



EXPEDITION™ SERIES

Ranger™ Mast and Accessories Operator's Manual



The Will-Burt Company
169 S. Main Street
Orrville, OH 44667

www.willburt.com

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Expedition Series® Ranger Mast® Ranger Pack® Warranty

Will-Burt warrants its Expedition Series® Ranger Mast® Ranger Pack® masts to be free from defects in material and workmanship for a period of two (2) years, with such time period running from the date of shipment by Will-Burt. Will-Burt shall not be responsible for any damage resulting to or caused by its products by reason of failure to properly install, maintain or store the product; use of the product in a manner inconsistent with its design; unauthorized service, alteration of products, neglect, abuse, accident, or acts of God,. This warranty does not extend to any component parts not manufactured by Will-Burt; provided, however, Will-Burt's warranty herein shall not limit any warranties by manufacturers of component parts which extend to the buyer.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, AND NO REPRESENTATIONS, GUARANTEES OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, A WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT ARE MADE BY WILL-BURT IN CONNECTION WITH THE MANUFACTURE OR SALE OF ITS PRODUCTS. NO EMPLOYEE, DISTRIBUTOR, OR REPRESENTATIVE IS AUTHORIZED TO CHANGE THIS WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY ON BEHALF OF WILL-BURT.

Claims for defects in material and workmanship shall be made in writing to Will-Burt within thirty (30) days of the discovery of defect. Failure to provide notice as required hereby shall be conclusive evidence that the product was in conformity with the warranty, and Will-Burt shall be released from any and all liability relating to the product. Will-Burt may either send a service representative or have the product returned to its factory at Buyer's expense for inspection. If judged by Will-Burt to be defective in material or workmanship, the product will be replaced or repaired at the option of Will-Burt, free from all charges except authorized transportation.

THE REMEDIES OF BUYER SET FORTH HEREIN ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER REMEDIES. THE LIABILITY OF WILL-BURT WHETHER IN CONTRACT, TORT, UNDER ANY WARRANTY, OR OTHERWISE, SHALL NOT EXTEND BEYOND ITS OBLIGATION TO REPAIR OR REPLACE, AT ITS OPTION, ANY PRODUCT OR PART FOUND BY WILL-BURT TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP. WILL-BURT SHALL NOT BE LIABLE FOR COST OF INSTALLATION AND/OR REMOVAL, OR BE RESPONSIBLE FOR DIRECT, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE.

Document History

Version	Date	Remarks
TP-4549901-00	10/4/10	Original Release
TP-4549901-A	2/15/11	Added reference to replacement kits (Section 4.2)
TP-4549901-B	4-6-11	Change to a caution and to step 39.
TP-4549901-C	4-26-11	Added Staging Guy Lines.
TP-4549901-D	5-8-12	Added cable weight note and height to stage guy lines.
TP-4549901-E	12-3-13	Updated warranty page.
TP-4549901-F	2-2-17	Formatting updates.

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1 Introduction

Will-Burt's Expedition Series masts are portable, field-erected masts available in Ranger™ and Ranger Pack™ models. They are a fast and easy solution for elevating a variety of payloads, including lighting, cameras and antennas. The masts are lightweight and can be manually transported and deployed by one, two, or three people.

This manual describes the installation, removal, and maintenance of the Ranger™ mast and accessories. The tube diameters of the masts are different; however, both masts operate the same. The Ranger™ is available in 2" diameter and maximum height of 60 feet. The Ranger™ will be referenced as the "mast" in the remainder of this manual. The Ranger Pack™ model is described in a separate manual.

By adding accessories, the mast can be configured with 2, 3, or 4 arms in 6, 12, 24, or 36" lengths. Optional payload adapters offered are the bolster plate, cup Holder, NATO plate, and the blank plate. Figure 1-1 shows the mast parts. Figure 1-2 shows mast accessories.



Bag	QTY	Description
Guy Bag	8	Guy Line Stakes
	4	Guy Ropes
	1	Guy Stub
	1	Lift Puck
	1	Hammer
Tube Bag	2	Section tubes for 12'
	3	Section tubes for 16'
	4	Section tubes for 20'
	5	Section tubes for 24'
	6	Section tubes for 28'
	7	Section tubes for 32'
	8	Section tubes for 36'
	9	Section tubes for 40'
	10	Section tubes for 44'
	11	Section tubes for 48'
	12	Section tubes for 52'
	13	Section tubes for 56'
	14	Section tubes for 60'
	Short Bag	4
1		Tripod Step
1		Manual (TP-4549901-A)
Long Bag		Empty
Wheeled Bag	1	Guy Accessory Bag
	1	Long Accessory Bag
	1	Tube Accessory Bag
	1	Short Accessory Bag
	1	Tripod
	1	Base Tube
	1	Top Tube

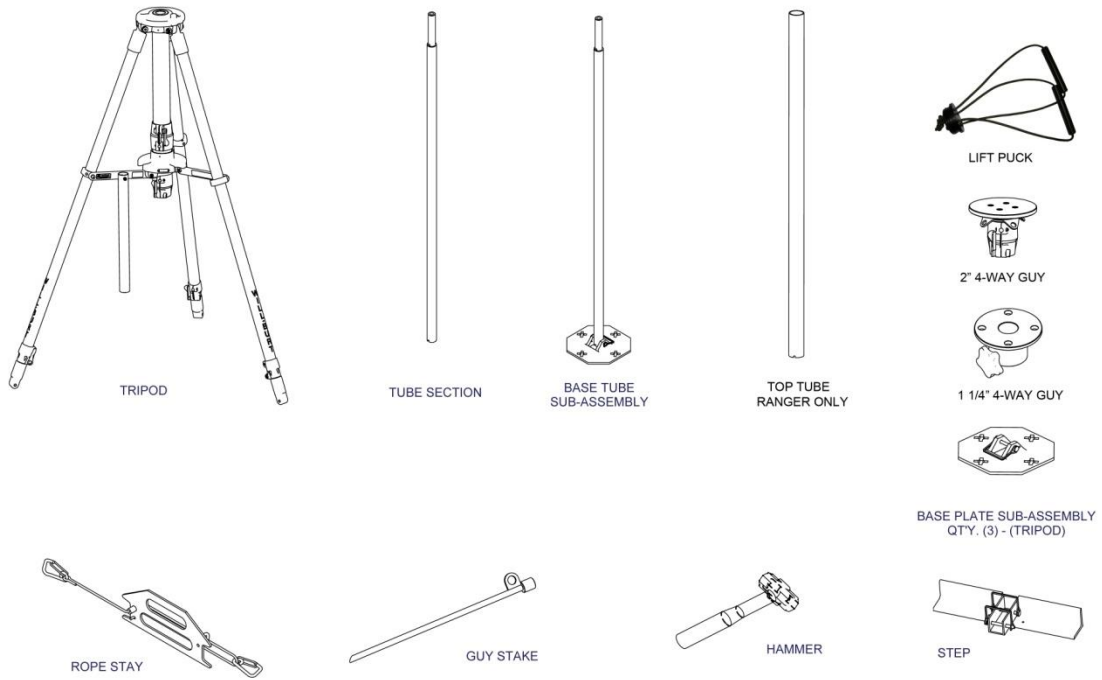


Figure 1-1 Mast Parts



Figure 1-2 Accessories

1.1 Safety Precautions

Per the ANSI Z535.4 standard, the following signal words and definitions are used to indicate hazardous situations:

 **DANGER**

DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

 **WARNING**

WARNING indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

 **CAUTION**

CAUTION indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It is also used to alert against unsafe practices.

Throughout this document safety precautions that are related to specific procedures appear in this publication for emphasis. These are recommended precautions that personnel must understand and apply during specific phases of installation, operation and maintenance.

 **CAUTION**

Lifting Hazard! In the UK, all lifting equipment must be thoroughly examined annually by a competent person according to the Lifting Operations and Lift Equipment Regulations 1998. Equivalent regulations exist in other EU states.

 **CAUTION**

Safety Instruction – Follow Procedure! Failure to follow drain kit installation instructions could damage the mast and render the mast inoperable. Read and understand the installation instructions before installing the drain kit.

 **WARNING**

Do not deploy the mast if power lines are less than 80 ft. (24.4 m) from the center of the deployment site.

 **WARNING**

Be mindful of buried cables when staking the mast.

 **WARNING**

Use ground stakes to secure tripod and mast.

 **WARNING**

Do not attempt to deploy the mast on soft or loose soil. The base plate and guy stakes could become unstable under wind loading and cause the mast to fall.

 **WARNING**

Do not attempt to deploy or retrieve this mast during electrical storms or when winds exceed 20 mph.

Helmets or hard hats, eye protection, gloves, and safety shoes or combat boots must be worn while working in the mast deployment area.

 **WARNING**

Do not attempt to deploy the tripod on ground that slopes more than 2 degrees.

The mast must be vertical before deployment. Adjust guy lines as required until the bubble level indicates the mast is vertical.

 **WARNING**

Always observe weight lift limits.

 **WARNING**

Read all instructions before deploying this mast. Always follow guystake removal instructions to avoid injury and/or guystake damage.

⚠ WARNING

Tip Over Hazard! Mast tip over could result in death or serious injury. Do not operate in high winds. Operate on level ground only. Stand clear of mast and mast payload during operation. Be certain that the mast is level and secure before and during installation, operation and maintenance.

⚠ WARNING

Safety Instruction - Trained Personnel Only! Death or serious injury could result if proper inspection, installation, operation and maintenance procedures are not observed. Installation, operation and maintenance to be performed by trained and authorized personnel only. Proper eye protection should be worn when servicing the mast.

⚠ WARNING

Pinch Point Hazard! Moving parts can crush and cut resulting in death or serious injury. Keep clear of moving parts while operating mast.

⚠ WARNING

Relocation Hazard! Relocating the mast during operation or after extension could result in death or serious injury. Do not relocate the mast during operation or while extended.

⚠ WARNING

Lifting Hazard! The mast is intended to lift a specific payload for lighting, surveillance or communication use only. Any other use without written consent is prohibited and could cause death or serious injury. Do not exceed specified payload capacity.

⚠ DANGER

Electrocution Hazard! Contact with high voltage will result in death or serious injury. Observe general safety precautions for handling equipment using high voltage. Do not locate or operate mast near electrical lines, cables or other unwanted sources of electricity. Do not operate mast in lightning. Be certain electrical cables are undamaged and properly terminated. Always disconnect power before performing service, repair or test operations.



2 Installing the Mast and Accessories

The maximum payload for the mast is 40 lbs total and 20 lbs maximum per arm. The payload weight should be evenly distributed between arms on the mast. For example, if you have 4 arms and a total payload of 40 lbs, place 10 lbs on each arm. Furthermore, payloads of 30 lbs and 8 lbs are not supported even though the total payload is 38 lbs since the maximum payload weight per arm is 20 lbs. The cable weight must be considered in the maximum payload weight. If the cable weight is significant, it may be possible to route the cable opposite the payload weight or to loosely wrap the cable around the tubes.

Do not deploy the mast in winds greater than 20 mph. For payload weights and wind sail areas outside website specified limits, contact the Will-Burt Company.

8 to 40 Foot Deployment

Depending on the payload weight and the current wind speeds at deployment, two or three people are required to raise an 8 to 40 foot mast. One person is typically required to load the mast tubes while one or two people manage the guy lines. Typically, single staking the tripod base plates is sufficient.

44 to 60 Foot Deployment

Depending on the payload weight and the current wind speeds at deployment, three to five people are required to raise a 44 to 60 foot tall mast. One or two people are required to load the mast tubes while two or three people manage the guy lines. Double staking the tripod base plates is required.

To install the mast and accessories, you will perform the following major tasks:

- Select a Level Site
- Begin Mast Installation
 - Unpack
 - Set Up the Tripod
 - Partially Raise the Tripod Legs
- Install the Top of the Mast
 - Insert the Top Tube
 - Install 4-way Guy Collar
 - Install Accessory Arm Collar and Guy Collar (for Accessories only)
 - Connect to Guy Collar
- Complete Tripod Installation
 - Fully Raise the Tripod Legs
 - Level the Tripod
 - Stake the Tripod
- Raise the Mast
 - Set Aside the Base Tube
 - Stake the Guy Lines
 - Stage Guy Lines
 - Breech Load Tubes
 - Install Base Tube
 - Stake the Base Plate
 - Tighten the Guy Lines

2.1 Select a Level Site

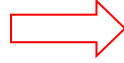
To ensure a safe installation:

1. For the base of the deployed tripod, select a site that has no more than a 2 degree slope.
2. Ensure that the center of the site, about a two foot square, is level and smooth. The center of the site is where the base tube for the mast will land later in the installation.
3. Ensure that the site has adequate overhead and ground clearances. The overhead clearance must be at least the height of the mast. The ground clearance must be a radius equal to the height of the mast. For example, for a 12 foot mast, ensure that the site has an overhead clearance of 12 feet and a clear radius of 12 feet from the center of the site.

2.2 Begin Mast Installation

Unpack

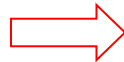
4. Unzip the wheeled bag and remove the tripod and base tube.



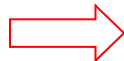
5. Open the guy bag.



6. Open the short bag.

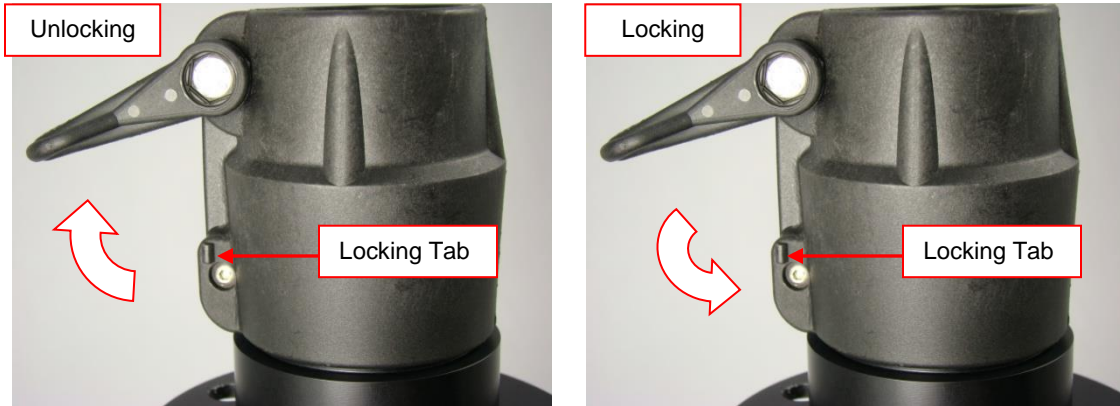


7. Open the tube bag.

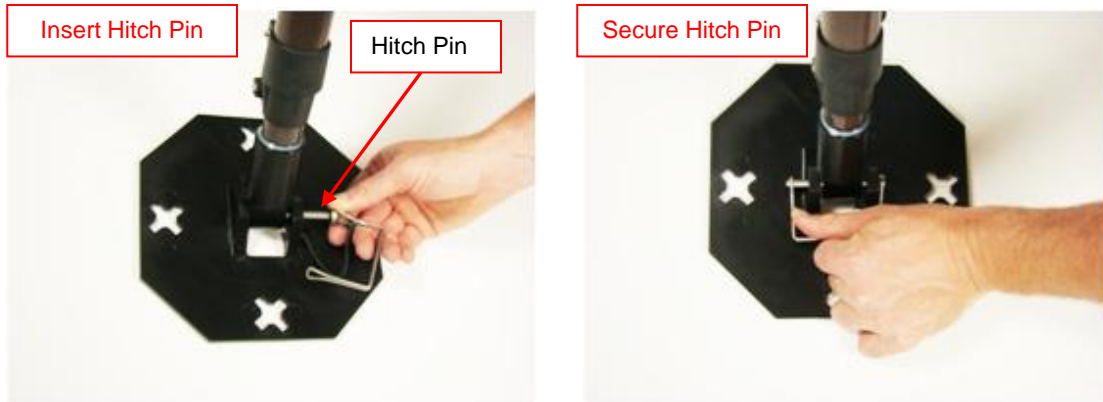


Set Up the Tripod

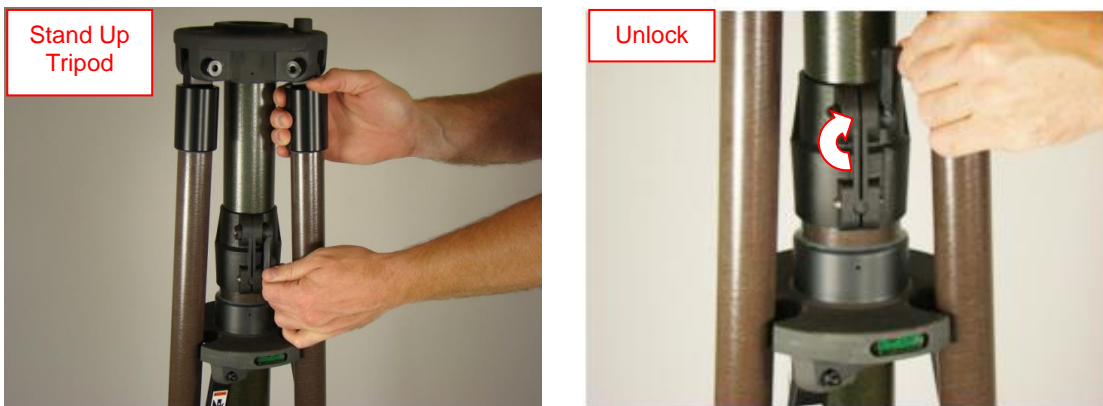
There are five clamps on the tripod. Three clamps are on the tripod legs and two clamps are in the center of the tripod. To unlock a clamp, push the lever towards the open position away from the locking tab. To lock a clamp, push the lever to the closed position and towards the locking tab. When locking a clamp, ensure that the lever locks into place on the tab. The clamps hold the weight of the mast and payload. See Section 4 to check that the clamps are sufficiently tight.



- Loosen the Velcro strap from around the tripod legs. With the tripod on the ground, attach three base plates to the three tripod legs by pushing the hitch pin through the leg and securing the other end.



- Lift the tripod and unlock the upper clamp. This unlocks the tripod.



- Open the tripod by pushing down on the center collar keeping fingers away from the pinch points. Push down on the collar until the collar hits the stop and the base plates are flat on the ground.



Partially Raise the Tripod Legs

- Partially raise the tripod leg to ensure that the tripod is at a comfortable working height for attaching any accessories and the payload in the later steps. With one person on each of the legs, unlock the leg clamp, step on the leg base, and lift the tripod until the tripod collar is about waist high. Lock the leg clamps.



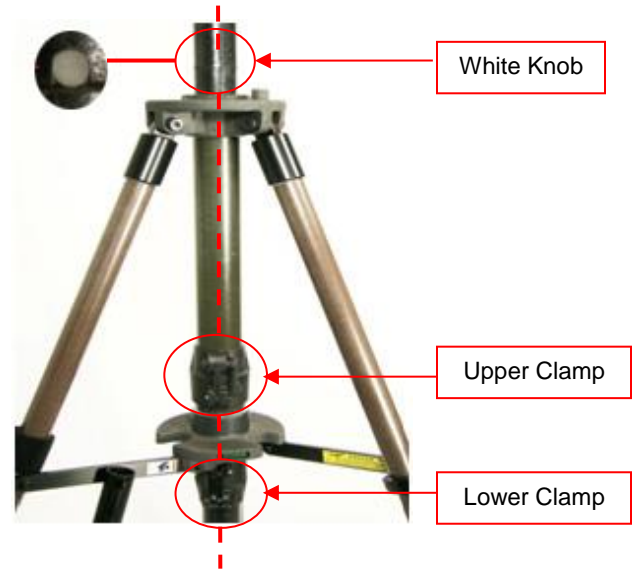
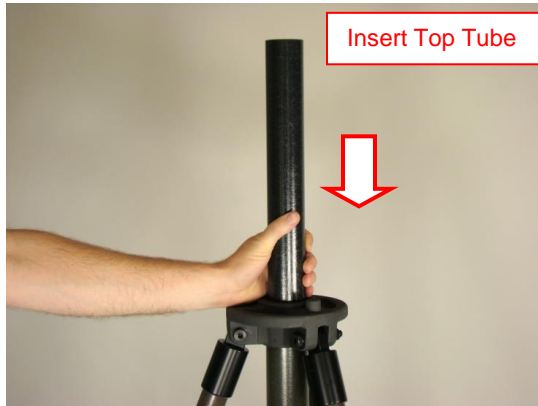
2.3 Install the Top of the Mast

Insert the Top Tube

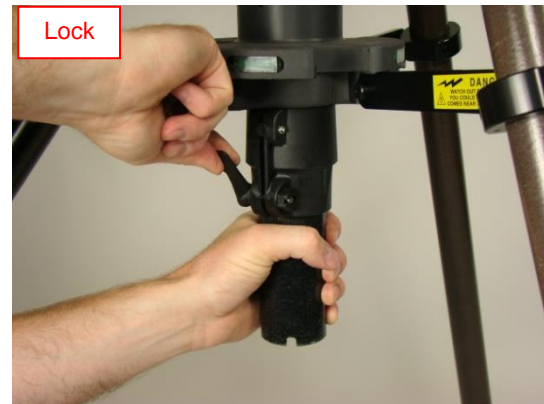
- Stand in the operator's quadrant. This area is next to the winch holder and in front of one of the levels. Lock the upper clamp. See Section 4 to check that the clamp is sufficiently tight. Unlock the lower clamp.



13. Retrieve the top tube (no tapered end (Figure 1-1)) from the tube bag. Insert the top tube from the top of the tripod. Ensure that the white knob, upper clamp, and lower clamp are in a straight line. See Section 4 to check that the clamps are sufficiently tight.



14. Lower the top tube until there is one hand width from the bottom of the tube and lock the lower clamp.



15. If installing accessories onto the mast, different collars and the accessories must be installed. Proceed as follows:

- If installing just the mast, continue with step 16.
- If installing the accessories along with the mast, got to step 19.

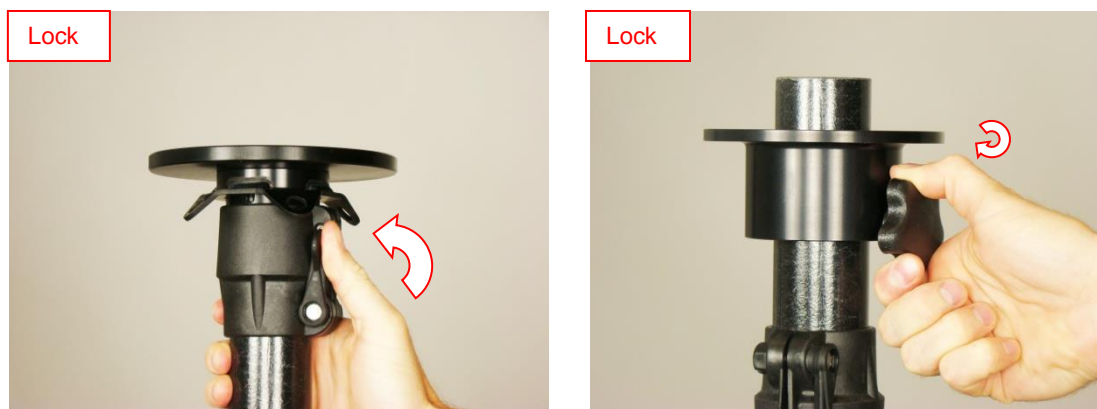
Install 4-way Guy Collar

16. Unlock the 4-way guy collar (2" or 1 ¼") and place the guy collar onto the top of the top tube. Connect the payload to the top of the payload stub. For payload weights and wind sail areas outside website specified limits, contact the Will-Burt company.



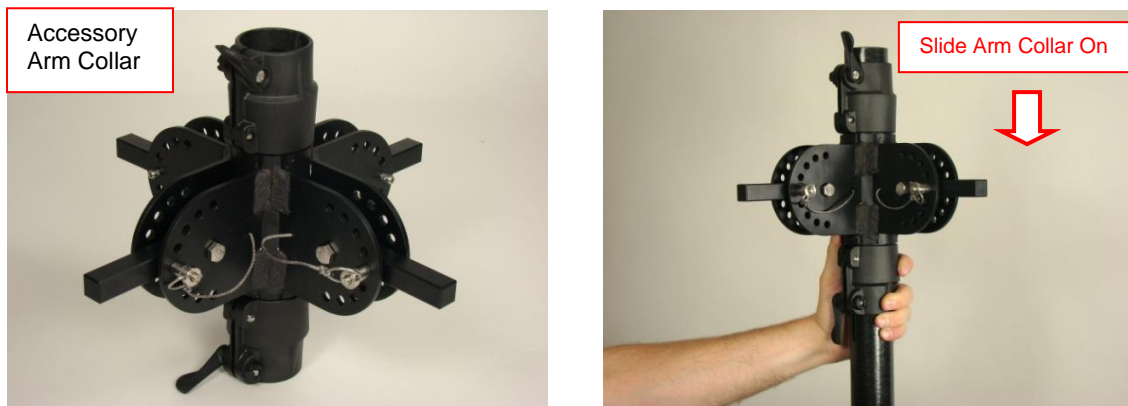
17. Rotate the guy collar so that the four guy lines will land on the ground where you want.

18. Lock the guy collar clamps. Go to step 28, since accessories are not going to be installed.

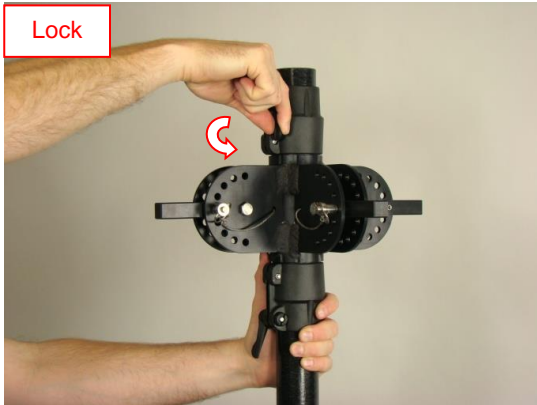


Install Accessory Arm Collar

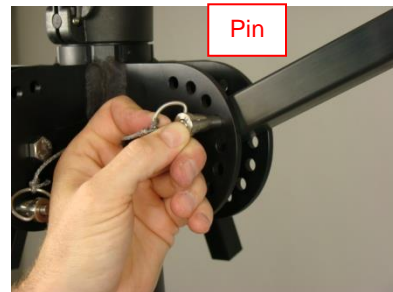
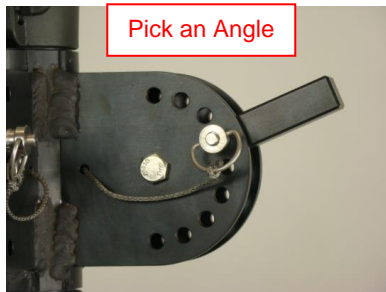
19. Slide the arm collar onto the top tube.



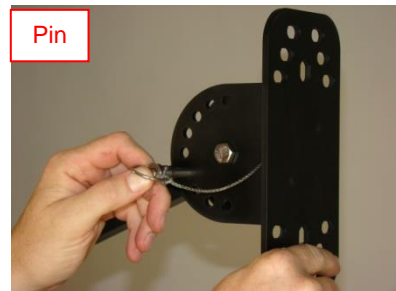
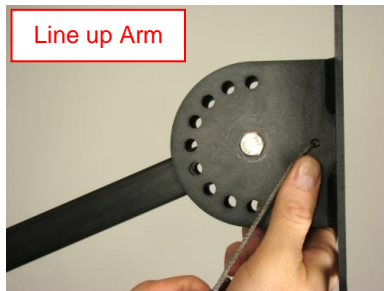
20. Lock the top and bottom clamps. See Section 4 to check that the clamps are sufficiently tight.



21. Pick an angle for the arm, line up the arm hole with the arm collar hole, and pin the arm in place by pressing the pin button.



22. Pick an angle for the payload adaptor, line up the arm hole with adapter hole, and pin the arm in place by pressing the pin button.



23. Connect the payload to the payload adapters. The payload weights (maximum of 40 lbs) should be distributed on multiple collar arms as much as possible. The maximum allowable weight per arm is 20 lbs. For payload weights and wind sail areas outside website specified limits, contact the Will-Burt company.

24. Repeat steps 21, 22, and 23 to add additional collar arms.

Install the Accessory Guy Collar

25. Unlock the top and bottom clamps of the accessory guy collar and place the guy collar onto the top of the top tube. If a second guy collar and lines are wanted for additional support, place both collars onto the top tube. The second guy collar, if used, can be tightened onto another tube as it is loaded. The payload can be attached above the guy collar. For payload weights and wind sail areas outside website specified limits, contact the Will-Burt company.

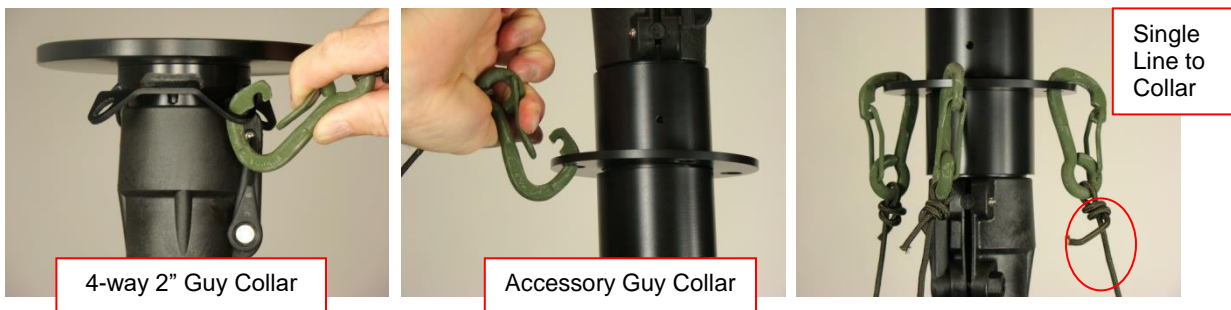


26. If using the rigid accessory guy collar, rotate the guy collar so that the four guy lines will land on the ground where you want. For the swivel guy collar, this is not needed since the guy plate swivels into any position.

27. Lock the top and bottom clamps.

Connect to Guy Collar

28. Remove the four guy line spools from the guy bag. Connect the single-line, hook ends from the bottom, to the four holes in the 4-way guy collar (1 ¼" or 2") or the accessory guy collar at 90 degree angles.



29. Let enough slack out of each guy line and place the spools on the ground about 10 feet from the center of the tripod in the general area where the stakes will be driven. Ensure that the lines are free of obstructions and snags. If you are raising the mast during windy conditions, the mast will need to be guyed as you raise the mast.

2.4 Complete Tripod Installation

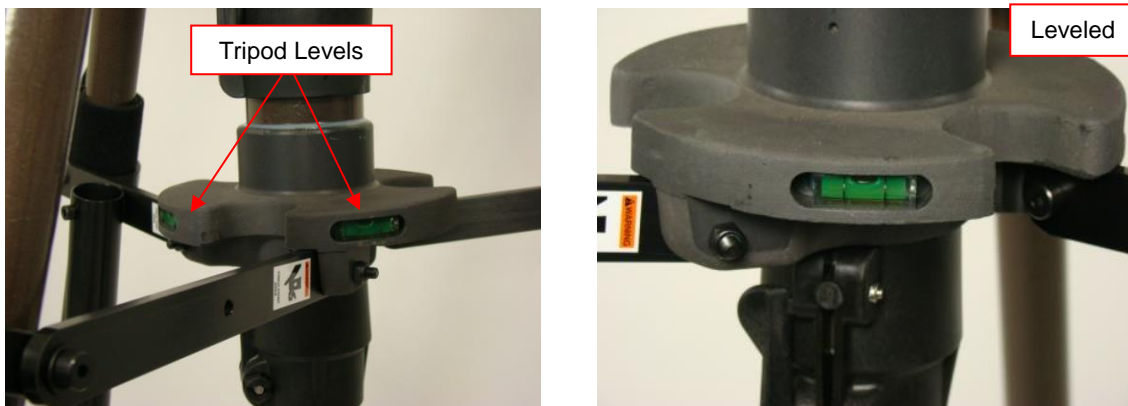
Fully Raise the Tripod Legs

30. As a team, unlock the leg clamps, step on the leg bases, and lift the tripod until the nested legs drop and are fully extended. Lock the leg clamps.



Level the Tripod

31. Check the front level. If the tripod is not level, unlock the one of the adjacent leg clamps and lower one of the legs. Relock the leg clamp.

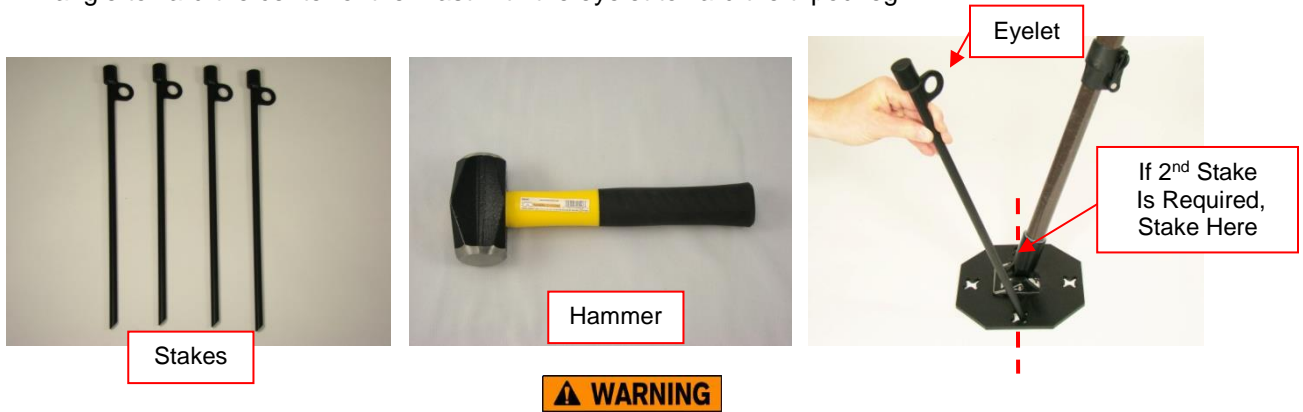


32. Check the side level. If the tripod is not level, unlock one of the adjacent leg clamps and lower one of the legs. Lock the leg clamp.

33. Check that all clamps on the mast are locked. There are three clamps on the legs, and two on the center of the tripod.

Stake the Tripod

34. Remove the stakes and hammer from the guy bag. For masts 8 to 40 foot tall and smaller payloads, one stake may be sufficient. For masts taller than 40 feet, two stakes are required on each tripod leg plate. Stake the base plates of each leg by driving a stake(s) in the two stake points aligned with the shaft of the hitch pin using the hammer. Stakes should be driven at an angle toward the center of the mast with the eyelet toward the tripod leg.



Be careful of buried cables and utilities when staking the mast.

2.5 Raise the Mast

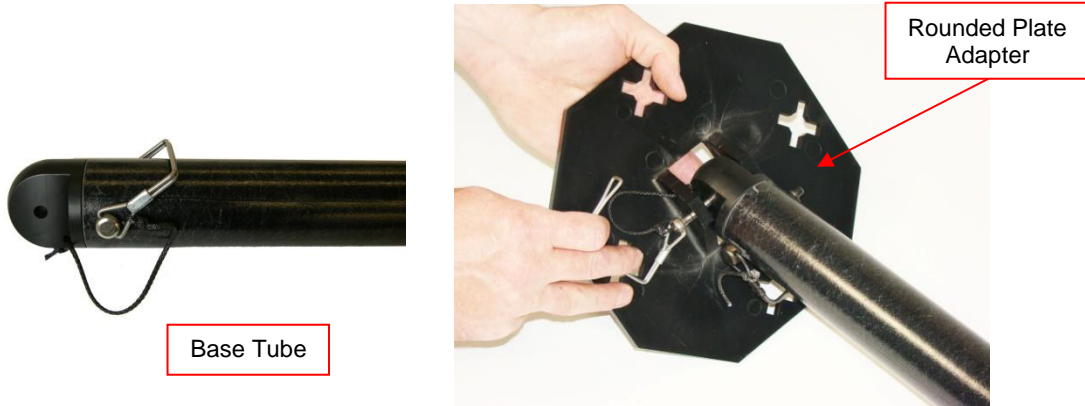
Currently you have installed the tripod and connected the guy lines to the guy collar. Figure 2-1 shows the progress on the installation of a mast with one accessory arm. Now you will breach load the remaining tubes, which raises the mast. The last tube installed is the base tube that will have a plate at the bottom.



Figure 2-1 Installation Progress

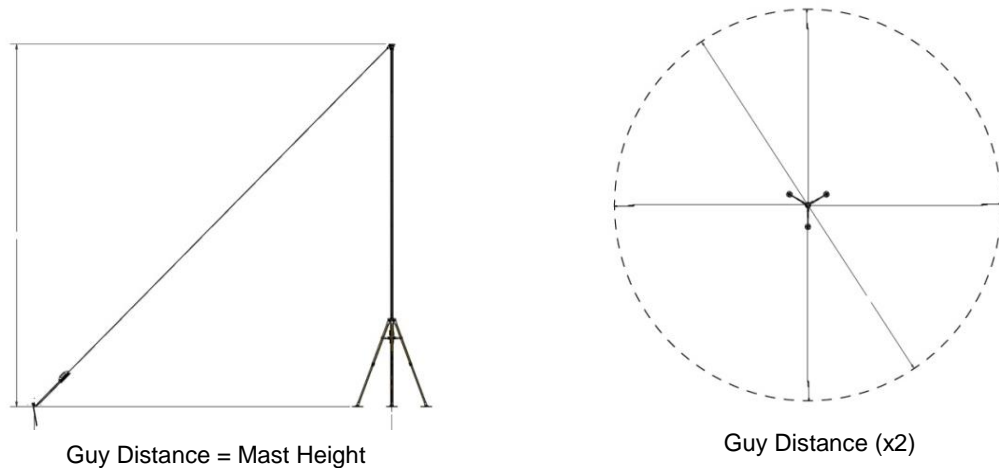
Set Aside the Base Tube

35. So that the base tube does not get confused with the other mast tubes, it is best to place the plate on the base tube now. The base tube has the rounded plate adapter at the bottom. Locate the base tube and place a base plate on the bottom. Set this tube off to the side, it will be installed last.



Stake the Guy Lines

36. Align the guy stakes to coincide with the four holes on the guy collar on the top of the mast (not required to align for the swivel collar since it automatically adjusts to the stakes). Place the stakes 90 degrees apart.
37. If possible, drive the stakes a distance equal to the mast height from the center of the mast.



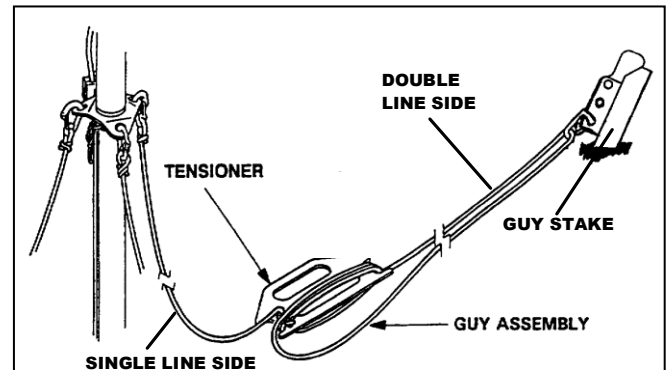
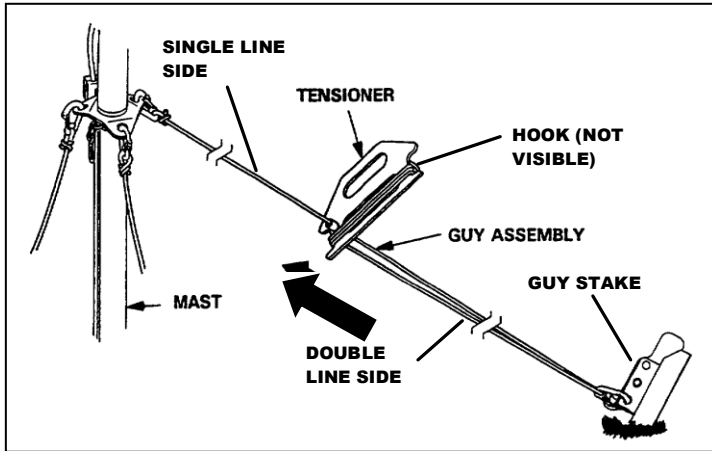
38. Drive each stake, with the hammer provided, into the ground at a 45 degree angle away from the tripod. Ensure that the stake is driven into the ground up to the eyelet of the stake and that the eyelet is facing the tripod.



39. Clip the carabineer of each of the tensioners to the ring of the guy stake.

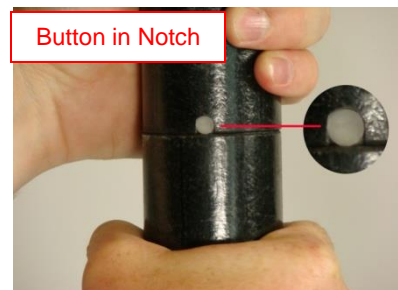
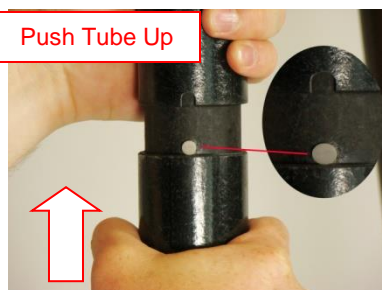
Stage the Guy Lines

40. For masts near maximum payloads and for masts 44' to 60' tall, prepare the guy lines for a tube to be breach loaded by loosening a maximum of five feet (1.5 meters) of guy line from each tensioner.



Breach Load Tubes

41. Place a tube (but not the base tube) into the bottom with white button up and aligned with the notch in the other tube.



42. While holding onto the tube just loaded, unlock the lower clamp, push the tube up until only a hand's length is visible, then lock the lower clamp. The puck can also be used to push up the tubes. Repeat steps 40 and 42, until all tubes are breech loaded.

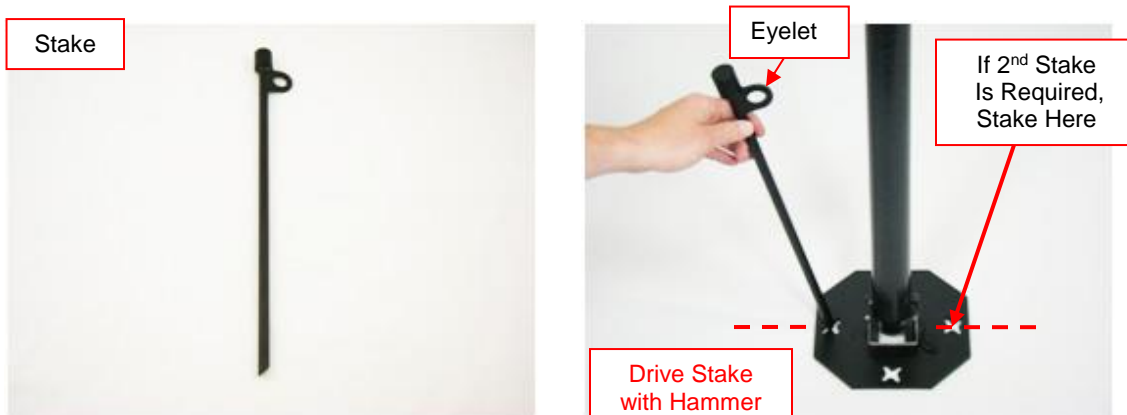
Install Base Tube

43. Place the base tube (tube with the base plate attached) into the bottom tube with the white button up and in the notch in the other tube. Raise the base tube until the white button seats in the notch. While holding onto the base tube, unlock the lower clamp and slowly allow the mast tubes and base tube to lower and rest level on the ground. Lock the lower clamp.



Stake the Base Plate

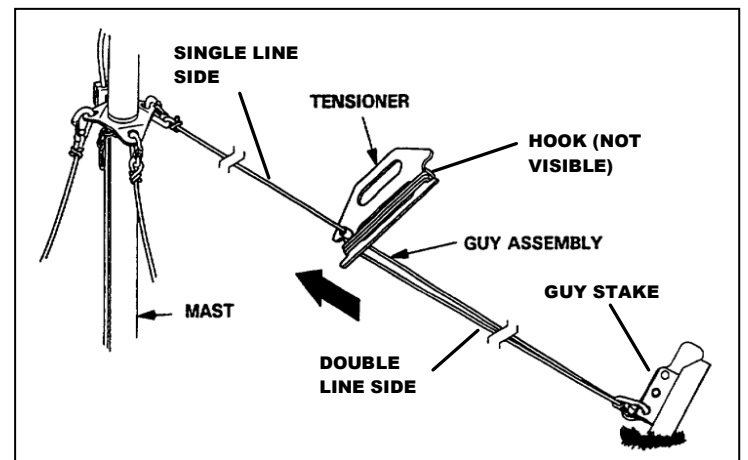
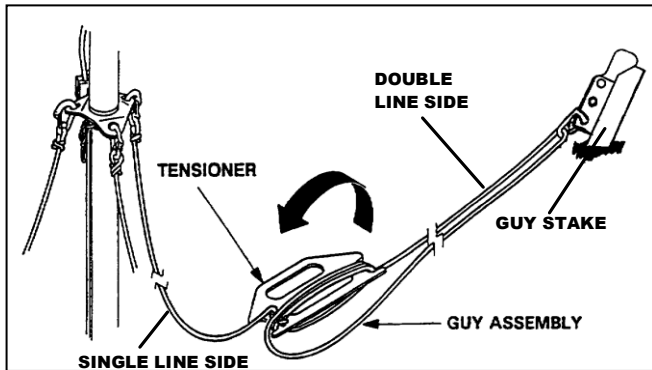
44. Stake the base plate of the base tube by driving the stake, with the hammer provided, at a point aligned with the shaft of the hitch pin. The stake should be driven at an angle toward the center of the mast. For masts 8 to 40 foot tall and smaller payloads, one stake may be sufficient. For masts taller than 40 feet, two stakes are required, depending on the soil type.



Tighten the Guy Lines

When tightening the guy lines, do not over-tighten the guy lines. Tighten the lines to the point that the mast is stabilized, sway is minimized, and the mast is stable during winds. Over-tightening the guy wires causes an additional or unlevel load on the mast and reduces the overall load capacity of the mast.

45. Ensure that guy line attached to the stake coincides with the aligned hole in guy collar on top the mast.
46. Ensure that none of the guy lines are crossed.
47. Tension the lines by sliding the tensioner toward the mast and lock it into position by placing the tensioner hook over the double guy line.



48. Check that the center mast tube remains straight and perpendicular.



3 Disassembling the Mast

To disassemble the mast, proceed as follows:

1. Slightly loosen the guy ropes to relieve any tension or binding that may exist between the mast tubes.
2. After making certain that the lock of the lower clamps is unlocked, lift up on the base tube enough to allow it to be removed. Lock the lower clamp of the tripod onto the next tube of the mast. Remove the base tube.
3. While holding the exposed portion of the tube (locked by the lower clamp), unlock the lower clamp and ease the tube down to where the tube is free from the lower clamp. Allow the next tube to slowly lower until it enters the lower clamp and a hands-width of tube is exposed. Lock the lower clamp and remove the free tube from under the tripod.
4. If accessories are installed on the tube, disassemble the accessories and place in the bags.
5. Repeat steps 3 and 4 for the remaining tubes until all the tubes have been removed (except for the top tube). Place the tubes in the tube bag.
6. Remove the ground stakes from the tripod base plate and place them in the guy bag.
7. Unlock the tripod legs and allow the legs to retract within themselves, bringing the mast to a comfortable working height.
8. Detach the guy line hooks from the guy collar on the top tube.
9. Detach the guy line hooks from the stakes. Wind the guy line around the tensioner. Remove the stakes. Place the guy lines and stakes in the guy bag.
10. Remove the 4-way guy collar or the accessory guy collar from the top tube and place the guy collar and top tube in a bag.
11. Unlock the upper clamp on the transport and fold up the tripod.
12. Remove the base plates from the tripod. Place the tripod and base plates in a bag.



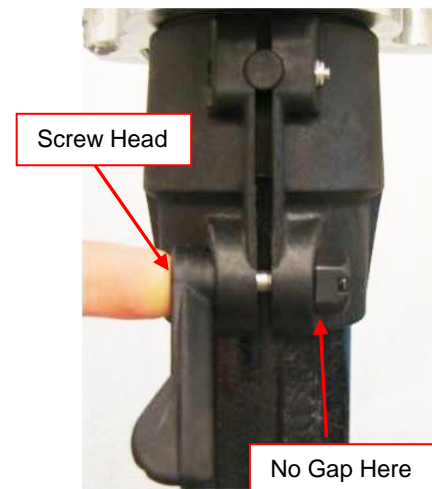
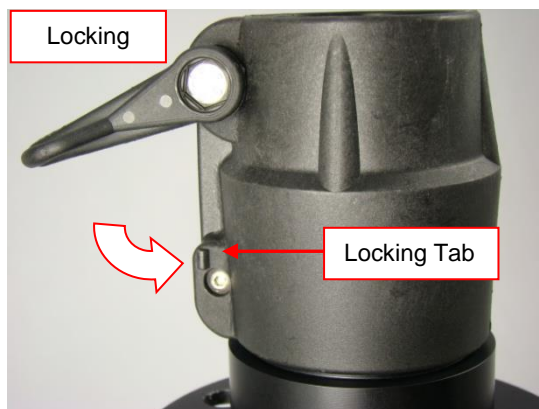
4 Maintenance

To maintain the mast and accessories, perform the following checks on a regular basis:

- Inspect nuts and bolts.
- Inspect all clamps for cracks or uneven wear.
- Inspect all clamps for tightness when locked.
- Inspect the tripod for uneven wear.
- Inspect all guy lines for frayed or cut lines.
- Inspect all guy handles for cracks or tears
- Inspect base plates for tears
- Wipe down all parts with a cloth

4.1 Checking and Adjusting Clamp Tightness

1. The tube clamps hold the weight of the mast and payload. It is very important that the clamps are sufficiently tight. This section describes the steps to follow to ensure that the clamps are sufficiently tight and how to tighten if necessary.
2. Before checking for proper tightness, load a mast tube of the same outer diameter into the clamp.
3. Lock the clamp and ensure that the lever locks onto the locking tab. Check that the screw head is fully nested in the back of the hexagon hole of the clamp lever. Ensure that there are no visible gaps between the clamp housing and nut.



4. To ensure that the clamp is tight, by hand, turn the nut in the “+” direction shown on the nut. The clamp is tight when the nut cannot be tightened further by hand. Do not use tools to tighten. Oscillate the lever to ensure tightness. The correct tightness should have minimum movement from side to side. Do not rely on the notch of the nut to mark the fully tight orientation of the clamp.



5. Occasionally, unlocking and locking a clamp causes the screw head to better seat in the clamp. Unlock the clamp then repeat steps 3 and 4 to lock and check for proper tightness.

4.2 Replacement Kits

To replace the white pins on the tubes and the levers on the clamps, the following two kits are available:

- Indicator Pin Replacement Kit (P/N 4592101)
- Friction Lock Lever Kit (P/N 4494901)