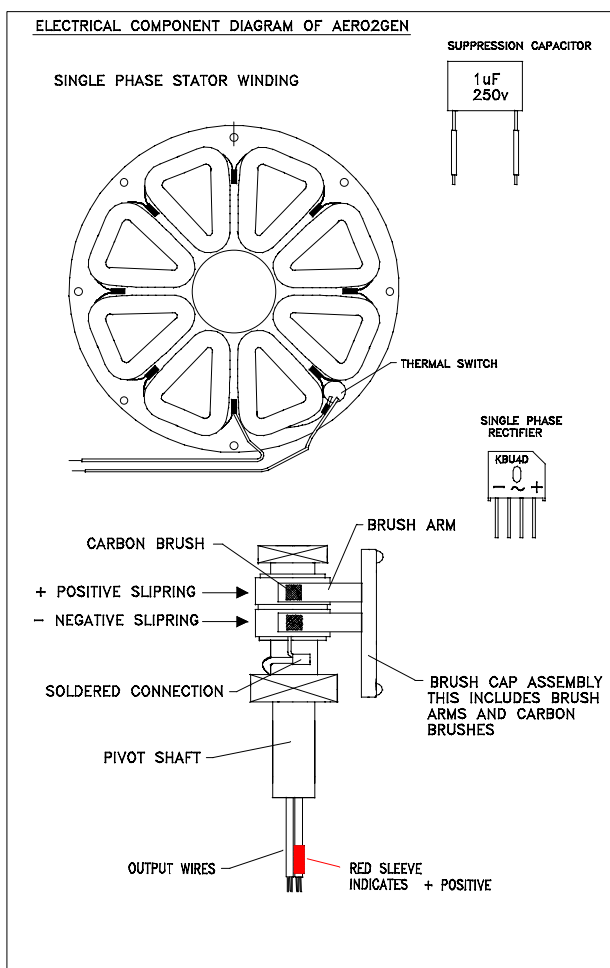
1. Rubber mount as many fixings within the system as possible.
2. Insert round insulation material (the type you fit around cold water pipes to stop them freezing during winter) into the bore of the 1" mounting tube.
3. Coil a length of rope around the outside diameter of the mounting tube (full length).

### REPLACING PIVOT BEARINGS

Remove the generator from it's mounting, taking off the tailfin and fan assembly. Remove adaptor (M8 grub screw), and brush cover. Remove bottom cover (2 screws).

Clamp the pivot shaft in a vice, using jaw protectors so as not to damage the pivotshaft. Then using a hammer against a piece of wood to protect the casting paintwork, tap out pivotshaft assembly by hitting the base of the casting.

The bearings can now be removed from the pivotshaft. Use Loctite bearing fit when refitting the new bearings to the pivot shaft, and to the generator housing. Apply silicone sealant to the bottom cover, and the output wires within the adaptor when reassembling the pivot shaft assembly. Refit brush cover using silicone sealant.



## INSTRUCTIONS FOR REMOVING AND REPLACING MAIN BEARINGS AERO2GEN

Parts required :

Main bearings # BEARING 221 ( 6300DDUCM)  
10mm Circlip # CIRCLIP 659  
10mm Shim Washers # WASHER 665  
Rear cover gasket # GASKET 548  
Loctite Bearing Fit

Tools required: Small press or hammer, Circlip pliers, Pozi drive screwdriver, Piece of hard wood, and a brass rod or similar.

1. Disconnect output leads, and remove generator from mounting tube.
2. Remove fan assembly and tailfin.
3. Remove the front circlip on the main shaft.
4. Remove the rear cover by removing the 6 off self tapping screws.
5. Grip the generators main shaft upright in a vice (use jaw protectors so as not to damage the shaft. Remove the 3 off M3 screws which retain the outer disc magnet and keeper assembly to the rotor hub.
6. To remove the outer ring magnet and keeper assembly, simply grip the keeper outer edge and turn (any direction and the magnet assembly will be repelled off the rotor hub by magnetic force. Retain the rear magnet spacer disc.
7. Remove the brush cap assembly (4 self tapping screws).
8. Trace the stator output wires, and unsolder them from the two centre terminals of the rectifier.
9. Remove the 6 off stator board retaining screws, and remove stator assembly.
10. To remove the main shaft and inner disc magnet/keeper assembly it is recommended to use a small press. If a press is not available, use a hammer and a piece of hard wood on the end of the main shaft to knock out the assembly. TAKE GREAT CARE, AS THE CERAMIC RING MAGNETS WILL EASILY CRACK IF TOO MUCH FORCE IS APPLIED.
11. Knock out the inner and outer bearings with a rod and hammer.
12. Reassembly -  
Clean all the components and check main shaft for wear.
13. Smear a little Loctite Bearing Fit supplied with the replacement bearing kit to the O/D of the new bearings and press in the bearings/ or use a hammer (take care not to damage bearings) into the main housing of the generator.
14. Smear a little Loctite bearing Fit to the inner race bore of both bearings, then slide the main shaft /magnet assembly into the bearings. Fit a new circlip on the main shaft in front of the outer bearing.
15. Thread through the stator wires into slipring housing, then refit stator board 7 off screws.
16. Fit the rear magnet spacer disc onto the hub (aligning the three holes) then refit outer ring magnet/keeper assembly to the main shaft hub (3 off screws) Fully tighten screws. Spin the magnet assembly and check that the magnets are not rubbing on the stator. There should be 1mm clearance between each side of the stator board and the ring magnet face.
17. Resolder stator output wires to the two centre terminals of the rectifier (it does not matter which way round).
18. Refit brush cover using silicone sealant.
19. Refit rear cover using a new gasket.
20. Test output with multimeter.

## SELECTING THE CORRECT LVM VOLTAGE REGULATOR

The output of the Aero2gen can be simply connected directly to the terminals of the battery that requires charging, however, if the terminal voltage of the battery is not continually monitored for over voltage (14.2v for 12v batteries) and (28.4v for 24v batteries) the battery can be seriously damaged. Fitting an LVM voltage regulator will protect the battery from becoming over charged.

**TEMPERATURE COMPENSATION** - This additional feature is available on all LVM regulators. If the battery is located in a building where the ambient temperature is always around 20 deg.C then standard regulators can be used. However if you intend to locate a battery where temperatures may go down to freezing and perhaps rise to tropical temperatures then you should install a regulator that is fitted with a temperature compensation circuit. This automatically allows the battery to be charged at a higher voltage as the temperature drops, and a lower voltage if the temperature increases. Simply add (-T) after the LVM Product No. ie. 2SB12 -T.

There are two types of regulator suitable for the Aero2gen –

1. **Single battery regulator** - LVM Product No. 2SB12, 2SB24 - These units are simply connected to the battery terminals, and if the battery voltage reaches 14.2v (12v systems) or 28.4 (24v systems) the regulator diverts power to a high wattage wire wound dump resistor. This regulator should NOT be used if you have any other form of charging system connected to the battery ie. Mains charger/ shore power, engine driven alternator.  
**THESE REGULATORS ARE NOT SUITABLE FOR YACHT INSTALLATIONS.**  
 Note: These regulators draw a continuous small standby current of around 10mA – 15mA.
2. **Twin battery regulators** – LVM product No. 2TB12, 2TB24 - These units are connected between the output of the Aero2gen, or Solargen module and the battery terminals. They control the actual output voltage of Aerogen, Aquagen or Solargen by diverting power to a high wattage wire wound dump resistor when their output voltage reaches 14.2v (12v systems) or 28.4 (24v systems). They have two schottky blocking diodes built into the regulator which enables them to monitor and control the charge to two batteries totally independent of each other, therefore making it ideal for separate charging of engine starting and domestic batteries. The battery with the lowest terminal voltage will be charged first, then gradually when both batteries become fully charged the Aero2gen or Solargen modules output is automatically diverted to the dump resistor, this does two things it stops the batteries over charging and keeps the generator always on load.  
 Note: These regulators draw NO standby current from the battery.  
**THESE REGULATORS ARE SUITABLE FOR YACHT INSTALLATIONS**

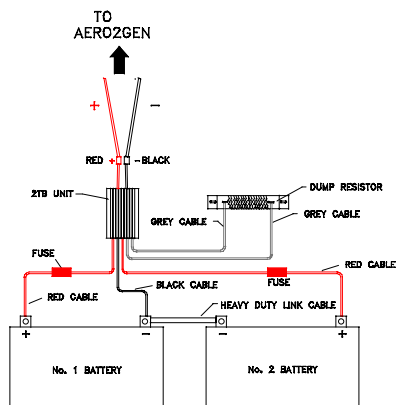
**Also available from LVM is a Diode Unit** – LVM product No. 4DU

The 4DU when combined with a 2TB or 4TB regulator enables one additional battery to be charged.

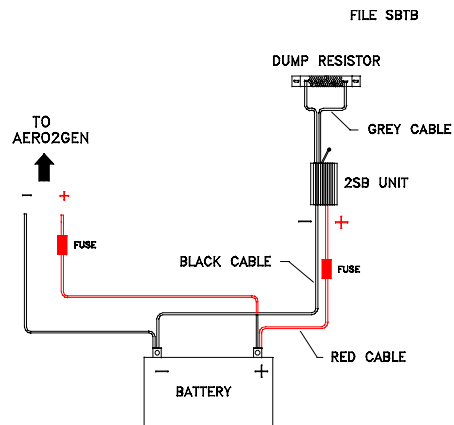
The Aero2gen and a Solargen modules output may often be combined, the table below shows the recommended regulator for various systems. Note: Two batteries wired in parallel are classed as one independent battery. Having selected the recommended regulator model from the table simply add the voltage required ie. 2TB12 for a 12v system or 2TB24 for a 24v system. Basic wiring diagrams are shown on page 18. If you cannot find your particular system or application within the table or require full wiring diagrams please check our web site [www.lvm-ltd.com](http://www.lvm-ltd.com) or call our sales office who will e-mail, fax or post you copies.

### VOLTAGE REGULATOR TABLE

SYSTEM	Number of independent batteries to be charged		
	1	2	3
1 x Aero2gen	2SB or 2TB	2TB	2TB + 4DU
1 x Aero2gen + 5w Solargen panel	2SB or 2TB	2TB	2TB + 4DU
1 x Aero2gen + 10w Solargen panel	2SB or 2TB	2TB	2TB + 4DU
1 x Aero2gen + 17w Solargen panel	2SB or 2TB	2TB	2TB + 4DU
1 x Aero2gen + 25w Solargen panel	2SB or 2TB	2TB	2TB + 4DU
1 x Aero2gen + 35w Solargen panel	4SB or 4TB	4TB	4TB + 4DU
1 x Aero2gen + 50w Solargen panel	4SB or 4TB	4TB	4TB + 4DU
1 x Aero2gen + up to 200w Solargen panels	4SB or 4TB	4TB	4TB + 4DU



TWIN BATTERY VOLTAGE REGULATOR WIRING DIAGRAM



SINGLE BATTERY VOLTAGE REGULATOR WIRING DIAGRAM

CIRCUIT DIAGRAM SHOWING THE 2TB REGULATOR CONTROLLING AN AERO2GEN AND A SOLAR MODULE

REGULATOR MODEL	MAX. SOLAR PANEL WATTAGE
2TB	25 WATT

SOLAR MODULE  
(SEE TABLE ABOVE FOR MAX. WATTAGE)

