Congratulations! You have just purchased one of the most efficient and long-lasting wind turbines on the market! These instructions will guide you on how to take care of your Raum Energy 3.5kW wind turbine system.

Inspection and Maintenance

The Raum Energy 3.5kW wind turbine requires no scheduled maintenance. However, Raum Energy recommends you inspect the system at least once a month once the system is installed. Once you are familiar with the operation of the system, less frequent inspections are required.

The inspection items are as follows:

1. Inspect the blades from the ground. This can be done by engaging the brake and using binoculars from the ground. Note any unusual wear or cracking. If a blade shows a crack, we recommend you replace it.
2. Inspect the cable that hangs down the tower from the turbine. Note any excessive wear at the bottom end of the cable. Occasionally, the turbine cable may need to be unplugged, untwisted, and plugged back in.
3. Inspect the tower structural components. Note any cracking or wear.
4. For the Raum Energy 15m monopole tower, inspect cotter pins and third-leg nut. Be sure they are not loose.
5. For the Raum Energy 70’ guyed tower, inspect the condition of the cables, Crosby clips, and turnbuckles. Note any excessive wear. Tighten any guy cables that are loose.

The maintenance for the Raum4000i grid-tie inverter is included in its own user manual.

Note any issues you might see. If you are concerned about a component’s condition, notify your dealer. Raum Energy can also be reached at:

Raum Energy Inc.
3718A Millar Ave.
Saskatoon, SK
Canada
S7P 0B1
Phone: (306) 651-0586

Operation

The Raum3500 wind turbine system is designed for efficient operation. The amount of energy you can expect depends on the average wind speeds in your region and the siting of the turbine. Any obstructions that are more than half the tower high and are within 200 meters will effect output energy. By way of example, long-term airport data from Saskatoon, Saskatchewan airport data indicates an average wind speed of 4.4 m/s (15.8 kmh or 9.8 mph). One would expect an annual output of roughly 4,800 kWh/yr on a 15m tower located directly beside the airport anemometer. This site in particular is very open, with no obstructions for at least several hundred meters from the anemometer.

In practice, most turbines are located at farms and acreages with trees and buildings in close proximity to the turbine (within, say, ten tower heights). This can reduce yearly output energy by 20% or more. For more information on obstruction effects on wind turbines, visit the excellent Danish Wind Energy website at:

http://guidedtour.windpower.org/en/tour/wres/index.htm

The braking of the wind turbine is done automatically by the inverter, but can be done manually. Please consult Figure 1 for the following discussion.

Figure 1: An example of a Raum 3.5kW wind turbine manual brake configuration.

The Turbine Enable/Disable brake is used for manually stopping the turbine in wind speeds below 60 kph (38 mph). It is the primary brake for the system.

The Park Brake is for low speed braking of the turbine. If engaged at wind speeds higher than 30kph (18 mph) wind speeds, *it will burn out the generator.* It is used as a secondary brake incase the primary brake fails. Its operation is similar to the parking brake in your family car.

In the very remote possibility that the primary brake (Turbine Enable/Disable brake) fails and the turbine is turning in winds above 60 kph (38 mph), leave the system alone. *Neither the Park Brake or Turbine Enable/Disable Brake will stop the turbine in high wind speeds.* The turbine blades are designed such that they bend out of the wind and passively reduce rotational speed. In other words, the turbine is made to handle very high winds and rotational speeds. Leave the turbine to ride out the storm, and when the winds subside, engage the Park Brake and lower the tower for turbine inspection.

Troubleshooting

1) The turbine turns slowly upwind and backwards.

The tower is not plumb. Instructions on how to align the tower are given in the tower installation manual.

2) The turbine shuts down for a few minutes to over an hour in gusty winds between 50 and 60 kph (32 and 38 mph).

This is normal operation. The wind turbine limits itself by engaging the brake in these weather conditions.

3) The turbine spins relatively fast and flaps/flutters its blades in winds over 60 kph (38 mph).

The brake has failed to engage. Leave the turbine alone until the wind storm is over. The turbine and tower are able to handle wind speeds much greater than 100 kph with no damage. After the wind storm, engage the Park Brake and lower the tower to inspect it.

4) The turbine will not spin up to speed and is "stiff".

There may be a short in the system. This could be caused by a short in the cabling, turbine, or inverter. Have a qualified electrician inspected the electrical connections first. If nothing is obviously wrong, consult the inverter manual. If the inverter reports no errors, consult your local dealer. This may require laying the tower down to inspect the turbine.

5) The cable that connects the turbine to the ground is twisted.

Disconnect the plug at the base and untwist the cable. We recommend performing this task in calm weather.

6) The turbine shuts down when the utility is down and takes 5 minutes afterward to engage when the utility grid is back up.

This is normal operation.

7) The tower emits a low hum when the turbine is running.

This is normal operation. Every tower will make some noise due to vibration of the turbine operation.

8) The turbine is slow to start turning, and doesn't export until turning faster.

As wind speed is increasing, your wind turbine is designed to start turning in a 12 kph wind speed at the turbine, and start exporting at roughly 15 kph. As wind speed is decreasing, your wind turbine will export down to roughly 7 kph. Production variations can affect these wind speeds slightly either higher or lower. After a break-in period, your turbine will turn more freely. In very cold weather (below -10C or 14F), the wind turbine will be more stiff and require more windspeed to turn than if it was at room temperature.