

Southwest Windpower, Inc.
Renewable Energy Made Simple

Owners Manual
Installation, Operation and Maintenance



WHISPER WIND GENERATORS
MODEL H40

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WIND GENERATOR SERIAL NUMBER _____

WELCOME TO YOUR RENEWABLE ENERGY SYSTEM!

ELECTRICITY FROM THE WIND AND SUN:

Renewable electric power systems provide independent (no utility grid!) electric power for boats, homeowners, farms, villages and commercial applications such as telecommunications. If utility power is available, your renewable energy system can reduce the electric bill and provide back up electricity during storms or line failure. The most common sources of renewable electric power in these systems are small wind powered generators and solar photovoltaic (pv) modules that convert sunlight directly to electricity. Renewable means power sources that do not deplete the world's finite fossil fuel resources, do not pollute or warm the atmosphere and do not generate hazardous waste. Electricity means your children can study at night for a better future and you can benefit from appliances, power tools and communication technologies that make life easier and more rewarding. Nearly three billion people in the world do not have electricity and by necessity most will ultimately get their electricity from renewable resources to the benefit of everybody. You are a pioneer and part of the solution!

BEFORE YOU BEGIN:

Read this entire manual. Identify and note your model wind generator where it appears in this manual. Following the instructions and recommendations in this manual will help assure safe and enjoyable use of your new renewable energy system.

SAFETY INFORMATION: These systems present mechanical, electrical and chemical (battery) hazards that can be life threatening. The tower or support structure could fall and cause injury or death and property destruction. A component of the wind generator could come loose causing injury or death and property destruction. Contact with the high speed propeller can result in severe injury or death. High voltage from the wind generator or the inverter can cause injury or electrocution. A burn injury can result from an electrical short. A severe chemical burn including blinding can occur from a battery explosion or contact with the sulfuric acid in a lead-acid battery.

These conditions are addressed in the following safety messages:

STOP! DANGER! It is your responsibility to obtain all required permits and engineering certifications for your tower and tower location. Soil and wind conditions vary and towers and tower foundations must be designed for your specific location. Tower must not be able to fall on occupied buildings, neighbor's property or power lines. Tower climbing is dangerous and should be attempted only by experienced personnel using proper safety equipment. A fold-over tower can eliminate climbing. Locate your mounting mast (tower) well away from occupied buildings and power lines; a minimum of 100m (300 ft) is recommended.

STOP! DANGER! If the generator appears or sounds loose in the tower or is making an unusual sound, the condition must be corrected immediately. A loose generator or component will soon damage itself further and may fall from the tower or lose parts that could be lethal. Never stand in line with an operating propeller.

STOP! DANGER! Provide climbing protection against all unauthorized persons or children. Never allow an untrained person or someone without the proper safety equipment to climb the tower. Always stop the propeller before climbing the tower. Both falling from the tower and contact with the operating propeller can be lethal.

STOP! DANGER! High voltage systems (that is, systems with battery voltages of 64 volts and above or the primary side of any system with a transformer) represent a dangerous shock hazard and could be lethal. All high voltage systems should be wired and maintained by a qualified and licensed electrician.

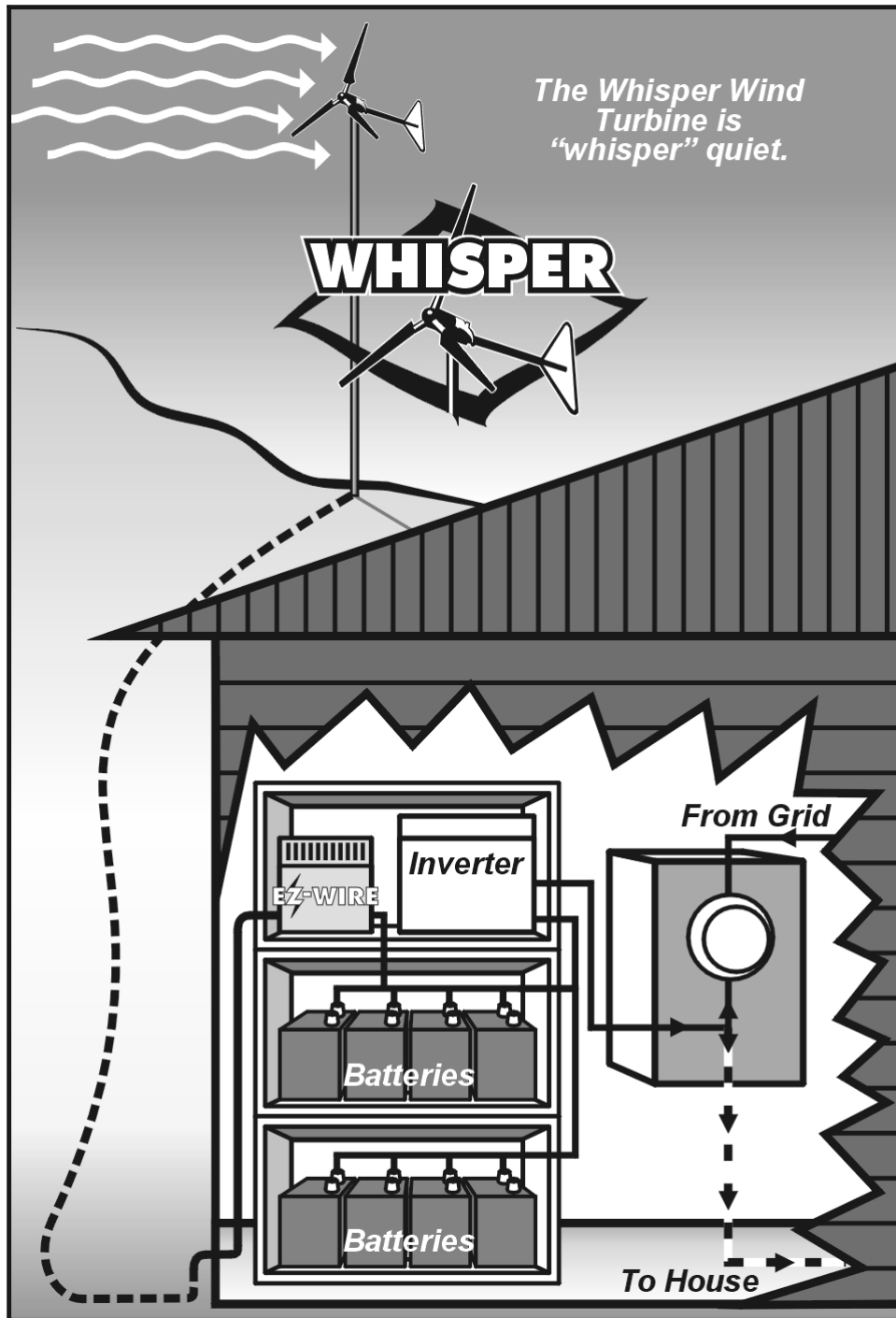
STOP! DANGER! Batteries may emit explosive and irritating gas while charging. Never turn on a light switch or make any other electrical connection or light a match or make any type of spark near a recently-charged battery. Use protective gloves and eyeglasses when working around a battery. Turn off all loads, wear safety glasses, and look away when making a final battery connection.

STOP! DANGER! NEVER place objects on top or near the EZ-WIRE enclosure. These devices must dissipate heat as part of normal operation. FIRE AND FAILURE can result if airflow is blocked.

DESCRIPTION OF SYSTEMS

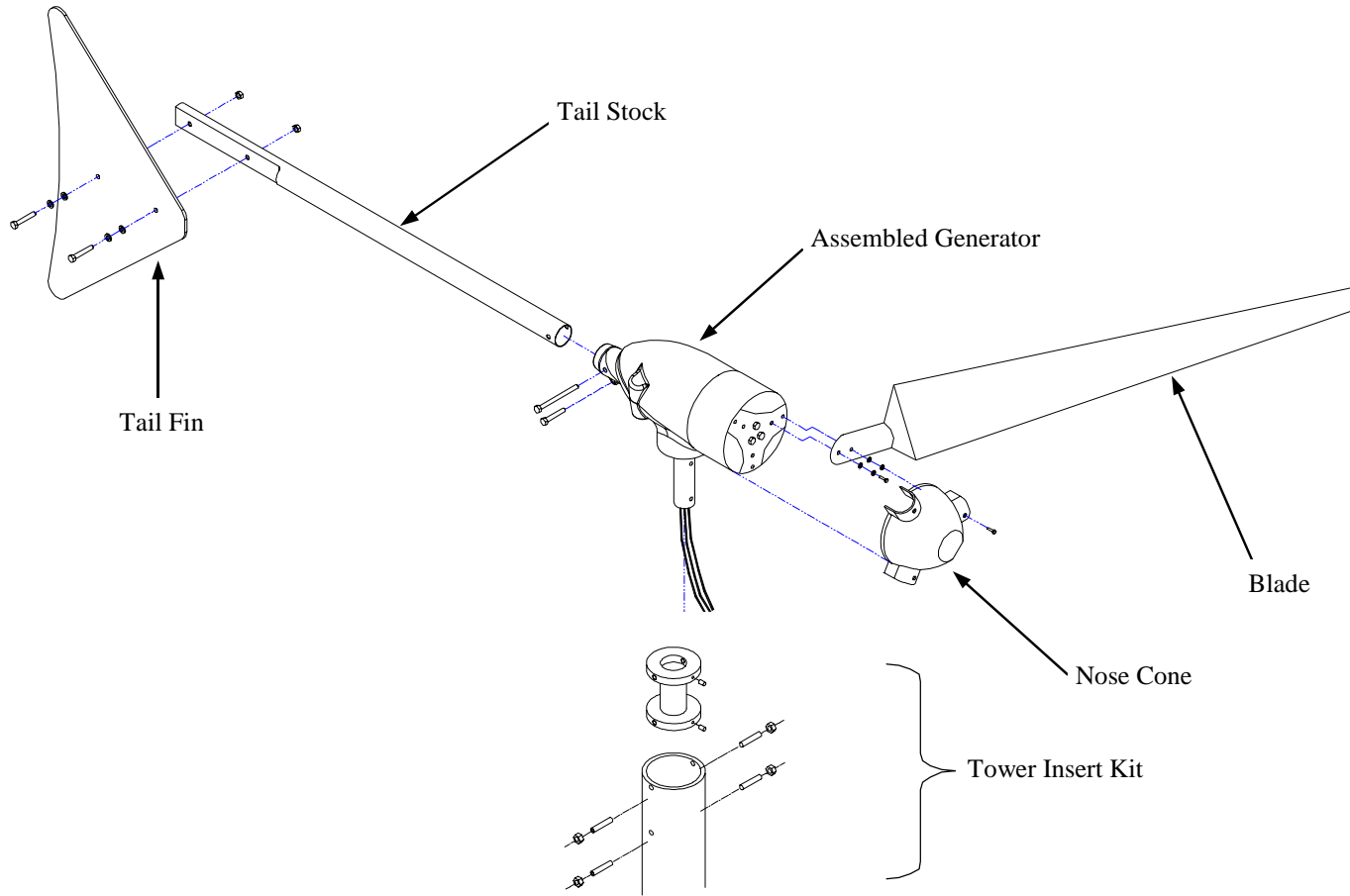
The illustration below depicts a typical installation. For more information regarding specifications of wind, wind/solar and inverter systems, contact Southwest Windpower. Note that the illustration below is for information purposes only. See the appropriate section to properly wire your own wind system.

Whisper Wind Generators (H-40) include the EZ-WIRE System Center and the user supplies the battery, tower, inverter and wiring. During windless periods, solar panels may supplement your usage of renewable energy. Solar PV (photovoltaic) panels make electricity directly from sunlight. Batteries store electricity so you have power during windless and sunless periods as well as periods of high demand. A deep cycle type of battery must be used. If you have the wind generator only, use this manual to help size the battery and inverter.



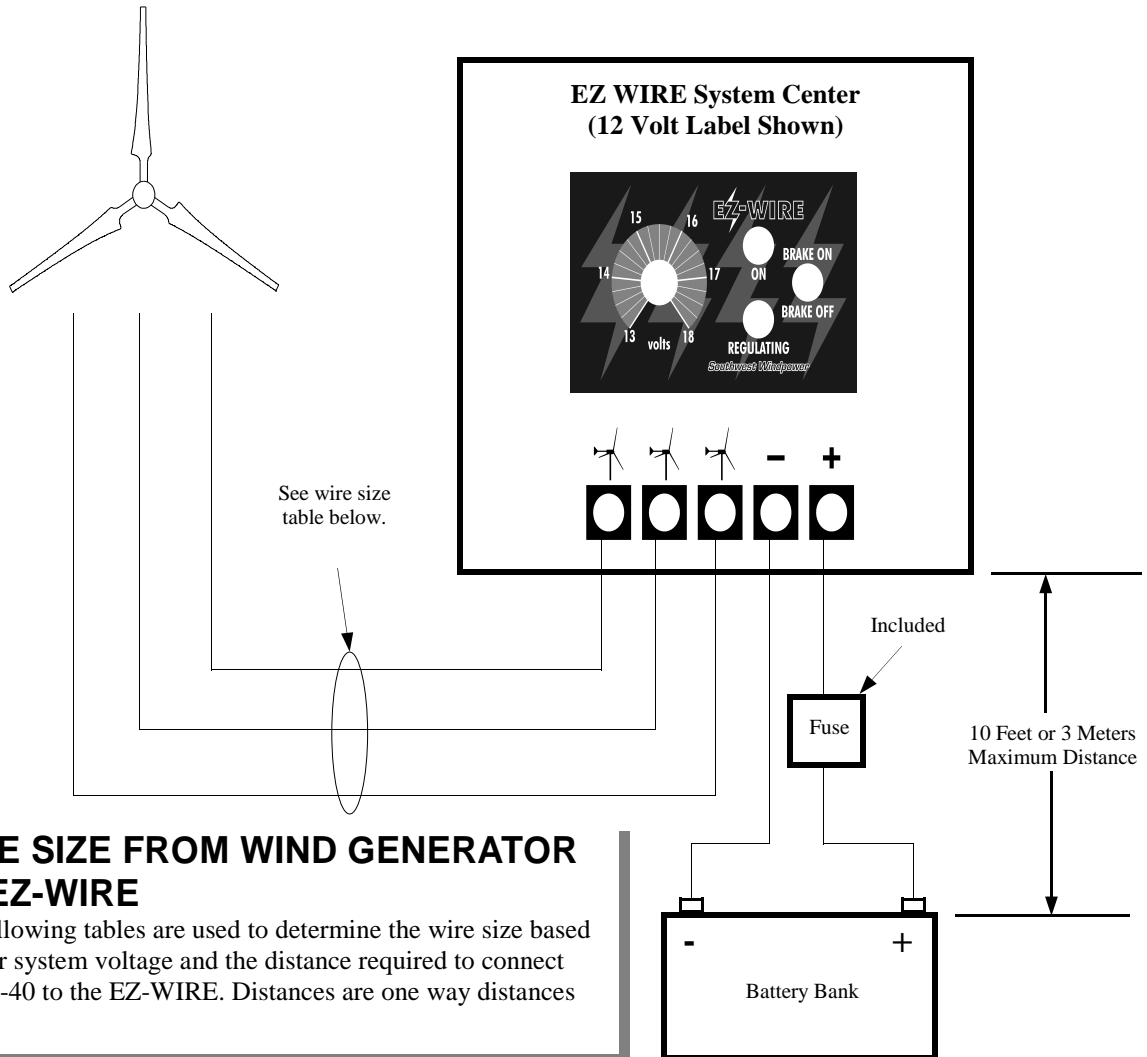
Overview of Wind Generator (Simplified H-40 Shown Below)

See Page 27 for Complete Exploded View



Typical Renewable Energy System Wiring

You will need to make the electrical connections as shown below.



WIRE SIZE FROM WIND GENERATOR TO EZ-WIRE

The following tables are used to determine the wire size based on your system voltage and the distance required to connect your H-40 to the EZ-WIRE. Distances are one way distances

VOLTS	FEET			
	12	24	36	48
COPPER WIRE SIZE				
AWG 12	xx	xx	108	216
10	xx	xx	173	346
8	xx	138	276	552
6	xx	218	436	872
4	84	339	678	1356
3	136	542	1084	2168
2	170	682	1364	2728
1	216	860	1720	3440
0	274	1098	2195	4390
2/0	342	1364	2727	5454
3/0	434	1730	3462	6924
4/0	546	2177	4355	8710

VOLTS	METERS			
	12	24	30-36	48
COPPER WIRE SIZE				
AWG 12	xx	xx	xx	66
10	xx	xx	53	106
8	xx	42	84	168
6	xx	66	133	266
4	26	103	207	414
3	42	165	330	660
2	52	208	416	832
1	66	262	524	1048
0	82	335	669	1338
2/0	104	416	831	1662
3/0	132	528	1055	2110
4/0	166	664	1327	2654

1. INSTALLATION

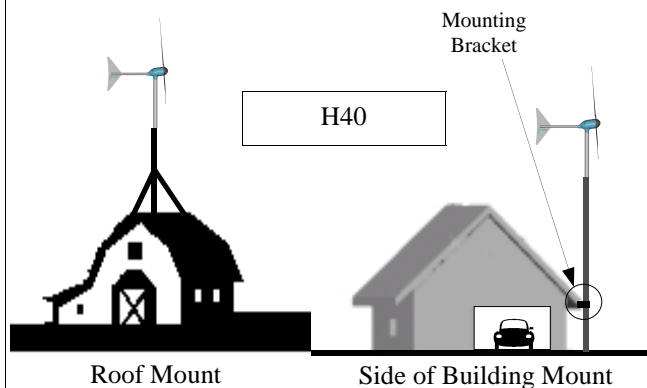
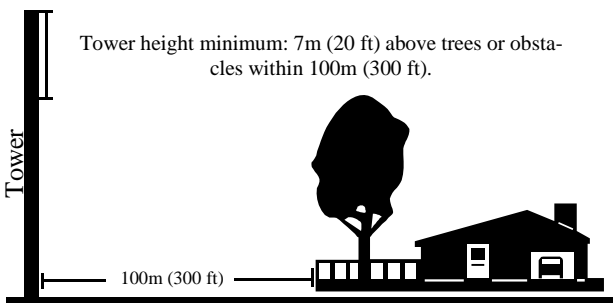
DO THE FOLLOWING STEPS IN ORDER AND CIRCLE WHEN COMPLETE

1. TOWER LOCATION/TYPE AND HEIGHT. INSTALL TOWER

(Install tower following manufacturer's instructions.)

Tower height minimum is 7 meters (20 feet) above trees or obstacles within 100m (300ft). The lateral thrust rating at top must match wind generator model. The highest point on your property is generally best, but wind generator distance to battery and the battery voltage determine the correct wire size (Refer to wire size table pg. 5). A self supporting tower occupies less ground area than a guyed tower but is more expensive. A fold over design permits easy installation and maintenance on the ground and eliminates the need for climbing.

Whisper Model H40 are suitable for roof or side-of-building mounting on **unoccupied** buildings such as garage or barn. Some vibration transmission will be noticeable from mounts to structure. Foundations must be designed and approved for local wind/soil conditions.



2. PURCHASE BATTERIES OF PROPER SIZE.

Packages contains suggested battery size. See Table below for minimum battery size.

MINIMUM BATTERY SIZES

Wind Generator Model	H40-24
Battery System Volts	24
Minimum Amp x Hours (20 hour rate)	200
Min. kwh (Volts x Amps x Hours/1000)	4

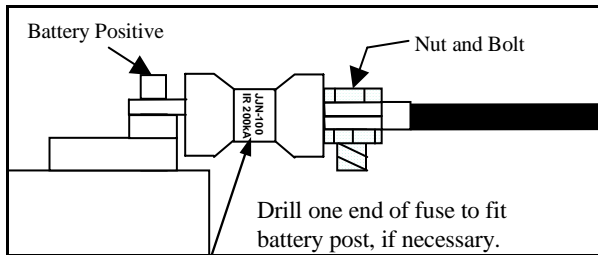
3. CHOOSE BATTERY LOCATION INSTALL BATTERY

Locate battery in moderately stable room temperature, dry unoccupied building. Battery performance is optimal at room temperatures. Run AC power from inverter to house or load. If battery is in an occupied building, an enclosure with vent to outside is required. Follow code. See the following diagrams for package system series/parallel arrangement.

Determine series/parallel arrangement and construct a rack or mount from heavy, treated lumber. Allow 5 cm (2 in) on all sides for ventilation. Allow 60 cm (2 ft) vertical separation for access to terminals and checking water.

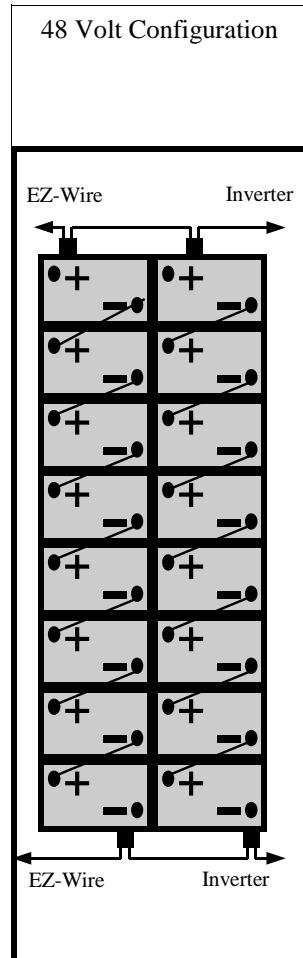
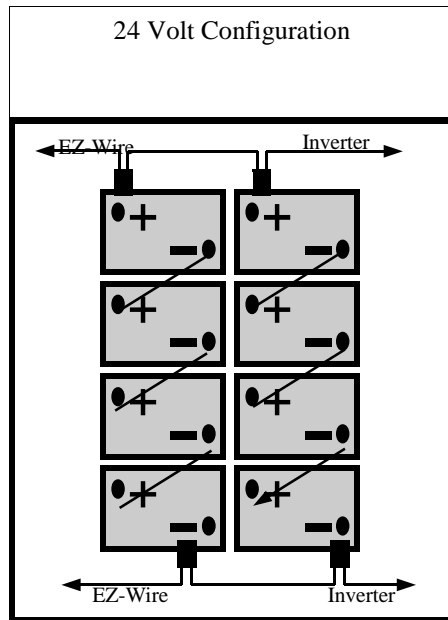
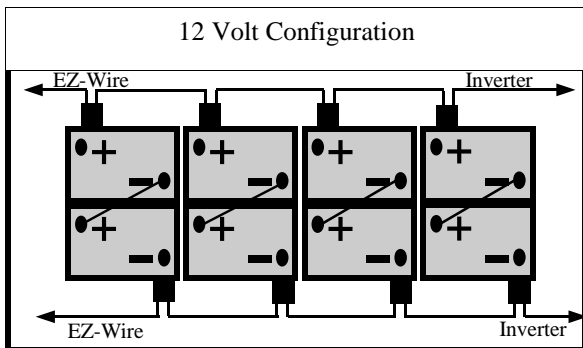
Coat all connections with grease or corrosion protector available at auto parts store. Install EZ-WIRE and Inverter fuse (if used) at battery positive. To minimize the possibility of EMI (electromagnetic interference), the line from the battery to the EZ-WIRE should be less than 10 feet (3 meters).

Recommended Battery Fuse Installation



Fuse Included

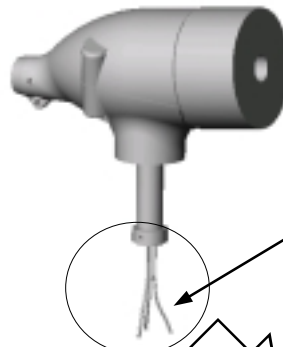
Use the diagrams below to determine the series/parallel arrangement for your system voltage (typical 6 volt battery arrangement shown).



4. WIND GENERATOR ELECTRICAL TESTS

Complete these tests before mounting blades to rotor. These tests confirm that the wind generator was not damaged in shipment and is ready to install on the tower.

OPEN CIRCUIT TEST



When the wires are unconnected the wind generator rotor should spin freely.

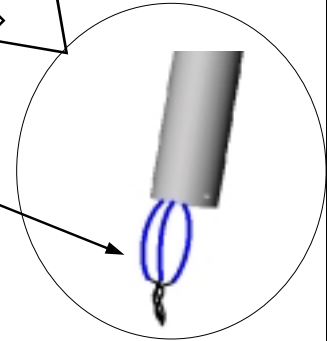
GROUND TEST



Check resistance to ground on any wire. Resistance must exceed 10,000 ohms.

SHORT CIRCUIT TEST

When the wires are shorted together the generator rotor should turn hard and smooth.



5. CONNECT WIRES AND MOUNT WIND GENERATOR TO TOWER

Whisper H40 - Tower Mount

Mounting Instructions

Check fit of insert by fitting it inside the tower. A maximum of 1.5 mm (1/16 in) play is allowed. You must be able to pull pipe or tube tight against insert with mounting bolts.

Install insert on yaw shaft with slot facing down. Slot used for tower wire support. Use medium-strength thread locking compound on all fasteners. M6 X 10 Allen head set-screws must engage both holes in yaw shaft

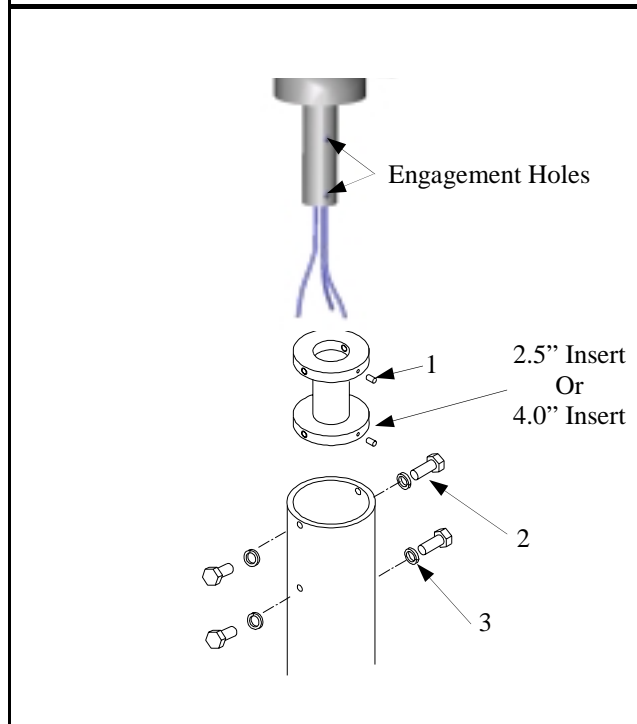
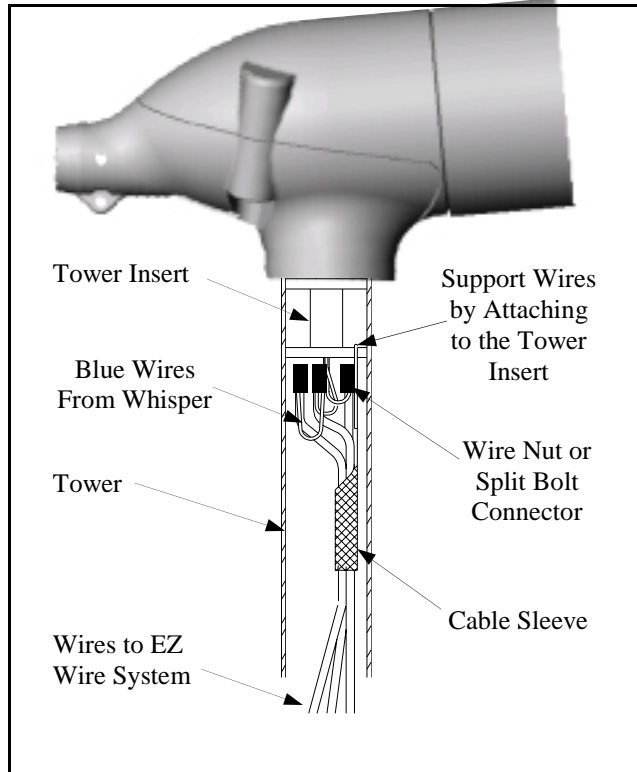
Use plastic wire nuts or split bolts to make electrical connections. Any wind generator wire can go to any tower wire. Wrap split bolts thoroughly with electrical tape to prevent shorts to tower. Support wires to avoid weight on slip ring wires.

Slide generator without propeller into tower and install mounting hardware as shown.

Part Number Tower Insert Kit

WP00174 Pipe 2.5 Schedule 40 (2.875 O.D. x .20Wall)

WP00177 Optional Tube 4" x .120 Wall



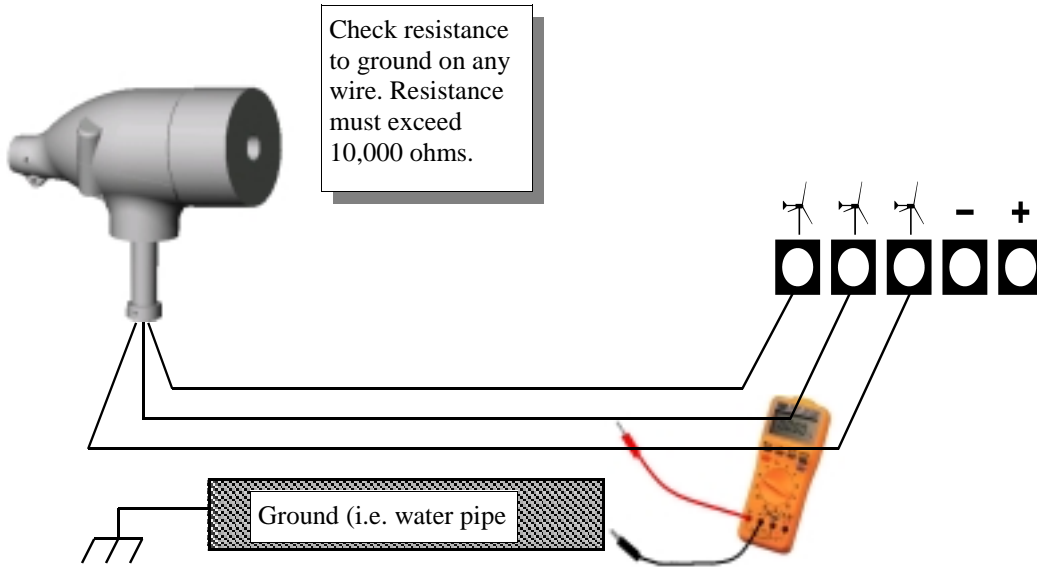
2.5" Insert Shown Above

Item	Description	2.5" QTY	4" QTY
1	Set Screw (M6 X 10)	2	2
2	Bolt M8X20	4	6
3	Lock Washer M8	4	6

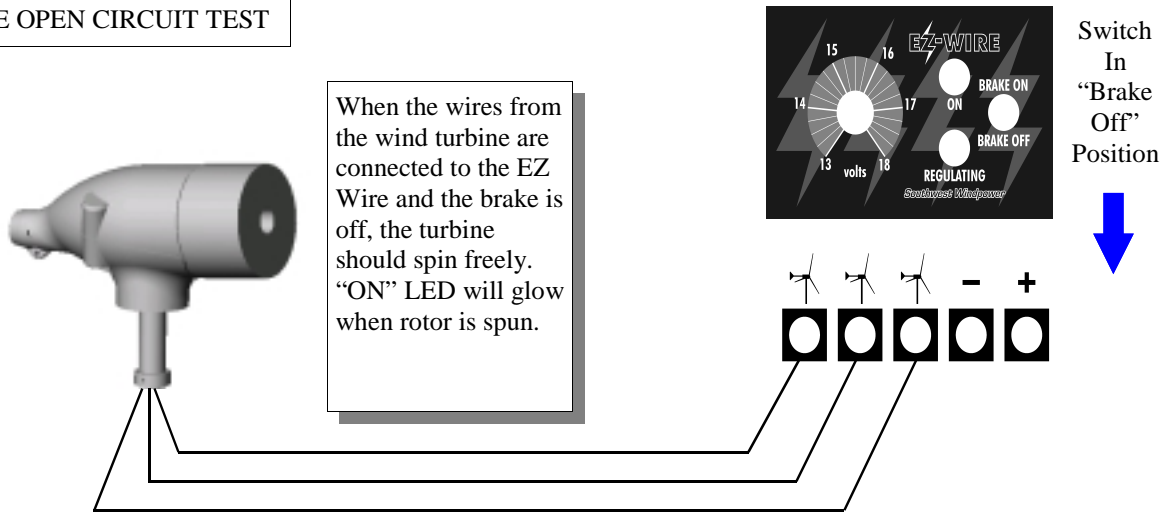
6. TEST WIND GENERATOR TO EZ WIRE WIRING

Complete these tests before mounting blades to rotor.
Repeat step 4 using brake switch to short wires

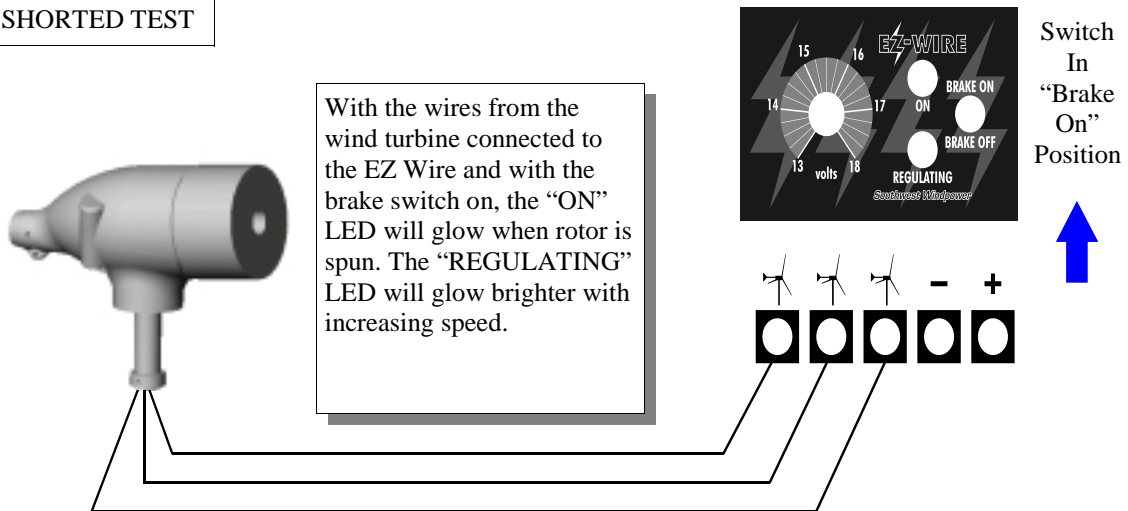
GROUND TEST



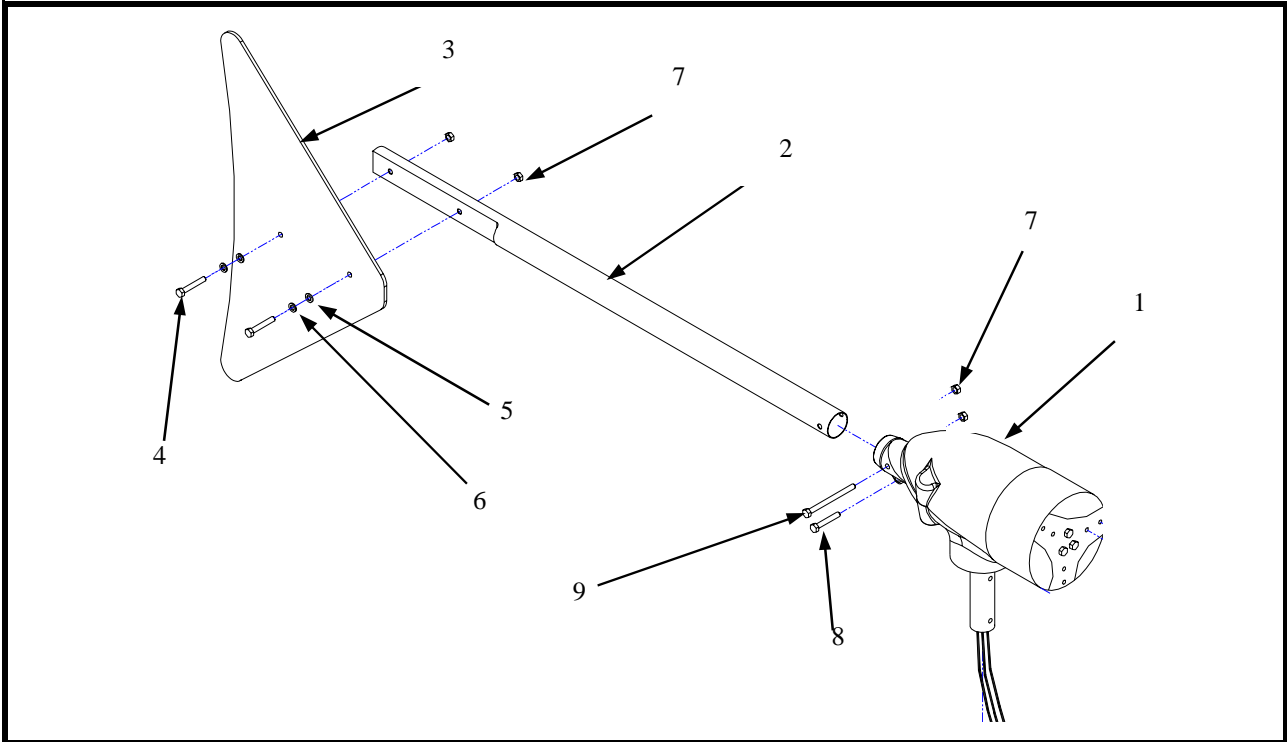
TURBINE OPEN CIRCUIT TEST



TURBINE SHORTED TEST



7. INSTALL TAIL



Item Number	Description	Quantity
1	Assembled Generator	1
2	Tail Stock	1
3	Tail Fin	1
4	Hex Bolts, M8 x 55	2
5	Nylon Washer, M8 X 31	2
6	SSTL Washer, M8 x 30	2
7	Nylock Nut, M8	4
8	Hex Bolt, M8 x 25	1
9	Hex Bolt, M8 x 70	1

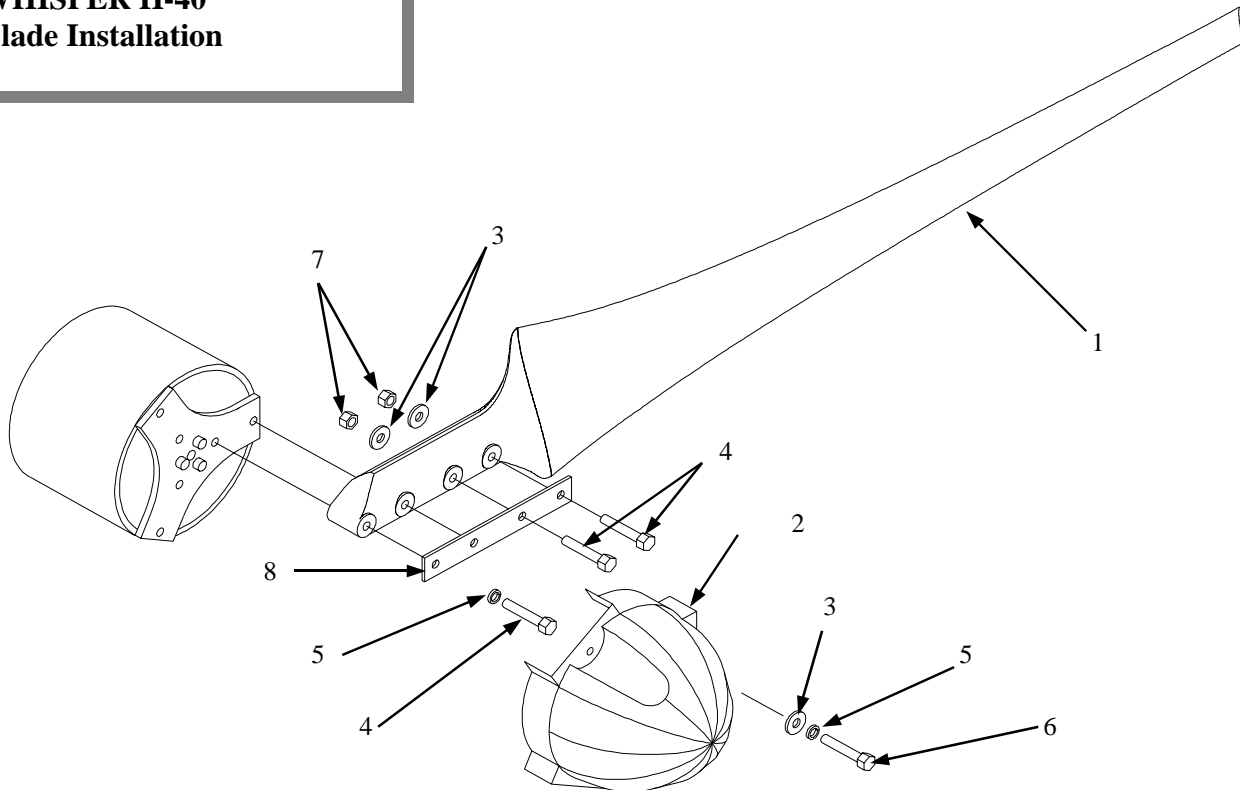
H-40 Tail Assembly

8. INSTALL BLADE AND NOSE CONE. BRAKE SWITCH "ON"

Installation instructions for Whisper H-40.

1. Flat (ribbed) side of blade lays against rotor front plate.
2. Use blue thread locking compound on all bolts.
3. Loosely install all items except Item 2 (Nose Cone).
4. Torque Item 4 (Bolt, M8 x 50) to 8 ft/lbs or snug. Do not over-tighten.
5. Install Item 2 (Nose Cone) using Items 3 (Flat Washer, M8 x 24), 4 (Bolt, M8 x 50), and 5 (Lock Washer, M8).
6. Install Item 2 (Nose Cone) using Items 3 (Flat Washer, M8 x 24), 5 (Lock Washer, M8) and 6 (Bolt, M8 x 55).

WHISPER H-40 Blade Installation



Item	Description	Quantity
1	Blade	3
2	Nose Cone	1
3	Flat Washer, M8 x 24	6
4	Hex Bolt, M8 x 50	9
5	Lock Washer, M8	6
6	Hex Bolt, M8 x 55	3
7	Hex Nut, M8	6
8	Blade Strap	3

NORMAL OPERATION

EZ-Wire System Center Controls and Features

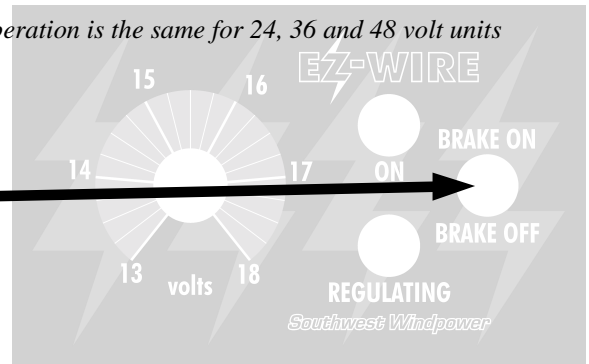
The EZ WIRE is a resistive load regulator and a rectifier. The three AC inputs from the wind turbine are rectified by the EZ Wire and then output as DC to the battery bank. When the battery bank voltage increases to a level set by the user, regulation occurs. When this happens, all power from the wind turbine is diverted to the resistor bank, which slows or stops the wind turbines blades from rotating. The regulator will not come out of regulation until the battery bank drops below a factory set voltage based upon the battery bank. The preset lower end and the adjustable upper end of the adjustment window are as shown in the table below.

Battery Bank	Lower End	Upper End Adjustable Range	Preset Level
12 V	12.5 V	18 V	14.1 V
24 V	25 V	37 V	28.4 V
36 V	37.5 V	55 V	42.3 V
48 V	50 V	73 V	56.4 V

Brake Switch ON

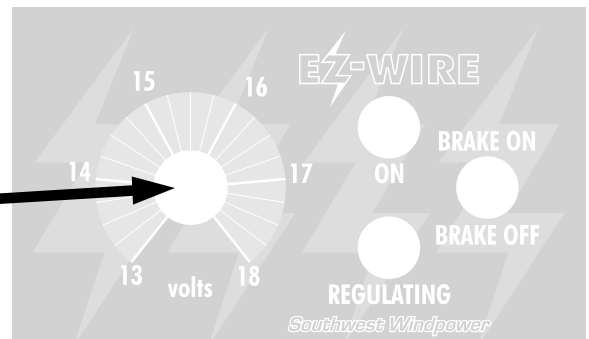
12 Volt label shown, operation is the same for 24, 36 and 48 volt units

Brake Switch: To slow or stop the wind turbine, flip the toggle switch on the control panel to BRAKE ON. This will slow or stop the wind turbine and divert the output DC current to the resistor bank. Returning the turbine to normal operation is achieved by simple flipping the toggle switch to BRAKE OFF. Having the turbine in regulation or in the brake mode during high winds is not damaging to the system.



Setting Regulation Voltage

Setting Regulation Voltage: To adjust regulation set point on the EZ WIRE II turn the potentiometer knob located on the control panel to the corresponding desired voltage.



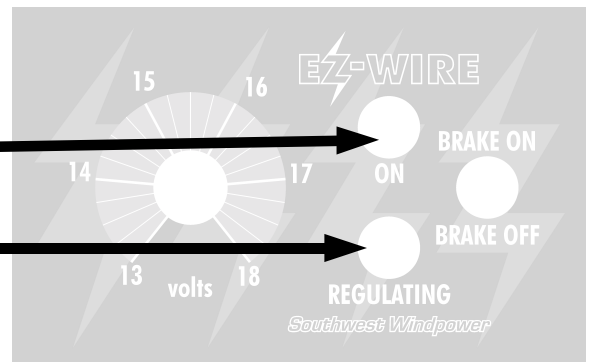
READ THIS BEFORE YOU CONSIDER ADJUSTING THE REGULATOR SET POINT

Turning up the regulation set point adjustment will **NOT** increase the turbines output voltage or amperes. It simply adjusts the “shut down” point for the generators’ voltage regulator. When the battery voltage reaches the regulation set point voltage, the turbine will slow down and stop charging the batteries.

LED Display

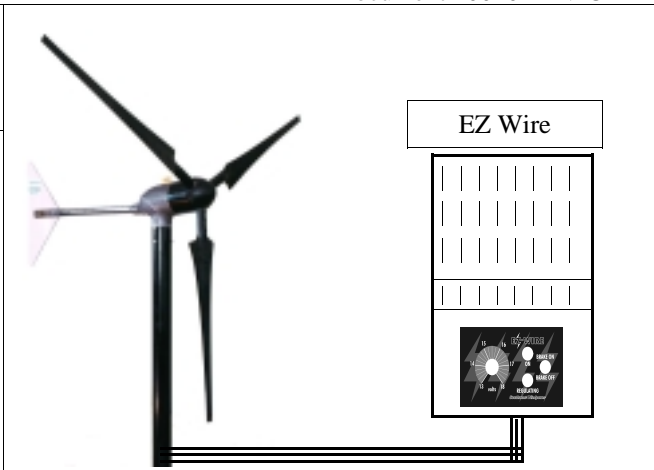
On LED: Indicates when the blades of the turbine are spinning.

Regulating LED: Indicates when the turbine is in regulation or when the turbine has been slowed using the brake switch.



MAINTENANCE-Monthly - H-40 Turbine

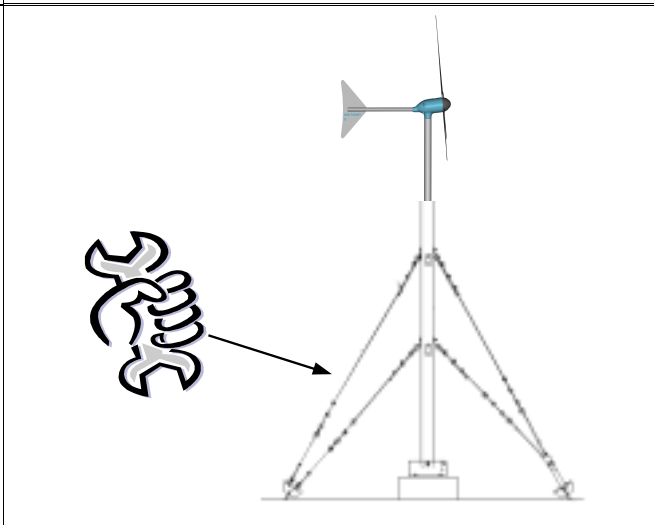
1. TEST BRAKE
(This checks electrical wiring.)
 STOP THE WIND GENERATOR IN A MODERATE WIND (CHARGING BUT NOT FURLING) No unusual difficulty or noise should be experienced in stopping the propeller. A noise during braking can indicate a disconnected wire.



2. CHECK MECHANICAL CONDITION
 WATCH AND LISTEN FROM THE TOWER BASE.
 Use binoculars. There should be no mechanical noise, rattle or vibration. The propeller and tail must not wobble. Lower or climb the tower for inspection, if indicated. There should be no buzzing either heard or felt with your hand on the tower mast. Go to Electrical Problems, if indicated.



3. INSPECT THE TOWER
 Follow all inspection and maintenance requirements of the tower manufacturer. Tighten all nuts and bolts, especially wire clips. Check for cracks and bent or broken parts at the anchors and base structure. Check for broken strands and tighten guys.



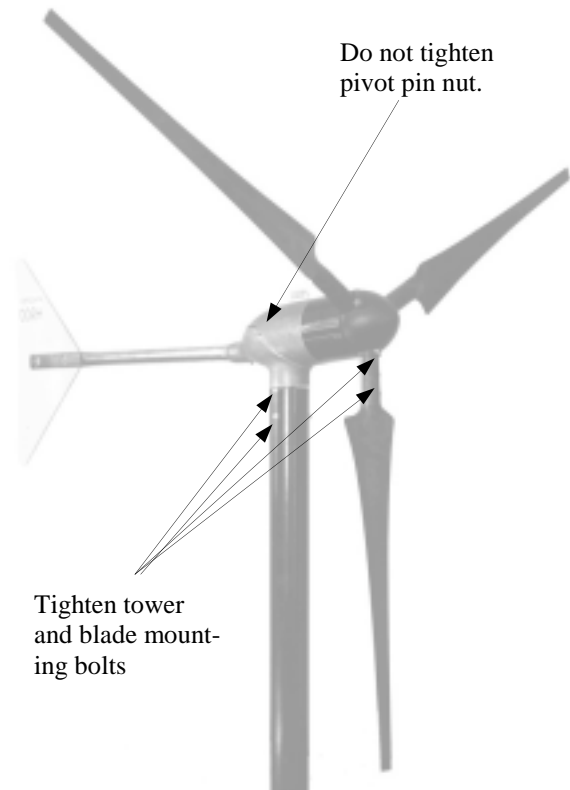
4. CHECK THE BATTERY
 Add only distilled water if low.
 Tighten battery connections
 Remove corrosion and protect terminals
 Wipe tops with baking soda solution.



MAINTENANCE ANNUAL

LOWER TOWER AND GIVE WIND GENERATOR A COMPLETE MECHANICAL CHECK. FIX OR REPLACE ANY WORN OR LOOSE PARTS.

- a) Check tightness of all tower mounting nuts and bolts and propeller mounting bolts.
- b) Check all bearings. Just perceptible play is acceptable.
- c) Clean the propeller with mild scrubbing agent to remove all dirt and debris. Replace blades if they are cracked or damaged.



Maintenance Log

Observe Monthly and Annual Inspection Requirements! Record ALL maintenance and repair work!

Date	Problem/Observation	Action Taken

TROUBLESHOOTING AND REPAIR

WIND GENERATOR SYSTEM

First, one must determine if the problem is mechanical or electrical. Refer to the two illustrations below and then proceed to the appropriate section.



Propeller does not turn = Mechanical Problem

Proceed directly to **Table: Symptoms of Mechanical Problems**

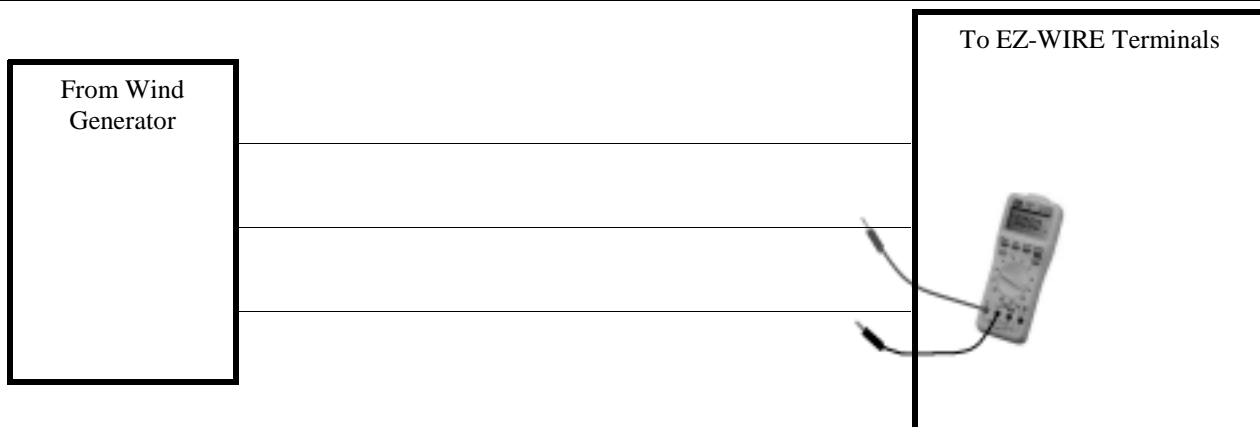
Propeller turns slowly = Electrical Problem

Proceed to next page to diagnose the type of electrical problem the turbine is experiencing.

DETERMINING THE TYPE OF ELECTRICAL PROBLEM

Electrical problems can be in the generator or the EZ-WIRE. Determine which as follows:

1. Wind generator will not start (blades turn slowly as if the brake is on): On a day of moderate wind, disconnect the three wires from the wind generator one at a time at the EZ-WIRE. If the wind generator starts, the wire that allowed it to start leads to a bad diode in the EZ-WIRE. Call the factory or the distributor to replace the diode..
2. Wind generator still does not start. On a day of moderate wind, disconnect any two wires. If the wind generator starts, the problem is in the EZ-WIRE. Go to Table, **Symptoms of EZ-WIRE System Center Problems**. If the wind generator still does not start the problem is in the tower wiring or the wind generator. Go to Table, **Symptoms of Electrical Problems**.
3. Wind generator is running, but may have an electrical problem. Using a voltmeter, read the voltage across the leads and see the list below as a guide to possible problems.



Voltmeter Test

1. Voltage increase and decreases slowly with wind speed equally across all wires = Everything ok.
2. No voltage across two wires = One wire from wind generator not carrying power. Check in order: Check the tower wiring to insure it is properly wired. Check slip rings and brushes, stator connections and stator windings for obvious damage. Report damage to authorized distributor or factory.
3. Voltage significantly high across two wires than the others = Contact the distributor or the factory, possibly a bad diode.
4. Voltage produced after BRAKE switch turned ON = Possibly a faulty brake switch or a wire shorted to the other two or an internal fault has occurred in your EZ WIRE system.
5. Voltage significantly lower across two wires than the others = Bad connection at wind turbine voltage connections or faulty stator winding. Report this failure to your distributor or the factory.
6. Should these results appear inconclusive in determining the problem proceed directly to **Table: Symptoms of Electrical Problems** or **Table: Symptoms of EZ-WIRE System Center Problems**.

Table: Symptoms of Mechanical Problems

Symptom	Possible Cause	Correction
1. Propeller is stationary, even in high winds	<ul style="list-style-type: none"> a. Ice in generator, or uneven ice on propeller b. Debris between rotor and stator c. Loose or high magnet d. Bad bearing 	<ul style="list-style-type: none"> i. Wait for warm weather i. Turn propeller gently by hand and blow or use piece of paper to dislodge debris i. Contact factory or distributor to remove rotor and re-glue magnets i. Contact factory or distributor to replace bearing(s)
2. Propeller will not turn at all except in high wind, scraping or rubbing sound at low rpm, always stops at same propeller position	<ul style="list-style-type: none"> a. Same as above, except more likely to be high magnet or bad bearing. b. Swelled wire keepers due to high moisture 	<ul style="list-style-type: none"> i. Same as above i. Contact factory. Stator may need re-varnishing.
3. Propeller is harder starting, out put is lower & there is more propeller noise than usual. Seems out of balance.	<ul style="list-style-type: none"> a. Ice on blade b. Dirty blade c. Split, warped or damaged blade d. One or more blades on backwards 	<ul style="list-style-type: none"> i. Wait for warm weather. Prop will eventually shed ice, leave running unless there is substantial vibration i. Clean with soap or bug cleaner i. Contact factory or distributor to replace broken or damaged blade
4. Propeller turns a little, never starts	<ul style="list-style-type: none"> a. Blades on backwards. (See blade installation) 	<ul style="list-style-type: none"> i. Turn blades over. Leading edge advances clockwise from upwind view.
5. Tail, generator and tower vibrate or shake at all or some wind speeds	<ul style="list-style-type: none"> a. Blade out of balance b. Blade not tracking c. Rotor (magnet can) out of balance d. blade plate out of balance 	<ul style="list-style-type: none"> i. Contact factory to replace blade i. Contact factory to replace mounting plate i. Return to factory or distributor i. Return to factory or distributor
6. Rattle or clunking from generator	<ul style="list-style-type: none"> a. Generator loose in tower b. Loose rotor (magnet can) on shaft loose tail, missing rubber bumper, wires slapping inside of mast, governor pivot bolt loose c. Worn bearings d. Shaft broken 	<ul style="list-style-type: none"> i. Retighten mounting hardware, use Loctite or equivalent thread-locking compound i. Repair as required i. Contact factory to replace bearings i. Contact factory to replace shaft

Table: Symptoms of Electrical Problems

Symptom	Possible Cause	Correction
1. Propeller turns slowly even in strong wind, but will not start	a. BRAKE switch is ON (brake on) b. Battery is dead (voltage less than (1/2 nominal)) c. Incorrect turbine wiring d. Short circuit in wiring from generator to EZ-WIRE (in tower) e. Shorted diodes in EZ-WIRE f. Short circuit in brush card or slip ring assembly g. Short in turbine	i. Turn BRAKE switch OFF i. Disconnect loads and /or battery from EZ-WIRE until generator starts i. Rewire i. Check wiring from tower i. See "Voltmeter Test, page 19" i. Contact distributor or factory i. Contact distributor or factory
2. Propeller runs too fast, may whistle, no output, no unusual mechanical noise	a. Load disconnected b. Two or three wires open between turbine and EZ-WIRE. c. EZ-WIRE diodes open or wire is disconnected at diode terminal	i. Check battery fuse and all connections i. See "Voltmeter Test page 19" i. See "Voltmeter Test page 19"
3. Propeller runs too fast, may whistle, no output, no unusual mechanical noise	a. Battery voltage over 50% high b. Turbine may be in regulation, but the wind may be too high for the turbine to stop	i. Battery too small ii. Battery out of water iii. Bad, corroded battery connections iv. Battery worn out
4. Propeller runs too fast, may whistle, output less than 50% for wind speed, growling, buzzing or vibration felt by hand or mast	a. Disconnected wire between the turbine and the EZ-WIRE b. One open or disconnected diode c. One slip ring or brush not making good connection.	i. Rewire i. See "Voltmeter Test, page 19" i. See "Voltmeter Test, page 19" i. Contact distributor or factory
5. Propeller runs too slowly, output low, no unusual mechanical noise	a. Battery voltage low, or a dead battery. b. Incorrect turbine wiring	i. Disconnect loads and let battery charge. i. Check wind generator wiring connections or rewire

Table: Symptoms of EZ-WIRE System Center Problems

Symptom	Possible Cause	Correction
1. Propeller turns slowly, even in strong wind	a. Brake Switch ON b. Shorted diode c. Dead Battery d. Short in wiring to turbine a. Battery dead or disconnected b. Circuit board fuse blown	i. Move switch to "OFF" i. Contact distributor or factory i. Charge or remove loads i. See "Table of Electrical Problems"
2. Doesn't regulate, red light off and heater is cold	a. Battery volts below setting b. Circuit Board bad	i. Adjust setting. Check battery with voltmeter. See page 15 i. Contact distributor or factory
3. Doesn't regulate, red light on and heater is cold	a. Heater burned out or disconnected or wired wrong b. Bad connection from Circuit Board to power block	i. Contact distributor or factory i. Contact distributor or factory
4. Heater always on, red light on	a. Wrong voltage setting b. Circuit Board bad	i. Adjust setting. Check battery with voltmeter. See page 15 i. Contact distributor or factory

MECHANICAL REPAIRS AND PARTS REPLACEMENT

(Refer to exploded view)

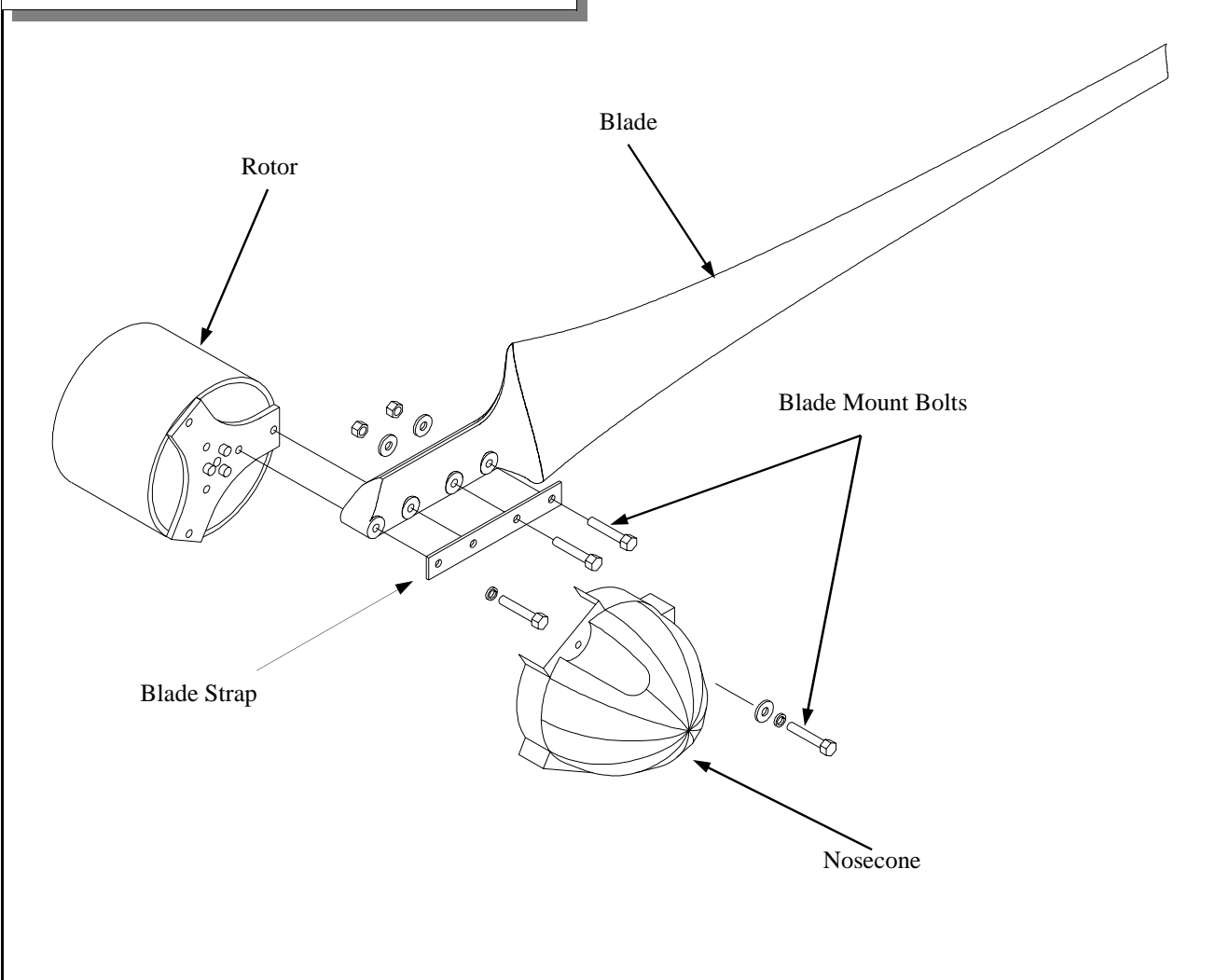


Do not attempt these repairs on top of the tower. Perform repairs only after tower has been lowered.

BLADE UNMOUNTING

Remove blade, see Installation step #8. Remove rotor bolts and blade strap. See exploded view.
Reassemble in reverse order.

Typical Blade Assembly H40



MECHANICAL REPAIRS AND PARTS REPLACEMENT

The following two sheets provide a complete exploded view and parts list of the Whisper H-40. It is included as a guide for replacement parts and troubleshooting. It is, however, recommended that any internal repair of the turbine be performed by the factory or your authorized distributor. Any unauthorized attempt to repair the turbine leading to damage is not covered by warranty.

Exploded View Parts List-Whisper H40			
Item No.	Description	Quantity	Southwest Windpower Part # - H40
1	Casting Top	1	IAA05
2	Nylock Nut, M8	1	IAR17
3	Hex Head Cap Screw M8 x20	1	IAR07
4	Stator	1	IA015
5	Snap Ring (20 mm)	2	IAR18
6	Bearing	2	IAJ01
7	Spindle	1	IAP06
8	Snap Ring (47 mm)	1	IAR20
9	Rotor	3	IAE20
10	Washer M6, SS	6	IAR05
11	Socket Head M6 x 16	6	IAR06
12	Stop Head, Rubber Pad	1	IAL03
13	Stop Head, Rubber Pad	1	IAL04
14	Pan Head Screw, M5 x 60	4	IAR02
15	Polymer Sleeve Bearing	1	IAJ03
16	Pivot Shaft	1	IAG03
17	Brush Cover	1	IAF09
18	Brush Holder	3	IAF06
19	Spring	4	IAF03
20	Brush with wire	3	IAF02
21	Brush, wire with terminal	1	IAF02, IAF01
22	Ground Screw M6 x 10	1	IAR03
23	Casting Bottom	1	IAB05
24	Washer, M8 x 16	1	IAR48
25	Nylock Nut, M8	1	IAR17
26	Yaw Shaft	1	IAD03
27	Snap Ring (62mm),	1	IAR21
28	Seal	1	IAR22
29	Light Assembly	1	IAK06
30	Hex Head Screw M4 x 10	1	IAR01
31	Hex Bolt, M8 x 25 SS	1	IAR09
32	Hex Bolt, M8 x 70 SS	1	IAR13
33	Tail Stock	1	IAQ05
34	Nylock Nut, M8	4	IAR17
35	Nylon Washer, M8 x 31	4	IAR16
36	SS Washer, M8 x 24	4	IAR15
37	Hex Bolts M8 x 55 SS	2	IAR12
38	Tail Fin	1	IAS03
39	Yaw Bearing	2	IAJ02
40	Yaw Shaft Snap Ring	1	IAR19

H40 Exploded View

