

190-5xx

User Manual

190-505 Tripod, 3 foot

190-510 Tripod, 5 foot

190-520 Tripod, 10 foot



190-505 Tripod (3')



190-510 Tripod (5')



190-520 Tripod (10')

Phone (530) 823-7185

Email nova@novalynx.com **Website** www.novalynx.com

Receiving and Unpacking

Carefully unpack all components and compare to the packing list. Notify NovaLynx Corporation immediately concerning any discrepancy. Inspect equipment to detect any damage that may have occurred during shipment. In the event of damage, any claim for loss must be filed immediately with the carrier by the consignee. Damages to equipment sent via Parcel Post or UPS require the consignee to contact NovaLynx Corporation for instructions.

Returns

If equipment is to be returned to the factory for any reason, call NovaLynx between 8:00 a.m. and 4:00 p.m. Pacific Time to request a Return Authorization Number (RA#). Include with the returned equipment a description of the problem and the name, address, and daytime phone number of the sender. Carefully pack the equipment to prevent damage or additional damage during the return shipment. Call NovaLynx for packing instructions in the case of delicate or sensitive items. If packing facilities are not available take the equipment to the nearest Post Office, UPS, or other freight service and obtain assistance with the packaging. Please write the RA# on the outside of the box.

Warranty

NovaLynx Corporation warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from the date of shipment from the factory. NovaLynx Corporation's obligations under this warranty are limited to, at NovaLynx's option: (i) replacing; or (ii) repairing; any product determined to be defective. In no case shall NovaLynx Corporation's liability exceed product's original purchase price. This warranty does not apply to any equipment that has been repaired or altered, except by NovaLynx Corporation, or that has been subjected to misuse, negligence, or accident. It is expressly agreed that this warranty will be in lieu of all warranties of fitness and in lieu of the warranty of merchantability.

Address

NovaLynx Corporation
431 Crown Point Circle, Suite 120
Grass Valley, CA 95945-9531 USA
Phone: (530) 823-7185
Email: nova@novalynx.com
Website: www.novalynx.com

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1 FORWARD

Thank you for purchasing NovaLynx products. NovaLynx has been designing and manufacturing weather instruments since 1988. NovaLynx represents several well-known brands of quality manufacturers, including Gill Instruments, RM Young, Kipp & Zonen, and Vaisala. It is our hope that our products will meet all your monitoring requirements.

2 INTRODUCTION

NovaLynx tripods are suitable for temporary or permanent installations to support weather monitoring instruments. These tripods may be ground-mounted or secured to the top of a building. Each tripod accommodates masts up to 1.75" (44.5mm) in diameter. Masts of various lengths are available to reach the desired height. For tall installations, guy wire kits are available to ensure the tripod is stable even in windy conditions. NovaLynx offers lightning rods and earth-grounding kits for lightning protection.

3 SAFETY PRECAUTIONS

WARNING – NEVER WORK ON OR NEAR THE TRIPOD WHEN THERE IS ANY POSSIBILITY OF A STORM THAT MAY CAUSE LIGHTNING.

WARNING – DO NOT INSTALL THE TRIPOD NEAR OVERHEAD POWER LINES TO AVOID ELECTRICAL SHOCK.

WARNING – DISCONNECT ANY POWER SOURCES THAT MAY BE CONNECTED TO THE INSTRUMENTS ON THE TRIPOD BEFORE WORKING ON OR NEAR THE TRIPOD.

WARNING – DO NOT LEAN A LADDER AGAINST THE TRIPOD AS BOTH MAY TIP OVER CAUSING INJURY.

WARNING – DO NOT DRILL HOLES IN THE TRIPOD OR MAST FOR MOUNTING PURPOSES. INSTEAD, USE SUITABLE CLAMPS TO SECURE CROSSARMS OR INSTRUMENTS TO THE MAST OR LEGS OF THE TRIPOD. DRILLING HOLES WEAKENS THE STRUCTURE AND MAY ALLOW CORROSION LEADING TO FAILURE OF THE TRIPOD OR MAST.

WARNING – MODEL 190-520 INCLUDES RUNGS FOR CLIMBING ON ONE SIDE OF THE TRIPOD. THE BUYER ASSUMES ALL RISK WHEN CLIMBING THE TRIPOD OR ALLOWING OTHERS TO DO SO.

WARNING - SEE ADDITIONAL PRECAUTIONS FOR RAISING AND LOWERING THE TRIPOD (SECTION 6.1)

4 SITE SELECTION

The tripod may be mounted at ground level or on the top of a building if it is safe to do so. In either case, verify that the proposed site does not have any overhead electrical lines within the "fall line" of the tripod/mast assembly. If the tripod/mast assembly will require guy wires for stability, make sure

that there are at least three locations at 120° angles from the center of the tripod, at an appropriate radius (typically 80% of tower height), for anchoring the guy wires. The area below the tripod should be level and free of debris, and consist of a material firm enough to support the weight of the tripod legs.

5 DYNAMIC EFFECTS

A good installation will take into account the fact that conditions change over time, so a system must be designed to survive "worst case" scenarios. This applies to all installations, even temporary ones.

- Balance** The tripod base must be on a horizontal surface so that the mast is as close to vertical as possible. The equipment attached to the mast should be distributed around the mast to maintain the balance as much as is practical. Often side booms are attached to extend sensors away from other instruments. If the weight on the end of the boom is significant then measures must be taken to counter the effect. It may be necessary to include guy wires to stabilize the mast.
- Wind Load** Each piece of equipment mounted on the tripod or mast blocks the wind to some degree depending on the cross-section facing the wind. Items like solar panels can have a large cross-section in one direction and a small cross-section in another. Furthermore, the higher the object is on the mast the more "leverage" it has against the base of the tripod. For these reasons, items with large wind cross-sections should be mounted as low as practical on the tripod/mast.
- Flutter** Items that are not securely mounted may begin to oscillate in the wind, loosening mounting hardware or causing metal fatigue that could lead to failure. It may be necessary to add braces to stiffen mounting arms that are not adequate for the conditions in your area.
- Oscillation** The vertical mast is flexible to some degree, so it is possible to set it in periodic motion similar to an inverted pendulum. This motion can quickly destroy the mast, so it must be prevented in the design of the system:
1. Keep the mast as short as possible for the needs of the application.
 2. Choose an appropriate mast. Masts with larger diameter / thicker cross section will be stiffer and less likely to oscillate.
 3. Make sure the base of the mast is firmly clamped by the tripod.
 4. Install guy wires if needed and in any case where the mast extends 10' above the tripod.
- Support** The surface on which the tripod is mounted is very important and its quality can change over time. For instance, if the tripod is temporarily mounted on a dirt base and there is rain, the dirt will soften and the tripod may tip over. If mounted on a wood structure, the

wood may deteriorate so that the mounting bolts loosen or pull out. Regular inspections should include making sure the support structure under the tripod is in good condition.

6 INSTALLATION

Even temporary installations must be planned carefully to ensure that the tripod will be stable once the mast and weather monitoring equipment is installed. The following are general guidelines and suggestions. It is up to the installer to determine the suitability of the method and materials for a particular application.

Be careful while opening the tripod to avoid pinching your fingers! As the legs are spread outwards the central brace beams will unfold until they are horizontal. After opening the tripod, rotate each foot until the flat part with the mounting holes is horizontal. Use a rubber mallet or piece of soft wood to tap the braces and feet into alignment.

The 190-520 Tripod (10') requires additional assembly to attach the braces and ladder rungs that are part of the kit. Once assembled it cannot be re-folded unless these parts are removed.

Two mast mounting collars clamp the mast securely to the tripod. Each collar should have three bolts, with two nuts each. Back off each bolt and test-fit one section of the mast in the tripod. Tighten the bolts evenly so that the mast is centered in the holders. If the tripod is on level ground the mast will be vertical at this point. After installation, the bolts may need to be re-positioned to adjust the mast to vertical.



6.1 Orientation

The placement of the legs is often only a matter of convenience, but there are exceptions where planning is definitely called for. Please review Equipment Mounting (Section 9) to plan the arrangement of items that will be attached to the structure, as this may affect your choice for orienting the legs of the tripod.

The 190-520 Tripod (10') has a built-in ladder, so it is important that the side where the ladder goes has easy access and clearance for the person using it. There should be no equipment mounted to the ladder area, and cables should not be fastened where they could entangle the climber.

In some cases it may be necessary to tilt the tripod/mast down to install or service the equipment mounted on it. The placement of the legs will determine which direction the tripod can be tipped. The 190-505 (3') and 190-510 (5') model tripods have two feet that are oriented parallel so that the tripod can be tipped while these two feet are still fastened down. Obviously, the area where the tripod will lay when tilted down must be free of obstructions.

WARNING – TAKE ADEQUATE PRECAUTIONS WHILE RAISING OR LOWERING THE TRIPOD

- 1) Get enough help to do the job safely. Do not attempt it single-handed in case of accident.
- 2) Make sure the two feet that will pivot the tripod are securely fastened. BE SURE THE RIVETS THAT HOLD THE FEET TO THE LEGS ARE IN GOOD CONDITION.
- 3) Check all cables to ensure that they will pivot with the tripod as it is raised or lowered.
- 4) Attach a rope to the opposite side to control the descending mast, being aware that as the mast gets lower there will be increasing tension on this rope and less control from this location.
- 5) Do not allow anyone to stand in the area where the equipment will land if things get out of control.

6.2 Ground Level Mounting

6.2.1 Temporary installations

Unless the tripod/mast assembly is very short and has a very low wind cross-section, it is advisable to either bolt down the legs or add weight to them to keep the tripod stable. A simple solution is to obtain a wood shipping pallet and bolt the tripod to it. If additional weight is needed it can be loaded onto the pallet.

If the tripod must be moved and re-installed frequently, consider purchasing the 190-210R Tripod Guy Kit with Stake (3 foot and 5 foot tripods only). The spiral stake is screwed into the ground below the center of the tripod, and the ratcheting tie-down tool is connected between the stake and a hook on the tripod. Once the slack is taken up the tripod is held firmly to the ground (Appendix D).

6.2.2 Permanent installations

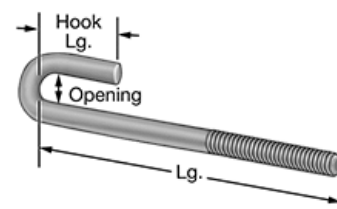
Permanent installation methods include bolting the tripod to a suitable wooden structure, or pouring cement for use as a base.

Wood Base Use pressure-treated lumber or out-door decking material for building a platform with enough stability to support the tripod. You may wish to make the platform large enough to stand on while working around the tripod. Use suitable lag screws to secure the tripod's feet to the deck.

Pour in-place Spread a layer of gravel to create a level surface for the tripod. Set up the tripod with at least one section of the mast, and use a carpenter's level to ensure the mast is vertical. Build a form around the tripod using 2x4 lumber. Fill the mold with cement and trowel it smooth around the legs of the tripod. Allow the cement to cure.

Bolt in-place The center hole of each foot on the 190-505 (3' tripod) is 0.4"Ø, which will accommodate a 3/8" J-Hook. Obtain three J-Hook anchors for wet concrete of suitable length, along with nuts and washers. Attach one J-Hook to each foot with the hook end facing down. The bolt

Steel J-Hook Anchors for Wet Concrete



holes on 190-510 (5' tripod) feet are all 0.32" and will require smaller J-Hooks, or the holes will need to be enlarged.

Prepare the area where the cement is to be poured using gravel to level the surface and a wood form to contain the cement.

Expand the tripod and install one mast section as described above. Set up the tripod over the prepared area so that the feet of the tripod are above the top level of the form. Use a carpenter's level to ensure the mast is vertical. The tripod will hold the J-Hooks in the correct locations while the cement is poured. Be sure to agitate the wet cement around each J-Hook to remove air pockets. Trowel the cement smooth and allow it to cure. Once cured, re-position the tripod so that the feet are sitting on the surface of the cement and the nuts are tightened securely.

6.3 Roof Mounting

NovaLynx recommends hiring a licensed contractor for roof mount installations. The contractor will be able to recommend the appropriate materials and hardware for installation, along with ensuring the installation does not cause other problems such as rainwater leaks.

An important consideration of any roof mount installation is lightning protection. The tripod must be earth grounded, and all equipment mounted on the tripod must also be earth grounded in accordance with the manufacturer's recommendations. Be sure to check local building codes while planning your installation.

7 GUY WIRES FOR ADDED STABILITY

Guy wires are typically used to ensure that high winds do not topple the tripod or cause the mast to oscillate which could lead to failure of the mast.

NovaLynx tripod guy kits include a 3-way mast clamp which is secured near the top of the mast. Three guy wires are attached to the clamp and extend down toward anchors (sold separately) which are arranged around the tripod. Turnbuckles are included so that the guy wires can be tensioned equally. Kits are available for various height masts. In the case of very tall masts two sets of guy wires can be installed, one attached near the top, and the other about the middle of the mast.

Tripod Guy Wire Kits

190-205	5' Tripod guy kit (no anchors) 3-way mast clamp, turnbuckles, 75' guy wire, wire clamps
190-210	10' Tripod guy kit (no anchors) 3-way mast clamp, turnbuckles, 75' guy wire, wire clamps
190-210-30	30' Tripod guy kit (no anchors) 3-way mast clamp, turnbuckles, 150' guy wire, wire clamps

A variety of anchors are available: spiral stakes (for temporary installations), earth anchors (for permanent ground mount installations), and a roof mount kit including nut eyebolts and screw eyes.

Tripod Anchor Kits

190-210R	Spiral stake and ratcheting tie down For use with 3' and 5' tripods
190-211	Earth anchors for use with Tripod Guy Kit, 3/set 3/8" x 15" shaft, 3" dish auger, eyebolt
190-212	Roof anchors for use with Tripod Guy Kit, 3/set 3 nut eyebolts (3/8" x 6") with nuts and washers for thru-hole mounting 3 screw eyes (5/16" x 6") for mounting directly to wood framing members
190-213	Heavy duty earth anchors for use with Tripod Guy Kit, 1 each 48" shaft, 6" disk auger

8 LIGHTNING PROTECTION

Earth grounding the tripod and electrical equipment mounted on it is important in any area where lightning may occur. Nearby strikes can damage electronic equipment that is not properly grounded. No grounding system can provide complete protection.

NovaLynx provides ground rods, wiring and clamps suitable for tripod installations. The simplest configuration is one ground rod connected to one leg of the tripod using #4 copper wire. A more robust installation would be to ground all three legs independently. In either case the mast is the conductor if there is a strike. If the area is open (i.e. no tall trees nearby), one should consider putting a lightning rod on top of the tripod with a cable leading to a ground rod, or better yet install another, taller tower with a lightning rod on it to take the hit. You may wish to consult a local contractor familiar with antenna installations to determine the best approach.

Tripod Grounding Kits

190-110	Grounding Kit with 8' ground rod Ground rod (8' x 5/8"), Clamps, #4 copper ground wire 1.2 m (4')
190-110-5	Grounding Kit with 5' ground rod Ground rod (8' x 5/8"), Clamps, #4 copper ground wire 1.2 m (4')

9 EQUIPMENT MOUNTING

Before you begin installing your weather monitoring equipment, take an inventory of all the parts that will need to be attached. Make sure the clamps and mounting arms fit the mast properly, so they can be tightened securely without damaging the mast. Equipment can also be mounted to the legs of the tripod, but since the legs are not vertical you may need to modify the mounting hardware.

The 190-520 Tripod (10') includes rungs for a ladder on one side. Do not install any equipment on this side of the tripod, as that would create a hazard when using the ladder.

The instruction manuals for the individual sensors may provide suggestions as to how high to mount certain instruments for best exposure. You may wish to make a sketch of your installation with the elevations for each instrument.

Here are some general guidelines:

1. Wind speed and direction instruments are usually mounted at or near the top of the mast. Wind direction sensors usually have a marking to indicate the side that is meant to face north.
2. Solar radiation sensors must be on the south side of the mast (Northern Hemisphere) and not below other instruments that would cause shade. Keep it away from large shiny instruments that might reflect sunlight towards the sensor, causing errors.
3. The solar panel must face south (Northern Hemisphere) and not be shaded.* The angle of the panel depends on the latitude. Refer to the solar panel's instructions for adjustment procedures. Position the panel as low on the tripod / mast as practical because of its relatively large wind cross-section.
4. Place enclosures on the north side of the tripod (Northern Hemisphere) as this provides more shade for the front of the enclosure. In very hot climates it may be necessary to install a sun shield around the enclosure.

***Note:** *Even a little shading on a solar panel, such as the shadow of a mounting arm or instrument above the panel, reduces the output of a solar panel disproportionately. The individual cells in a panel are often connected in series, so that shade on one cell restricts the current flow through all the cells in the string. It is similar to the effect of a clog in a pipe, which slows the flow of water along the entire pipe.*

10 MAINTENANCE

Inspect the mast and tripod at least once a year to ensure that it is in good condition and will support all the equipment that is attached to it.

- Check the bolts that hold the tripod feet. If these are loose it might mean the support structure is deteriorating or there is excessive vibration in windy conditions. Take appropriate action to secure the base.

- Check the rivets that hold the feet to the tower. If any are worn replace them with bolts and locking nuts.
- Check for signs of corrosion. Replace any tripod or mast showing signs of corrosion before it weakens the structure.
- Tighten the bolts holding the mast if any are loose.
- Inspect the mounting brackets of all equipment attached to the tripod and mast and tighten any loose brackets.
- Check the tension on each guy wire and adjust as needed.
- Inspect the earth ground rods and cables. Tighten any loose clamps.

11 MAST OPTIONS

Tripods can accommodate masts up to 1.75"Ø. NovaLynx offers a variety of standard aluminum masts which can be used singly or threaded on one end to adapt to a smaller diameter mast at the top. Swaged masts can be fitted together to extend the height.

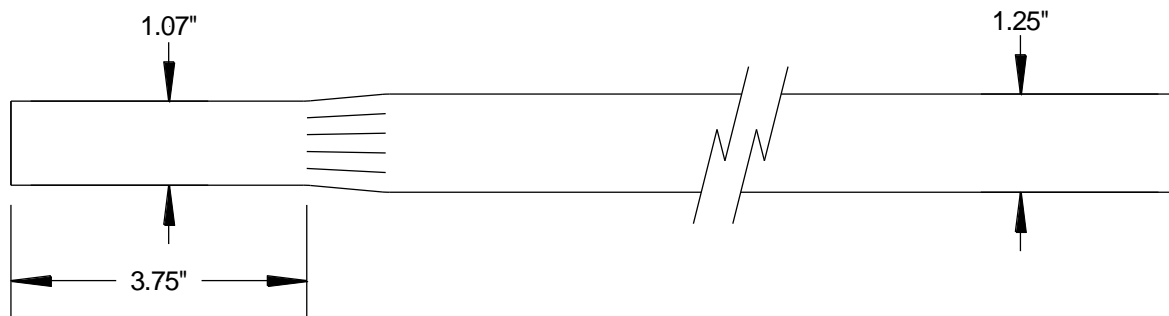
Part of the mast extends to the cross braces below the top of the tripod for stability. This shortens the effective length of the mast. Deduct the following approximations from the overall mast length when figuring overall height of your tripod/mast assembly:

- 3' Tripod ~15"
- 5' Tripod ~25"
- 10' Tripod ~24"

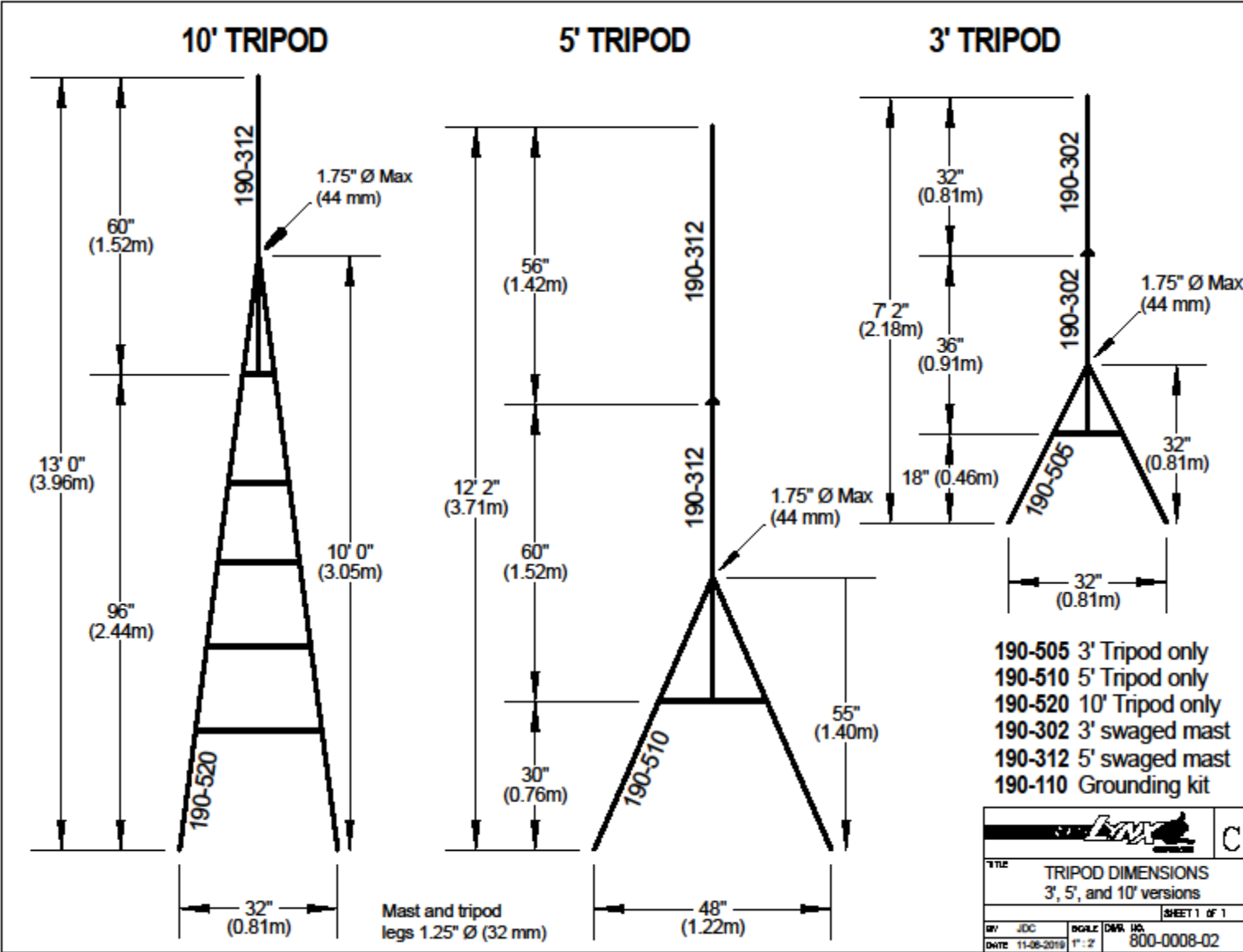
Aluminum Mast Part Numbers

	2'	3'	5'	6'	8'	10'
Ø1.25" Swaged		190-302	190-312		190-318	190-322
Ø1.315"	190-300	190-301		190-310		
Ø1.34"		190-313	190-314			190-320*
Ø1.66"		190-313	190-311			190-321
Ø1.708"			190-315			
* Options:	190-320-T	1" NPT adapter threaded on one end				
	190-320-W	1" NPT adapter welded to one end				

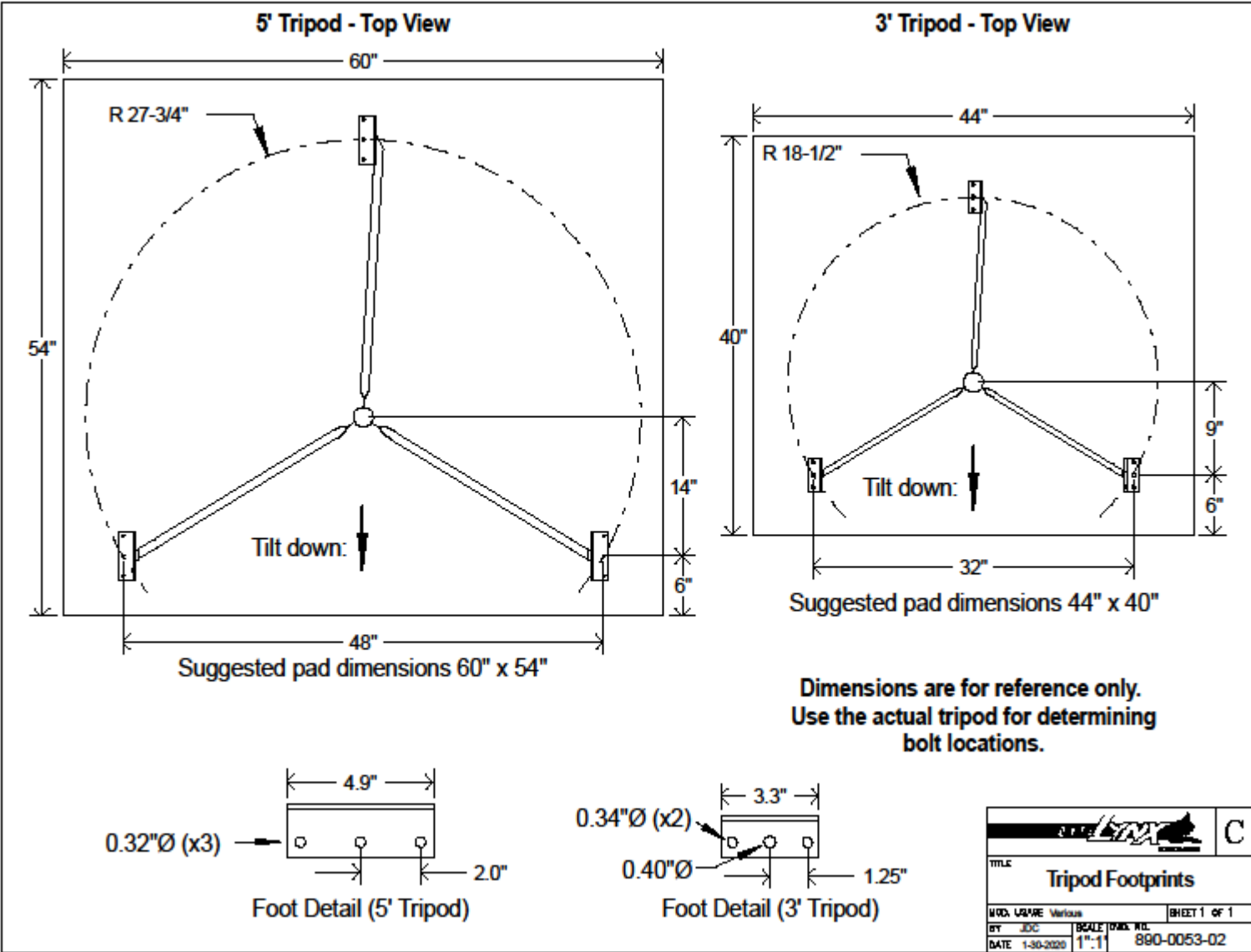
SWAGED ALUMINUM MAST



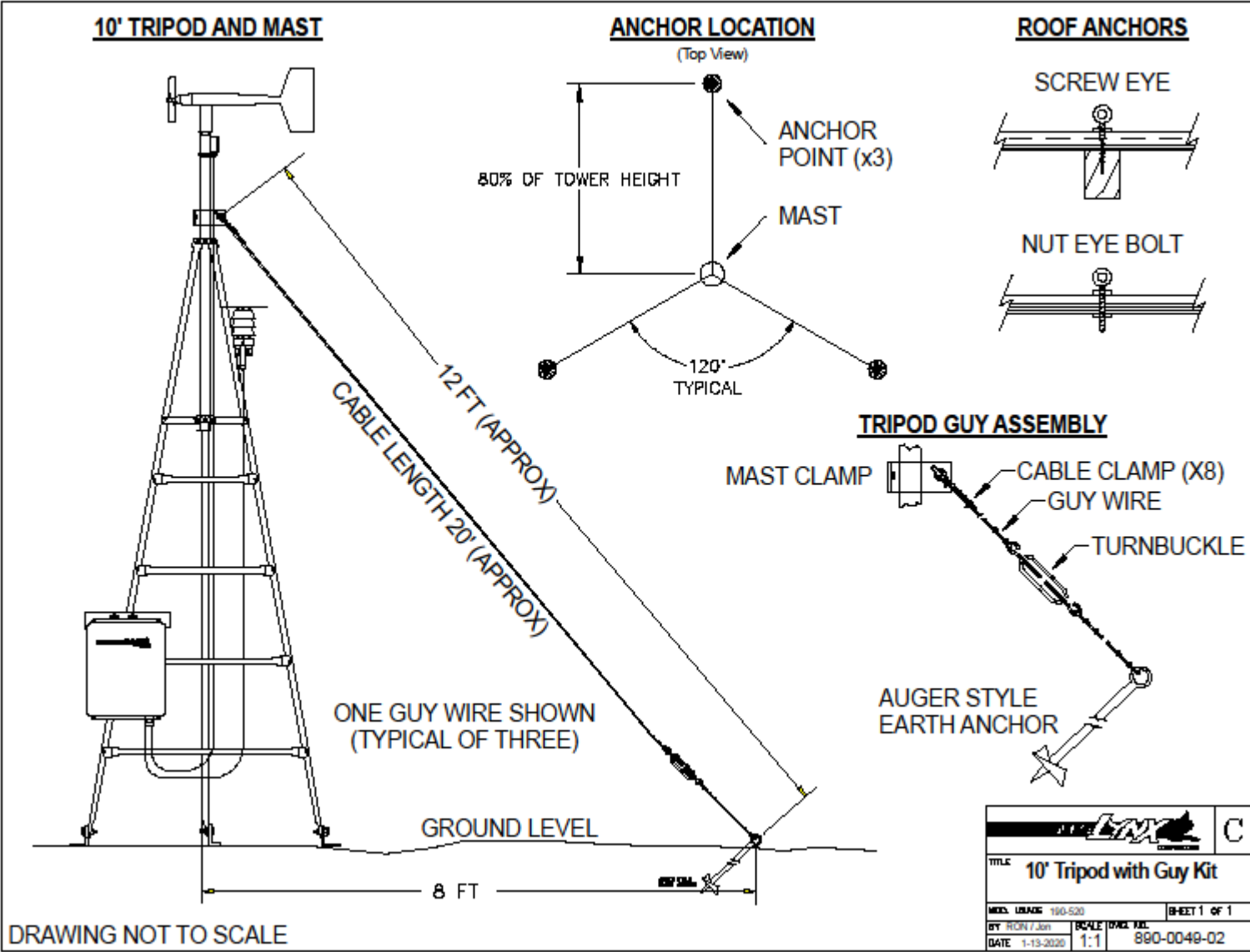
APPENDIX A TRIPOD DIMENSIONS



APPENDIX B TRIPOD FOOTPRINTS



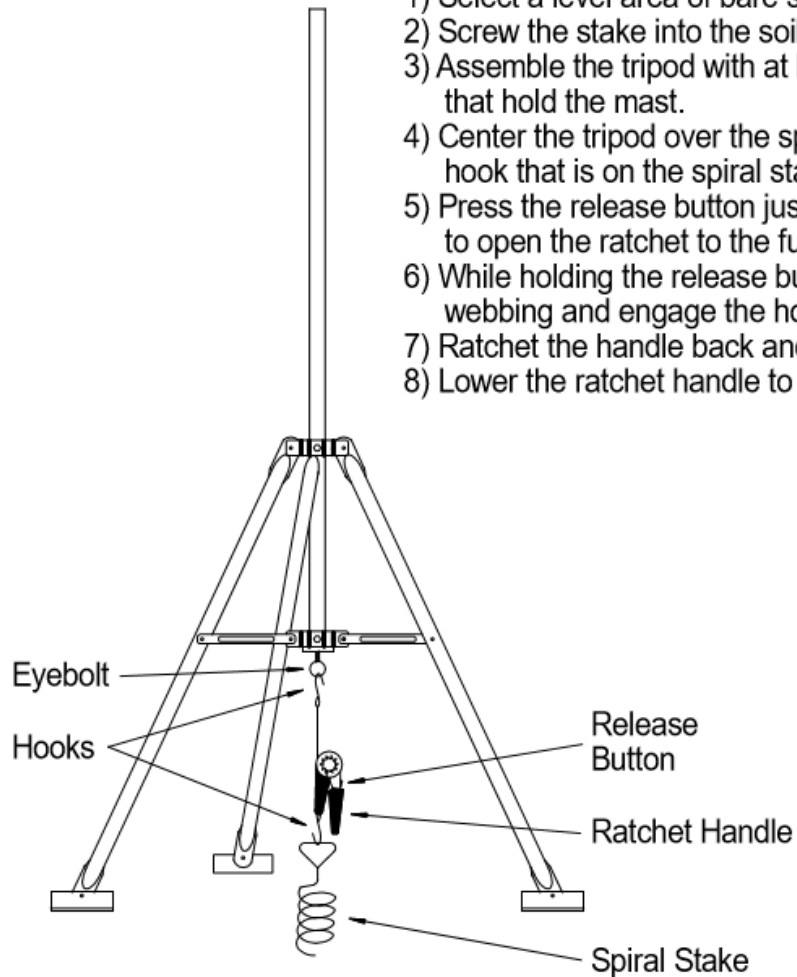
APPENDIX C TRIPOD GUY WIRING



APPENDIX D RATCHETING TIE DOWN FOR TEMPORARY INSTALLATIONS

Ratcheting Tie Down for 3' and 5' Tripods

- 1) Select a level area of bare soil or grass where the spiral stake can be installed.
- 2) Screw the stake into the soil until only the handle is exposed.
- 3) Assemble the tripod with at least one mast section and tighten the bolts that hold the mast.
- 4) Center the tripod over the spiral stake and attach the base of the ratchet to the hook that is on the spiral stake.
- 5) Press the release button just above the ratchet handle and raise the handle to open the ratchet to the fullest extent (the handle will be pointing up).
- 6) While holding the release button, pull up on the hook that is attached to the webbing and engage the hook in the eyebolt on the tripod, just below the mast.
- 7) Ratchet the handle back and forth until the tripod is held down securely.
- 8) Lower the ratchet handle to the fully closed position to lock the cam mechanism.



DRAWING NOT TO SCALE.

		C
TITLE Ratcheting Tie-Down		
MOD. USAGE 190-505 & 190-510		SHEET 1 OF 1
BY Jon	SCALE 1:1	DWG. NO. 890-0050-01
DATE 1-15-2020		