



spiderbeam

high performance lightweight antennas

Spiderbeam aluminum masts basic installation and “how-to” information

Spiderbeam nesting collapsible aluminum telescoping masts are available in sizes of 33, 41, 47, 49, 60 ft. Weight loading capability on the mast depends on the version of the mast and the height it is used.

33 ft portable = 26 lb @ 23 ft. 13 lb @ 33 ft.

33 ft HD = 26 lb @ 33 ft

41 ft = 26 lb @ 29 ft, 13 lb @ 41 ft

47 ft HD = 26 lb @ 47 ft

49 ft = 26 lb @ 36 ft, 13 lb @ 49 ft

60 ft = 26 lb @ 46 ft, 13 lb @ 60 ft

When collapsed, the transport length is between 4 ft 5 inches and 6 ft 7 inches depending on model. Intersection clamps are custom built and use a 8mm allen screw (allen wrench provided with mast).

GUYING THE MASTS:

Guying provides stability and downward load force. They are not used free-standing or without guys. There are two guy plate sets available, 3 hole 120 degrees or 4 hole 90 degrees. 3 hole 120 degree guying is adequate unless high winds are expected at installation. The max wind rating for masts and hardware properly installed is 70 MPH.



3 hole 120 degree guy hardware. Guy plate shown upside down – plate guy connection tabs face downward when installed.



4 hole 120 degree guy hardware. Guy plate shown upside down – plate guy connection tabs face downward when installed.

The circular bushing shown is slightly larger (~1mm) in inner diameter than the mast segment it is installed on. Guy hardware installs just above the section junctions of mast segments. The bushing flange faces upwards. The guy plate center hole rests on the flange with the 3 or 4 guy attachment points facing downward.

Example, on the 33 ft HD mast the guy hardware is installed at 2 segment points, 40mm and 50mm. The 7 segments have an outer diameter from bottom to top of 70, 65, 60, 55, 50, 45, and 40mm. The guy hardware for 40mm is approx. 41 mm ID, 50mm is 51 mm ID. The bushing for the bottom 50mm guy would be placed above the junction of the 55 and 50mm segments, resting on the top edge of the 55mm segment near the low end of the 50mm. Same for the 40mm bushing – it rests on the top edge of the 45mm segment at the junction of the 45 and 40mm mast segments. As the ID of the bushing is slightly larger than the mast segment, the mast can be rotated inside the bushings and guy attachment hardware.

GUY ROPES AND INSTALLATION:

Spiderbeam offers 2 types of rope for guying the masts.

- 6mm Polyester rope, UV resistant
- 4mm Dyneema rope, UV resistant

Dyneema rope is better for permanent installations as it's no-stretch and will not elongate with the passing of time. Polyester rope is usable for temporary and portable installations, but can also be used for permanent installations if monitored and re-tightened if needed with time.

Rope can be installed at the guy plate two ways. Tying the rope or steel guy wires directly to the guy plate holes or installing with carabiners, thimbles, and rope clamps. Same for guy attachment points at ground level. See next section for more information.

Guy rope lengths are recommended as minimum 60% of the height the mast will be used, 70% is recommended. The distance of the guy attachment points at ground level will increase stability of the mast up to 100% of the height of the mast, but this is not required. 70% is adequate.

(RECOMMENDED)						
Mast Type	10.0	10-HD	12.5	14.5	15.0	18.0
1. Top Guy	30mm	40mm	30mm	40mm	30mm	30mm
2. Middle Guy				50mm	40mm	40mm
3. Middle Guy						50mm
4. Bottom Guy	45mm	50mm	45mm	60mm	50mm	60mm
Height 1.	9.1	8.7	11.0	13.0	13.5	16.3
Height 2.				9.3	9.9	12.7
Height 3.						9.3
Height 4.	5.4	7.2	6.9	6.1	6.5	6.1
Guy Stake (0.7)	7.0	7.0	8.8	10.2	10.5	12.6
Guy Length 1.	13.5	13.2	16.1	18.5	19.1	22.6
Guy Length 2.				15.8	16.4	19.9
Guy Length 3.						17.7
Guy Length 4.	10.8	12.0	13.2	13.9	14.3	16.0
Total Guy Line	24.3	25.2	29.3	48.2	49.9	76.2
Total 3 directions	73.0	75.6	87.8	144.6	149.6	228.5
Total 4 directions	97.3	100.8	117.1	192.8	199.5	304.6
3D: Rolls Polyester	1.5	1.5	1.8	2.9	3.0	4.6
4D: Rolls Polyester	1.95	2.02	2.34	3.86	3.99	6.09
3D: Rolls Dyneema	0.73	0.76	0.88	1.45	1.50	2.28
4D: Rolls Dyneema	0.97	1.01	1.17	1.93	2.00	3.05
(MINIMUM)						
Mast Type	10.0	10-HD	12.5	14.5	15.0	18.0
1. Top Guy	30mm	40mm	30mm	40mm	30mm	30mm
2. Middle Guy				50mm	40mm	40mm
3. Middle Guy						50mm
4. Bottom Guy	45mm	50mm	45mm	60mm	50mm	60mm
Height 1.	9.1	8.7	11.0	13.0	13.5	16.3
Height 2.				9.3	9.9	12.7
Height 3.						9.3
Height 4.	5.4	7.2	6.9	6.1	6.5	6.1
Guy Stake (0.6)	6.0	6.0	7.6	8.7	9.0	10.8
Guy Length 1.	12.9	12.6	15.4	17.6	18.2	21.6
Guy Length 2.				14.7	15.4	18.7
Guy Length 3.						16.3
Guy Length 4.	10.1	11.4	12.3	12.6	13.1	14.4
Total Guy Line	23.0	23.9	27.6	45.0	46.7	70.9
Total 3 directions	68.9	71.8	82.9	135.0	140.1	212.6
Total 4 directions	91.9	95.8	110.5	180.0	186.8	283.5
3D: Rolls Polyester	1.38	1.44	1.66	2.70	2.80	4.25
4D: Rolls Polyester	1.84	1.92	2.21	3.60	3.74	5.67
3D: Rolls Dyneema	0.69	0.72	0.83	1.35	1.40	2.13
4D: Rolls Dyneema	0.92	0.96	1.11	1.80	1.87	2.84

Guy length table for aluminum masts with guy lengths shown in **meters**. For imperial measurements (feet) multiply meter length x 3.281. The guy lengths shows are the distance between the installed guy hardware attachment point on the mast and the attachment point at ground level. In practice cutting the ropes 2 meters (6.6 ft) longer than the length shown will allow for tying the ropes off at each end.

The top table “Recommended” is for guying the mast at full extended height with the ground attachment point at 70% of the height. All guy ropes are tied to the same ground stake on each side of the mast. “Minimum” is for guying the mast at full extended height with the ground attachment point at 60% of the height.

Tighten as needed – do not tie off guy ropes at maximum pull. Having the rope somewhat taut but not stretched tightly is adequate for installation and allows the mast and ropes to move in weather without risking pulling the mast over or breaking the ropes.

The table at the bottom shows the number of 50m 6mm polyester rope rolls or 100m 4mm Dyneema rope rolls required to guy the mast off at the lengths shown on the table. “3D” is 3 directions, 120 degrees. “4D” is 4 directions, 90 degrees.

GUY ROPE ATTACHMENT:

Edges of guy plate hardware can, over time, abrade the rope attached and cut it if tied directly to the guy plates. This is possible to happen, but not a certainty. Many long term Spiderbeam mast installations have used guy rope tied directly to the hardware and to the ground attachment points.

Carabiners and rope thimbles can eliminate this possibility.

Rope can be looped over a thimble and clamped back on itself with a rope clamp or tied off with a knot below the thimble. This thimble is then placed inside a carabiner which is installed on the mast guy hardware. It is also possible to not use the thimble and rope clamps and simply tie the rope directly to the carabiner and have it clipped onto the guy hardware. A note for easy install or removing the mast later – it’s much easier to get the ropes off of guy hardware at a later date if the rope is tied or installed to a carabiner than if tied to the mast. If tied directly the knots can tighten and harden, lending need to cut the rope off at the guy point later if necessary. With a carabiner, you simply unclip the rope from the guy hardware.

Rope clamps Spiderbeam sells are 3mm diameter, too small for 4mm or 6mm rope. Spiderbeam makes these available for steel wire guy ropes for commercial installations.

As noted, tying the rope directly to a carabiner is acceptable.

ROTATOR ADAPTER INSTALLATION (OR NOT):

There are two possibilities for mast rotation. One is to use no rotator at the bottom and turn the mast by hand (the “Armstrong” method). The other is the installation of a commercial rotator (Yaesu G-450, etc.) to turn the mast and antenna.

For use with no rotator, the mast itself can be used with the bottom end at ground and the mast can be turned by hand. The guy hardware will keep the mast vertical, but there is nothing to keep it from moving from side to side somewhat. Spiderbeam sells a BASEPLATE for eliminating this and to have a spot to hold the mast steady at the base. The baseplate has a metal “cup” larger than the bottom of the mast that the bottom of the mast rests inside. There are 4 attachment holes on the outer sides of the baseplate and stakes provided to be pounded into the ground tent style to keep the baseplate stable.

The other is to use a commercial rotator for turning the mast and antenna.

The masts themselves are too large at the base to fit inside the clamp openings of commercial rotators. To get around this, Spiderbeam offers 2 rotator adapters that measure 80/50mm and 70/50mm. The 80/50 model is attached to the base of the masts that have a bottom segment of 80mm OD, the 70/50 is attached to the base of the masts that have a bottom segment of 70mm OD. It does require drilling a hole in the bottom segment of the mast. Drill hole, insert adapter into the bottom of the mast, use the supplied bolt through the mast hole and adapter to pin it to the mast and then insert the 50mm side of the adapter into the clamp opening on the rotator.

Now, a counterforce. With the rotator attached the mast with the adapter, the rotator has to be attached to something via the attachment bolts that are on the bottom of it. This is where a little bit of creativity will be needed depending on how the installation will be done. A couple of common ways to do this are to use a Rohn 25 tower rotator shelf to attach to the bottom of the rotator and in turn bolting it to something like a small concrete block in the ground. Another is to use a metal L bracket with drill pattern to fit the rotator bolt holes attached to a stub of 4x4 that has been cemented into the ground. Keep in mind you don’t need a lot of heft here, all you need is a counterforce to keep the rotator turning the mast and not turning itself.

ATTACHING AN ANTENNA AT THE TOP:

The most obvious way to do this is to simply clamp the antenna boom-to-mast plate or whatever is used to connect it to a mast to the top of the mast. The other option is to use one of the Spiderbeam 35mm or 45mm standpipes to place the antenna on the top. 35mm standpipe fits on top of masts that have a 30mm OD, 45mm for masts with 40mm OD at top.

The standpipe is 150cm (4 ft 11 inches) long. The antenna can be bolted to the standpipe and in turn it is clamped onto the top section of the mast (clamp included with standpipe). Pulling the standpipe down over the top segment of the mast also provides additional mechanical strength at the point where the antenna is attached.

