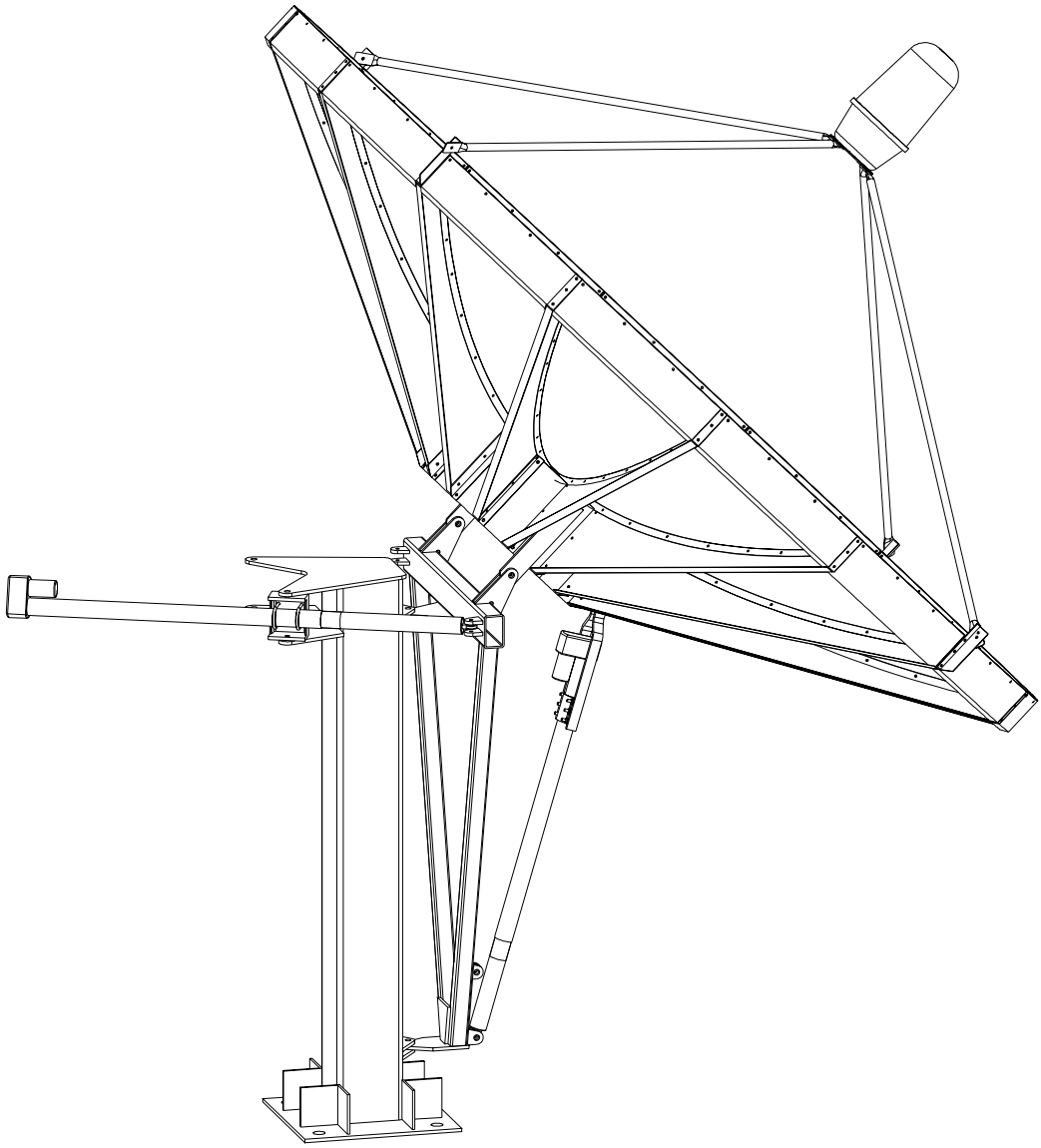
CHALLENGER COMMUNICATIONS

4.5m Prime Focus Antenna System

King Post Mount Assembly Manual



Motorized Option Depicted

LIMITED TWELVE (12) MONTH WARRANTY

This CHALLENGER COMMUNICATIONS, LLC ("CHALLENGER") equipment is warranted to be free from defects in material and workmanship under normal use and service. CHALLENGER shall repair or replace defective equipment, at no charge, or at its option, refund the purchase price, if the equipment is returned to CHALLENGER not more than twelve (12) months after shipment. Removal or reinstallation of equipment and its transportation shall not be at cost of CHALLENGER except CHALLENGER shall return repaired or replaced equipment freight prepaid.

This Warranty shall not apply to equipment which has been repaired or altered in any way so as to affect its stability or durability, or which has been subject to misuse, negligence or accident. This Warranty does not cover equipment which has been impaired by severe weather conditions such as excessive wind, ice, storms, lightning, or other natural occurrences over which CHALLENGER has no control, and this Warranty shall not apply to equipment which has been operated or installed other than in accordance with the instructions furnished by CHALLENGER.

Claimants under this Warranty shall present their claims along with the defective equipment to CHALLENGER immediately upon failure. Noncompliance with any part of this claim procedure may invalidate this warranty in whole or in part.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER AGREEMENTS AND WARRANTIES, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY. CHALLENGER DOES NOT AUTHORIZE ANY PERSON TO ASSUME FOR IT THE OBLIGATIONS CONTAINED IN THIS WARRANTY AND CHALLENGER COMMUNICATIONS NEITHER ASSUMES NOR AUTHORIZES ANY REPRESENTATIVE OR OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE EQUIPMENT DELIVERED OR PROVIDED.

IN NO EVENT SHALL CHALLENGER BE LIABLE FOR ANY LOSS OF PROFITS, LOSS OF USE, INTERRUPTION OF BUSINESS, OR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND.

In no event shall CHALLENGER be liable for damages in an amount greater than the purchase price of the equipment.

Some states do not allow limitations on how long an implied warranty lasts, or allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

CHALLENGER has the right to void the warranty when the antenna is installed by someone other then a certified installer.

Product Serial Number: _____

Date Purchased: _____

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IMPORTANT!!!

INSTALLATION OF THIS PRODUCT SHOULD BE PERFORMED ONLY BY A PROFESSIONAL INSTALLER AND IS NOT RECOMMENDED FOR CONSUMER D.I.Y. (DO-IT-YOURSELF) INSTALLATIONS.

WATCH FOR WIRES!

Installation of this product near power lines is dangerous. For your own safety, follow these important safety rules.

1. Perform as many functions as possible on the ground.

2. Watch out for overhead power lines. Check the distance to the power lines before starting installation. We recommend you stay a minimum of 6 meters (20 feet) from all power lines.

3. Do not use metal ladders.

4. Do not install antenna or mast assembly on a windy day.

5. If you start to drop antenna or mast assembly, get away from it and let if fall.

6. If any part of the antenna or mast assembly comes in contact with a power line, call your local power company. DO NOT TRY TO REMOVE IT YOURSELF! They will remove it safely.

7. Make sure that the mast assembly is properly grounded.

WARNING

Assembling dish antennas on windy days can be dangerous. Because of the antenna surface, even slight winds create strong forces. For example, a 1.0m antenna facing a wind of 32 km/h (20 mph) can undergo forces of 269 N (60 lbs.). Be prepared to safely handle these forces at unexpected moments. Do not attempt to assemble, move or mount dish on windy days or serious, even fatal accidents may occur. CHALLENGER COMMUNICATIONS is not responsible or liable for damage or injury resulting from antenna installations.

WARNING

Antennas improperly installed or installed to an inadequate structure are very susceptible to wind damage. This damage can be very serious or even life threatening. The owner and installer assumes full responsibility that the installation is structurally sound to support all loads (weight, wind & ice) and properly sealed against leaks. CHALLENGER COMMUNICATIONS will not accept liability for any damage caused by a satellite system due to the many unknown variable applications.

Introduction

Thank you for purchasing your Challenger Communications product. We trust that you will find this to be a well designed product that will proved many years of reliable service. Please read this manual thoroughly before beginning assembly. For best results in the assembly process, perform each step in the same sequence as listed in this manual. Record the serial number of the unit on to page two for future referance and read the warranty information. The serial number plate can be found on the hub.

Unpacking and Inspection

Shipping cartons should be unpacked and contents checked for damaged or missing parts. Should there be any parts that are damaged or missing, please contact technical support for replacement.

Site Selection

The main objective of conducting a site survey utilizing a compass and inclinometer is to choose a mounting location on the ground that will give you the greatest amount of swing for azimuth and elevation for present as well as future use. A thorough pre-installation site survey is strongly recommended because it can alert you to any “look angle”, soil, wind or other problems.

The first and most important consideration when choosing a prospective antenna site is whether or not the area can provide an acceptable “look angle” to the satellite. A site with a clear, unobstructed view facing south, southeast is required. Your antenna site must be selected in advance so that you will be able to receive the strongest signal available. Also consider obstructions that may occur in the future such as the growth of trees.

It is important to conduct an on-site survey with a portable antenna or with a compass and clinometer to avoid interference, obstructions, etc.

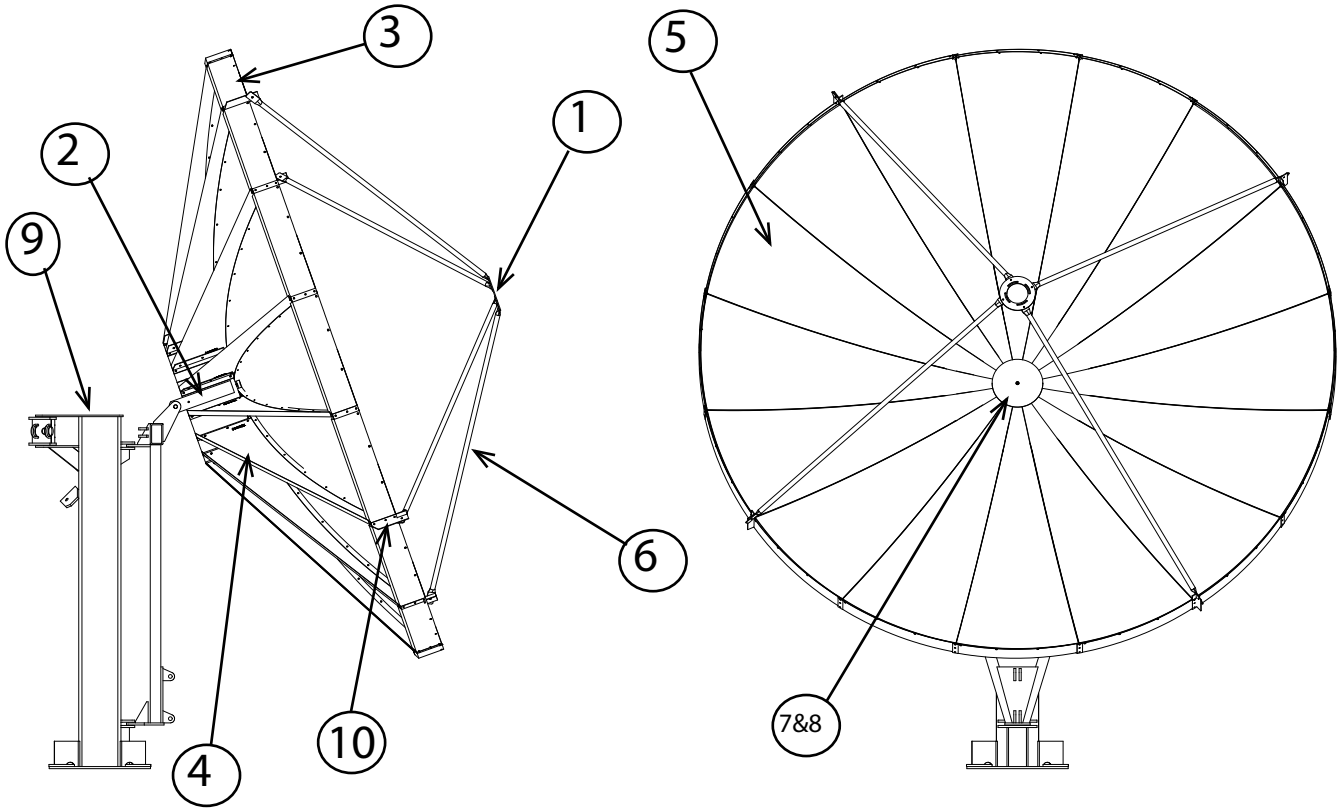
When selecting “look angle,” be sure to observe and take readings approximately 10 deg to the left and right, above and below your selected “look angle.”

Before Ground Pole Installation, the soil type should be checked because soil conditions vary widely in composition and load bearing capacity. A soil check will help you to determine the type
and size of foundation required to provide a stable base for the antenna.

Before digging is done, information regarding the possibility of underground telephone lines, power lines, storm drains, etc., in the excavation area should be obtained from the appropriate agency.

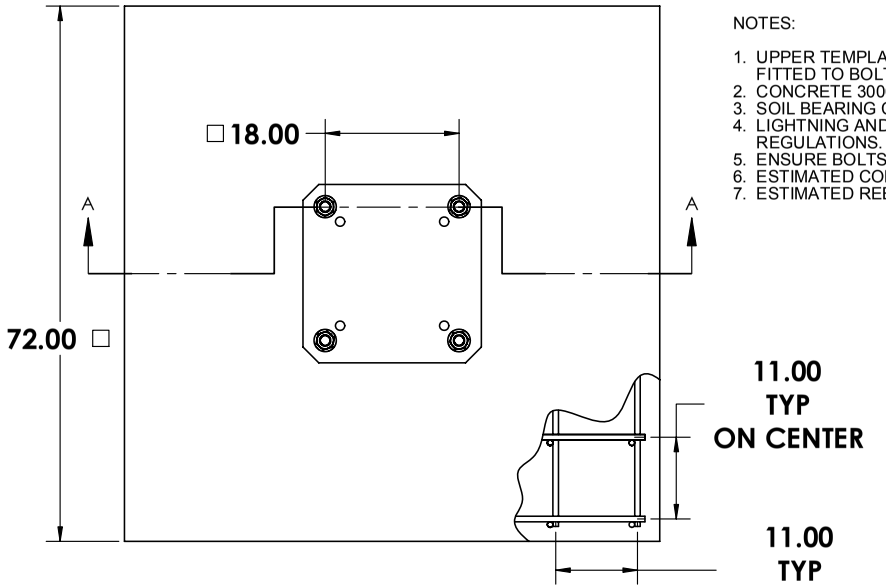
As with any other type of construction, a local building permit may be required before installing an antenna. It is the property owner’s responsibility to obtain any and all permits. Ground mounts are certified for 125 mph wind survival.

ITEM #	PART#	DESCRIPTION	QTY	REV
1	450-0001	3.8/4.5m Feed Plate	1	000
2	450-H	4.5m P.F., Hub Assembly	1	000
3	450-0005	4.5m P.F., Outboard Skirt	16	000
4	450-0002	4.5m P.F., Radial Beam	16	000
5	450-0006	4.5m P.F., Petal	16	000
6	450-0003	4.5m P.F., Standard Feed Strut	4	000
7	38P-0007	3.8/4.5m, Back Support	1	000
8	38P-0006	3.8/4.5m, Center Plate	1	000
9	45KP-Y	3.8/4.5m, Kingpost/Yoke Mount	1	001
10	450-0007	4.5m P.F., Feed Strut Angle	4	000
PG 10	45H-0006	4.5m P.F., Hub Angle	16	000
PG 8	450-TB	4.5m P.F., Turnbuckle	1	000
PG 8	45KP-AZR	3.8/4.5m Kingpost Mount, Az Rod	1	000
PG 9 (option)	TS-36BRC	Actuator, Thompson 36" Reed	2	000
PG 9 (option)	45KP-MOT	Kingpost/Yoke Moto Kit	1	000



HARDWARE KIT (PRT # 3HP45013) BREAK DOWN:

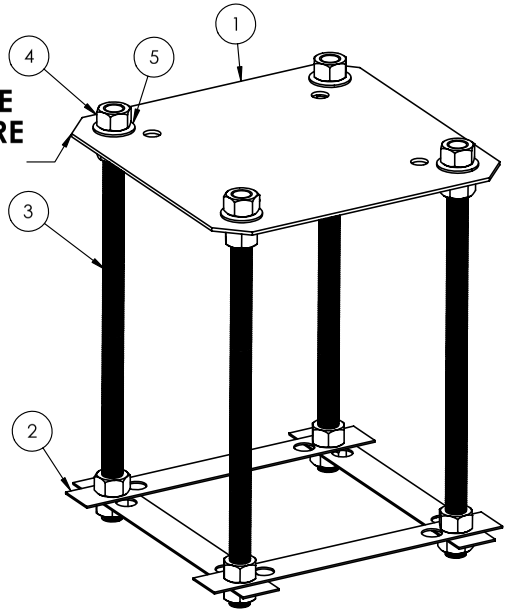
3HP45013-01 PETAL TO RADIAL BEAM
3HP45013-02 RADIAL BEAM TO HUB ANGLE
3HP45013-03 OUT BOARD SKIRT
3HP45013-04 FEED STRUT TOP
3HP45013-05 FEED STRUT BOTTOM
3HP45013-06 CENTER COVER
3HP45013-07 FEED COVER
3HP45013-08 EXTRA HARDWARE
3HP45013-09 HUB ANGLE TO HUB
3HP45013-10 ELEVATION BRACKET TO HUB

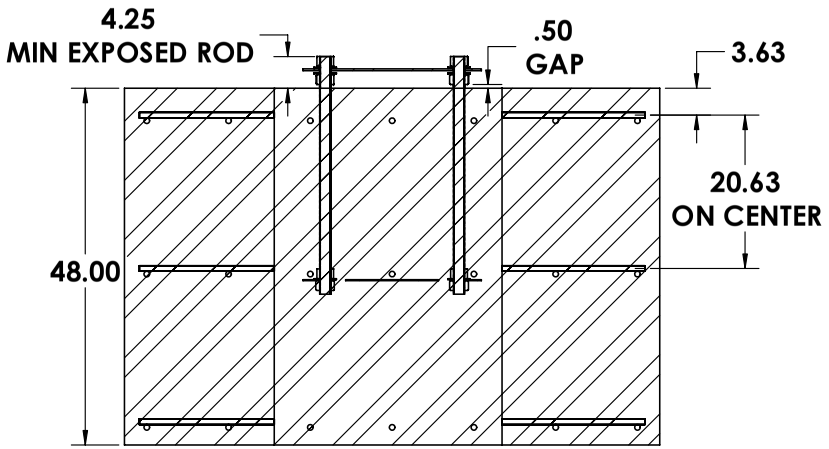


NOTES:

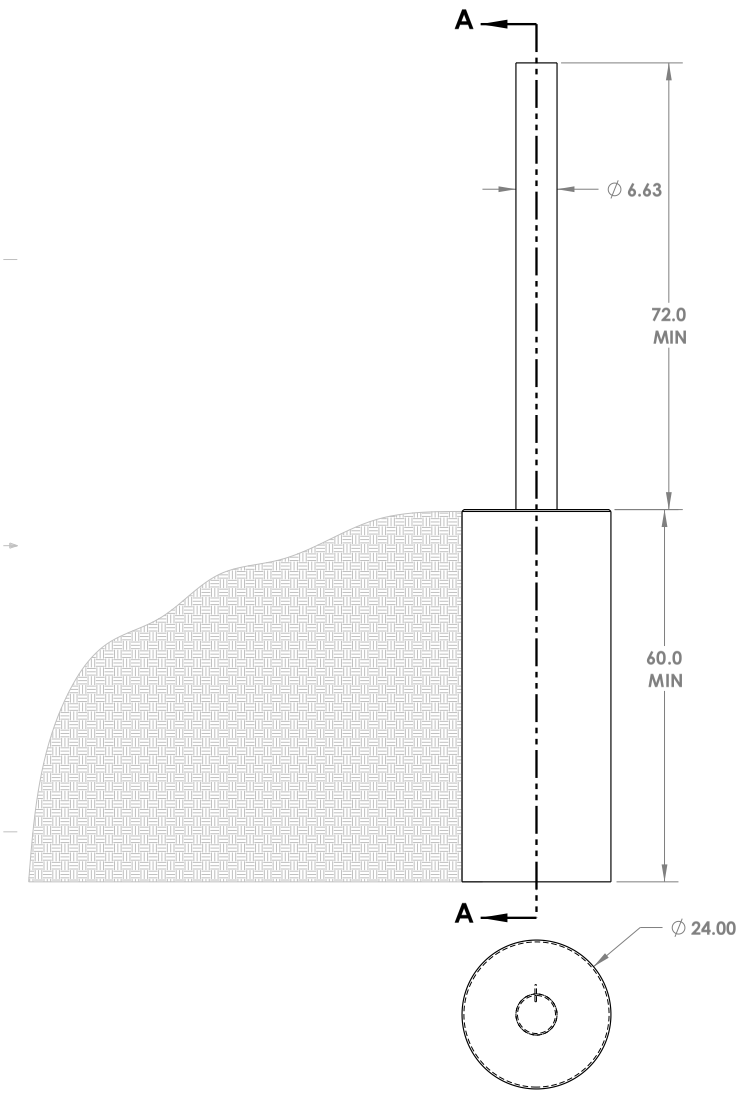
1. UPPER TEMPLATE REMOVED WHEN MOUNT IS FITTED TO BOLTS
2. CONCRETE 3000 PSI MINIMUM- VIBRATED
3. SOIL BEARING CAPACITY- 2000 PSF
4. LIGHTNING AND GROUNDING AS PER LOCAL REGULATIONS.
5. ENSURE BOLTS ARE VERTICAL.
6. ESTIMATED CONCRETE- 5.33 CUBIC YARDS
7. ESTIMATED REBAR- 392FT OF #5

CARDBOARD TEMPLATE TO BE REMOVED BEFORE KINGPOST IS SET





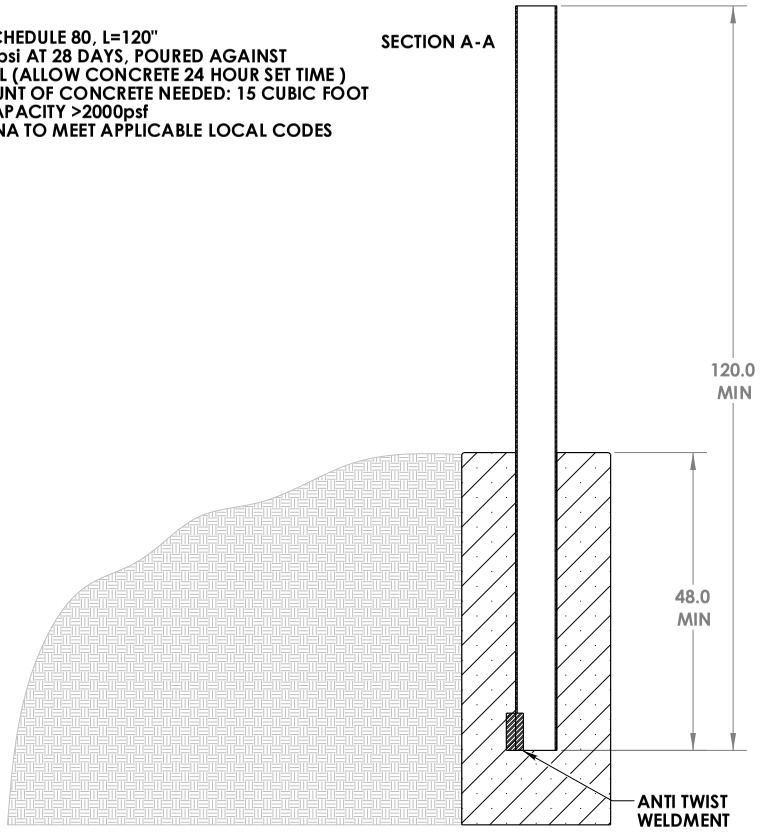
SECTION A-A



NOTES:

1) STEEL MAST: 6" SCHEDULE 80, L=120"
2) CONCRETE: 3000psi AT 28 DAYS, POURED AGAINST UNDISTURBED SOIL (ALLOW CONCRETE 24 HOUR SET TIME)
3) ESTIMATED AMOUNT OF CONCRETE NEEDED: 15 CUBIC FOOT
4) SOIL BEARING CAPACITY >2000psf
5) GROUND ANTENNA TO MEET APPLICABLE LOCAL CODES

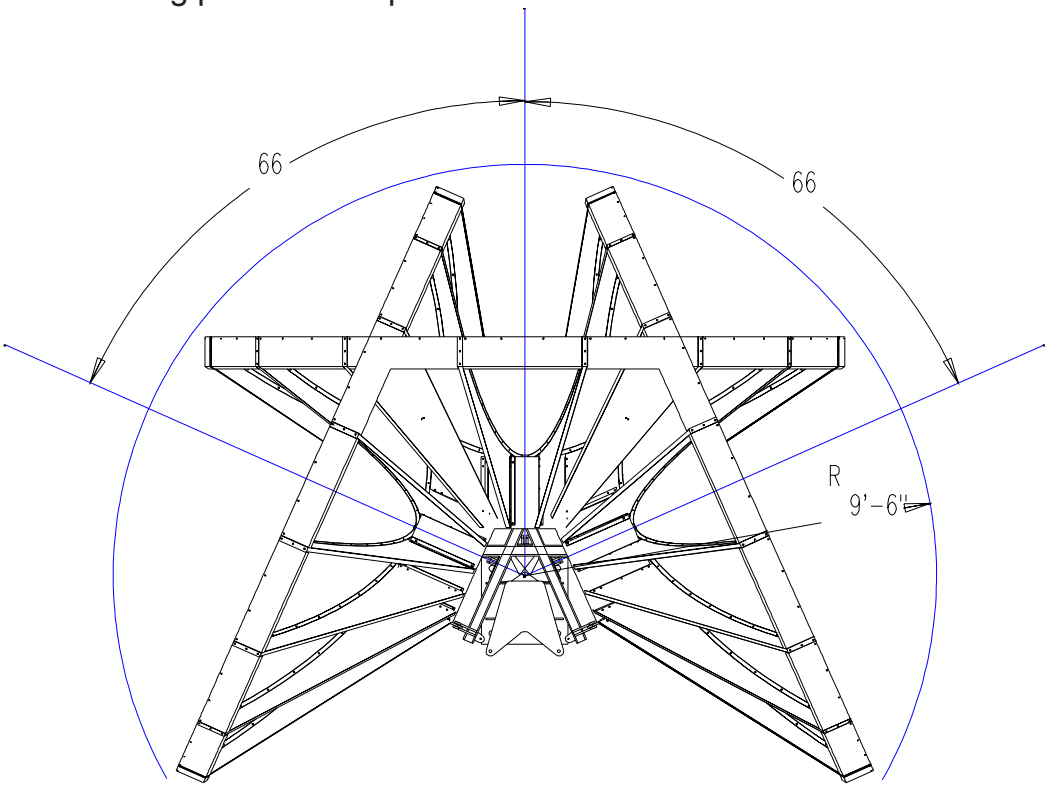
SECTION A-A

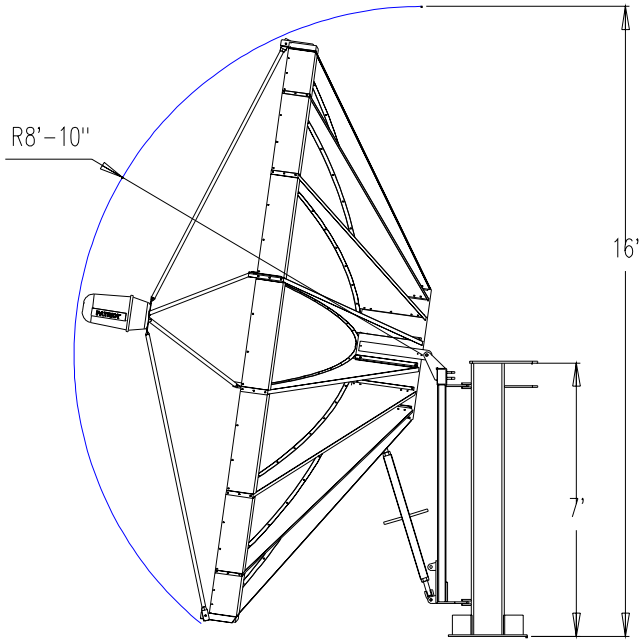


7

Antenna Placement:

The AzEl Fixed King Post mount is designed to have a total arc coverage of 132 degrees. The pad bolts must be placed in the concrete to allow coverage of the desired portion of the satellite arc. Please consult a satellite chart, software program or a qualified consultant for compass setting to point the king post bolt template.





*Dual Axis Motorized King Post has approximately 116 degree of travel depending on the actuators used.

Mount Assembly- Fixed

1. Place the King Post assembly onto the foundation sliding the bottom plate on to the threaded studs pointing the "A-frame" assembly of the mount in the desired direction- south in the northern hemisphere, north in the southern hemisphere. (See Note on page 4 regarding stud installation).

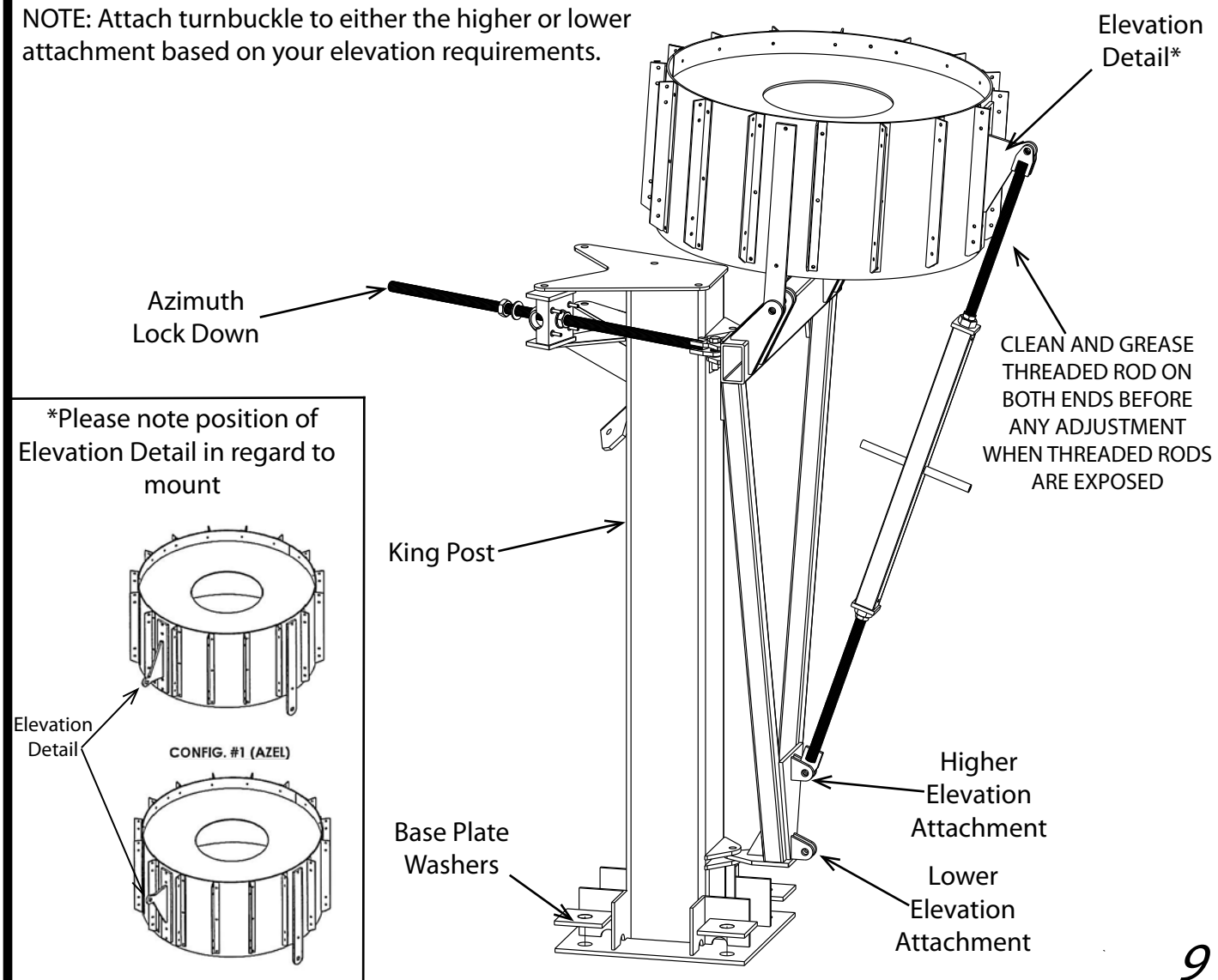
Tighten the nuts so that the square tube mast is relatively plumb. (Make sure to use base plate washers as pictured below.)

2. Assemble the Azimuth Lock down threaded rod to the main post clevis double nutting it with the pre-assembled washers and nuts. Attach the thru-hole end to the A-frame attachment details. Snug the Lock down bar hardware so the Hub assembly can be safely placed.

3. With 2 helpers, place the Hub assembly in the zenith (bird bath) position on top of the King Post A-frame as shown using the pre-assembled hardware in place on the A-frame. (Note the position of the Elevation detail!)

4. Assemble the elevation Turnbuckle as shown, and adjust it to position the Hub assembly in the upward "bird bath" position.

NOTE: Attach turnbuckle to either the higher or lower attachment based on your elevation requirements.



*Please note position of Elevation Detail in regard to mount

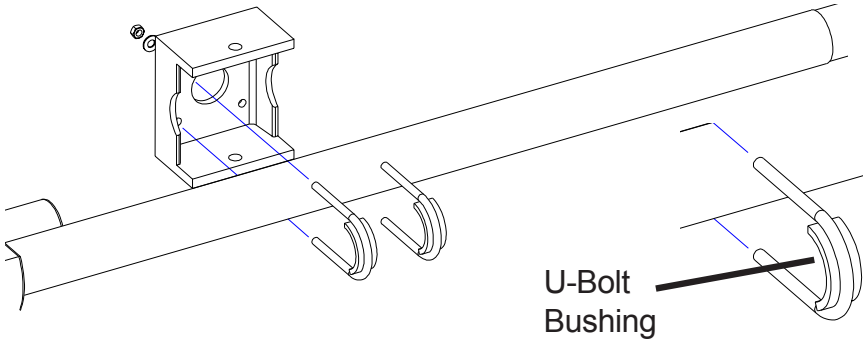
Mount Assembly-Motorized

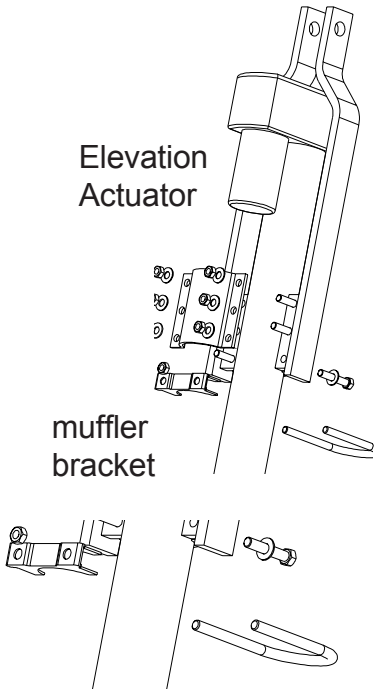
1. Set King Post to foundation as instructed on previous page.

2. Assemble the azimuth actuator to the main post and A-frame locking it into a steady position so the Hub assembly can be safely placed.

3. With 2 helpers place the hub assembly in the zenith (bird bath) position on top of the King Post A-frame as shown using the preassembled hardware in place on the A-frame. (Note the position of the Elevation detail!)

4. Assemble the elevation actuator as shown, and adjust it to position the Hub assembly in the upward "bird bath" position.



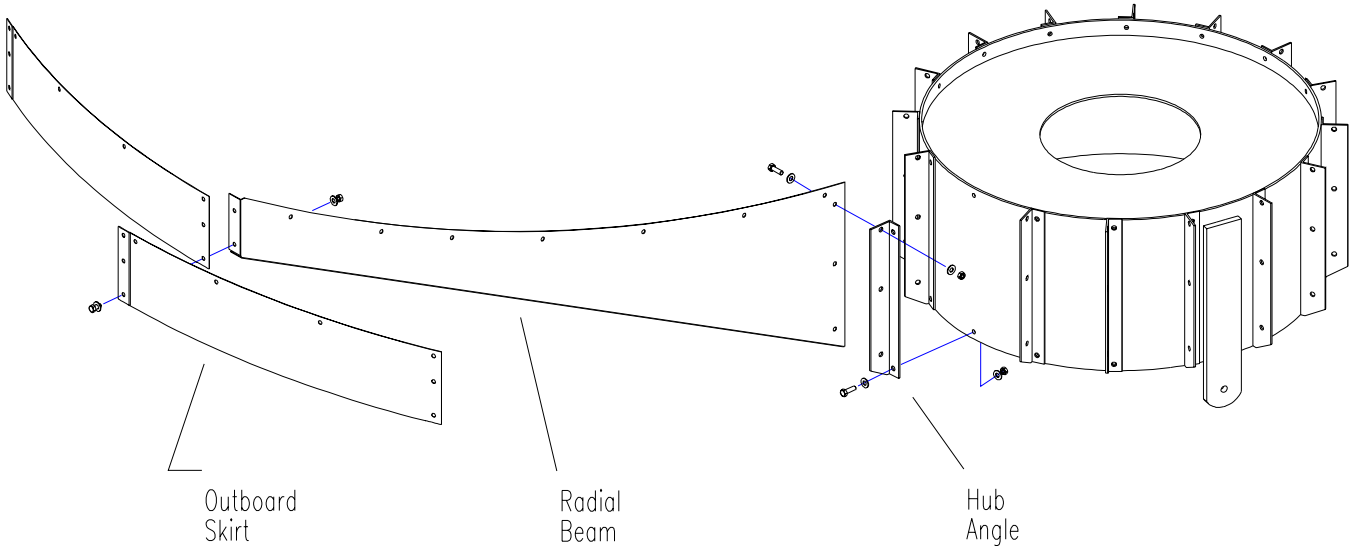


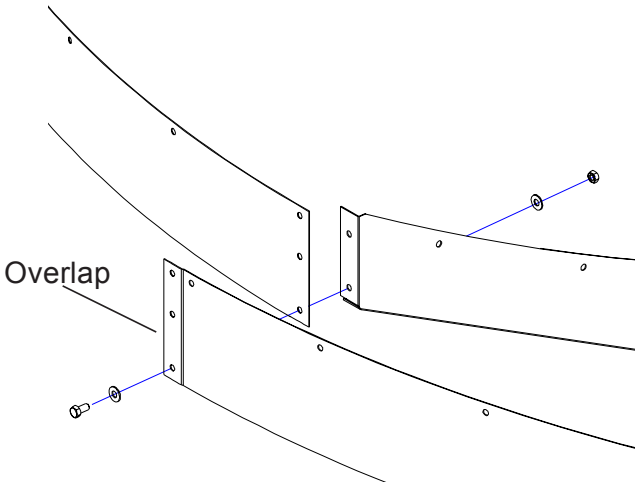
Reflector Assembly

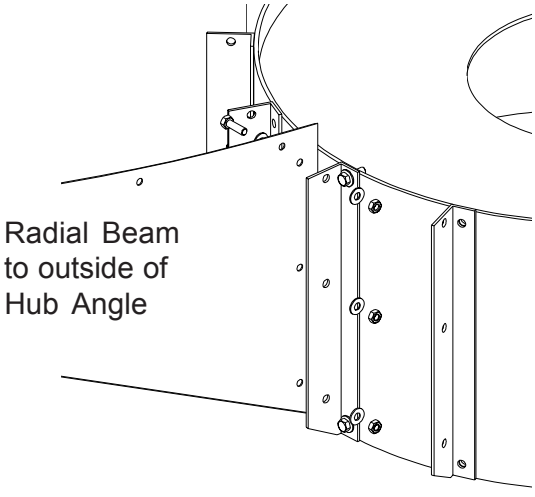
1. Fasten hub to King Post assembly as pictured on page 7.

2. Once hub is attached to King Post assembly, begin to attach 450-0002 (RADIAL BEAM 4.5 PRIME) to 45H-006 (ANGLE, 4.5 HUB). Make sure that Radial Beams are to the outside of the hub angle as pictured below.

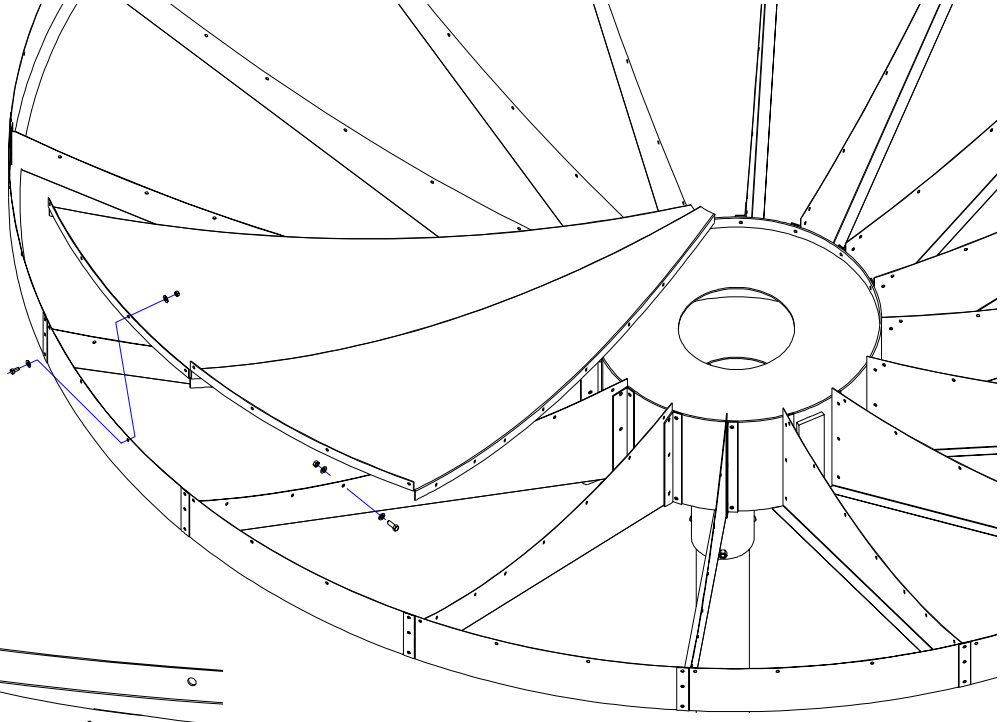
3. With all Radial Beams in place and hardware in place install all of the 450-0005 (OUT BRD SKIRT, 4.5 PRIME) on the end of the Radial Beams (bent edge down). Make sure overlap is in proper place as pictured below. Leave this hardware loose at this time.



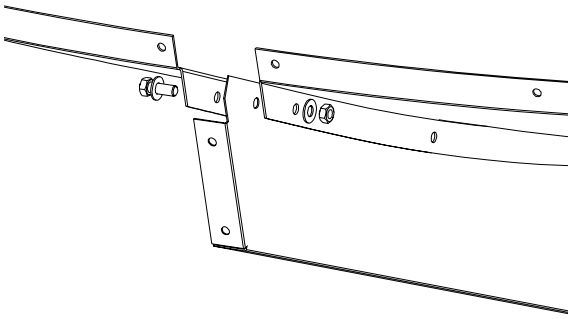




5. Set in place 2 Panels into the Radial Beams. The Radial Beam will be between the flange of each Panel (see below). Using 3 tapered alignment tools- 2 in the outermost holes, and 1 in the center hole to align the holes in the panels and radial beam, install the hardware in the remaining holes (from kit labeled: Petal to Radial Beam) starting with the hole closest to the hub. Use 1 bolt, 2 washers, and 1 nut per hole. Pull the tapered alignment tools and install that hardware. Leave hardware loose at this time.
Continue installing the remaining Petals using this method.



NOTE:
Radial Beam between panel flanges!



Tightening Procedure- Important!

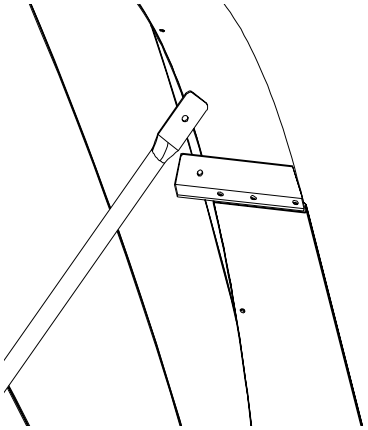
6. Starting at the Hub, tighten all hardware by working outward 1 circular row at a time.

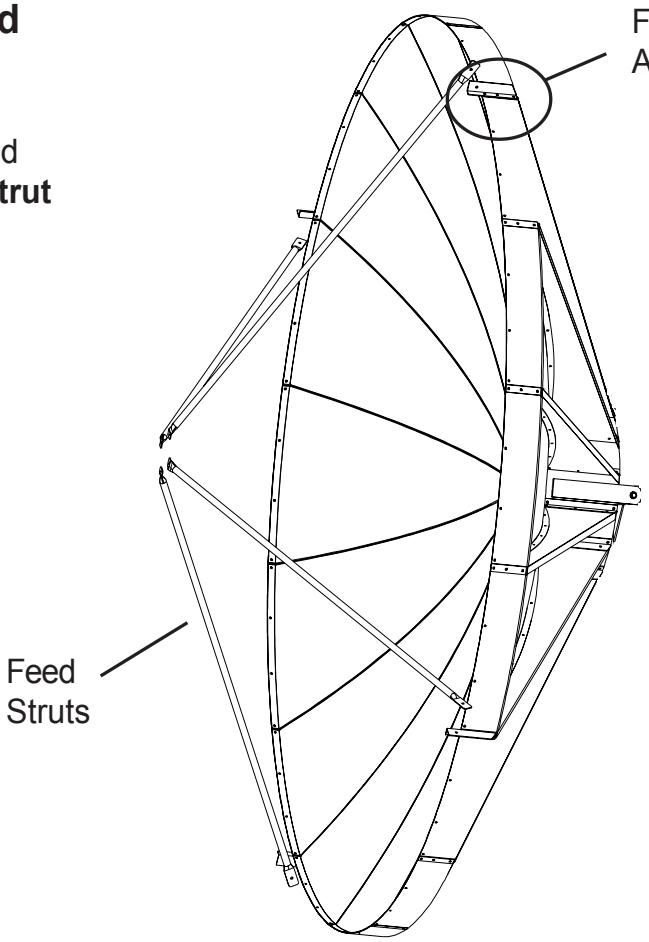
7. When all petals are tight, put in the remaining hardware from the Outboard Skirt pack. At every 4th Radial Beam/Outboard Skirt junction include an Outboard Feed Angle as you assemble using hardware kit labeled: Feed Strut Bottom. Tighten hardware as you intall it.

NOTE: The 3 holes in Outboard Feed Angle should be aligned with the 3 holes in Outboard Skirt. See next page.

Feed Support Assembly- Standard

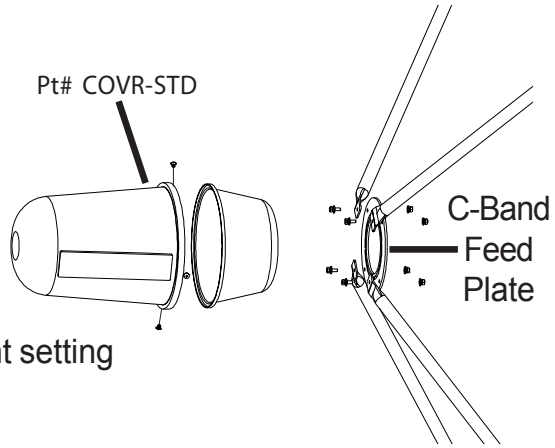
1. Place the Feed Struts in place with the straight end assembled to the Outboard Feed Angles at the edge of the dish. Use **Feed Strut Top** pack hardware.





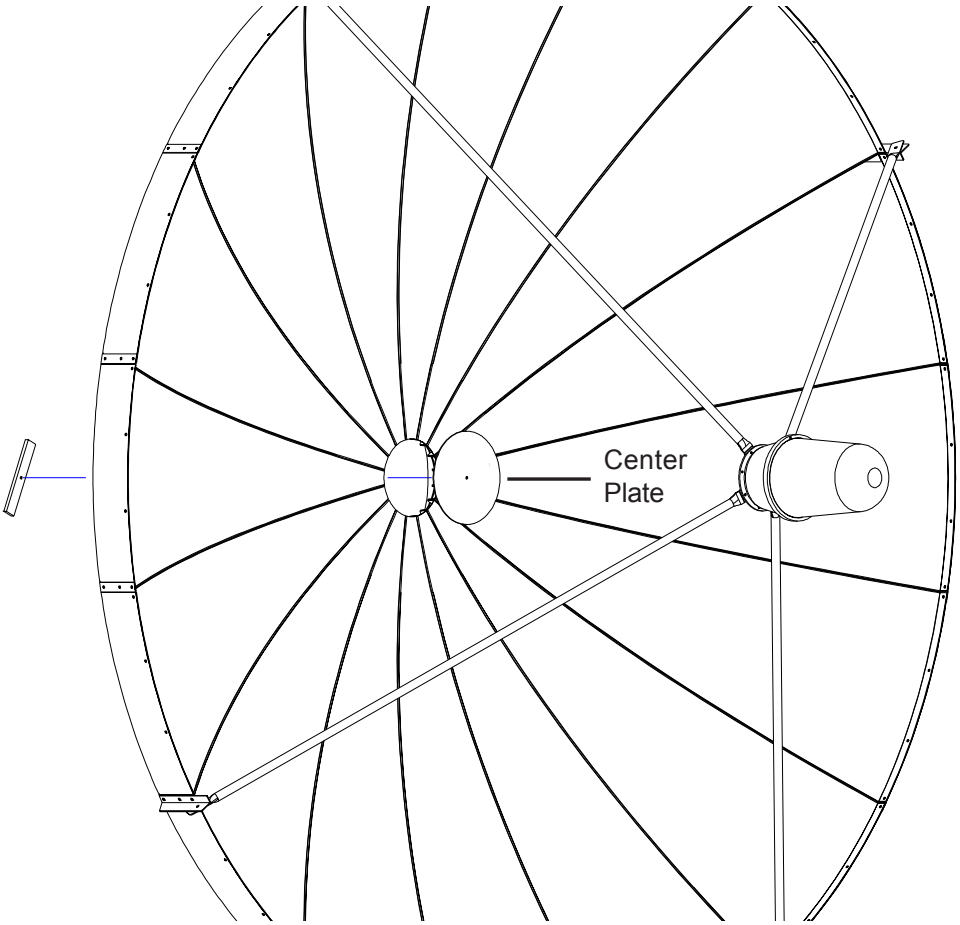
2. Assemble the C-Band Feed Plate to the inside of the Feed Struts as shown using the 1/4" hardware also from the Feed Strut Top pack. Then assemble the feed scalar to the dish side of the plate using the 4 slotted holes with the feed cover bottom half to the opposite side of the plate.

3. Check Focal Distance- 1.57m (61.95")



NOTE: The 4 slotted holes provide skew adjustment setting

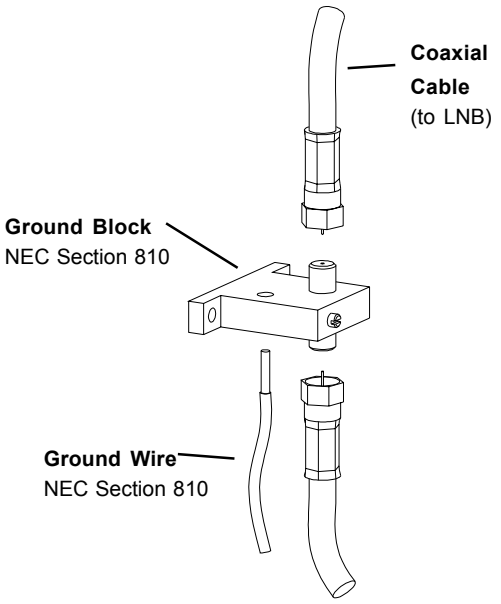
With a helper, place the center plate in place in the center of the opening of the panels using hardware from **Center Plate** pack. From behind place the back brace through the hub center across the hub opening. Tighten the nut on the bolt being careful not to overtighten which could crush the petals.
NOTE: If you need to climb into the dish be sure to place your feet along the Radial Beams and not into the center areas of a panel!



The antenna assembly is now complete. Now lower the antenna out of the "bird bath" position. To adjust the antenna toward the selected satellite you must first know its elevation angle above horizon. This will be the reference angle for the face of the antenna. Using an inclinometer on the face of the antenna pre-adjust the desired angle Tighten the Az-El pipe head bolts only enough to allow rotation of the mount on the ground pipe. Knowing the azimuth angle of the satellite from due south roughly aim the antenna in that direction. With the LNB connected to the proper sight-in equipment the antenna can be accurately adjusted to the satellite signal. Tighten all hardware.

Installation is complete.

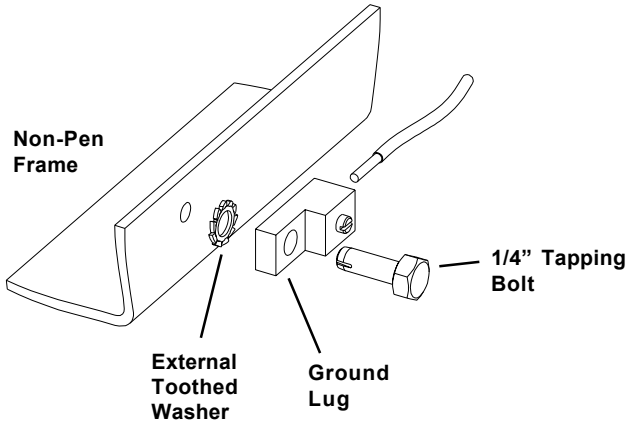
Grounding



Grounding Antenna Feed Cables

1. Ground antenna feed cables in accordance with current National Electric code and local electric codes. The illustration shows a typical grounding method.
Clamps that provide a solid connection between ground wire and a ground source should be used.

Grounding Non-Penetrating Mount Frame (if applicable)



1. Ground the Non-Penetrating mount frame. The illustration shows a typical grounding method.
Refer to the NEC Section 810 and local electric codes for specific instructions on grounding the remaining end of the ground wire.

Antenna Pointing

1) Begin by obtaining the correct Az/El pointing data for the satellite of interest based for your site location.

2) Using an inclinometer or position readout form controller placed on the enclosure drum surface, position the antenna to the specified elevation angle.

3) Manually scan the antenna (back-and-forth in the azimuth around the direction of the specified azimuth angle) to achieve the maximum transponder signal.

4) Next repeat the procedure for elevation.

5) Repeat this procedure alternating between the azimuth and elevation until maximum transponder signal is achieved.

4.5m Prime Focus Antenna System

Ku-Band and C-Band Options

Features

Multi-Feed Systems Available (up to 4)

Available in Dual Axis Motorized, King Post, and Az-El Fixed Pipe Head Mounts

125 Mph Wind Survival

King Post Pedestal Mount for Superior Steering and Stability

High Accuracy Antenna, Low Transportation Cost

Description

The Challenger Prime Focus antenna is manufactured in the United States and is the symbol of quality in the antenna industry.

This antenna features an aluminum reflector which is powder coated for superior protection against the elements. Challenger offers a variety of mounting options and stainless steel hardware is included.

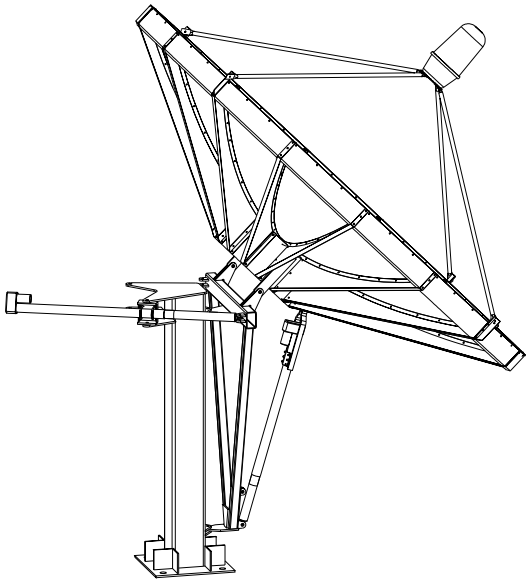
The contoured petals with matched radial beams and hub assembly ensure easy installation without field alignment.

Complete turnkey systems are available.

RF Specifications	Ku-Band	C-Band
Receive Frequency (GHz)	10.95 - 12.75	3.625 - 4.2
Midband Gain	51.9 dBi	42.7 dBi
Noise Temperature	55K @ 10°	50K @ 10°
Ports/Polarization	1 or 2 Port Linear	1 or 2 Port Circular/1 or 2 Port Linear
Polarization Rotation		360° Continuous
Polarization Isolation	30 dB LP	30 dB LP
VSWR	Rx 1.3:1	Rx 1.4:1
Feed Flanges	Rx WR75	Rx CPR 229G

Mechanical Data	Az-El Head	Kingpost
F/D Ratio	0.35	0.35
Focal Distance	61.9 in.	61.9 in.
Azimuth Travel	360° Continuous	132° Arc
Elevation Travel	15° to 90°	15° to 90°
Polarization Travel	±90°	±90°
Total Weight	970 lb	881/725 lb
Crate Dimensions	112 x 46 x 42 in.	112 x 46 x 42 in.
		48 x 48 x 94 in.
Units/40 ft Container	16 units	10 units

Environmental Data		
Wind Loading	Operational:	60 mph (100 km/h)
	Survival:	120 mph (193 km/h)
Temperature	Operational:	-40° to 140° F (-40° to 60° C)
	Survival:	-60° to 180° F (-51° to 82° C)
Rain	Operational:	1.5 in./hr (1.25 cm/hr)
	Survival:	3 in./hr (7.6 cm/hr)
Ice	Survival:	1 in. (2.5 cm) radial
		1.5 in. (1.25 cm) radial + 60 mph (100 km/h)



The 4.5m Prime Focus reflector consists of 16 draw die formed petals and achieves a .020 in. surface accuracy. Radial beams are constructed of aluminum. The contoured petals, radial beams, outboard skirts, and hub assembly are powder coated for superior protection against the elements. Stainless steel hardware is included.

Challenger Communications
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