MAX-GAIN SYSTEMS, INC.

ASSEMBLY INSTRUCTIONS

for Fiberglass Telescoping / Push-Up Masts

All mast kits (“MK”) include telescoping fiberglass tubes and corresponding quik-clamps

ABOUT OUR MASTS

The Max-Gain Systems' Fiberglass push-up masts are made of the highest quality pultruded fiberglass tubing and with a massive 1/8 inch wall thickness. The Quik-Clamps we designed to use with our fiberglass tubing use a proprietary stainless steel reverse double helix screw and matching nylon thumb lever to create great holding power while being extremely easy to use. Our fiberglass mast kits are available in 10 different maximum height configurations. The desired height can be achieved for your application by using less of the mast sections (not extending each section so far out) or by removing sections altogether and using more length of the larger tube sections.

Notice: No fiberglass mast in the world, (and few, if any, steel masts of these heights) are designed to withstand multiple wire antenna loads or any rotational loads. NO rotators or "rotors" should be mounted on our masts! Our masts are not designed to support HF beams. They are well suited for support of light wire antennas, small, light, VHF and UHF antennas (even small VHF and UHF beams in fixed-position use... again, no rotators), small cell phone and wifi boosters, light camera equipment, and other attachments. ***Hand rotation**** is possible with our guy rings as they "float" over the "quik-clamps". Remember that the coax cable or feed line is part of the weight to be supported by the mast and must be considered as part of the weight of the antenna. Be reasonable in your expectations and careful in guying and erecting your mast, and it will serve you well!

Demonstrating Hand Rotation*

Leverage experienced with tall structures will make them impossible to hold at an angle, so again, keep the structure vertical at all times during extension and retraction (**DO NOT** extend the mast on the ground and "walk it up"). Having people on all guy ropes to maintain control **(keeping the structure VERTICAL at all times)** during raising or lowering the structure is a **must**. When letting the structure down, be certain to maintain a firm grip on the inner tubes when you SLOWLY release tension on the thumb clamp. Do not rely on the clamp tension only to let down each section. Gloves (selected for a good grip on the tube surface) will be a BIG help. Always raise and lower in adequate lighting to avoid accidentally extending the mast past the "stop" line you marked on the tubes. Again, ALWAYS have adequate help on hand to maintain control of the structure when raising or lowering.

POWER LINE CAUTIONS

Even though your new mast is a non-conductor, (and as a result is MUCH safer in many applications than metal masts) **do not get a false sense of security if near power lines.** Remember that even if you use the non-conductive Dacron guy ropes and our guy rings that we recommend, (which are also non-conductive) the items that you are supporting (such as wires, metal antennas, cameras and control cables, and coaxial cables and wire feed lines) ARE conductive. If these components of your installation come in contact with power lines, they can KILL. The insulation on coax cable or most control cables is only rated for a few hundred volts, and you may find THOUSANDS of volts present on power lines. DO NOT INSTALL IN CLOSE PROXIMITY TO POWER LINES. Should a power line somehow come in contact with any part of your installation, always consider it to be energized, and dangerous. Do not touch any part of your installation and call the power company immediately for help.

MAST KITS AVAILABLE

We have ten mast kits available. Ranging from as short as 10.4 feet when fully extended, that could fit in a luggage bag, up through the 50 foot tall MK-8-HD mast.

See the chart below:

Part Number	Maximum Usable Length	Length when sleeved	Minimum overlap of tubes	Length of tubes	OD of bottom tube section	OD of top tube section	Number of Sections	Weight
MK-8-HD	50 feet	9 feet 5 inches	8.5 inches	93 inches	2.5 inches	1 inch	7	22.6 Lbs
MK-6-EXT	43.3 feet	7 feet 10 inches	8 inches	72 inches	2.5 inches	3/4 inch	8	18.9 Lbs
MK-6-HD	38 feet	7 feet 7 inches	8 inches	72 inches	2.5 inches	1 inch	7	17.8 Lbs
MK-6-STD	32 feet	7 feet 2 inches	8 inches	72 inches	2 inches	3/4 inch	6	11.8 Lbs
MK-4-EXT	28.5 feet	5 feet 8 inches	4.25 inches	46.5 inches	2.5 inches	3/4 inch	8	12.75 Lbs
MK-4-HD	25 feet	5 feet 6 inches	4.25 inches	46.5 inches	2.5 inches	1 inch	7	12 Lbs
MK-4-STD	21.5 feet	5 feet 1 inch	4.25 inches	46.5 inches	2 inches	3/4 inch	6	7.9 Lbs
MK-2-EXT	14 feet	3 feet 10 inches	3 inches	23.25 inches	2.5 inches	3/4 inch	8	7.2 Lbs
MK-2-HD	12.1 feet	3 feet 7 inches	3 inches	23.25 inches	2.5 inches	1 inch	7	6.75 Lbs
MK-2-STD	10.4 feet	3 feet 3 inches	3 inches	23.25 inches	2 inches	3/4 inch	6	4.4 Lbs

When selecting a mast, do not just look at the maximum usable height. Be sure to take note of the differences in the different models. The HD and EXT have a bottom tube section starting at 2.5 inches where the STD starts at only 2 inches. These diameter differences are very pronounced when trying to figure out what you want to support by the mast. The STD models have a piece of 3/4 inch tube at the top making it ideal for supporting things like a vertical wire antenna whereas the HD models have a 1 inch top section which is much more stiff than the 3/4 inch tube. This allows for greater rigidity and allows for support of more robust equipment. Tube length also makes a difference when deciding as a shorter piece of 3/4 inch tube is far more stiff than a longer one (a 46.5 inch piece in the MK-4-EXT would be less flexible than the 72 inch piece in the MK-6-EXT). All of these factors need to be considered when selecting a mast for your application.

LEVER LOCK “QUIK-CLAMPS” (TELESCOPING TUBE CLAMPS)

Each Mast Kit comes with its corresponding quik clamps. EXT masts come with 7 clamps, HD masts come with 6 clamps, and STD masts come with 5 clamps. These telescoping tube clamps can also be purchased individually on our website: https://mgs4u.com/product/max-gain-systems-quik-clamp-mast-clamps/

Each clamp is determined by the outer diameter of the tube that the base end of the clamp sits on. If the base of the clamp sits on the end of the 1.5 inch OD round tube the clamp used is the MC-150. The MC-150 accepts the 1.25 inch OD round tube through the top of the clamp which is clamped by the clamping ears.

GLUING, GLUES, AND ADHESIVES

Surface Prep: Do not clean the fiberglass surface with alcohol, mineral spirits, etc… if you wish to clean the surface, use ONLY a damp towel to wipe off surface dust.

When gluing the Quik Clamps, be certain to apply a bead of the adhesive completely around the bottom edge of the clamp. Smooth the adhesive into a nice fillet as you would if caulking a bathtub. Let dry for a day or two, and you are done!

NOTE: If you find a clamp that is not an easy slip fit on a tube end, just get a piece of scrap board, and place the board on the top of the clamp and tap it into place with a small hammer. Don't worry… the clamps are very tough! **Be certain that the clamp is square with the end of the tube and is not tilted.** Tilted clamps will cause the fiberglass tubes to bind as they are extended and retracted. (Tight fitting clamps have the advantage of not needing adhesive, as they will not accidentally be pulled off.)

Many glues and adhesives are satisfactory since the glue works to prevent the clamp from pulling off as you extend the inner tubes upward. In use, the downward pressure of the weight above keeps the clamps firmly in place. Some clamps may not require any adhesive as they maybe "tight" to put on the corresponding tube. Glues such as "Goop", silicone sealer, and 50/50 epoxy (consistency of syrup... not filler types with putty consistency) will all do the job. JB Weld 2 part epoxy in the Red and Black tubes labeled with "Steel" and "Hardener" on the tail end, which is available in most hardware stores, sets up in a few hours and cures fully in a day or so, applies easily, and works very well.

J-B WELD (Original Cold-Weld Formula)

Our favorite adhesive for gluing the Quik-Clamps on our fiberglass tubes

Glues "NOT" to use

Glues which expand as they dry, such as "Gorilla Glue" are **NOT** recommended, because the glue tends to migrate into places where it should not be as it expands. **Do NOT use PVC cement (purple and clear mixture)**, which works by dissolving PVC and "melting" it together. It will NOT dissolve fiberglass and will not work at all. **Do NOT use Liquid Nails or any other glue designed for gluing wood.** These glues will not bond to fiberglass and will only make a mess. **Do NOT use "Super Glues".** They cure then become rock hard and brittle.

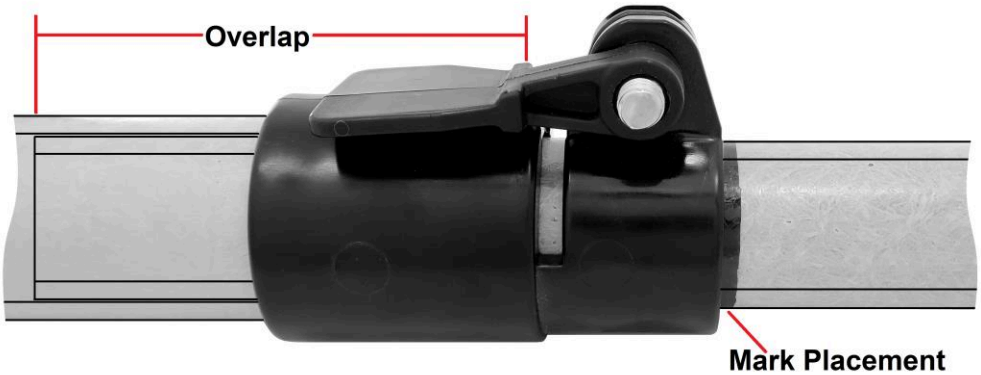
FULLY SEATED CLAMP

NOT FULLY SEATED CLAMP

Allow enough time for the adhesive you have chosen to dry before proceeding.

MARK TUBES

The fiberglass tube sets do not have a physical stop inside each tube to prevent pulling out the tube during the extending process. Use this period to mark the outside of each tube (except the bottom one) with a contrasting color band for a visual stop. A black magic marker will work nicely on the gray tubes. Do **NOT** try to “cheat” a little on these recommended overlaps to gain a little extra height. These overlaps are ABSOLUTE MINIMUMS. Greater overlaps only make your mast more rigid if maximum height is not required.



Mark placement is a crucial step in order to ensure you are staying within safe operating ranges.

See the following chart which details, for each mast, the point from one end of each tube at which to place the mark all the way around the tube. Your model of mast will determine the point for each tube where to make your mark:

Part Number	Distance from one end of each tube
MK-8-HD	10 inches
MK-6-EXT	9.5 inches
MK-6-HD	9.5 inches
MK-6-STD	9.5 inches
MK-4-EXT	5.75 inches
MK-4-HD	5.75 inches
MK-4-STD	5.75 inches
MK-2-EXT	4.5 inches
MK-2-HD	4.5 inches
MK-2-STD	4.5 inches

ADJUSTING CLAMP TIGHTNESS

After the Quik-Clamps are cured, you can then raise the thumb-clamp levers and insert the tubes within one another. You will notice a screw in the clamp. This screw is used to adjust the tension of the clamping mechanism. With a Phillips tip screwdriver, (be certain to use a large enough Phillips screwdriver to properly engage the large screw slots. (Preferably a #3 Phillips). Tighten the screw just to the point before it hinders passage of the inner tube. The screw is **REVERSE THREAD**, so turn COUNTERCLOCKWISE to tighten. **TEST** the thumb clamp at that point, and make certain that you have the tension adjusted properly so that you may extend the inner tube, and that when the thumb clamp is in the “down” position, that the inner tube is gripped **FIRMLY**. It is most important not to over-tighten the screw. The thumb clamps have tremendous leverage, and if over-tightened, something HAS to give... (probably one of the sides of the clamp “ears”). Try this adjustment a few times until you find the perfect setting. Do not use thread-lock compound on the screws. It is not necessary, and thread-lock compound is one of the very few things that can attack and weaken the material used to make the clamps.

NOTE: We do NOT recommend painting our push-up masts or extension poles! The inside of the tubes is more abrasive than the smooth outer finish and will quickly scar most paints. Thick paint coats can also decrease clearances between the tubes, causing them to jam. Count on our high percentage of UV inhibitors in the resin to provide long useful life. **We do not recommend using solid rods in the place of our hollow tubes with our Quik-Clamps.** The solid rods are much more difficult for the clamps to hold tightly for several reasons, and if the clamps are over-tightened in an attempt to do so, the clamps may break. If you feel that you need to use a solid rod at the top of your mast, call or email us to discuss some options that will in fact work satisfactorily.

GUYING INSTRUCTIONS

A tall structure such as our full-length model MK-8 or MK-6 series masts (including the HD versions) **MUST** be guyed and kept under control with guys even while being erected. **NOTE:** Do **NOT** use metal guy cables with this mast system! Metal cables are conductive and HEAVY and add significantly to the vertical loading of the mast. Enlist three friends, family, or neighbors (or 4, if you choose 4 point guying) to stand in the approximate locations of the guy anchor points, and to hold the guy ropes and "feed them out" as you extend the mast, all the while being certain that the mast stays vertical. We recommend guying at least two levels with three direction guys.
Non-stretch, UV resistant, light, low visibility ropes such as the 1/8" OD black double-weave Dacron rope such as the "Hexrope 4" (1000 foot rolls) or "Hexrope 3" (200 foot rolls) that we sell are ideal. If you are not proficient in knot tying, we recommend that you seek tutoring from someone who is OR use a tension device known as a guy rope tensioner.

Our specially made GUY RINGS are tough, non-conductive, and UV-proof. Our guy rings are made in seven sizes to fit perfectly on our different tubes (3/4 inch, 1 inch, 1.25 inch, 1.5 inch, 1.75 inch, 2 inch, and 2.25 inch). Having these seven sizes should offer adequate choice of guying position for almost any use. These guy rings slip on the tubes and rest on the Quik-Clamp beneath. They are drilled for either 3-point guying or 4-point guying, as you prefer. The guy rope holes are counter-sunk to avoid cutting ropes.

Be sure to check out our part number: GUY-TEN-02. These **guy line tensioners** make the guying process easy. Attach the ring on the guy tensioner to your ground guy points (one tensioner per guy rope), rotate back on the "Cam" portion of the tensioner. Feed the rope through the opposite end of the tensioner. Grab the body of the tensioner and begin to take up the slack from the rope. Pull to the desired tightness. Each tensioner is rated for a safe working load of 280 pounds!

Using the **Guy Line Tensioners** (our P/N GUY-TEN-02) is a quick and easy way to guy a mobile OR a permanent setup!

For the Guy Tensioners, if you are using a mounting point that does not have an opening to hook the guy tensioner's carabiner to / or even if you are, we offer a pear shaped **Quick Link** (our P/N QL-NPS-1625) that is ideal to attach the guy tensioners to any attachment point. This will make a strong, rock solid connection between your guy point and the guy tensioner.

We also have designed **Guy Stakes** (our P/N GUY-STAKE-23). These stakes are incredibly strong. Made of galvanized steel angle, these stakes can be deployed numerous times and not bend like most all others out there. Being made of angle steel, these stakes bite into an enormous amount of earth unlike the thin auger type anchors which bend and bow under the stress of guying a structure.

Guying shorter masts such as our models MK-4 and MK-6 depends on your application, and the item(s) being supported. An adequately spaced, at least 2-point clamp arrangement on the bottom section may be sufficient for many light duty or partially-extended applications. When clamping to fiberglass tubes with U-bolts, be careful not to over-tighten to avoid crushing the tube. When in doubt, guy! Err on the side of over-engineering, never under! Even with guyed structures, always secure the base in a secure fashion where it cannot move. In semi-permanent

installations, be sure the bottom tube end is not plugged so that water can drain out. Water can freeze and split the tube if allowed to accumulate. Guy anchor points should be strong enough to withstand a great deal of pulling force, and away from the mast far enough that the guy ropes form a 45-degree or greater angle with respect to the mast. If the guy anchor points are too close to the mast, the guys not only exert a great deal of downward pressure on the mast, adding to the vertical load, but they have far less mechanical advantage on the structure while doing their job of keeping your mast stable during severe environmental conditions. Final adjustment of your guy ropes should be without excess slack, but not so tight as to “load” the mast.

Leverage experienced with tall structures will make them impossible to hold at an angle, so again, keep the structure vertical at all times during extension and retraction. Having people on all guy ropes to maintain control **(keeping the structure VERTICAL at all times)** during raising or lowering the structure is a **must**. When letting the structure down, be certain to maintain a firm grip on the inner tubes when you SLOWLY release tension on the thumb clamp. Do not rely on the clamp tension only to let down each section. Gloves (selected for a good grip on the tube surface) will be a BIG help. Always raise and lower in adequate lighting to avoid accidentally extending the mast past the “stop” line you marked on the tubes. Again, **ALWAYS have adequate help on hand to maintain control of the structure when raising or lowering.**

GUY KITS

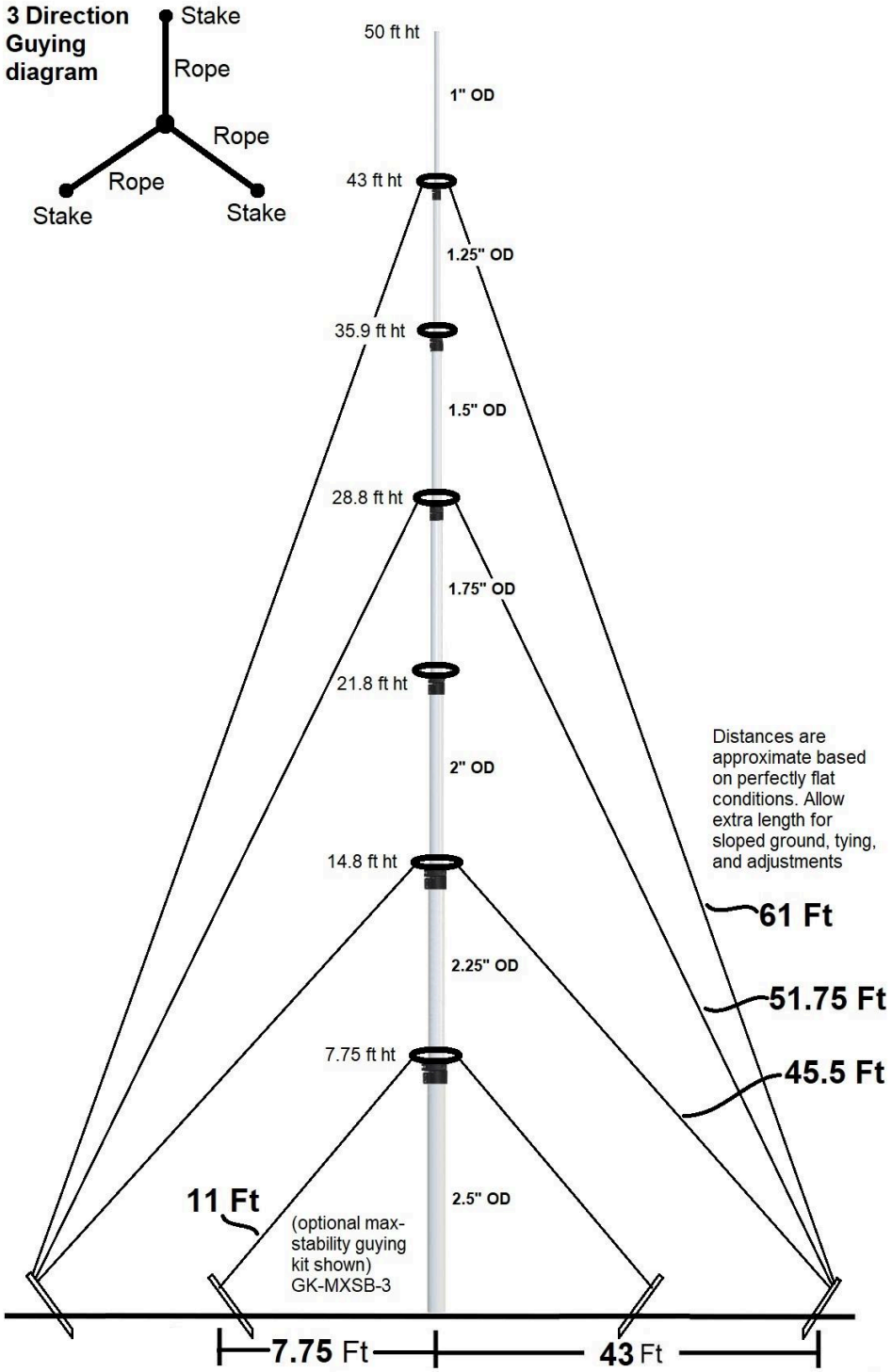
Above is a picture of the materials provided in one of several guy kits we offer. See your respective mast listing on our website for detailed guying instructions per mast. There are diagrams provided there with lengths of rope needed for guying on a flat surface. Please pay attention to the dimensions provided and adjust accordingly based on distance guyed from the mast, elevation of the guy point relative to the base of the mast, and the height of the guy ring from the base of the mast.

GUYING DIAGRAM EXAMPLE

See below an example of one of our guying diagrams. This is for our 50 foot mast guy kit on a flat surface. Adjustments will need to be made base on distance guyed from the mast, elevation of the guy point relative to the base of the mast, and the height of the guy ring from the base of the mast.

50 foot Heavy Duty Fiberglass Push-Up Mast Guying Diagram

Fiberglass is a strong, stiff, yet inherently flexible material. Fiberglass resists bending, but if it does bend, it wants to return to it's original shape unlike metal masts. In order to make sure your mast stays in the vertical position, guying is neccessary. The following diagram shows the optimal guying conditions along with measurements to plan for. These measurements WILL VARY based on your install so be sure to allow extra length when preparing your ropes.



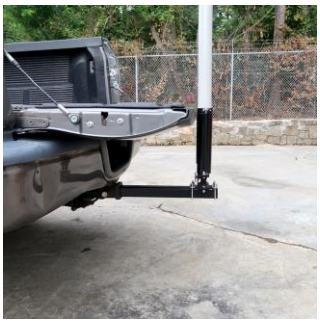
MOUNTING

Our Mast line needed a full array of mounting products that could easily be adapted for any use or situation. For permanent or mobile / temporary use. Not to mention, built to stand the test of time. We have painstakingly designed a mounting system that can be configured in multiple configurations. A **trailer hitch mount**, **ground mount**, and **drive on mount**, using most of the same components. The same **support tube** can be paired with one of the **plates** to make a ground mount or a drive-on mount, use the holes in the center or the holes toward the end of the plate. Pair the support tube with a **hitch bar** and two of our super tough **stainless square U-Bolts** to make a hitch mount. We do offer all of these parts as **Kits** to make it easy to pick. We also have a tilt mechanism that will allow for MUCH easier operation of your mast. With a tilt mechanism, you can have your mast secured in the mounting base and, while the mast is down in the collapsed position, tilt it over and prop your mast up on something to allow for easy access to the top section of your mast to operate on your antenna, flag, light fixture, whatever you might have on top. The tilt mechanism is operated by a T-Bolt on the side of the device. You would remove it to tilt it over. All of our mounting products are made using steel that is laser cut for precise fits and reduced manufacturing burrs that can scratch the fiberglass masts. The mounts are powder coated for durability and to ensure your mount has a nice smooth finish. All of the hardware is stainless to make sure that the mount will be as easily operated as possible for as many years as possible. This mounting system is sold in kits and by the piece so you can make the system fit your needs without paying for any parts you don't need. **Tripod Mast Mounts** now available! These Tripod Mast Mounts have a base that is very wide when extended and can self support a mast, and a low profile object on the top, in a low wind environment. They are easy to setup and stow away for quick mobile installations. Wall mount brackets also available.

Tripod

Drive-On Mount

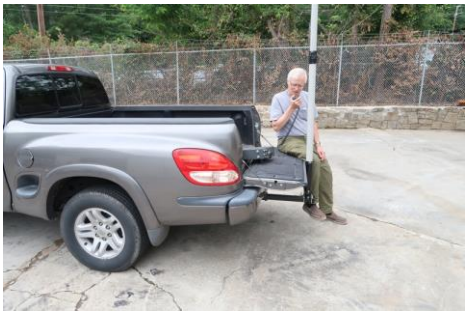
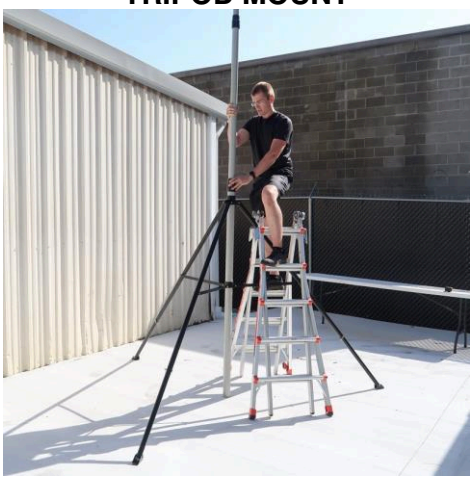
Ground Mount



Hitch

Wall Mount

Bumper Mountable

HITCH MOUNT	DRIVE-ON MOUNT	WALL MOUNT BRACKET
 (Hitch mount with 23 inch bar for use with tailgate) 	 (Drive-on Base Mount)	
GROUND MOUNT	**TRIPOD MOUNT**	
		

Thank you for your purchase!

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ONE YEAR LIMITED WARRANTY

Max-Gain Systems, Inc. (“MGS”) warrants its fiberglass mast products to the original purchaser for a period of one year from the date of the original end-user purchase, that the mast components (fiberglass tubes and associated clamps) shall be free of defects in workmanship and materials, under normal use conditions and if installed, guyed, and maintained in accordance with our provided instructions.

Exclusions and limitations

This warranty does not apply to conditions of faulty or improper installation, guying, or maintenance, or alteration in any way that is not covered in the documentation for the product, or if the product is damaged by acts of God, misuse, abuse, negligence, accident, normal wear and tear and deterioration, or lack of responsible care, or by any other causes not related to defective materials or workmanship. This warranty does not cover any antennas or other equipment mounted on or supported by our product.

Applicable law

This limited warranty is governed by the laws of the state of Georgia, USA.

Warranty claims

Requests for warranty adjustments shall be made in writing, (letter or email) to the address or email address shown on the Max-Gain Systems, Inc. website.
MGS may, at our option, request return of defective parts. Any and all shipping to and from addresses outside the contiguous 48 states in the USA shall be the exclusive responsibility of the purchaser. For customer addresses within the contiguous 48 states in the USA, shipping of any damaged parts to MGS, should we (at our option) request their return, shall be the responsibility of the purchaser. Shipping (via standard ground service) of replacement parts back to the customer (within the 48 contiguous states of the USA) is covered under this limited warranty.

If a valid claim is received within the warranty period, the sole remedy of the original purchaser and Max-Gain Systems, Inc.’s sole and exclusive liability shall be limited to, at Max-Gain Systems, Inc.’s sole discretion, replacement of the defective component or replacement of the product, or refund of price paid for the product.

The warranties and remedies provided above are exclusive and in lieu of all other express or implied warranties including, but not limited to, the implied warranties of merchantability or fitness for a particular purpose. Certain jurisdictions do not allow the exclusion of implied warranties. If laws under such jurisdictions apply, then all express and implied warranties are limited to the warranty period identified above. Unless provided herein, any statements or representations made by any other person or firm are void. Except as provided in this written limited warranty and to the extent permitted by law, neither Max-Gain Systems, Inc., or any affiliates shall be liable for any loss, inconvenience, or damage, including, but not limited to direct, special, incidental, or consequential damages, resulting from the use or inability to use any Max-Gain Systems, Inc. product, whether resulting from breach of warranty or any other legal theory.

Notwithstanding the foregoing, Max-Gain Systems, Inc.’s total liability for any and all claims under this limited warranty shall not exceed the price paid for the product. These limitations on potential liabilities have been an essential condition in setting the product price.