

Installation of Heights Tower Bases and Tower Erection

Hinge Base-'J' or Rebar Anchor Leg Version

Thank you for choosing a Heights Tower. These are the installation guidelines for installing your free-standing aluminum tower. This installation manual covers stacked towers on Hinged Bases and towers with Fold-Over-Kits. Please read carefully.

Tools Needed:

- Excavation equipment like a small backhoe truck or manually with a shovel.
- Two or three carpenter's levels.
- Combination or ratchet wrenches; bolt-heads require 9/16" or 3/4" sockets.
- hammer and rubber hammer
- Helpful items: a tapered drift-pin for 3/8" and 1/2" holes; rat-tail file(s) also.

WARNING:

Installation of this product near power lines is dangerous. For your safety, follow the installation instructions. Read through these instructions once through completely before planning or beginning any work.

Make sure there are no underground power lines or any phone/cable lines near the sites where you will be digging the foundation hole. If in doubt, call your local utilities companies, and they will check the site for you or recommend someone who can.

DO NOT install, remove or repair this tower at a distance within one and one-half times its height from any electric power lines.

YOU CAN BE KILLED IF THIS PRODUCT COMES NEAR POWER LINES.

FOUNDATION INSTALLATION PROCEDURES

Dig the hole size according to the dimensions listed in the calculations and your Detailed Concrete Footing Diagram (Fig. 1). In most cases, the base hole needs to be between 3 and 4 ft. in diameter and from 5' to 8' in depth. These sized holes would require from 1.5 to 4 cubic yards of concrete. Concrete is to be 3000# proof or 6 bag.

Our original specs and the illustrations in our brochure show a cylindrical 'sona' tube being installed as forming for the hole. It is not necessary to use a 'sona' tube; you can make a box shaped forming from regular plywood (4' x 8' or similar size). Plywood is usually easier to find and buy, and you can build the excavation into a box form with it. The only disadvantage that a box shape has over a cylindrical shape base is it will require about 20 to 70% more concrete.

Another option is to use no form. This is actually the most desirable

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option from a building code standpoint, if you can manage it. You can not wait very long to pour the concrete, as the walls may cave in if it rains, etc.

Rebar Caging

To conform to building codes, we also specify rebar caging to be installed just inside of the footings walls. The specifications for rebar caging are listed in the Footing Design section of your tower's Calculations and it's Concrete Footing Diagram (Fig. 1) for the tower. We can manufacture a prefabricated cage for your tower, if you do not wish to build your own.

The cage should be centered in the hole and raised up a few inches by propping up the bottom bars with small bricks. There should be at least 3" of clearance between the walls of the excavation and the cage frame.

To set the **Hinge Base ('HB') legs** in place, use the bottom tower section as a template and support it over the base hole by spanning a couple strong pieces of lumber under it (as shown in diagram labeled "Installation and Foundation Schematic").

The three HB legs need to be arranged so that their extended hook-legs will form a triangular pattern when viewed from above (as shown in fig. 1's "Sect 'A'"). The three pairs of clevis straps on top also need to be parallel to allow the tower to be 'hinged' over on one side. To make sure this occurs correctly, we color coordinate the HB legs for you. The red-marked leg is the 'front' leg, while the blue and yellow are the back legs. Please see 'Bolt Configuration' diagram.

Set the tower section vertically on the scaffolding supports before concrete is poured. Use carpenter's levels to determine straightness (see Installation Schematic drawing). Pour concrete, attempting not to knock the legs out of position. However, you should be able to nudge the section and legs back into the plum position after concrete is poured and still fresh.

Carpenter's levels should be taped to the side of the tower section vertically (see diagram). If you have a tapered junction section (AJ-xx) on the bottom, you can still use the levels--you simply need to make sure the all read the same amount of offset in the level-bubbles.

Allow concrete to set for 3 to 5 days before installing the remaining

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tower sections.

HINGE BASE FUNCTION

After the concrete has cured, you may hinge the bottom tower section over by removing all the bolts from the front leg and all but one bolt from each of the back two legs (see diagram). Now the back legs will function as a hinge, allowing the tower to be tilted up or down as needed. Once the tower is assembled on the ground (as described in steps below), the entire tower structure may be hoisted up by very gradually opening up the Screw System on the Fold Over Kit option. Read about exactly how to install this system in the Fold Over Kit section further on in this manual.

TOWER ASSEMBLY/ERECTION

Basic tower section assembly:

Assemble the sections in their self-evident order. If in doubt, refer to you tower 'bolt list' shipped with the tower (look in hardware boxes), drawings, if you ordered them, your Packing List or Invoice.

If you decided to use a lubricant or grease on the tower legs, please apply before mating the tower sections together. A light lubricant like 'Alum-a-Lub' (which may be purchased with your tower order for a wholesale price) or other general utility sprays like WD-40, will only help reduce friction and prevent scarring of telescoping tube surfaces. Some sections, especially the tapering 'AJ' style sections will be much tighter fitting than the straight ones (ACs or AT). Lay the sections on fairly flat ground and attempt to slide all three legs on evenly and incrementally on each side, gradually 'wiggling' the sections together, and not cocking one side in before another.

Once the bolt-holes start approaching alignment, get out your tapered pin tool (if you do not have one, we can lend or sell you one) to align one completely and insert a bolt through them. The tip on an acceptable taper pin should come down to below 3/8" dia. and near 1/4". When you get the first hole bolted, the remaining holes should more easily be aligned.

If it is difficult to align the first hole, a tapered drift pin can help begin the process of better aligning the holes. If you use the taper to drift them into full alignment, you should be able to get at least one other bolt hole in the pattern aligned for bolt insertion. Repeat this process on each of the three legs connection, until you have one bolt in each (of the 3) leg tubes and their couplers or junctions (depending on the tower size).

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Please be aware that you will not get more than 2/3rds of the holes perfectly aligned. Because we want your tower connections to remain snug and tight for the life of the tower, we do not manufacture any hole diameter tolerance into the fitting between the section. Each hole has zero tolerance, which means there will be some misalignment on some holes. Almost always, this misalignment between the holes will be less than 1/16" difference between the eclipsed holes. If the overlap is large enough so that it prevent the 'threading' type insertion of the bolts, or gently turning the bolt screws through the holes with a ratchet with moderate turning pressure (less than 80 lbs. if using a torque-wrench), then you may need to ream or drill out the slightly misaligned holes. Before reaming or drilling any holes, you must first align one of the two to four holes in your leg pattern and insert a bolt into them, so that a stable base reference is provided. We recommend first using a small 5/16" or 3/8 dia. 'rat-tail' cylindrical file to carefully shave off the overlapping material within the hole that interferes with a 3/8" or 1/2" bolt passage (depending on the size section you are working on).

If that does not work, and you are skilled at using an electric hand-drill, you could put in a 3/8" dia. drill in the chuck, and quickly ream through the holes. Be careful not to take out too much of the tube legs meat, and also how you hold your hand-drill, as it is easy to catch them in the holes and break the bit. Again, you must use the above pinning techniques to align at least one hole in each leg **before** drilling any off-alignment holes.

Tighten the locking nuts snugly, but do not over-tighten, as this may egg-shape and gouge the tubing. Our fastener connections do not depend on torqued down nuts, or what is sometimes called a friction fit. All the bearing pressure is calculated for on the bolt shanks and holes, so do not worry about overtightening the nuts. Just a snug fit is fine.

Attaching to bases:

If you have a tower with a Hinge Base and a Fold-Over Kit at the 8, 16 or 24 ft. level, the tower may be raised to the vertical position by utilizing a combination of the Hinge Base's and Fold-Over-Kit's functions. While another person is cranking open the screw with the tower laying on the ground, another person should help to hoist the tower up at the section junction that holds the Fold-Over-Kit. This will allow the tower to gradually jack-knife into place, with the bottom segment of tower ultimately vertical and the segment above the Fold point swinging off to

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the side. Of course, the complete tower may be cranked up to the vertical tower 'closed' position, when final antenna or other instrument adjustments are completed.

OTHER BASE CONSIDERATIONS

Grounding system: You should ground your tower to prevent lightning damage. The simplest grounding system would consist of two or three copper-clad, 8-10 ft. ground rods spiked into the ground near the edge of the concrete pad, and all connected to the tower legs with heavy duty electrical wire. See 'Grounding' diagram.

Should you have any questions on these instructions, call Heights Tower Systems at 1-850-455-1210 or email at info@heightstowers.com or hts2001@bellsouth.net.