



WindyNation

Windtura 750 Owner's Manual

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WINDTURA 750 WIND TURBINE LIMITED WARRANTY AND PRODUCT DISCLAIMER

Windy Nation Inc. (“Windy Nation”) is not assembling the wind unit, installing the blade system, or any other product offered by Windy Nation. Windy Nation, and its directors, officers and employees disclaim, and by purchasing a Windy Nation wind-powered product you accept all liability and responsibility for damage to property, injury, or death arising out of or related to the use or misuse of any product offered by Windy Nation.

Limited Warranty

Windy Nation warrants that the Windtura 750 (the “Product”), including its component parts supplied by Windy Nation, will be free from manufacturing defects in materials and workmanship under normal authorized use consistent with product instructions for a period of two (2) years from the date the original purchaser (“Customer”) receives the Product (the “Warranty Period”). This warranty extends only to the original purchaser. The Customer’s sole and exclusive remedy and the entire liability of Windy Nation, its suppliers and affiliates for breach of the warranty is, at Windy Nation’s option, either (i) to replace the Product (or defective component part(s)) with a new or reconditioned Product (or component part(s)); (ii) to repair the reported problem; or (iii) to refund the purchase price of the Product. Repaired or replaced products are warranted for the remainder of the original warranty period only. No employee, agent, dealer or other person is authorized to give any warranties on behalf of Windy Nation not expressly set forth in this limited warranty.

Restrictions

No warranty will apply if the Product (i) has been altered or modified except by Windy Nation; (ii) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by Windy Nation; (iii) has been exposed to winds exceeding 105 mph (46.9 m/s), or (iv) has been subjected to abnormal physical, thermal or electrical stress, misuse, negligence, or accident. If Windy Nation determines that the problem with the Product is not due to a manufacturing defect in Windy Nation’s workmanship or materials, or otherwise does not qualify for warranty repair, then the Customer will be responsible for the costs of all necessary repairs and expenses incurred by Windy Nation.

Warranty Claims & Return Procedures

To be eligible for service under this warranty, the Customer must submit a service request within the Warranty Period by contacting Windy Nation in writing or via telephone and obtaining a Returned Materials Authorization (“RMA”) number. This RMA must be obtained before returning any product under this warranty. Notification must include a description of the alleged defect, the manner in which the Product was used, the serial number, and the original purchase date in addition to the name, address, and telephone number of the Customer. Within five (5) business days of the date of notification, Windy Nation will provide the Customer with an RMA number and the location to which the Customer must return the defective Product. Any Product returned for warranty service shall be shipped at the expense and risk of the Customer. The Customer must return the entire Product kit (or, if authorized by Windy Nation, the defective component parts), within fifteen (15) days after issuance of the RMA number. Windy Nation will be under no obligation to accept any returned Product that does not have a valid RMA number. Customer’s failure to return the Product within fifteen (15) days of its receipt of an RMA number may result in cancellation of the RMA. All parts that Windy Nation replaces shall become Windy Nation’s property on the date Windy Nation ships the repaired Product or part back to the Customer. Windy Nation will use all

reasonable efforts within thirty (30) days of receipt of the defective Product to repair or replace such Product. If a warranty claim is invalid for any reason, the Customer will be charged at Windy Nation's then-current rates for services performed and will be charged for all necessary repairs and expense incurred by Windy Nation. If Windy Nation determines that a warranty claim is valid, it will ship the repaired or replaced Product to Customer at Windy Nation's cost.

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WINDY NATION EXPRESSLY DISCLAIMS ALL LIABILITY FOR BODILY INJURIES OR DEATH THAT MAY OCCUR, DIRECTLY OR INDIRECTLY, BY USE OF THE PRODUCT BY ANY PERSON.

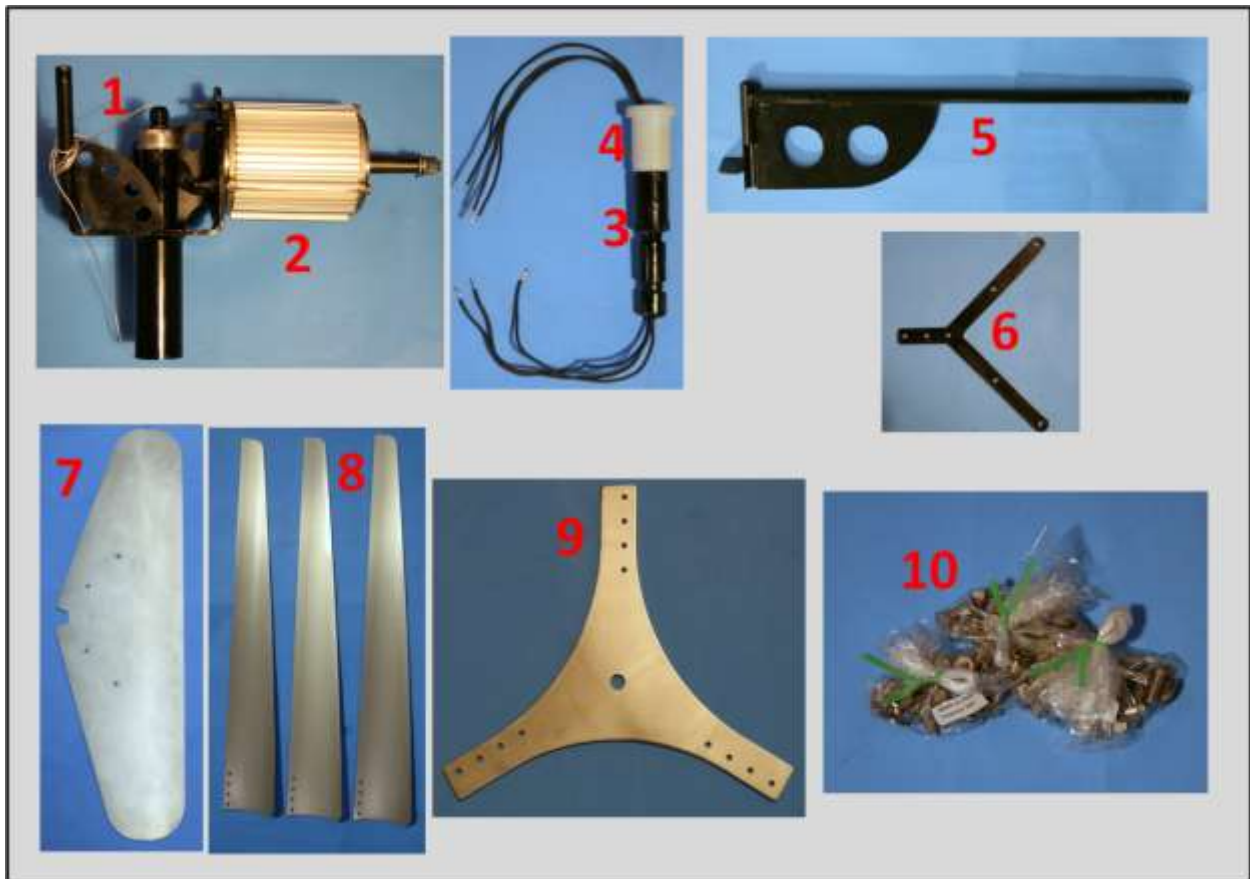
Limitation of Liability

UNDER NO CIRCUMSTANCES WILL WINDY NATION OR ITS AFFILIATES OR SUPPLIERS BE LIABLE OR RESPONSIBLE FOR ANY LOSS OF USE, INTERRUPTION OF BUSINESS, LOST PROFITS, LOST DATA, OR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE, EVEN IF WINDY NATION OR ITS AFFILIATE OR SUPPLIER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so these limitations may not apply to you. Neither Windy Nation nor its affiliates or suppliers will be held liable or responsible for any damage or loss to any items or products connected to, powered by or otherwise attached to the Product. The total cumulative liability to Customer, from all causes of action and all theories of liability, will be limited to and will not exceed the purchase price of the Product paid by Customer. This warranty gives the Customer specific legal rights and the Customer may also have other legal rights that vary from state to state.

Windtura 750 Wind Turbine Parts List:

1. Generator/Yaw Mount (comes pre-attached to the generator)
2. 750 Watt Generator (comes pre-attached to the generator/yaw mount)
3. 3 phase slip ring (comes attached to yaw bushing)
4. Yaw bushing (comes attached to 3 phase slip ring)
5. Pivoting tail boom
6. Tail mounting bracket
7. Directional Tail
8. Three 35 inch *WindGrabber* Blades
9. Stainless steel 3-blade hub
10. All the necessary bolts, nuts, washers and electrical connectors to make the necessary connections to assemble the Windtura 750 Wind turbine



Installation Warnings

Do not assemble or install the Windtura 750 until you have read the entirety of this owner's manual!

1. It is necessary to follow the installation instructions and safety precautions included in this owner's manual. Failure to do so can result in serious accidents including but not limited to property damage, serious injury, and death. Additionally, keep this owner's manual after you install your Windtura 750 Wind Turbine as it includes maintenance information.
2. Before assembling the Windtura 750 inspect all parts for any defects. If you have any questions or concerns, contact WindyNation Inc. or your local distributor before proceeding with installing your Windtura 750.
3. Never install a wind turbine on a windy day.
4. Use proper electrical wiring and grounding techniques which are in compliance with your country's electrical codes.
5. Tower design and construction should be approved by a professional engineer and also follow all local and national laws in your respective area.
6. Do not install the Windtura 750 in any location where anyone or anything can come in contact with it. The Windtura 750 has moving parts, including high rpm blades, which can cause serious injury or death. **Use common sense when choosing a location to mount the Windtura 750.**

Technical Specifications:

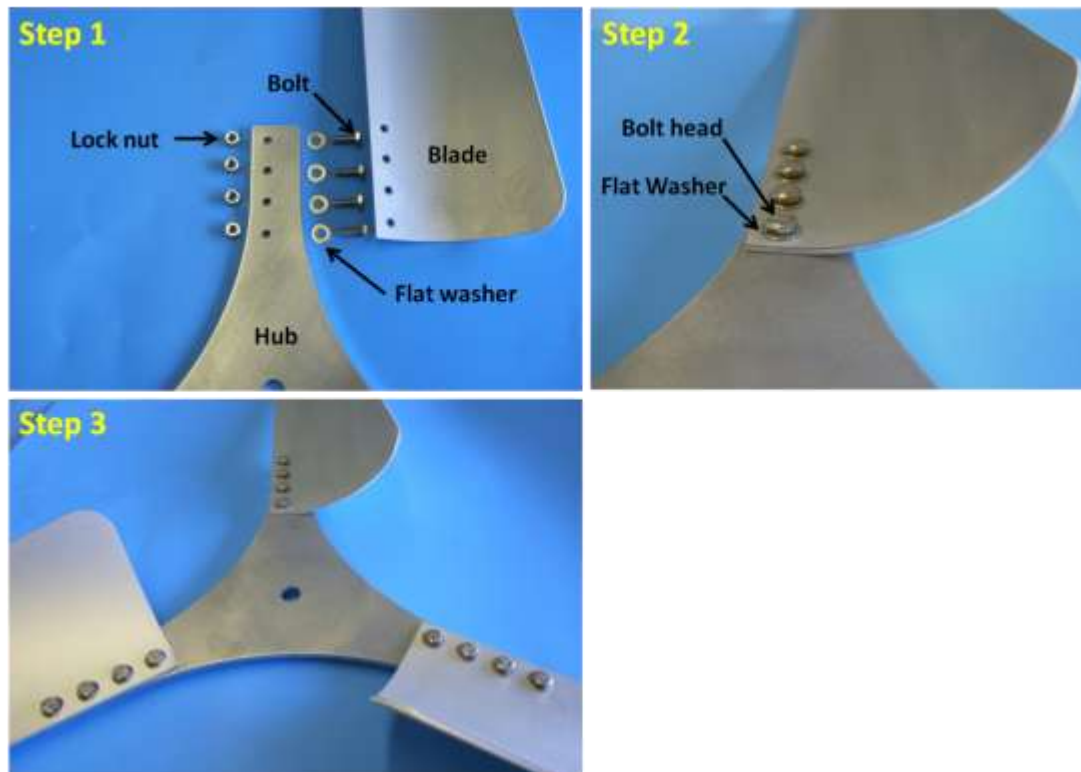
Model	Windtura 750
Rotor Diameter	79 in (200.7 cm)
Net Weight	56 lbs (23.6 kg)
Survival Wind Speed	105 mph (47 m/s or 169 kph)
Initial Power Generator Wind Speed	6-8 mph (2.7-3.6 m/s)
Rated Power	800 Watts at 29 mph wind speed
Battery Bank Specifications	Suitable for 12 and 24 volt battery banks
Recommended Fuse for 12 volt system	60 amp slow blow
Recommended Fuse 24 volt system	60 amp slow blow

Windtura 750 Assembly Instructions

The Windtura 750 comes partially assembled. The 750 Watt generator has been pre-attached to the generator/yaw mount at the factory. Additionally, the yaw bushing and slip ring have been pre-attached at the factory.

Attach the blades to the hub:

Figure 1: Blade to hub assembly diagram



Notes: Be careful not to hit, bend or damage the blades while assembling the blade rotor as this could make the blades unbalanced! Once you are finished attaching the blades to the hub, lay the blade/hub assembly on a flat surface as shown in Step 3 in Figure 1.

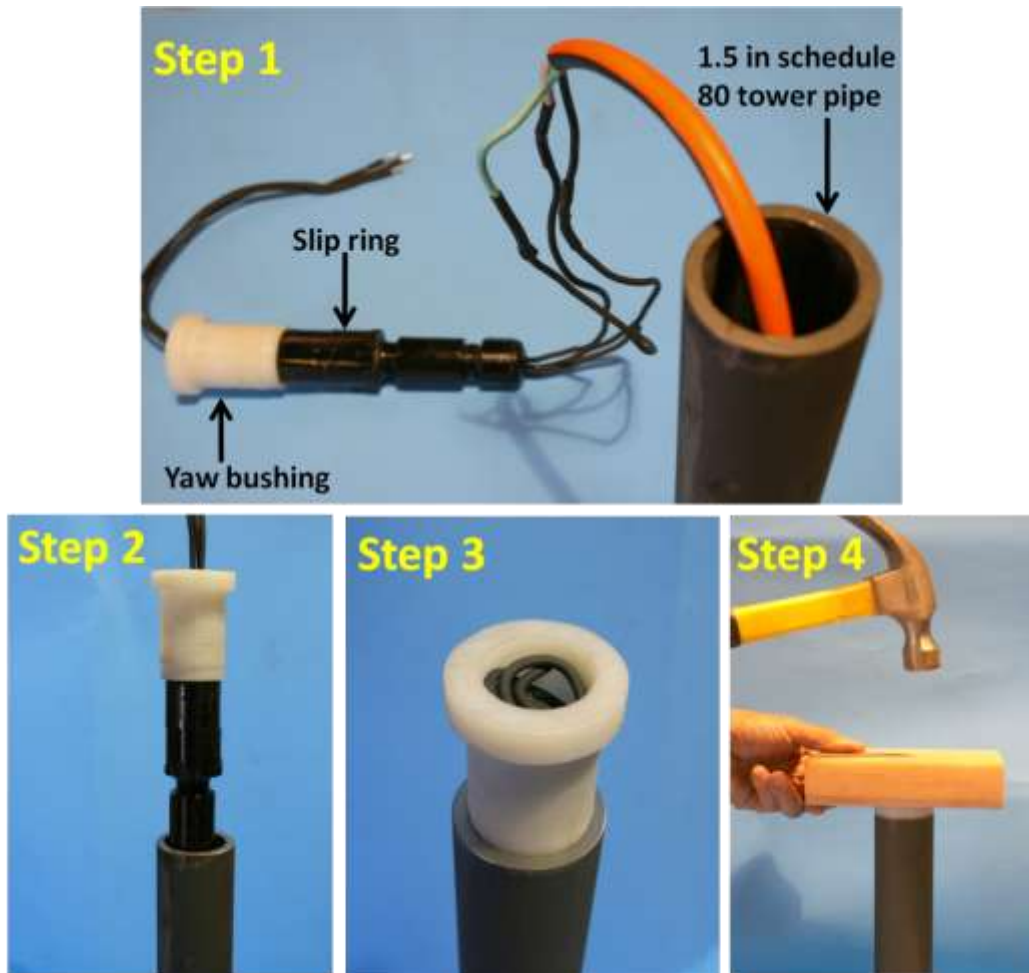
Step 1: Locate the bag which is labeled “Blade to Hub Fastener Set”. This bag should contain the following fasteners: 12 stainless steel bolts, 12 stainless steel k-lock nuts, and 12 stainless steel flat washers. Lay the hub on a flat surface and attach the blades using the fasteners. Refer to **Step 1** in **Figure 1** above to see the proper fastener orientation for attaching the blades to hub.

Step 2: Using the stainless steel bolts, flat washers and k-lock nuts, attach the blade to the hub. Refer to the **Step 2** in **Figure 1** above to see the proper placement of the bolt, flat washer and k-lock nut. Note the k-lock nut is on the back side of the hub and is therefore not shown in the picture. Tighten the k-lock nuts to 9.0 lb-ft (12.1 N·m).

Step 3: Repeat the process and attach the two other blades to the hub. The blades are now mounted to the hub.

Attach Yaw Bushing and Slip Ring to Tower Pipe:

Figure 2: Yaw bushing and slip ring diagram



Step 1: The yaw bushing and slip ring are attached together (both labeled in **Step 1** of **Figure 2** above). Run three wires through your 1.5 inch schedule 80 steel tower pipe so that the wires come out the top of the tower (orange wire in **Step 1** of **Figure 2**). Connect the three wires coming out of the slip ring to the three wires coming out of the top of your tower as shown in **Step 1** of **Figure 2**. **Be certain these wire connections are very strong as these connections will**

have to support the weight of the wire traveling down the tower. It is highly advisable to cover the wire connections with shrink tubing to prevent the possibility of wire shorts.

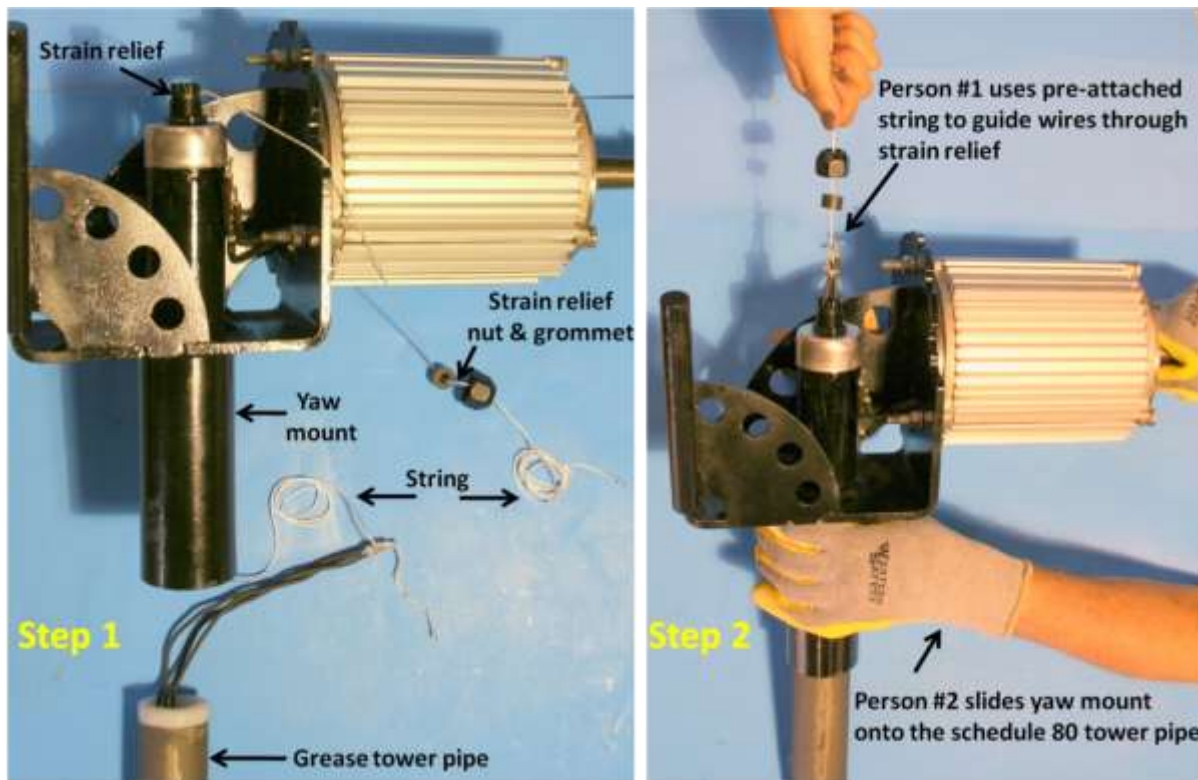
Step 2: Insert the yaw bushing and slip ring into the 1.5 inch schedule 80 steel tower pipe as shown in **Step 2** of **Figure 2**.

Step 3: Coil the wires coming out of the top of the yaw bushing so that they all fit inside the yaw bushing as shown in **Step 3** of **Figure 2**. Place the yaw bushing so that it is resting on the top of the tower pipe as shown in **Step 3** of **Figure 2**.

Step 4: Next, using a rubber mallet or hammer pound the yaw bushing into the tower pipe **until the top circle of the yaw bushing makes contact with the top of the tower pipe**. It is necessary to cover the yaw bushing with a piece of wood so that it is not damaged from direct strikes from a hammer or mallet. Guide the yaw bushing straight down by hitting the wood with light taps or swings with the hammer. **Do not pound the yaw bushing in with heavy/strong hammer blows as this could cause the yaw bushing to be inserted at an angle!**

Mounting the Generator/Yaw Mount to Tower Pipe:

Figure 3: Attaching yaw mount to tower pipe



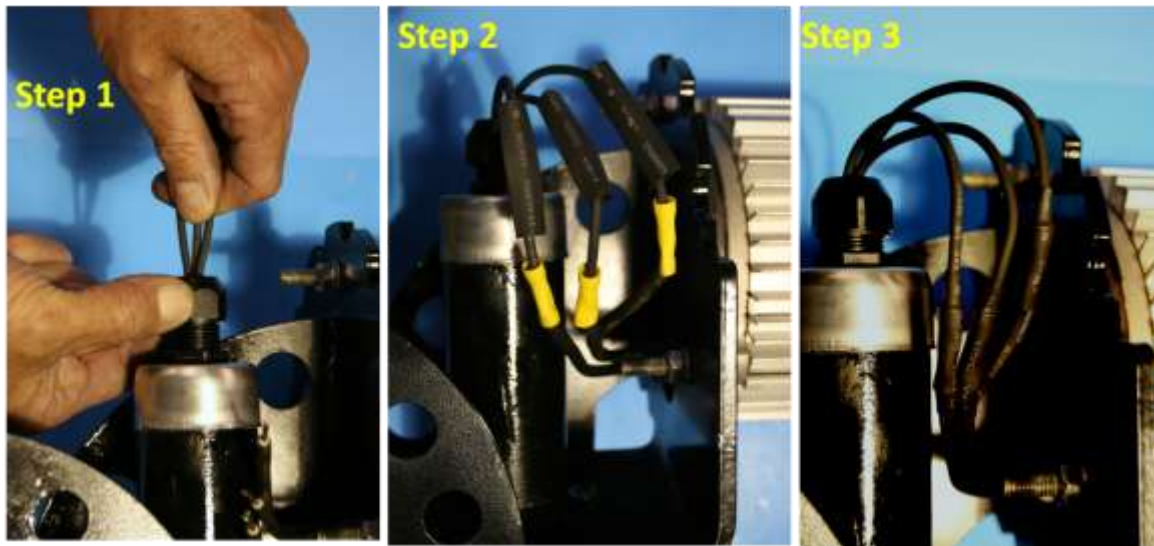
Step 1a: Grease the region of the tower pipe that the yaw mount will be sliding over. The yaw mount slides down 5.5 inches so grease about 6 inches of the tower pipe.

Step 1b: Locate the pre-attached string that has been run through the yaw mount and strain relief. Secure the string coming out the bottom of the yaw mount to the three wires coming out of the yaw bushing as shown in **Step 1** of **Figure 3**. Remove the nut and grommet from the strain relief as shown in **Step 1** of **Figure 3**. Note that the strain relief may not contain a free grommet as shown in **Step 1** of **Figure 3**. This is because some strains reliefs use a non-removable grommet. If there is no grommet, you only need to remove the nut from the strain relief.

Step 2: It is highly recommended that **Step 2** be performed using two people. Person #1 guides the three wires out the top of the strain relief while, at the same time, Person #2 slides the yaw mount onto the tower pipe.

Wiring the Generator to the Slip Ring:

Figure 4: Generator wiring diagram



Step 1a: If your strain relief has a free grommet, insert the plastic grommet back into the strain relief. If there is no free grommet, proceed to **Step 1b**.

Step 1b: Gently pull on all three wires coming out of the strain relief until you feel tension in all three wires. While continuing to hold tension on all three wires, use your fingers to tighten the strain relief nut. Tighten the strain relief nut very firmly with your fingers until it is “finger tight” as shown in **step 1** of **Figure 4**. You may use a wrench to gently tighten the strain relief nut but firmly tightening it with your fingers is sufficient. If you choose to use a wrench, take great care

not to over tighten the strain relief nut. The strain relief accomplishes two tasks: (1) It removes any wire slack from inside the yaw mount which could cause the wires to rub against the metal pipe walls inside the yaw mount. (2) The strain relief forms a water tight seal which keeps water out of the inside of the yaw mount and slip ring.

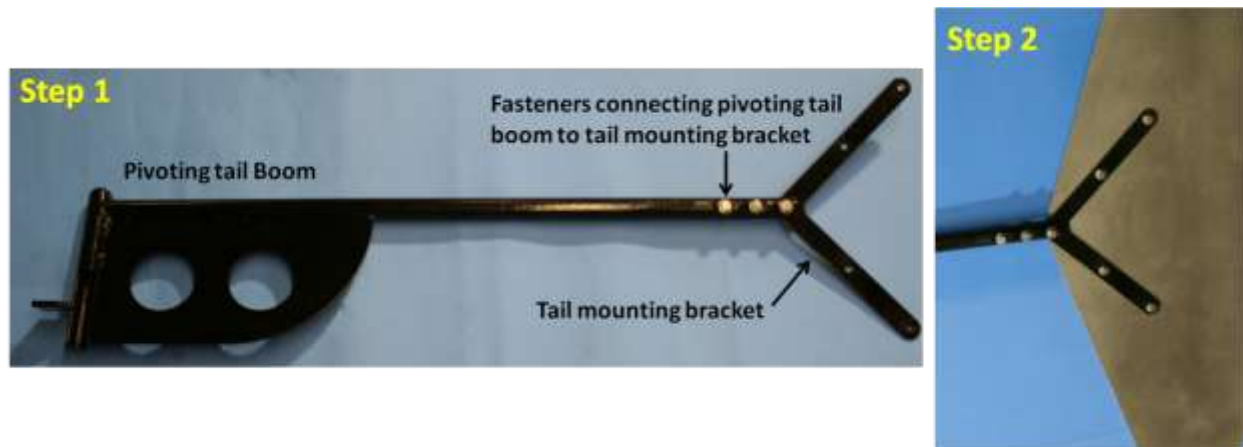
Step 2: Locate the bag labeled “Electrical Connectors”. Slide a piece of shrink tubing (included) on all three slip ring wires. Use the electrical butt connectors to connect each generator wire to one slip ring wire as shown in **Step 2** of **Figure 4**. It does not matter which slip ring wire is connected to which generator wire.

Step 3: Before applying the shrink tubing, test all three of your crimp connections for structural integrity and continuity! A poorly crimped electrical connection will negatively affect the ability for power to transfer from the generator! Firmly pull on both wires coming out of the butt connector to test for structural integrity. Use a voltmeter to test for continuity. After you are satisfied with the connections, cover each crimp connection with the shrink tubing and apply a heat gun to the shrink tubing.

Step 4 (Not shown in diagram): The generator/yaw mount is now sitting on the tower and is connected to the wires running down the tower pipe. At this time, short the three wires coming out of the bottom of the tower by connecting all three of these wires together. This will help prevent the generator from spinning once the blades are attached. Note that shorting all three of these wires will NOT prevent the blades from spinning; it will only make it more difficult for the blades to spin. This is done as a safety precaution. Keep these three wires shorted until the Windtura 500 is ready for operational use.

Bolting the Tail Assembly Together:

Figure 5: Diagram for connecting the tail assembly

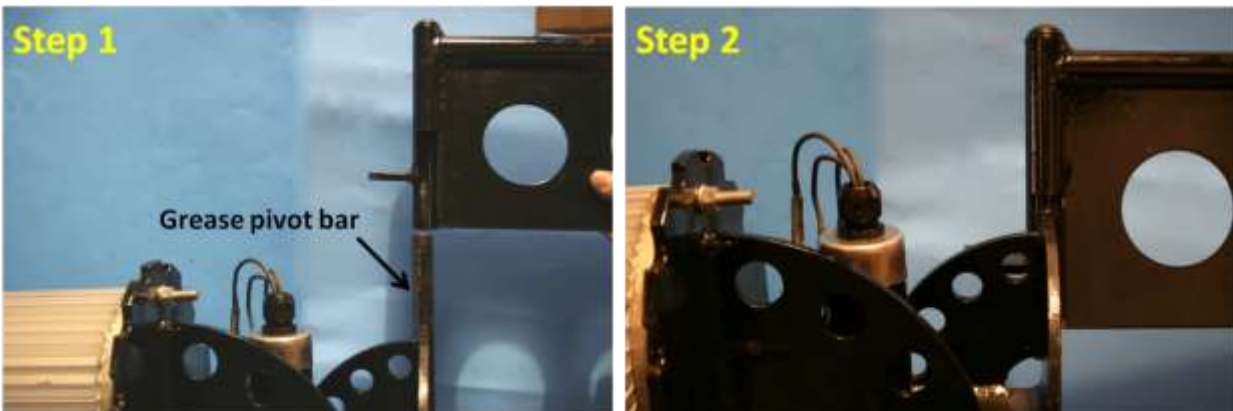


Step 1: Locate the pivoting tail boom and tail mounting bracket. Locate the fastener bag labeled “Tail Assembly Fastener Set”. Slide the tail mounting bracket into the slot in the back of the pivoting tail boom. Next, locate the three 1.5 inch long bolts and insert these three bolts through the three holes in the pivoting tail boom and tail mounting bracket. Now, put one flat washer on each of these bolts, followed by a lock washer, followed by a nut. Tighten until the slot on the pivoting tail boom very firmly grips the tail mounting bracket. See **Step 1** of **Figure 4**.

Step 2: Use the remaining fasteners in the “Tail Assembly Fasteners” bag to secure the directional tail to the tail mounting bracket. Slide the bolts through their respective holes and then attach the flat washer, followed by the nut. See **Step 2** of **Figure 4**.

Attaching the Completed Tail Assembly to the Yaw/Generator Mount:

Figure 6: Diagram of tail assembly attachment to pivot bar

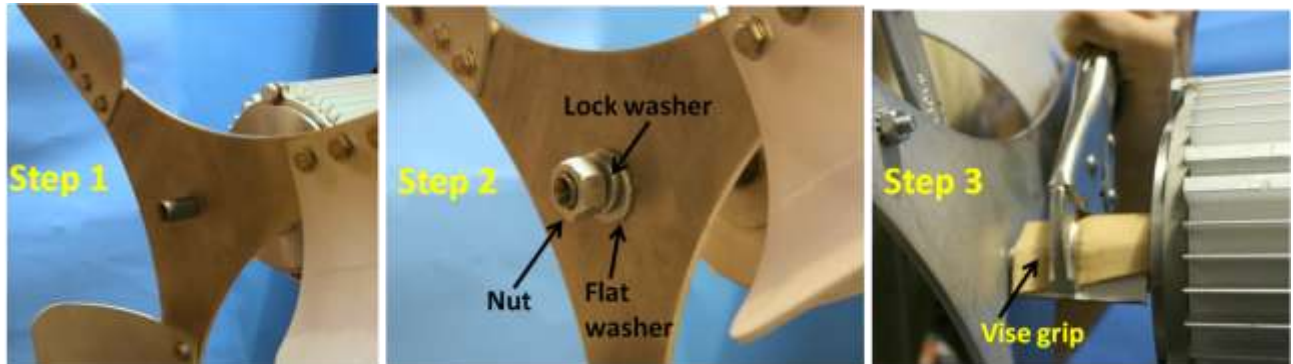


Step 1: Grease the pivot bar shown in **Step 1** of **Figure 6**. After greasing the pivot bar, the tail assembly can be slid onto the pivot bar.

Step 2: Slide the tail assembly onto the pivot bar as shown in **Step 2** of **Figure 6**. Confirm that you have slid the tail assembly completely onto the pivot bar by pushing firmly down on the tail assembly.

Attaching the Blades and Hub to Generator:

Figure 7: Diagram for attaching blades and hub to generator:



Step 1: With the blades already attached, slide the hub onto the threaded portion of the generator's shaft as shown in **Step 1** of **Figure 7**.

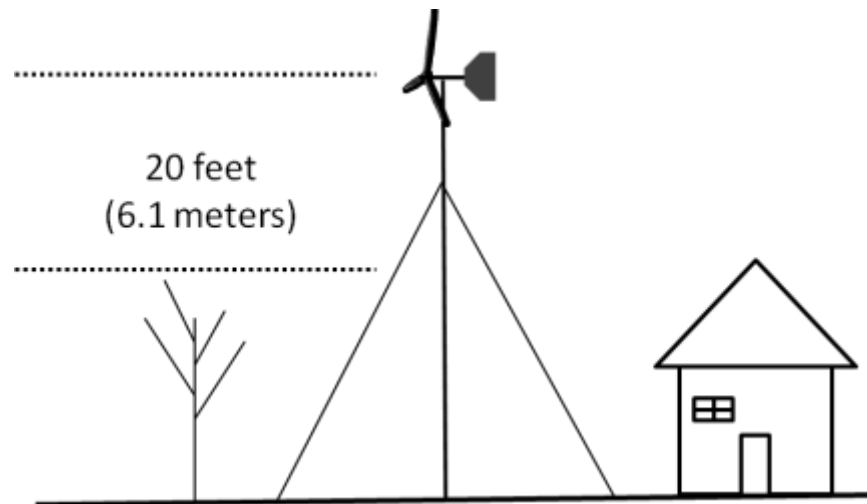
Step 2: Slide on the flat washer, followed by the lock washer, followed by the nut. Tighten the nut to 180 lb-ft (245 N·m). **Take special care not to grab or push on the blades while tightening the nut as this could damage the blades.**

Step 3: It may be difficult to get the nut to “catch” and tighten because the generator shaft spins freely. If this is the case, a vise grip can be used to immobilize the shaft of the generator. Cardboard can be wrapped around the generator shaft to protect it from being dented or scratched from the vise grips as shown in **Step 3** of **Figure 7**.

Final Assembly of the Windtura 750 Wind Turbine

The Windtura 750 Wind Turbine is now completely assembled and mounted on the tower. Before continuing, look over the entire wind turbine to be sure everything is attached correctly and securely. In particular, pay special attention to all fastener connections and attachments.

Locating a Site for the Windtura 750



If mounted incorrectly, trees, buildings and other tall objects will block the wind available to all wind turbines. For best performance of the Windtura 750, it is necessary to mount it 20 feet above all objects within a 100 foot radius. Failure to do this will negatively affect the power output of the Windtura 750. Note that this general rule is necessary for all wind turbines. A roof mounted wind turbine will always perform worse than a wind turbine that is 20 feet above all objects within 100 feet.

Main Operational Characteristics of the Windtura 750

Electricity production and regulation:

The Windtura 750 produces energy by capturing kinetic energy from the wind. The wind is captured by three blades which use the wind's kinetic energy to rotate a three phase AC permanent magnet alternator. The rotation of the permanent magnet alternator (PMA) produces electrical power which is transferred from the PMA to ground level by three electrical wires.

In general, at ground level the three phase alternating current (AC) produced by the PMA is rectified to direct current (DC). This is accomplished by using a three phase bridge rectifier. WindyNation sells an 80 amp three phase bridge rectifier suitable for this task. Once the three phase AC is rectified to DC, the electricity is generally used to (1) charge a 12 or 24 volt battery bank or (2) feed a grid tie inverter. The majority of customers use the Windtura 500 to charge 12 or 24 volt battery banks.

If the Windtura 750 is used to charge a 12 or 24 volt battery bank, there must be a device in place to prevent the battery bank from being overcharged by the Windtura 750. Additionally, this device must keep the Windtura 750 under an electrical load while the Windtura 750 is not charging the battery bank. To accomplish both these tasks, a device called a diversion load (or dump load) charge controller is used. In the most simple terms, a diversion load charge controller is a voltage monitoring device. The diversion load charge controller monitors the voltage of the battery bank. When the voltage of the battery bank reaches a level that indicates the battery bank is fully charged, the diversion load charge controller disconnects the Windtura 750 from the battery bank. Because the Windtura 750 must stay under an electrical load to operate safely, the diversion load charge controller connects the Windtura 750 to a diversion load. Generally, large wire wound resistors or heating elements are used as the diversion loads. Once the battery bank's voltage level drops from a fully charged level, the charge controller senses this and switches the Windtura 750 back to charging the battery bank.

Overspeed protection in high winds:

All wind turbines need to be capable of protecting themselves in high wind conditions (typically greater than 30-35 mph). If a wind turbine has no method of protection in high winds, catastrophic failures can occur: (1) The blades will begin to spin too fast and will be under very high stress, strain and tension forces. This could lead to the blades cracking or breaking. Additionally, the noise from the blades will be very loud in high winds. (2) The wind turbine's generator will begin to rotate at very high rpms and the current (amps) produced by the generator might produce too much heat for the generator to handle. The intense heat will overheat the generator and it will break.

The Windtura 750 uses a high wind protection method called furling. The tail assembly of the Windtura 750 is attached to the yaw mount on a pivot bar angled at 20 degrees. The pivot bar allows the generator and yaw mount to rotate away from the wind. At a wind speed of approximately 30 mph, the rotational inertia of the blades begins to turn the blades and generator "out of the wind". As the wind speed increases, the Windtura 750 will continue to turn "out of the wind" to almost 90 degrees. By turning "out of the wind", the blades no longer capture all of the wind's kinetic energy and, therefore, the Windtura 750 is capable of protecting itself in high winds. Because the tail assembly is mounted on a 20 degree pivot bar and is free to rotate, the tail assembly does not move and stays "in the wind". When the wind speed lowers to 28-30 mph, the Windtura 750 unfurls and the blades and generator face the wind again.

Because the Windtura 750's furling mechanism is based on an angled tail boom, it is very important that the tower is installed vertically. Use a level to confirm that your tower is mounted vertically. If it is not, you will have to adjust the tower until it is vertical. A tower that is not mounted vertically can cause the Windtura 750 to furl at an undesignated wind speed.

Windtura 750 Maintenance Instructions

(Warning: Never attempt to perform maintenance on a wind turbine on a windy day. Never approach a wind turbine when the blades are spinning.)

Required Maintenance	Frequency	Notes
Grease pivot bar	Once a year	Steps 1 & 2 of Figure 6
Grease tower pipe	Once a year	Step 1a of Figure 3
Inspect blades for dents, chips cracks. Clean blades of any dirt or debris.	Once a year	Replace blade(s) if structural integrity is compromised
Inspect all fastener connections	Once a year	Tighten fasteners if loose. Replace fasteners if corrosion is present
Inspect all electrical connections	Once a year	Fix or replace as needed if connection is bad or corrosion is present
Recommended to replace 500 Watt generator bearings	For optimal performance, we suggest to replace bearings every 7-10 years.	Car mechanic shops are capable of replacing bearings
Check tower angle is vertical	Twice a year	Re-align tower angle when necessary