

Seven - Gin Pole Installation Instructions

There are three versions of the Gin Pole Kit as shown below. The installation instructions for each kit differ slightly. Where required the directions indicate specific instructions for either the "A", "B" or "C" versions of the Gin Pole Kit.



TIP: The tower is now set to be raised. Southwest Windpower recommends raising the tower once without the wind turbine installed. This permits checking the proper operation and installation of the hinge and gin pole and also allows inexperienced installers an opportunity to practice raising the tower without risking damage to the wind turbine.

A

- two cables
- two shackles
- two M16 (metric 16 mm) bolts
- two M16 nuts
- three M24 (metric 24 mm) bolts
- three M24 nuts

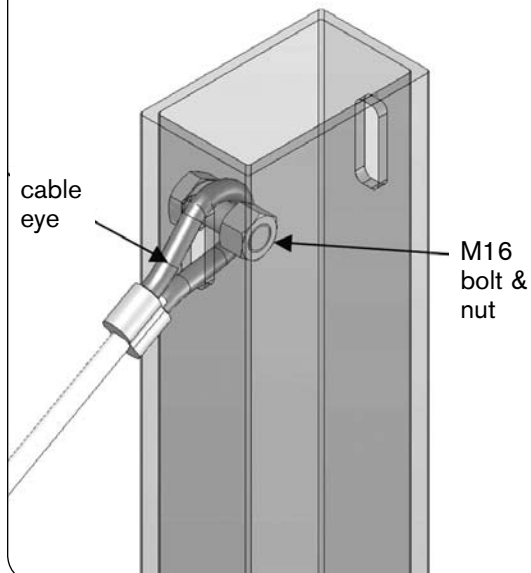


Fig. 10 Early Version cable-gin pole assembly details

B

- gin pole
- two cables
- three shackles
- one M16 (metric 16 mm) bolt
- one M16 nut
- three M24 (metric 24 mm) bolts
- three M24 nuts

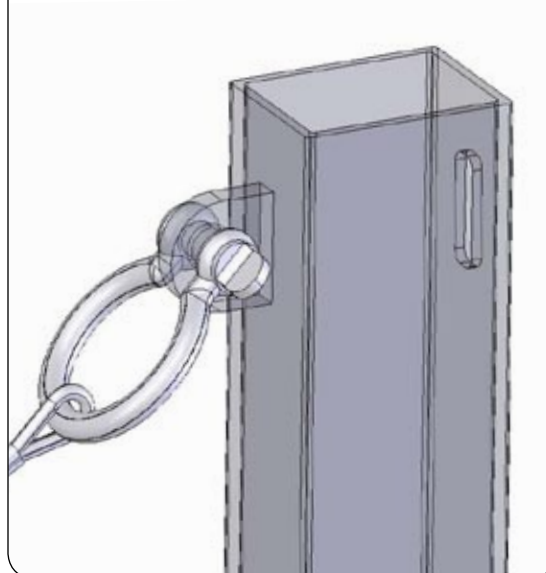


Fig. 11 Late Version cable-gin pole assembly details

C

- gin pole
- two cables
- four shackles
- three M24 (metric 24 mm) bolts
- three M24 nuts

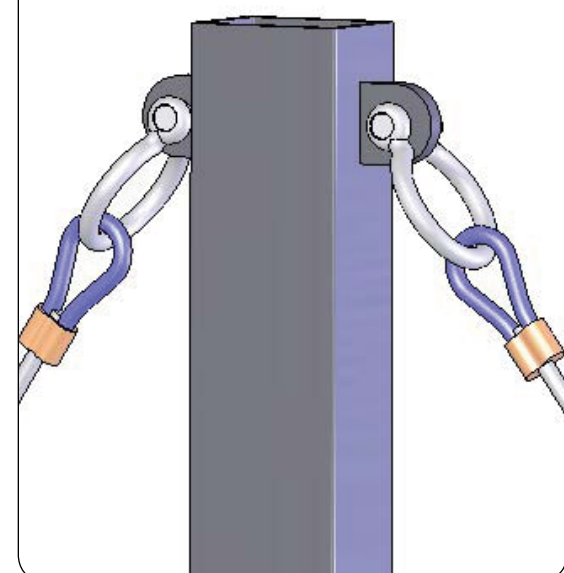


Fig. 12 Version "C" cable-gin pole assembly details

- Connect the gin pole to the tower base on the opposite side of the tower hinge. Use three 24 mm nuts and bolts. The nuts only need to be hand tight.



TIP: Install 24 mm gin pole bolts from above so they can be removed after tower is tilted into position.

- “A” and “B” model gin poles – using a 16 mm nut and bolt connect one cable end to the gin pole as shown in **Fig 10**. Connect the other end of the cable to the welded tab on the tower using one of the supplied shackles.
- “C” model gin poles – connect the welded tab on the gin pole to the welded tab on the tower using a cable and two shackles.
- “A” model gin pole only – connect the second cable to the gin pole using a 16 mm nut and bolt as depicted in **Fig 10**.
- “B” and “C” model gin poles – connect the second cable to the welded tab on the gin pole using a shackle as shown in **Figs. 11 and 12**.
- All model gin poles – connect loose end of second cable to raising vehicle using one of supplied shackles.

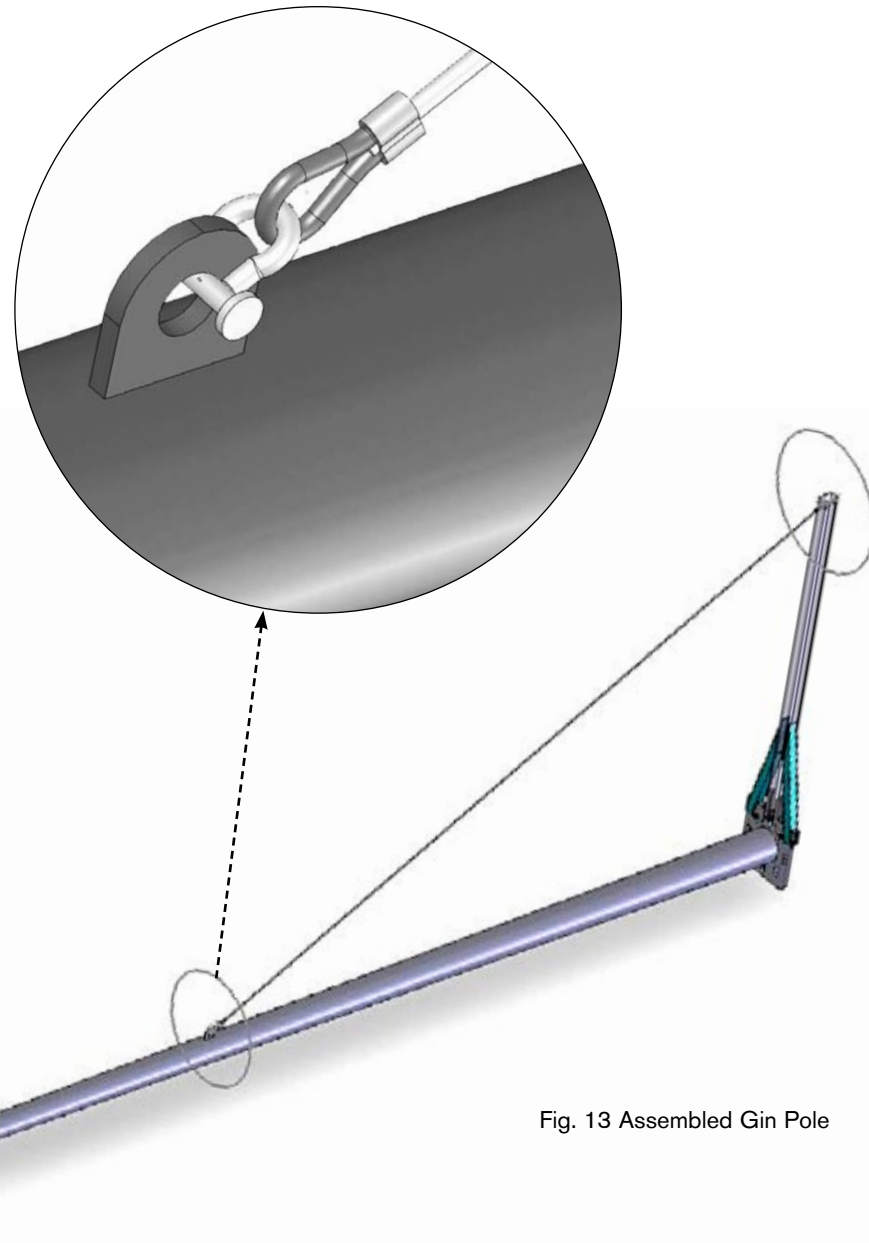


Fig. 13 Assembled Gin Pole

Eight - Raising the Tower

Refer to your Skystream Owner's Manual for directions on mounting Skystream on the tower. If you have not raised a tower before it is also recommended to first raise the tower without the turbine. Raising the tower without the turbine provides the opportunity to practice the procedure without risking damage to the turbine.

A minimum of three people are required to raise the tower.

- Position the remainder of tower mounting hardware and tools close to the tower foundation.
- Securely connect the gin pole cable to the raising vehicle.
- Very slowly, drive the vehicle away from the tower taking the “slack” out of the cable. Keep the vehicle inline with the tower while slowly raising the tower.



WARNING: Use extreme caution when raising the tower. Keep well away and to sides of tower and cable. Beware of overhead power lines.

- As the tower approaches vertical it will reach a “balance point”. At this point two people can take over from the vehicle and use the gin pole to manually “lower” the tower into the full upright position. The goal is to prevent the tower from “falling” into the final vertical position after it passes the “balance point”.
- With the tower vertical and resting on the foundation bolts, install the remaining nuts and washers and hand tighten the nuts. Note that the tower may be tilted away from the hinge and it may be necessary to lower the “hinge side” of the tower to fully thread the nuts on the foundation bolts.
- If the tower was raised without the wind turbine, refer to the Lowering the Tower section and follow the instructions. If the tower was raised with the wind turbine proceed to Leveling the Tower section.

Nine - Lowering the Tower

Lowering the tower is essentially the reverse of raising the tower. The same precautions should be observed, including positioning the hinge so the tower base plate clears the foundation bolts. As with raising the tower a minimum of three people are recommended.



WARNING: Use extreme caution when lowering the tower. Keep well away and to sides of tower and cable.

- Position suitable bracing support the top of the tower after it is lowered. The support should be located approximately 8 feet (2.5 m) from the top of the tower to clear the turbine blades.
 - If not already in place, install the hinge plate by sliding the hinge between the lower and middle nuts on the foundation bolts. Slide the 7/8" diameter bolts that act as hinge pins through the hinge and tower foundation plate and snugly tighten the 7/8" nuts.
 - Securely tighten the 1 1/4" nuts that secure the hinge to the foundation bolts. Check the distance from the top of the hinge to the top of the foundation bolts is 4 1/4". Adjust if necessary. Refer to **Fig. 8**.
 - Bolt the gin pole to the foundation plate and connect the cable from gin pole to the weldment on the tower.
- Connect the second cable to the gin pole and lowering vehicle.
 - Position the vehicle so it is in line with the tower and there is approximately 1 foot (30 cm) of slack in the gin pole cable.
 - Remove the remaining 1 1/4" nuts and washers from the foundation bolts.
 - The lowering process is started by two people lifting the gin pole so that the tower starts to tilt and takes up the cable slack.
 - Once the tower passes the balance point the the vehicle can then be used to fully lower the tower.



WARNING: Someone **MUST** be in the vehicle at all times to control lowering the tower. The "pulling" force the tower exerts greatly increases as the tower approaches the horizontal. In other words the tower is lowered using the vehicle brakes to slow the descent of the tower. During lowering keep the vehicle engine running to provide power brake assistance.

Ten - Leveling the Tower

Leveling the tower is most easily accomplished using only four of the eight foundation bolts. Once the tower is leveled the remaining bolts can be fully tightened to secure the tower.

Be aware that leveling the tower may require some trial and error adjustments – even though the base is level, the upper tower flange may be off level due to manufacturing tolerances.

To level the tower:

- Level the tower on a calm day to minimize movement of Skystream. Start by loosening all the upper foundation nuts about a full turn.
- Loosen and lower the four nuts on the “sides” of the foundation base plate. In other words the tower should be supported by the four “corner” nuts of the tower base plate. (refer to **Fig. 8**, Bolts A and B are “corner” bolts)

- Using two bubble levels set perpendicular to each other on the base plate adjust the foundation nuts until the tower is level. Magnetic bubble levels may make this process easier.

- Once the tower is level tighten all nuts and recheck level.

Observe the position of Skystream on calm days. If the wind turbine seems to favor a single position with no wind, the tower may require fine tuning even if it appears level using the bubble leveling technique.

To fine tune the tower realize that the nose cone of the wind turbine will “point” in the direction of the tower low side. Therefore, to level the tower, slightly raise the side of the tower under the nose cone or lower the side of the tower opposite the nose cone. Make fine adjustments. Approximately one turn of a foundation nut equates to slightly more than 1/8" (6.4 mm) so even a half turn adjustment will make a difference.