



**Skystream 3.7™**  
**Owner's Manual**

INSTALLATION

OPERATION

MAINTENANCE

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SKYSTREAM

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**Southwest Windpower  
Congratulations on your purchase and welcome to our family!**

Dear Skystream 3.7™ Owner,

Thank you for your purchase of Skystream. You have just selected the most technologically advanced cost effective renewable energy appliance available today for a home or small business. We congratulate you on your choice and are confident you will experience years of dependable service.

Before going any further, please complete and return the enclosed Warranty Registration Card. **The conditions of your warranty are dependent upon the proper installation of your Skystream.** Furthermore, this will assure you of being kept up to date with the latest developments from Southwest Windpower. These include new options, performance tips, updated software to maximize output and user notices. It is important to know that we do not sell or distribute your information to any third party. We understand your privacy is important.

If you have any questions or comments, we would like to hear from you. Please call during working hours (Monday-Friday – 8:00am – 5:00pm Mountain Standard Time). Our number is 928-779-9463, toll-free 866-807-9463.

Again, welcome to our family and thank you for investing in the future of wind energy with Skystream.

Best Regards,

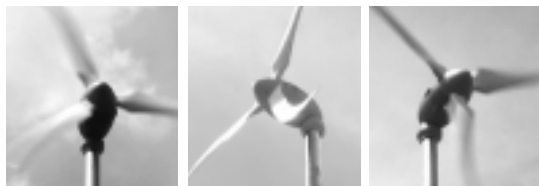
Southwest Windpower

**Enter the serial and model number below**

Serial Number \_\_\_\_\_

Model Number \_\_\_\_\_

MADE IN THE **USA**



Skystream Installation Manual  
Document No. 0313

## IMPORTANT SAFETY INSTRUCTIONS

READ THESE INSTRUCTIONS IN THEIR ENTIRETY BEFORE INSTALLING OR OPERATING



**Professional installation**  
highly recommended

- 1) Read, understand and respect all warnings.
- 2) Do not install Skystream around standing water.
- 3) Do not install Skystream on a windy day.
- 4) Install Skystream in accordance with National Electric Code (NEC) and local building codes.
- 5) Use only with Professionally Engineered (PE) certified towers.
- 6) Always obtain a building permit before construction.
- 7) When moving Skystream or any heavy objects to the site, use a cart to prevent back injury.
- 8) If unusual noise or abnormal operation is observed from Skystream, turn off the machine and contact authorized service personnel.
- 9) This wind generator complies with international safety standards and therefore the design or its installation must never be compromised.
  - a. Do not open the inverter cover – Doing so without factory authorization will void the warranty.
  - b. Apply the proper torque to all fasteners.
  - c. Install only on a PE certified tower.
  - d. Do not paint the blades.
- 10) Use only proper grounding techniques as established by the NEC.
- 11) Properly complete the warranty registration card; failure to complete and return the card may affect your warranty.
- 12) Skystream must be installed in accordance with this manual and local and national building codes. Failure to comply with the manual and local codes will affect and possibly void your warranty.
- 13) Skystream uses high voltage and is potentially dangerous. Be sure to use all safety precautions at all times.

### In this manual



**TIP:** Helpful information to ease the installation



**Professional installation**  
highly recommended



**Warning:** Risk of injury or death - proceed with extreme caution

**Table of Contents**

**1) BEFORE INSTALLATION** \_\_\_\_\_ **5**

**1-1 Package Contents** \_\_\_\_\_ **5-6**

**1-2 Recommended Tools** \_\_\_\_\_ **6**

**1-3 Skystream Options** \_\_\_\_\_ **7**

**1-4 Skystream Project Preparation** \_\_\_\_\_ **8**

**1-4-1 Finding the Best Location for Your Skystream** \_\_\_\_\_ **8**

**1-4-2 Tower Types** \_\_\_\_\_ **9**

**1-4-3 Working With Your Utility** \_\_\_\_\_ **9**

**1-4-4 Working With Your Local Zoning Authority** \_\_\_\_\_ **9**

**2) INSTALLATION** \_\_\_\_\_ **10**

**2-1 Electrical** \_\_\_\_\_ **10**

**2-1-1 Wiring** \_\_\_\_\_ **10**

**2-1-2 Electrical Connections** \_\_\_\_\_ **12**

**2-1-3 Wire Sizing** \_\_\_\_\_ **12**

**2-1-4 Grounding** \_\_\_\_\_ **13**

**2-1-5 Fusing/Circuit Breaker** \_\_\_\_\_ **13**

**2-1-6 Checking Grid Connectivity** \_\_\_\_\_ **13**

**2-2 Installing Skystream on a Tower** \_\_\_\_\_ **14-15**

**2-2-1 Mounting Skystream to the Tower** \_\_\_\_\_ **15**

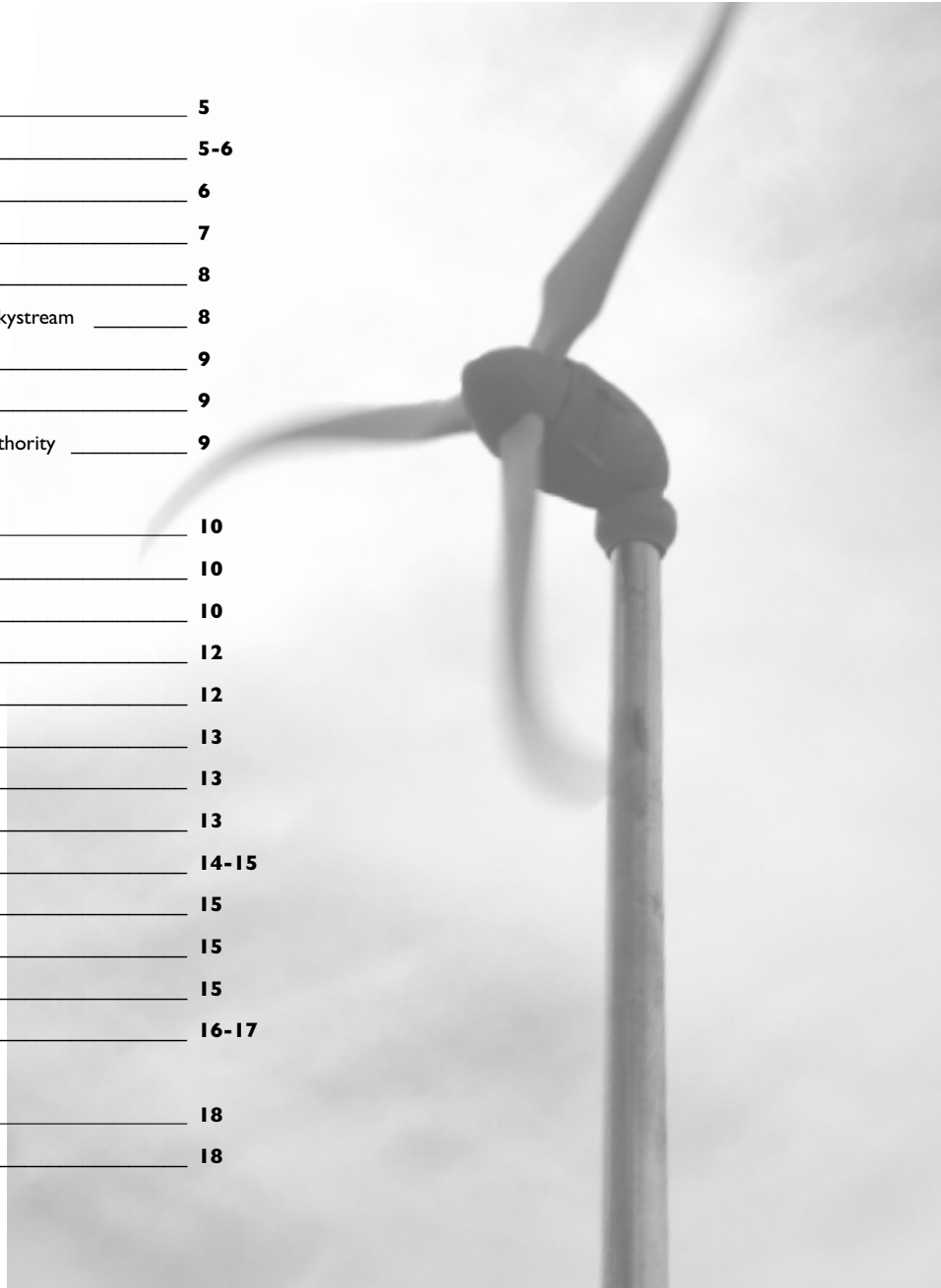
**2-3 Testing on the Ground** \_\_\_\_\_ **15**

**2-3-1 Electrical Test** \_\_\_\_\_ **15**

**2-4 Blade, Nosecone and Antenna Assembly** \_\_\_\_\_ **16-17**

**3) OPERATION AND MAINTENANCE** \_\_\_\_\_ **18**

**3-1 Frequently Asked Questions** \_\_\_\_\_ **18**



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**One - Before Installation**

**Instructions in this guide apply to Skystream Land and Skystream Marine U.S. models only.**

**I-1 Package Contents**

Before you begin, inspect the contents to make sure there is no damage or missing parts. Your Skystream wind generator is shipped in two boxes:

- Identify the parts of your Skystream system using the information on the next two pages.
- Inspect for damage and/or missing parts.

**Box One: rotor blades (three each)**

Box dimensions: 40"L x 22"W x 27"H (102 cm L x 56 cm W x 69 cm H)  
 Weight: 40 lbs (18 kg)

Upon opening, carefully inspect each of the blades to make sure there are no fractures or cracks in the surfaces. Although the Skystream rotor blades are comprised of a durable compression molded fiberglass, damage can occur to the blades during shipping. Once inspected, be sure to set them away from the construction site and protect them from any damage until they are ready for assembly.

**Box Two: Skystream 3.7 wind generator assembly**

Box dimensions: 76"L x 15"W x 12"H (102 cm L x 56 cm W x 69 cm H)  
 Weight: 175 lbs (80 kg)

Your Skystream comes in several versions in accordance with local utility requirements. Be sure to inspect the package and confirm you have the right voltage and HZ. If you have ANY questions, call your dealer or the factory before continuing.

configuration	120/240V	120/208V	240V
output power factor rating	1.0		
operating voltage range (ac)	106-132V l-n		212-264V
operating frequency range	59.3-60.5 Hz		
nominal output voltage (ac)	240V	208V	240V
normal output frequency	60 Hz		
max continuous output current	7.5A	8.7A	7.5A
max continuous output power	1800W		
max ambient temperature	50C. output power is reduced above 60 C. nacelle temperature		

## Your Skystream shipment includes:

Your Skystream shipment includes the following components. A spare of each fastener (bolt, washer or nut) is included. The quantities indicated below are quantities required to assemble Skystream:

### RF Antenna

### Loctite® 242

### Turbine assembly with blade hub, retaining nut, blade plate and nosecone

#### Blade mounting hardware

- M10-1.5 x 120 socket head bolts, grade 12.9 (quantity 12)
- M10-1.5 nuts, grade 12.9 (quantity 12)
- M10 flat washers, A2 stainless steel (quantity 12)
- M10 lock washer, A2 stainless steel (quantity 12)

#### Nose cone with mounting hardware

- M6-1.0 x 12 socket head bolts, grade 8.8 (quantity 3)



**TIP:** See exploded view on pages 16-17

### Yaw vibration isolators with mounting hardware

- Vibration Isolators (quantity 8)
- M12-.75 x 90 hex head bolt, grade 10.9 (quantity 8)
- M12-1.75 nuts, grade 10.9 (quantity 8)
- M12 flat washers, A2 stainless steel (quantity 8)
- M12 lock washers, A2 stainless steel (quantity 8)
- M12 snubbing washers

### Yaw shield (two halves)

#### Strain relief cover and small fasteners

- Strain relief cover with ground wire
- M5-0.8 x 12 socket head bolt (quantity 4)
- M5 lock washer A2 stainless steel (quantity 4)
- M6-1.0x12 socket head bolt (quantity 3)
- M5-0.8x12 button head screws (quantity 4)

## I-2 Recommended Tools

You will need the following tools to complete assembly of Skystream and install on the tower:

- Crescent wrench up to 40 mm
- 3, 4, 5 mm Allen (hexagon) wrenches
- 8 mm Allen (hexagon) wrench socket for torque wrench
- 17, 24, 33, 36 & 50 mm hex wrenches
- 19 mm hex wrench and socket for torque wrench
- Wire stripper
- Phillips head screwdriver
- Flat blade screwdriver and socket for torque wrench
- Multi-meter
- Torque wrench, 0-100 lb-ft (135 N-M)
- Torque wrench, 0-50 lb-inch ( 5.6 N-M)

**Note:** This list does not include tools you will need for the construction of the tower or wire trench.



## I-3 Skystream Options

There are a number of options that can enhance the experience of using a Skystream wind appliance. Although your Skystream will operate without them, we suggest reviewing this chapter. Contact Southwest Windpower or your dealer if you have questions.



### ◀ Remote Display

The optional remote display allows you to observe Skystream's performance in real time. You can also collect data such as kWh per day, per month and per year. The display wirelessly connects via a 900 MHz frequency and works up to 1000 feet from the tower.

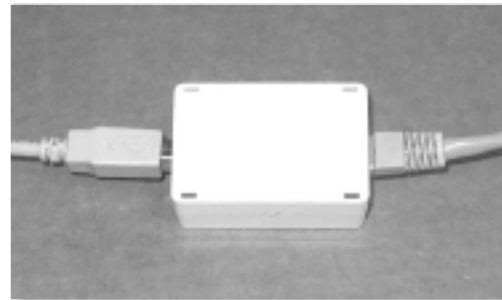
### Remote Monitoring

There are a number of benefits to remote monitoring. A subscription to Fat Spaniel Technology allows a third party company to monitor the performance of your Skystream and communicate with a local dealer in the event there is a problem. Additionally, for states with "green tags" you could receive added revenue for each kWh your Skystream produces. Contact your dealer or Southwest Windpower directly for more information.



### ◀ Tower Adaptor

The tower adaptor allows you to attach your Skystream to a tower constructed of 5 inch Schedule 40 pipe. Nominal internal diameter of 5 inch (12.7 cm).



### USB Converter ▶

The USB converter allows you to connect the remote display to your computer and monitor Skystream real time. Specialized software allows you to create your own power curves, monitor performance remotely and even download and transmit the latest software directly to your Skystream to maximize performance. To connect Skystream to your computer, you must also use the wireless remote.

## I-4 Skystream Project Preparation

There are several considerations before you begin the installation process of your Skystream. These considerations are more important if you intend to connect your machine to the electrical utility. Although Skystream is UL and IEEE certified, your local utility and zoning authority may require additional information prior to construction. This chapter will provide an overview of what to expect when working with your zoning authority and utility. Southwest Windpower has a number of resources that may assist you in the permitting and interconnection processes.

To learn more go to: [www.skystreamenergy.com](http://www.skystreamenergy.com)

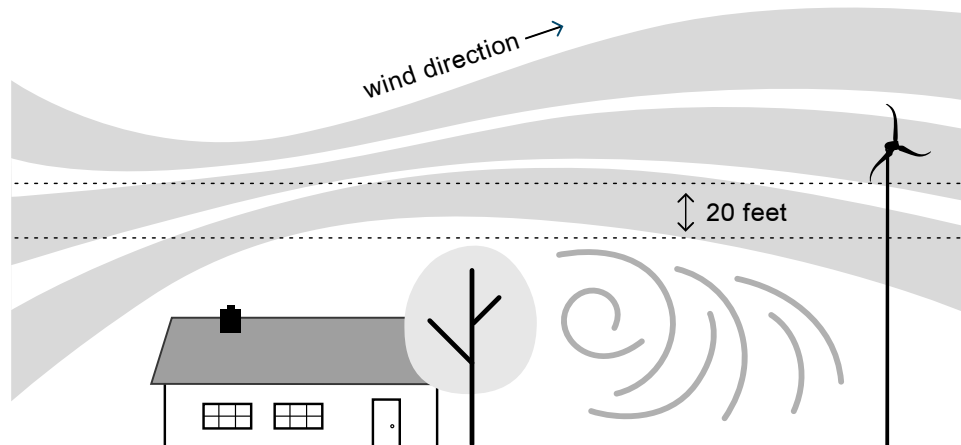
### I-4-1 Finding the Best Location for Your Skystream

We have worked at simplifying the installation process of Skystream, but each installation is likely to be different. Skystream may require a different tower depending on trees, obstructions and soil types.

**Very Important:** Proper siting is essential to a well performing wind generator.

The taller the tower, the more energy your Skystream will produce but keep in mind, this will also increase the cost of the installation. It is extremely important to balance performance (tower height) to installed cost in order for you to achieve the lowest cost of energy and quickest payback. Also, keep in mind zoning regulations that may restrict the height of your tower. See section I-4-4 regarding zoning.

**Our general rule:** For optimal performance, Skystream should be 20 feet (7 m) above any surrounding object within a 250 foot (76 m) radius.



**TIP:** Your dealer can help you determine the best location for Skystream on your property.

Fig. 1 Optimal Skystream location

### I-4-2 Tower Types

Depending on your site needs, Skystream can be mounted on several different tower types as long as they meet the tower load specifications determined by Southwest Windpower and are certified by a Professional Engineer (PE). While a guyleless monopole tower is the most desired tower type, it may be more expensive than some other options such as a guyed tower or latticed tower. You can find out more about available tower options provided by Southwest Windpower at [www.skystreamenergy.com](http://www.skystreamenergy.com).

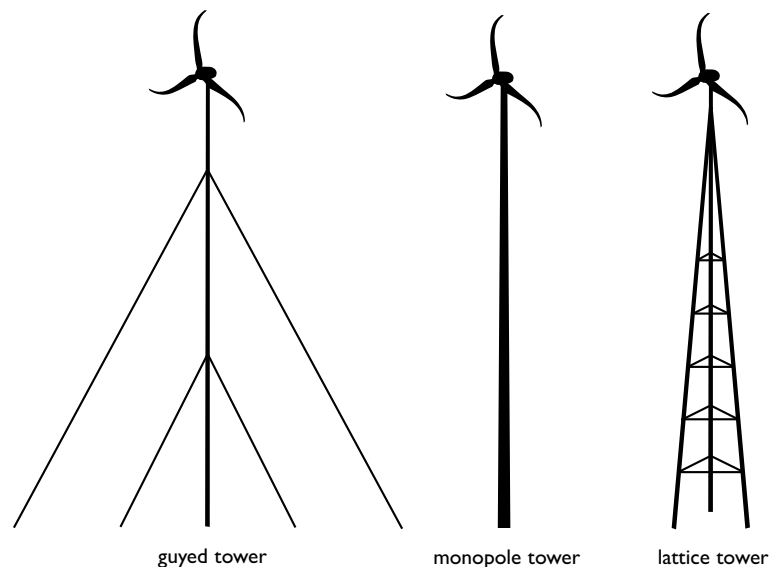


Fig. 2 Tower types

### I-4-3 Working With Your Utility

Call your local utility, tell them your intentions and ask for their "interconnection agreement." They should have one. Depending on your utility, the interconnection agreement may be one page, or as many as 500 pages. Keep in mind that small utility-connected solar and wind systems is a relatively new industry and grid connection requests may be unfamiliar to your utility. If you are the first, realize the process may take longer. Southwest Windpower has people and tools that may assist in the process.

Your utility may request documentation demonstrating that Skystream is UL 1741 certified. You can download these at our website: [www.skystreamenergy.com](http://www.skystreamenergy.com)



**TIP:** See our website [www.skystreamenergy.com](http://www.skystreamenergy.com) for a sample interconnection agreement that may be used by a utility that has yet to establish a program.

### I-4-4 Working With Your Local Zoning Authority

Like your utility, the local planning and zoning authority may or may not have experience with an individual installing a small wind generator at their home or small business. The most important issue is the height of the tower. Prior to purchasing your Skystream tower, check for local zoning limitations. Determine what your community allows for towers and determine if the height is appropriate. Specific data and statistics that may be required by your zoning authority can be found at [www.skystreamenergy.com](http://www.skystreamenergy.com).

## Two - Installation

Southwest Windpower designed the installation process of Skystream to be as easy as possible by minimizing the number of connections between the machine and circuit breaker. Depending on your local utility requirement, you may or may not need to install a separate disconnect and/or second meter.

You will notice the rotor shaft on Skystream is extremely difficult to turn. This is normal. As a safety precaution, the default position of Skystream is in brake mode when the inverter is disconnected from the utility-supplied power. The reason is if there is a fault in the utility line, Skystream must shut down to prevent back feeding of electricity into the line while it is being repaired.

### 2-1 Electrical

One of the most common causes of wind generator failures is a poor electrical connection. Be sure to follow the instructions and tighten all fasteners appropriately.

**IMPORTANT:** It is extremely important that the installation of your Skystream is done in accordance with local and national building codes as specified by the NEC, UBC (Uniform Building Code) or IBC (International Building Code). These codes will vary from city to city and even country to country.

#### 2-1-1 Wiring

Skystream has a built-in utility-connected inverter compliant with UL 1741. This means Skystream connects directly to your existing electrical system. The Appendix includes two reference drawings for utility-supplied power interconnection of your Skystream generator. These drawings are for reference only and should be modified for your specific installation.

Refer to the following Fig. 3 for a complete overview of Skystream wiring.



**Warning:** For your safety, make sure power is turned off before working on any and all electrical connections.

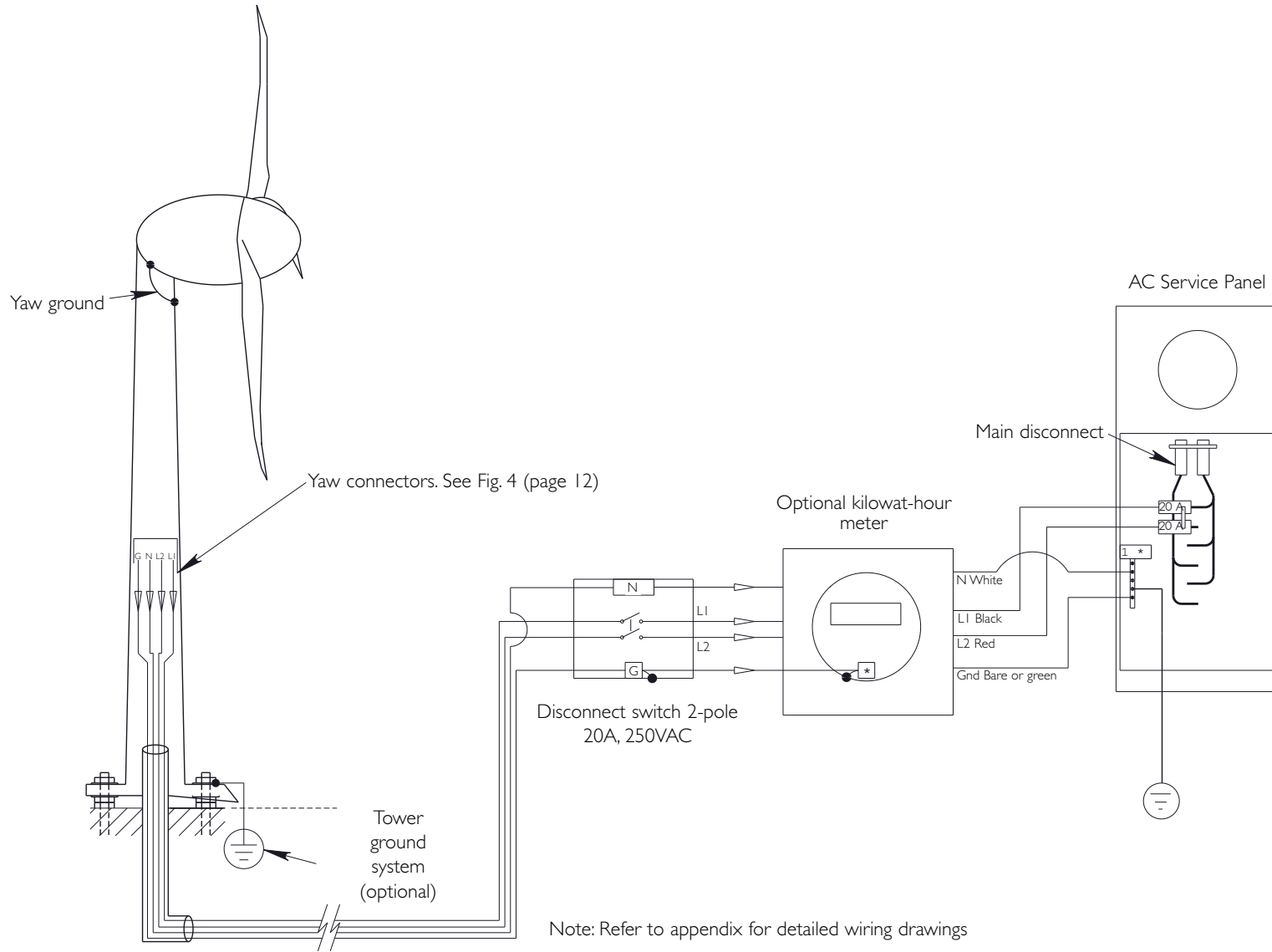


Fig. 3 Wiring diagram

### 2-1-2 Electrical Connections

**CAUTION – Be sure power is turned off when making electrical connections.**

- Position Skystream on its side to access the wire terminals.
- Remove approximately 2 inches (5 cm) of protective sheathing from cable and strip approximately 0.375 inches (1 cm) of insulation off wire leads.
- Pass cable through strain relief cover so approximately 1 inch (2.5 cm) of cable sheath protrudes through as shown in Fig. 4 at right. Tighten strain relief clamp to secure cable.
- Connect the red, black, and white wires to the matching color coded terminals on Skystream yaw assembly. Connect the green or bare copper wire to the green terminal. Tighten each screw to 20-25 inch-lbs (2.3-2.5 N-M).
- Secure strain relief cover to yaw using four M5-0.8 x 12 socket head screws and split lock washers. Torque screws to 25 inch-lbs.

Skystream is now ready to be bolted to the tower. Before bolting Skystream to tower, test electrical connections by turning on electrical power and measuring AC voltage at yaw terminals.

Additionally, with AC power switched on, wait 5-7 minutes and attempt to rotate the blade shaft. The shaft should be noticeably easier to rotate. Turn off power and Skystream should revert to "brake" mode. If Skystream fails this test, check all connections and repeat test. Test must be passed before proceeding.

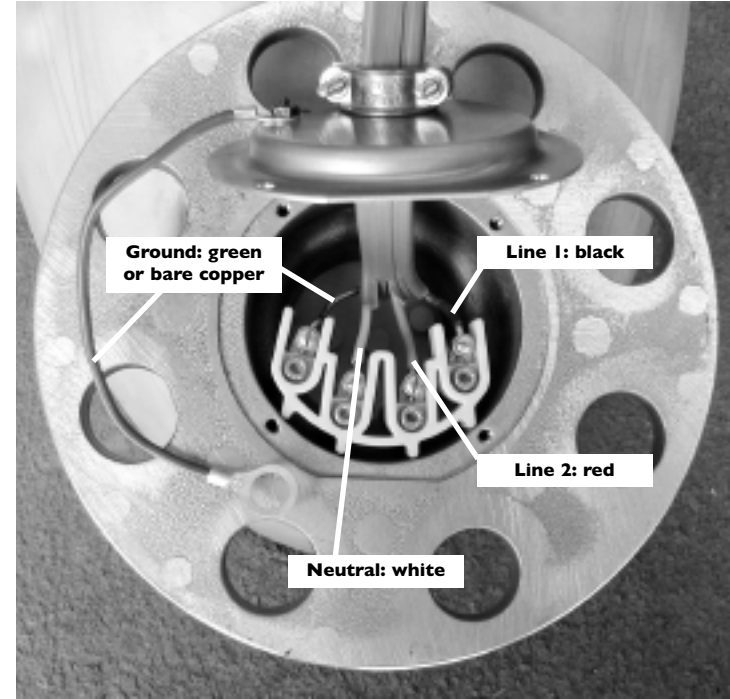


Fig. 4 Wire run to the yaw connection



**Caution:** Make sure AC power is switched "OFF" before proceeding with installation

Distance AC Service Panel to Tower Top	AWG American Wire Gauge	Metric Wire Size (mm <sup>2</sup> )
300 feet (92 m)	8 AWG	10 mm <sup>2</sup>
185 feet (56 m)	10 AWG	6 mm <sup>2</sup>
125 feet (37 m)	12 AWG	4 mm <sup>2</sup>
75 feet (23 m)	14 AWG	2.5 mm <sup>2</sup>

### 2-1-3 Wire Sizing

Measure distance from AC Service panel to Skystream (be sure to include tower height). Refer to the accompanying wire chart and select the appropriate gauge wire. Indicated wire sizes will include length from top of tower to connection at main utility panel.

### 2-1-4 Grounding

Every electrical system must be grounded in accordance with local and national standards. This will provide some protection against voltage surges and built-up static charges (see reference drawings in Appendix).

Section 810 of the National Electrical Code ANSI/NFPA No. 70 (USA only) provides information with respect to proper grounding of the tower, size of the ground wire, type of discharge unit, size of grounding conductors, location of discharge unit, connection to grounding electrodes and requirements for the ground electrode.

**The instructions in this section are for reference only as the requirements in your area may be different.**

### 2-1-5 Fusing/Circuit Breaker

Skystream wires directly into your electrical panel. Wiring will vary with local zoning authority and utility (see reference drawings in Appendix). Some installations will require a visible lockable disconnect switch located next to the electrical meter and/or at the base of the tower. The disconnect switch is utilized by your local utility in the event of a power outage to ensure no voltage is placed on the utility line during repair. Again, it is extremely important to install in accordance with local and national zoning regulations.

You will need at least a 20 amp 240 volt circuit breaker for your electrical panel.

### 2-1-6 Checking correct grid connectivity

**IMPORTANT: All electrical connections should be completed before testing.**

To check for correct connections:

- Check that all connections are complete.
- Switch on all of the disconnects between the turbine and the utility power.
- Wait for 5-7 minutes.
- Check that the rotor spins free.
- **IMPORTANT:** Disconnect the turbine from utility power.
- Check that the rotor no longer spins free.

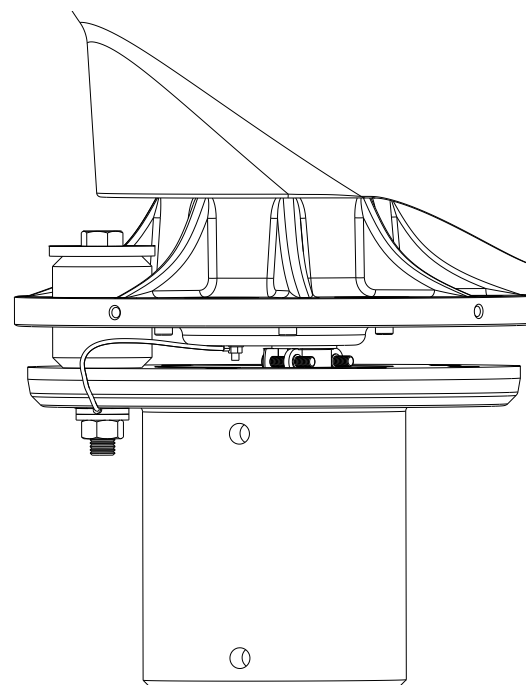
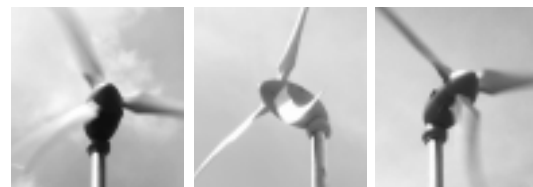


Fig. 5 Proper grounding of the yaw connection



### 2-2 Installing Skystream on a Tower

There are several types of towers that can be used with Skystream. It is essential that Skystream is installed on a properly engineered tower. One of the leading causes of wind generator failure is use on a poorly designed tower.

Southwest Windpower has made available various tower designs that meet our criteria. We have established a program allowing tower manufacturers to include their designs on Southwest Windpower's website of recommended towers. The customer is also welcome to build his/her own tower as long as it is properly reviewed by a professional engineer.

Regardless of the tower design and height you select, there are two critical areas that must be considered when selecting the tower. These are the stub tower height and blade clearance (see Fig. 6).

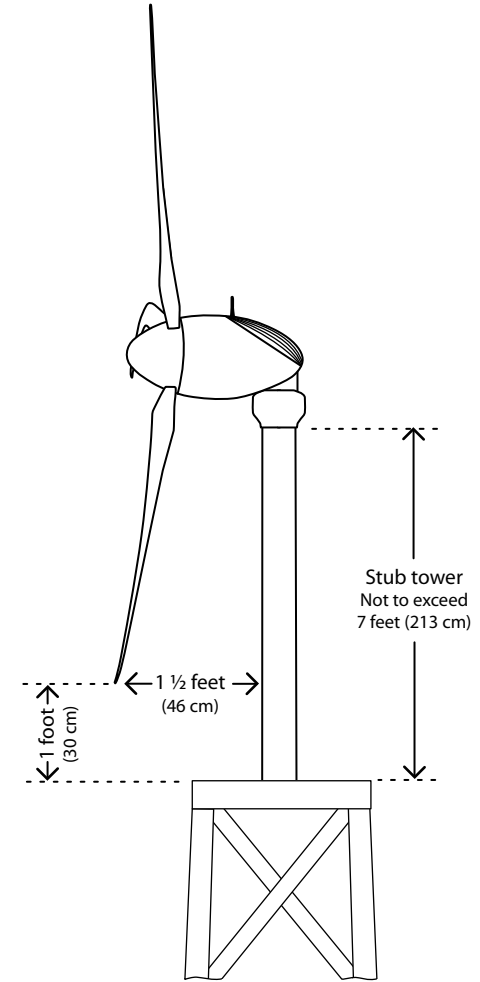


Fig. 6 Blade tip clearances

**IMPORTANT:** SOUTHWEST WINDPOWER'S WARRANTY IS ONLY EXTENDED TO INSTALLATIONS THAT ARE MADE ON A PROPERLY ENGINEERED TOWER. SOUTHWEST WINDPOWER RESERVES THE RIGHT TO DENY ANY WARRANTY CLAIM IN WHICH AN IMPROPERLY DESIGNED TOWER IS USED.



### 2-2-1 Mounting Skystream to the Tower

Refer to Fig. 7 (page 16) for visual aid.

Note: the following directions assume Skystream will be bolted to tower on ground and tower will be tilted into position. Alternately Skystream may be completely assembled on the ground and “hoisted” into position.



**Warning:** working on towers is dangerous and should be left to professionals with proper safety equipment and training.

To ease mounting Skystream, support the upper end of the tower approximately 2-3 feet (0.6-1.0 m) above the ground.

- Install the vibration isolators on yaw flange as shown in Fig. 7 (page 16). Install snubbing washers and bolts in vibration isolators.

#### **Note - The orientation of the vibration isolators is very important.**

- Using an appropriate lifting device and sling, lift Skystream and align vibration isolator bolts with holes in tower flange.
- Install nuts, flat washers and lock washer on bolts to secure Skystream to tower.
- Torque vibration isolator bolts to 80 lb-ft (108 N-M) in two steps. First torque all bolts to 40 lb-ft (54 N-M) then to 80 lb-ft (108 N-M).
- Mount yaw shield halves using four M5 button head screws. See Fig. 7 (page 16). Use Loctite® 242 supplied with Skystream.

### 2-3 Testing on the Ground

Though Skystream is thoroughly tested at the factory, it is very important to conduct one more test prior to erecting the tower. Skystream should be wired and mounted to the top of the tower. The blades should not be attached. To do this test, you must have all wires and breakers installed with at least one disconnect switch open (off).

#### 2-3-1 Electrical Test

- 1) Grab on to the rotor shaft and try to spin it. It should be difficult to turn.
- 2) Now turn on all power going to Skystream. Turn on all breakers, connect all switches and wait 5-7 minutes.
- 3) Grab the rotor shaft again and try to spin it. If assembled correctly, it should spin easily.
- 4) Before you go any further, turn the power off and disconnect any switches. Again, try spinning the shaft. It should be difficult to turn.

If Skystream does not spin freely after electrical test, then check for loose or disconnected wires. Repeat the test until you are successful.

### 2-4 Blades, Nosecone and Antenna Assembly

Refer to Fig. 8 (page 17) for visual aid.

The Skystream blades may be bolted to the blade hub and mounted on Skystream as a complete assembly by performing the following steps.

- Remove the blade mounting hub and plate from Skystream by “unscrewing” the hub while holding the rotor shaft stationary.
- Place a blade between the blade hub and blade mounting plate. Refer to Fig. 8 (page 17) for proper orientation. Note the blades may only be installed in one position due to the “triangular” boss cast into one side of the blade root (base).
- Loosely install the bolts, flat and lock washers for one blade leaving enough play so remaining blades can be installed.
- After all blades and bolts are loosely installed between blade hub and mounting plate, tighten bolts enough to clamp blades between hub and blade plate.
- Torque blade bolts to 50 lb-ft (68 N-M) in two steps. First torque all bolts to 25 lb-ft (34 N-M) then to 50 lb-ft (68 N-M).
- Blade assembly may now be mounted on Skystream. Slide blade assembly completely onto shaft. With assembly completely on shaft, large mounting nut can be started on shaft threads.
- Completely “spin” on blade assembly. Securely tighten blade assembly by holding blades and tightening “flat” on rotor shaft. Note the blade assembly is self-tightening in operation; however it should be securely tightened during assembly.
- Install nosecone with three M6-1.0x12 socket head bolts. Use Loctite® 242 supplied with Skystream.
- Install RF Antenna on matching fitting on top of Skystream.

**Important Note – Do not forget to install RF Antenna.** Even if you have not purchased the optional Remote Display, the RF Antenna may be used by service personnel to diagnose, troubleshoot or upgrade your Skystream without having to removing it from the tower.

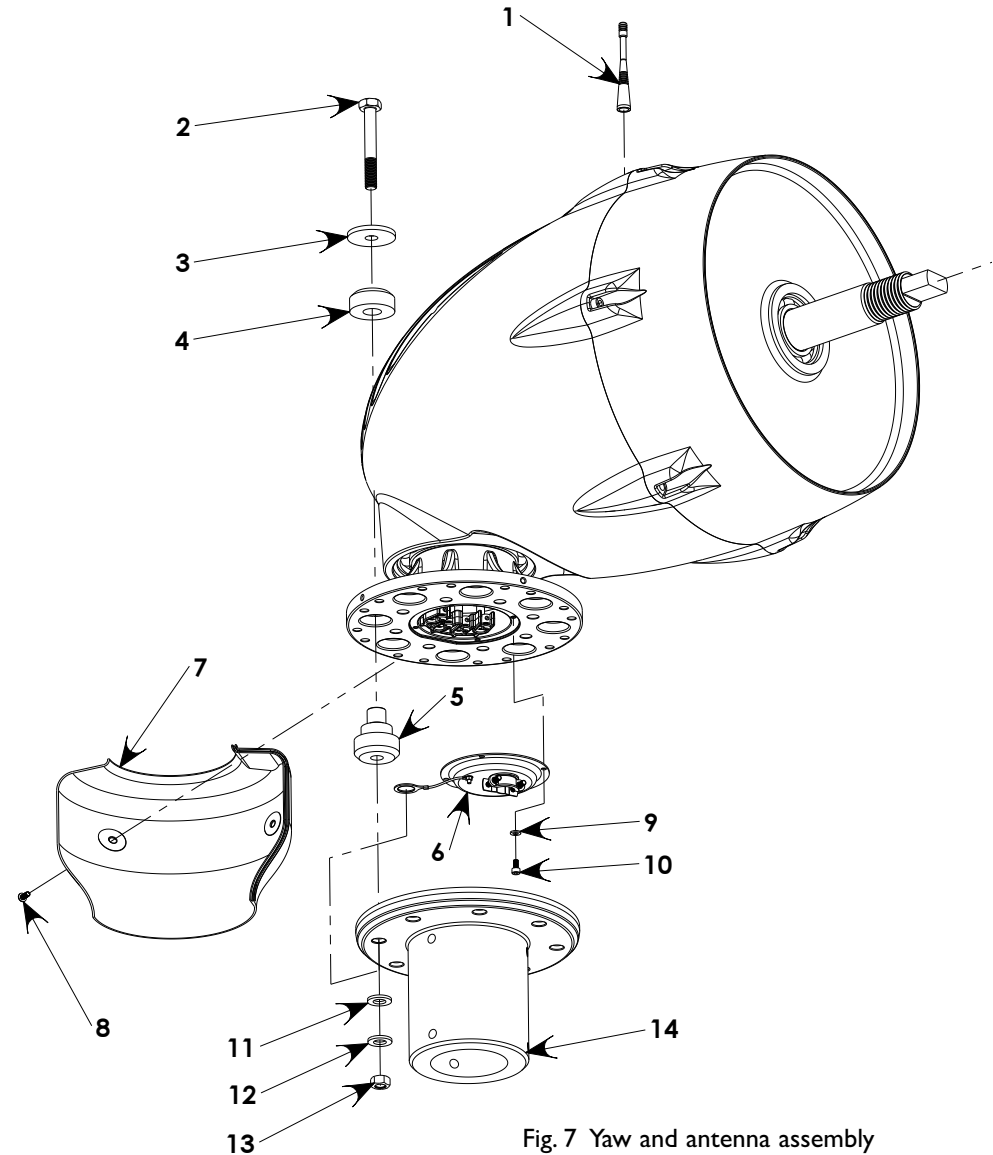


Fig. 7 Yaw and antenna assembly

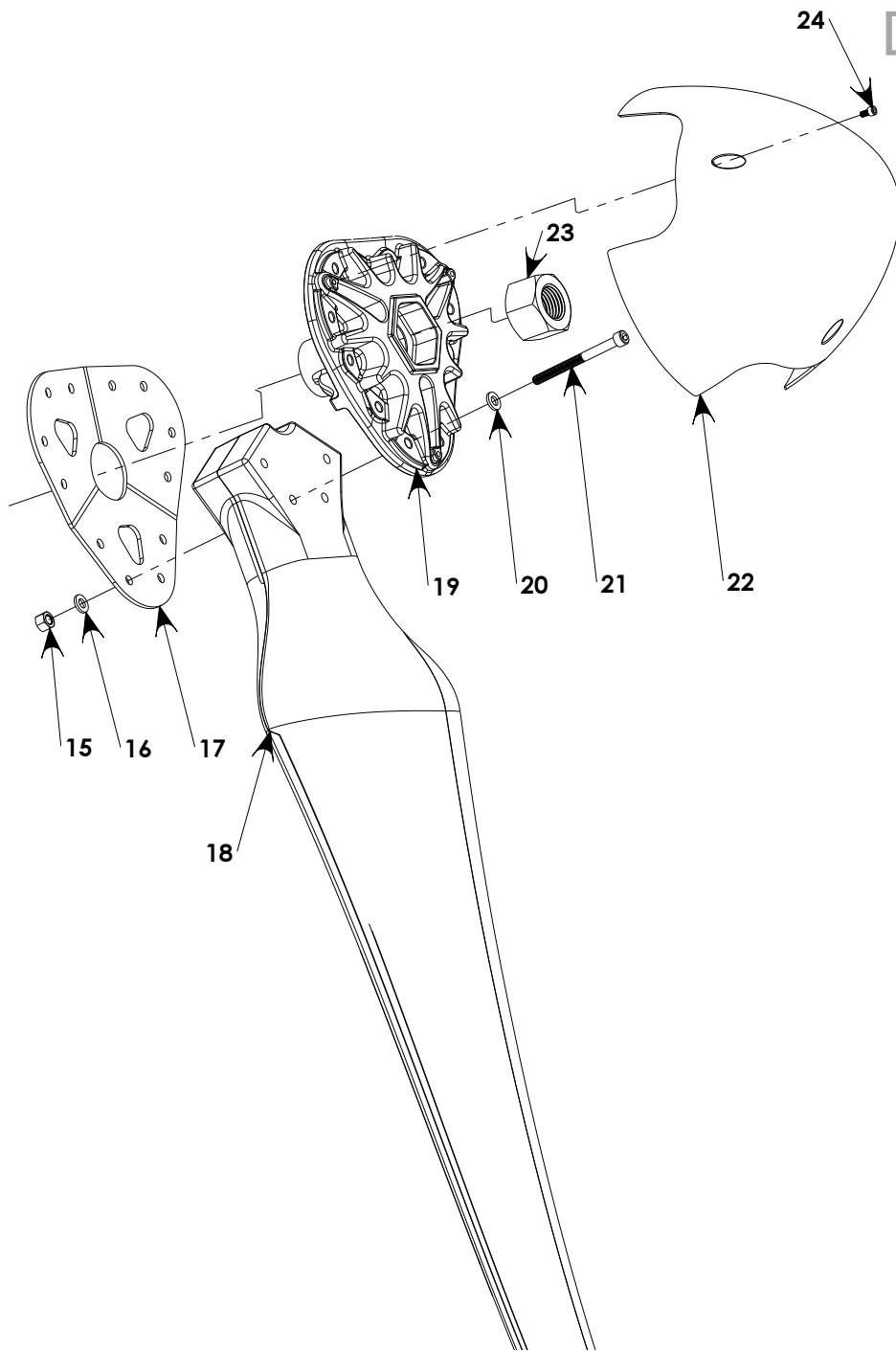


Fig. 8 Blade and nosecone assembly

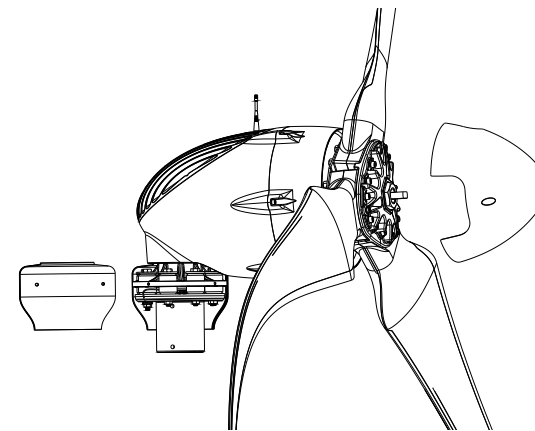


Fig. 9 Completed assembly

<b>Yaw Components</b>		
#	Description	Qty.
1	RF Antenna	1
2	M12x1.75x90mm Hex Bolt grade 10.9	8
3	Snubbing Washer	8
4, 5	Vibration Isolation Ring (4) and Bushing (5)	8
6	Strain Relief Cover Assembly	1
7	Shield	2
8	M5x.8x12mm Button Head grade 8.8	4
9	M5 Lock Washer A2 stainless steel	4
10	M5x.8x12mm Bolt SHCS grade 8.8	4
11	Flat Washer (M12) A2 stainless steel	8
12	Lock Washer (M12) A2 stainless steel	8
13	M12x1.75 Nut grade 10.9	8
14	5" Tower Insert	1
<b>Blade Components</b>		
#	Description	Qty.
15	M10x1.5 Nut grade 12.9	12
16	Lock Washer (M10) A2 stainless steel	12
17	Blade Plate	1
18	Blade	3
19	Blade Hub	1
20	Flat Washer (M10) A2 stainless steel	12
21	M10x1.3x120mm Bolt SHCS grade 12.9	12
22	Nose Cone	1
23	Hub Retaining Nut grade 10.9	1
24	M6x1x12mm Bolt SHCS grade 8.8	3

## Three - Operation & Maintenance

### 3-1 Frequently Asked Questions

#### 1. What happens if I lose power from my utility company?

If there is a power outage the Skystream will shut down within one second. There are many safety requirements of a utility-tied inverter. The Skystream meets all of these requirements per UL 1741.

#### 2. Does the Skystream have lightning protection?

Yes the Skystream has lightning protection. The Skystream can handle 6000 Volts as required by UL 1741. If you live in a lightning prone area SWWP recommends an additional lightning arrester at the base of the tower.

#### 3. What should I do if I'm expecting a severe storm?

The Skystream is designed for very high winds, but it is always a good idea to shut Skystream down if there is going to be a severe storm to protect against any flying debris.

#### 4. How do I shut down Skystream?

To turn off Skystream all you need to do is turn off the breaker Skystream is connected to. This will cause NO damage to the unit.

#### 5. Can I leave Skystream unattended?

Yes, the Skystream is designed to operate without any user input. If there is any fault it will shutdown on its own.

#### 6. What do I do if Skystream is facing upwind even though there is a strong wind.

If the Skystream is not tracking correctly, then you should check to see if the tower is level.

#### 7. When should I contact an authorized service technician?

- A. If there is any unusual vibration coming from Skystream.
- B. If you hear any noise that sounds like mechanical interference.
- C. If the Skystream is connected to the utility power (i.e. all breakers and disconnects are turned on), the wind is blowing, but the Skystream is not turning very fast.