

1.2M KU-BAND
TYPE 961 CLASS I KU ANTENNA SYSTEM
TYPE 125 CLASS I KU ANTENNA SYSTEM
TYPE 1215 CLASS I KA ANTENNA SYSTEM
TYPE 1213 CLASS 1 KU ANTENNA SYSTEM
with Factory Assembled Az/El Cap Mount

Global Invacom
VERY SMALL APERTURE TERMINAL (VSAT) PRODUCTS
TWELVE (12) MONTH LIMITED WARRANTY

Seller warrants that all Global Invacom manufactured VSAT products are transferred rightfully and with good title; that they are free from any lawful security interest or other lien or encumbrance unknown to Buyer. Seller also warrants that for a period of twelve (12) months from the date of shipment from Seller's factory, all its VSAT products shall be free from defects in material and workmanship which arise under proper and normal use and service. Buyer's exclusive remedy hereunder is limited to Seller's correction (either at its plant or at such other place as may be agreed upon between Seller and Buyer) of any such defects by repair or replacement at no cost to Buyer, except for the costs of any transportation in connection with the return of the defective VSAT products to be replaced or repaired, and the costs to remove and/or reinstall the products, which shall be borne by Buyer. The limited warranty period shall not be extended beyond its original term with respect to any part or parts repaired or replaced by seller hereunder.

This warranty shall not apply to VSAT products which (i) have been repaired or altered in any way so as to affect stability or durability, (ii) have been subject to misuse, negligence or accident, (iii) have been damaged by severe weather conditions such as excessive wind, ice, storms, lightning, or other natural occurrences beyond Seller's control; (iv) have presented damages, defects or nonconformances caused by improper shipping, handling or storage, and (v) have not been installed, operated or maintained in accordance with Seller's instructions.

Buyer shall present any claims along with the defective VSAT product(s) to Seller immediately upon failure. Non-compliance with any part of this warranty procedure may invalidate this warranty in whole or in part.

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, OTHER THAN AS SPECIFICALLY STATED ABOVE. EXPRESSLY EXCLUDED ARE ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE FOREGOING SHALL CONSTITUTE ALL OF SELLER'S LIABILITY (EXCEPT AS TO PATENT INFRINGEMENT) WITH RESPECT TO THE VSAT PRODUCTS. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY LOSS OF PROFITS OR REVENUE, LOSS OF USE, INTERRUPTION OF BUSINESS, OR INDIRECT, SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY KIND AS A RESULT OF THE USE OF THE PRODUCTS MANUFACTURED BY SELLER, WHETHER USED IN ACCORDANCE WITH THE INSTRUCTIONS OR NOT. UNDER NO CIRCUMSTANCES SHALL SELLER'S LIABILITY TO BUYER EXCEED THE ACTUAL SALES PRICE OF THE VSAT PRODUCTS HEREUNDER.

In some jurisdictions, Buyer may have other rights under certain statutes that may imply non-excludable warranties. No representative is authorized to assume for Seller any other liability in connection with the VSAT products.



DO NOT DISCARD CONTENTS

The product in this packaging was placed in the market after August 13, 2005. Its components must not be discarded with normal municipal or household waste.

Contact your local waste disposal agency for recovery, recycling, or disposal instructions.

WARNINGS

LAW: Installation and installer must meet local codes and ordinances regarding safety! Installation of this product should be performed only by a professional installer and is not recommended for consumer Do-It-Yourself installations.

DANGER: WATCH FOR WIRES! Installation of this product near power lines is extremely dangerous and must never be attempted. Installation of this product near power lines can result in death or serious injury! For your own safety, you must follow these important safety rules. Failure to follow these rules could result in death or serious injury

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. Stay at least 6 meters (20 feet) away from all power lines.
3. Do not install antenna or mast assembly on a windy day.
4. If you start to drop antenna or mast assembly, move away from it and let it fall.
5. 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.
6. Make sure that the mast assembly is properly grounded.

WARNING: Assembling dish antennas on windy days is extremely dangerous and must never be attempted. Due to the surface area of the reflector, even slight winds create strong forces. For example, this antenna facing a wind of 32 km/h (20 mph) can undergo forces of 269 N (60 lb). **BE PREPARED TO SAFELY HANDLE THESE FORCES AT UNEXPECTED MOMENTS. ATTEMPTING TO ASSEMBLE, MOVE OR MOUNT A DISH ON WINDY DAYS COULD RESULT IN DEATH OR SERIOUS INJURY.** Global Skyware 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 and ice) and properly sealed against leaks. Global Skyware will not accept liability for any damage caused by a satellite system due to the many unknown variable applications.

PRE INSTALLATION CONSIDERATIONS

TOOLS REQUIRED:

Compass	13 mm Deep Socket (3/8" Drive)	10 mm Nut Driver	Torque Wrench
Clinometer	#1 or #2 Phillips Screwdriver	10 mm Socket (3/8" Drive)	9" Magnetic Level
3/8" Drive Ratchet Wrench	13 mm Combination Wrench	10 mm Combination Wrench	

ADDITIONAL INSTALLATION MATERIALS (Not Included with Antenna)

Installation Mount (Ground Pole, King Post, Wall Mount or Roof Mount)
Grounding Rod, Clamp & Grounding Block - As required by National Electric Code or local codes.
Ground Wire - #10 solid copper or #8 aluminum as required by National Electric Code or local codes (length as required).
RG-6 Coaxial Cables from antenna to indoor units.
Concrete: See "Ground Pole" section for quantity
M10 or #3 Rebar: See "Ground Pole" section for quantity. Deformed steel per ASTM A615, Grade 40 or 60.

SITE SELECTION

The first and most important consideration when choosing a prospective antenna site is whether or not the area can provide an acceptable "look angle" at the satellites. A site with a clear, unobstructed view is preferred. Also consider obstruction that may occur in the future such as the growth of trees. Your antenna site must be selected in advance so that you will be able to receive the strongest signal available. To avoid obstructions, etc., conduct an on-site survey with a portable antenna. The satellite antenna can be installed on a ground pole, wall/roof mount, or non-penetrating roof mount with 2-7/8" or 3" outside diameter mast. The chosen mount type should be assembled and in place before installing the antenna. Refer to instructions packed with mount for its proper installation. The mast pipe must be vertical and plumb to insure ease of alignment.

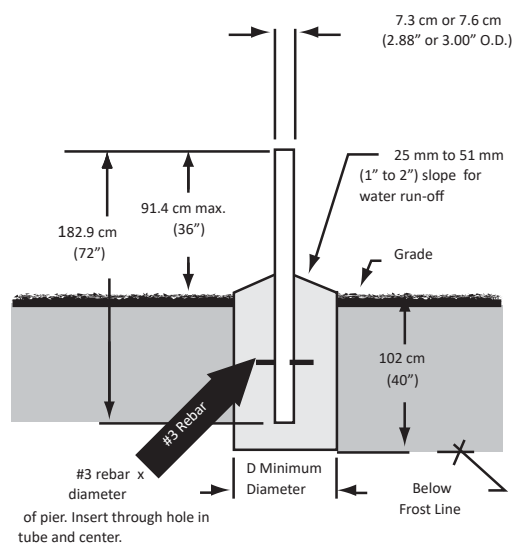
As with any other type of construction, a local building permit may be required before installing an antenna. It is the property owner's responsibility to obtain any and all permits.

Before any 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.

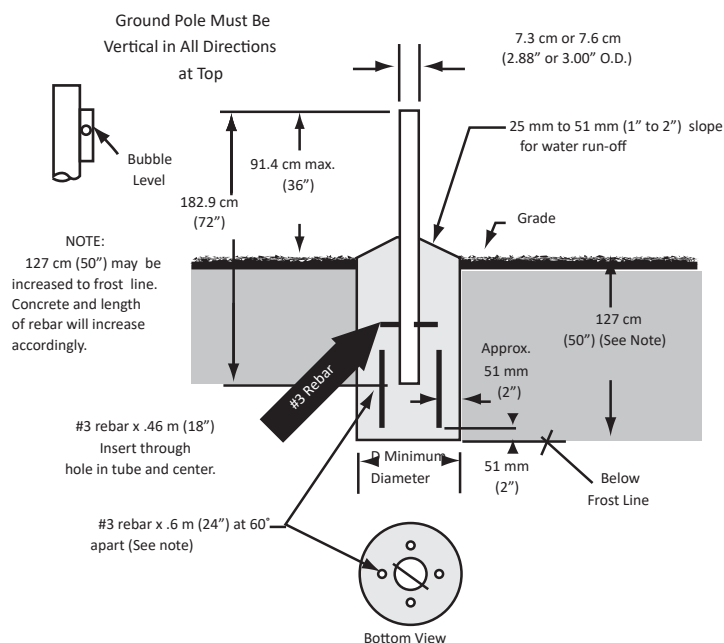
Because soils vary widely in composition and load capacity, consult a local professional engineer to determine the appropriate foundation design and installation procedure. A suggested foundation design with conditions noted is included in this manual for reference purposes only.

GROUND POLE INSTALLATION

Pier Foundations



Deep Frost Line Foundations



Pier Foundations

Deep Frost Line Foundations

	EXPOSURE B				EXPOSURE C				GROUND POLE
	WIND VEL km/h (mph)	DIM D cm (in)	CONC VOL m ³ (ft ³)		DIM D cm (in)	CONC VOL m ³ (ft ³)			
96 cm Antenna	161 (100)	25 (10)	0.05 (1.8)		38 (15)	0.11 (4.0)			A, B or C
	201 (125)	36 (14)	0.10 (3.5)		51 (20)	0.20 (7.2)			A, B or C
1.2 m Antenna	161 (100)	30 (12)	0.08 (2.9)		46 (18)	0.18 (6.5)			A, B or C
	201 (125)	43 (17)	0.17 (5.9)		61 (24)	0.33 (11.5)			C

POLE SPECIFICATIONS:

Ground Pole "A"	2-1/2 Schedule 40 Steel ASTM A53 Pipe (73 mm x 5 mm Wall/2.88" OD x .203" Wall)
Ground Pole "B"	3.0" OD x 9 Gauge (.148" Wall) Steel ASTM A501 Pipe (76 mm OD x 3.8 mm Wall)
Ground Pole "C"	2-1/2 Schedule 80 Steel ASTM A53 Pipe (73 mm x 7 mm Wall/2.88" OD x .276" Wall)

NOTE:

- Poles are not supplied (purchase locally to above specifications) and must be field drilled 5/8" diameter for M10 #3 rebar, drilled 5.55 mm (.218") for 1/4-20 self tapping grounding screw and galvanized or painted for protection.
- Pole and foundation design based on the following criteria:
 - Uniform building code Exposure B or C wind loading.
 - Vertical soil pressure of 95.7 kPa (2000 pounds per square foot).
 - Lateral soil pressure of 19.2 kPa (400 pounds per square foot).
 - Concrete compressive strength of 17.2 MPa (2500 pounds per square inch) in 28 days.
- See page 6 for grounding recommendations.

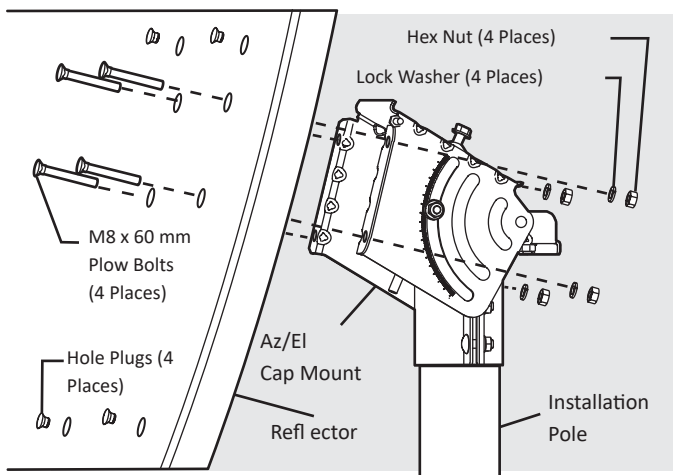
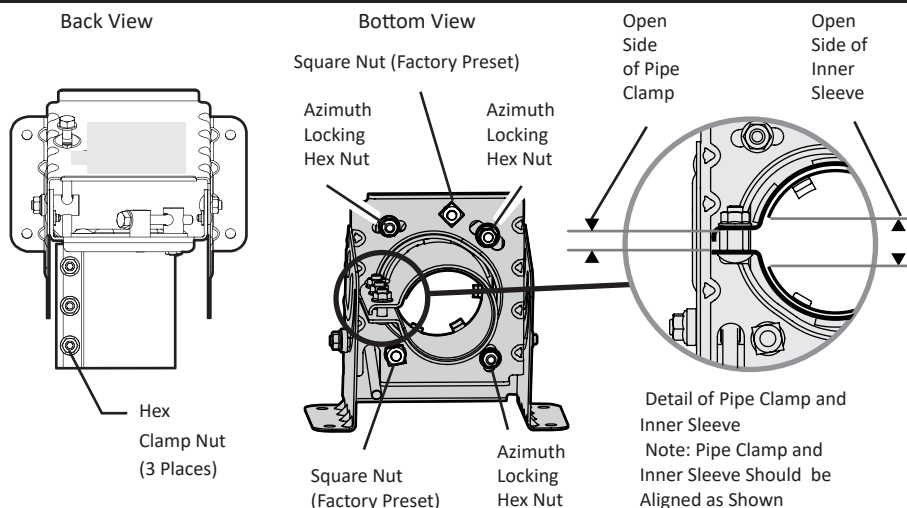
CAUTION: The foundation design shown does not represent an appropriate design for any specific locality. Soil conditions vary and may not meet design criteria given in Note 2. Consult a local professional engineer to determine your soil conditions and appropriate foundation.

ASSEMBLY AND INSTALLATION

Installing Az/El Cap Mount Onto Pole

The az/el cap is factory pre assembled. No assembly is required. Before installing az/el cap onto pole, installation mount should be in place. Loosen (3) az/el locking nuts on pipe clamp.

Install az/el cap onto pole. If using 2 7/8" ground pole, ensure that the inner sleeve is inserted and that the open side is aligned with the open side of the pipe clamp (see Bottom View). If using 3.00" ground pole, remove inner sleeve on pipe clamp and discard it. Position the az/el cap in approximate azimuth setting and equally tighten (3) clamp nuts so that cap is held stationary on pole, but can be swiveled with slight pressure. Tighten to approximately 2.7 N-m (2 ft-lb).



Assembling Reflector Onto Az/El Cap Mount

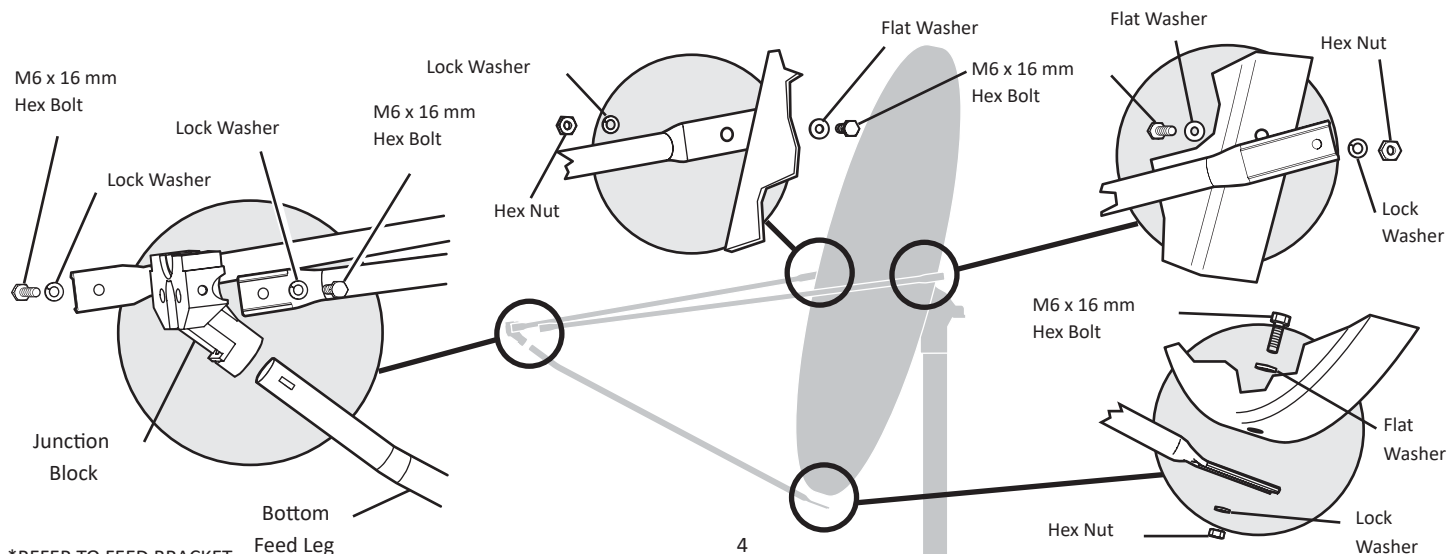
Install four M8 x 60 mm plow bolts into holes in reflector face. Lift reflector and insert exposed portion of bolt into holes into Az/El mount flange. Install 4 lock washers and hex nuts on bolts. Tighten and torque to 15 N-m (11 ft-lb). Do not over tighten. Overtightening bolts may damage reflector. Press fit hole plugs in remaining four unused holes of the reflector.

IMPORTANT: Note orientation of feed leg holes in reflector rim. Top of reflector does NOT have feed leg hole.

Feed Leg Installation

NOTE: Long formed end of side feed leg attaches to the reflector rim, short formed end to side of feed support junction block. Assemble bottom feed leg to bottom of reflector rim. From the inside of reflector rim, assemble flat washer to the M6 x 16 mm hex bolt. Insert bolt through hole in rim and attach bottom feed leg. Secure with lock washer and hex nut. **NOTE:** Bottom feed leg is the one with a slight bend and a lance on one end. It is shorter than the side feed legs.

Leave all hardware loose. Insert bottom feed leg end with lance into socket hole in center of feed support terminal. Twist to engage lances. Attach left and right feed support legs to feed support junction block, securing with M6 x 16 mm hex bolts and lock washers. Refer to instruction to assemble feed assembly and outdoor electronics to junction block. Tighten and torque all hardware to junction block and reflector to 5.4 N-m (4 ft-lb). Tighten two screws in junction block socket equally.



*REFER TO FEED BRACKET INSTRUCTION SHEET FOR SPECIFIC ANTENNA

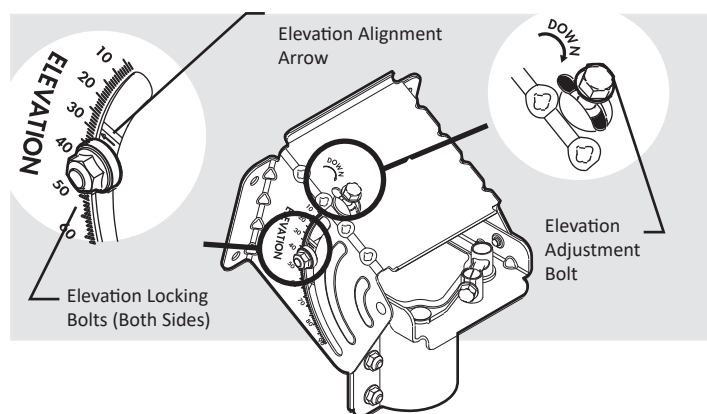
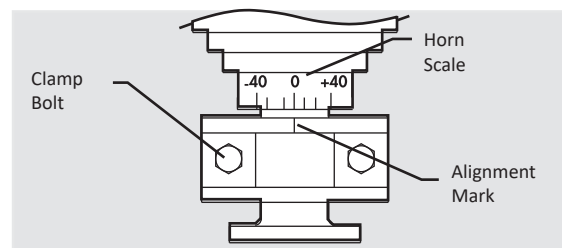
ANTENNA ALIGNMENT PROCEDURE

Satellite Alignment

Alignment with the satellite is obtained by setting polarization, elevation, and azimuth. Charts are provided in this manual to determine the values for your earth station antenna site. "ΔL" is the difference between the earth station antenna site longitude and the satellite longitude. Use "ΔL" and your earth station latitude to obtain polarization, elevation or azimuth setting.

Polarization of Feed

Loosen feed Horn clamp bolts and turn feed clockwise or counterclockwise, depending on being east or west of the satellite as shown on Chart 1. For coarse setting, align marks on the horn scale. Polarization chart assumes antenna system polarization is transmit vertical and satellite vertical Pol is perpendicular to plane of geostationary arc. For horizontal transmit of antenna, feed must be rotated 90° from values shown. (Starting point for polarization adjustment is 0°, as shown. Use a signal strength measuring device for final polarization setting and tighten horn clamp bolts to 5.4 N-m (4 ft-lb).

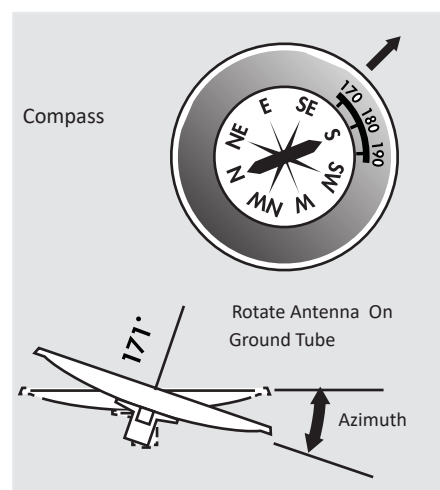
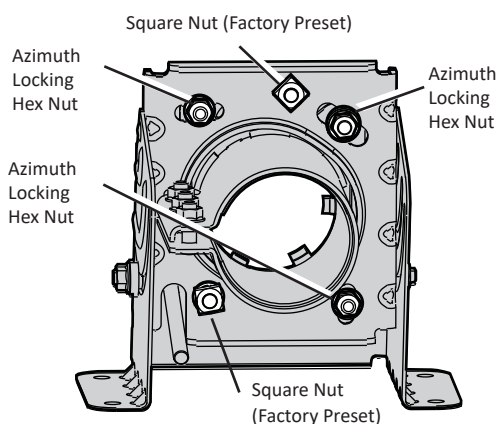


Elevation - Initial Setting

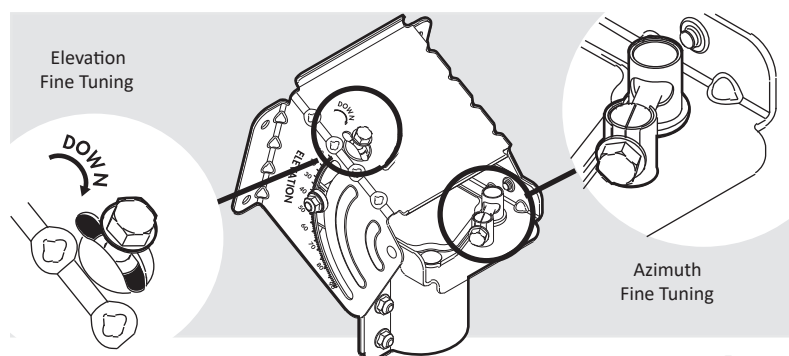
Use Chart 2 and determine your elevation setting. Loosen elevation locking bolts, located in curved slots, on both sides. Turn elevation adjustment bolt clockwise to decrease elevation or counterclockwise to increase elevation. Position the elevation alignment arrow with the appropriate mark on the housing at the desired elevation reading. Scale is in 1 degree increments. This will be an approximate setting. Snug tighten elevation locking bolts. (Finger tighten only).

Azimuth - Initial Setting

Refer to the azimuth value determined on chart 3. Values in chart must be adjusted for magnetic deviation for your location for correct compass reading. Rotate the reflector and az/el mount, on the pipe, pointing it to the compass reading for your location and satellite. Sweep in azimuth for signal. If desired signal is not located, increase or decrease elevation setting and repeat the azimuth sweep. Tighten progressively (1/8 turn each) all three pipe clamp nuts. Repeat until 24 N-m (18 ft-lb) torque is reached.



Example Depicts Azimuth Heading To 171°
(Azimuth ± Magnetic Deviation)



Elevation and Azimuth Fine Tuning

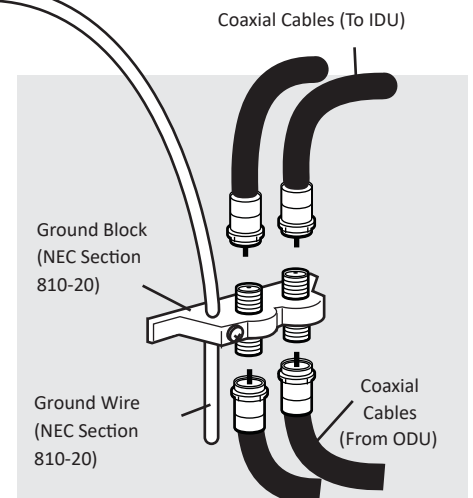
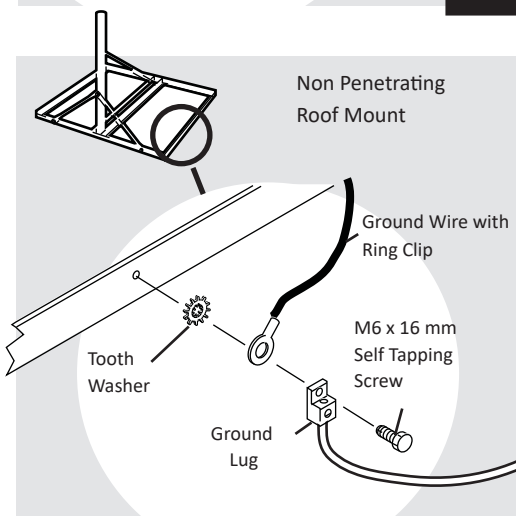
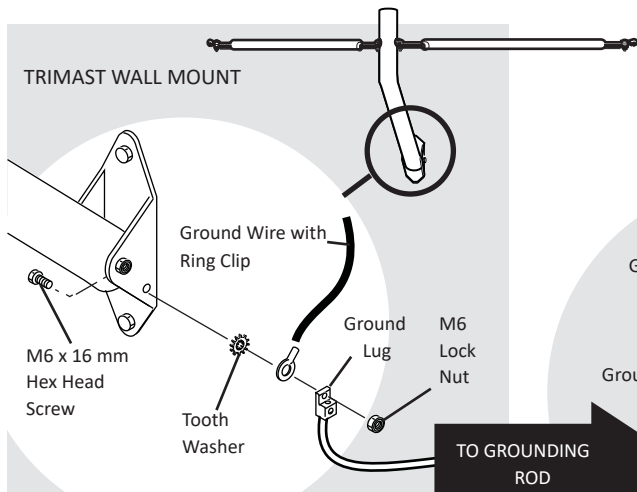
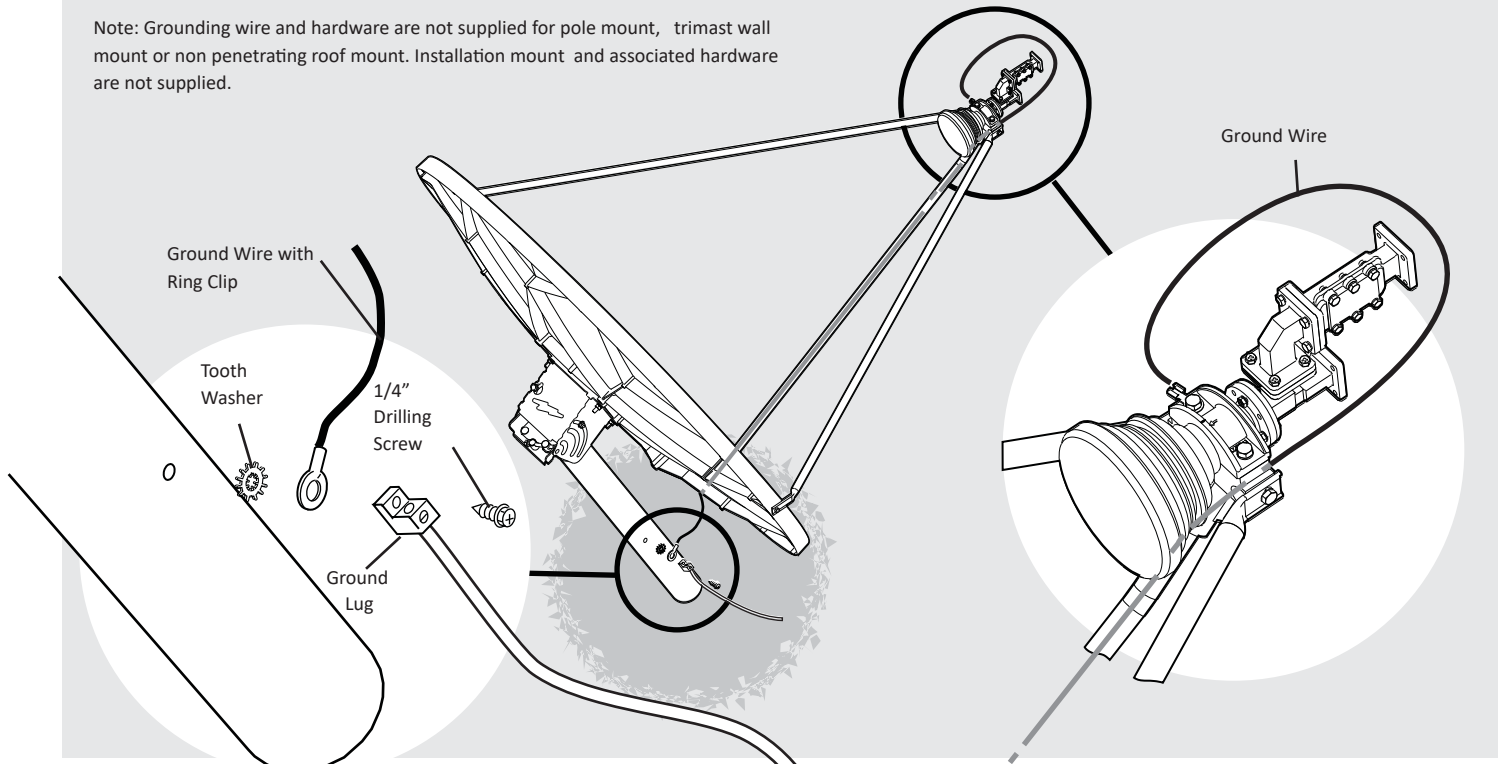
Loosen (3) azimuth locking nuts. Note that the square nuts are factory preset, and should not be loosened or tightened. Turn the azimuth fine tune bolt clockwise or counterclockwise for azimuth fine tuning.

Use a signal strength measuring device to obtain the most accurate alignment and maximum antenna performance. Alternate between elevation and azimuth fine tuning to reach maximum signal strength, until no improvement can be detected. Tighten and torque all hardware, alternating sequence, until all bolts are equally torqued to 24 N-m (18 ft-lb).

GROUNDING PROCEDURE

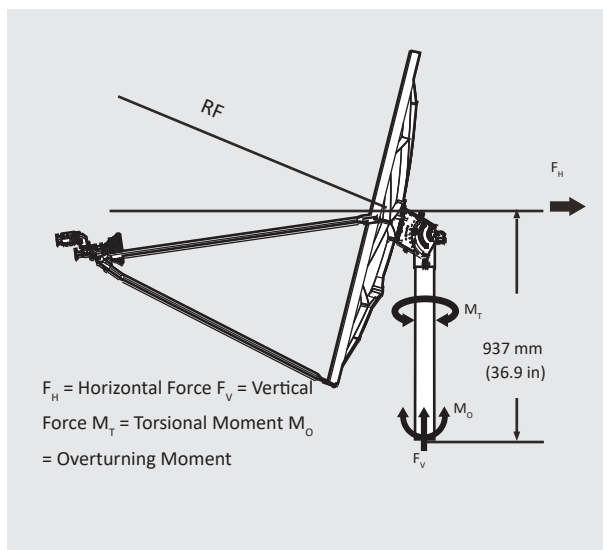
INSTALLATION POLE MOUNT

Note: Grounding wire and hardware are not supplied for pole mount, trimast wall mount or non penetrating roof mount. Installation mount and associated hardware are not supplied.



Note: Ground wire, secure clamp, grounding rod, coaxial cables and ground block are not supplied.

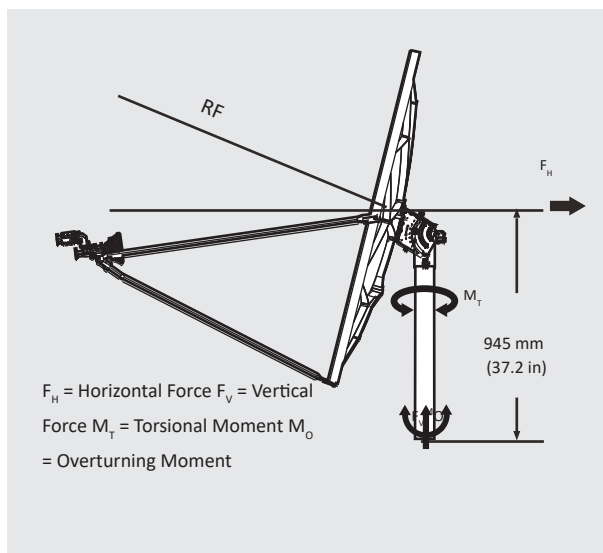
IMPORTANT: All antenna systems must be properly grounded. Refer to NEC (National Electric Code) Article 810, 820 and local building codes for specific requirements. Typical grounding methods are shown as examples. Tighten all hardware securely to assure good continuity.



96 cm Antenna Survival Wind Loads at 125 mph Velocity

Elevation Degrees		Force N (Pounds)				Moments N-m (Foot-Pounds)			
Mech.	Beam	F_H		F_V		M_T		M_O	
0	15	3,323	(747)	-89	(-20)	203	(150)	3,114	(2,301)
10	25	3,145	(707)	-667	(-150)	199	(147)	2,947	(2,178)
20	35	3,056	(687)	-1,286	(-289)	188	(139)	2,863	(2,116)
30	45	2,767	(622)	-1,837	(-413)	171	(126)	2,592	(1,916)
40	65	2,438	(548)	-2,215	(-498)	145	(107)	2,286	(1,689)
50	75	2,126	(478)	-2,438	(-548)	122	(90)	1,992	(1,472)
60	85	1,770	(398)	-2,546	(-573)	95	(70)	1,660	(1,226)
70	95	1,330	(299)	-1,971	(-443)	73	(54)	1,246	(921)

M_O based on 937 mm (36.9 in) from mounting surface of center line of antenna. Values shown represent maximum forces for any wind direction and include 1.5 FS. Height and exposure factors from uniform building code are NOT included. Center line based on 36" max. height of mounting post.

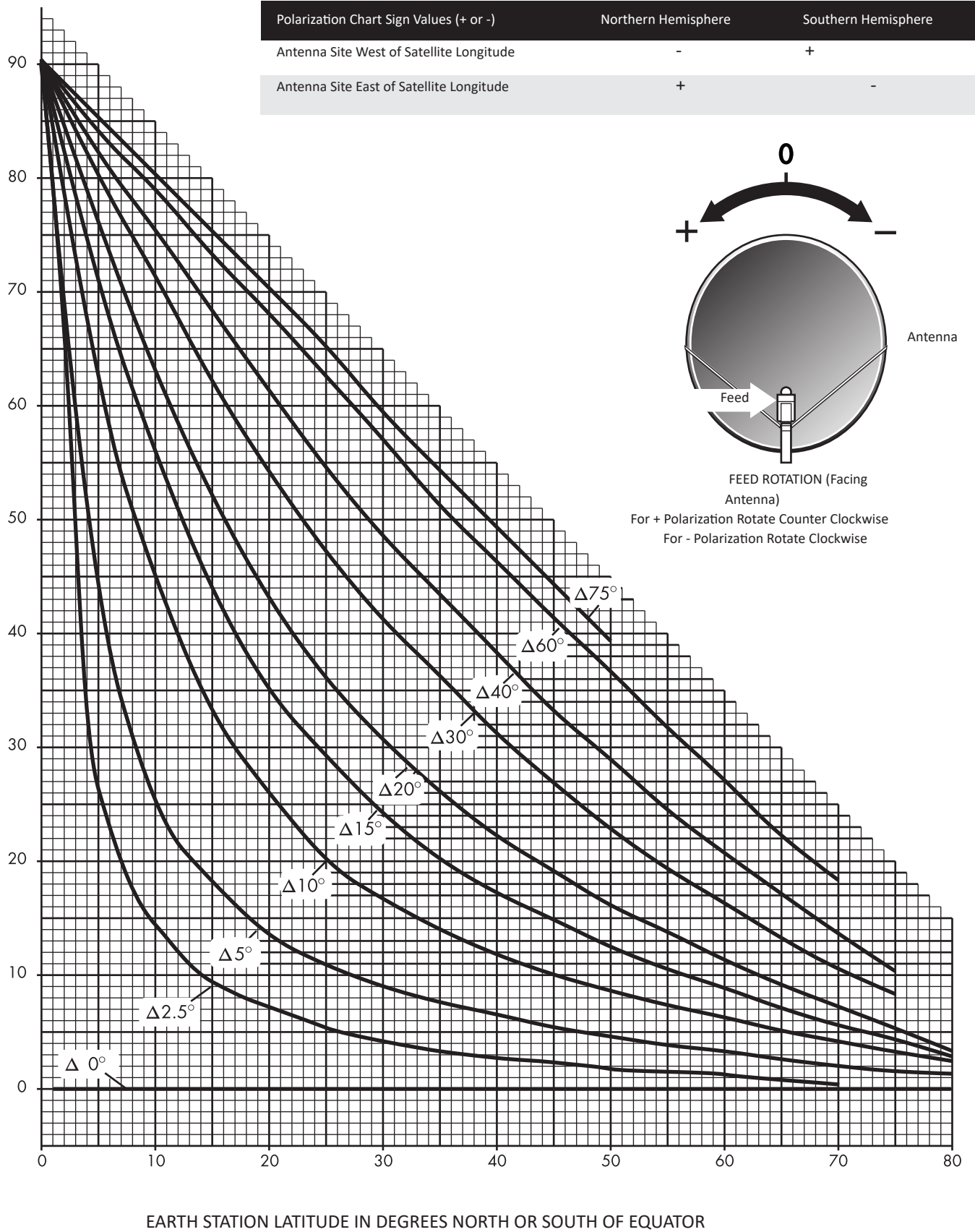


1.2 m Antenna Survival Wind Loads at 125 mph Velocity

Elevation Degrees		Force N (Pounds)				Moments N-m (Foot-Pounds)			
Mech.	Beam	F_H		F_V		M_T		M_O	
0	17	5,716	(1,285)	-156	(-35)	678	(500)	5,401	(3,991)
10	27	5,413	(1,217)	-1,143	(-257)	662	(488)	5,115	(3,780)
20	37	5,258	(1,182)	-2,211	(-497)	629	(464)	4,969	(3,672)
30	47	4,764	(1,071)	-3,163	(-711)	571	(421)	4,501	(3,326)
40	57	4,195	(943)	-3,812	(-857)	484	(357)	3,964	(2,929)
50	67	3,656	(822)	-4,195	(-943)	405	(299)	3,455	(2,553)
60	77	3,051	(686)	-4,381	(-985)	315	(232)	2,883	(2,130)
70	87	2,291	(515)	-3,390	(-762)	241	(178)	2,585	(1,910)

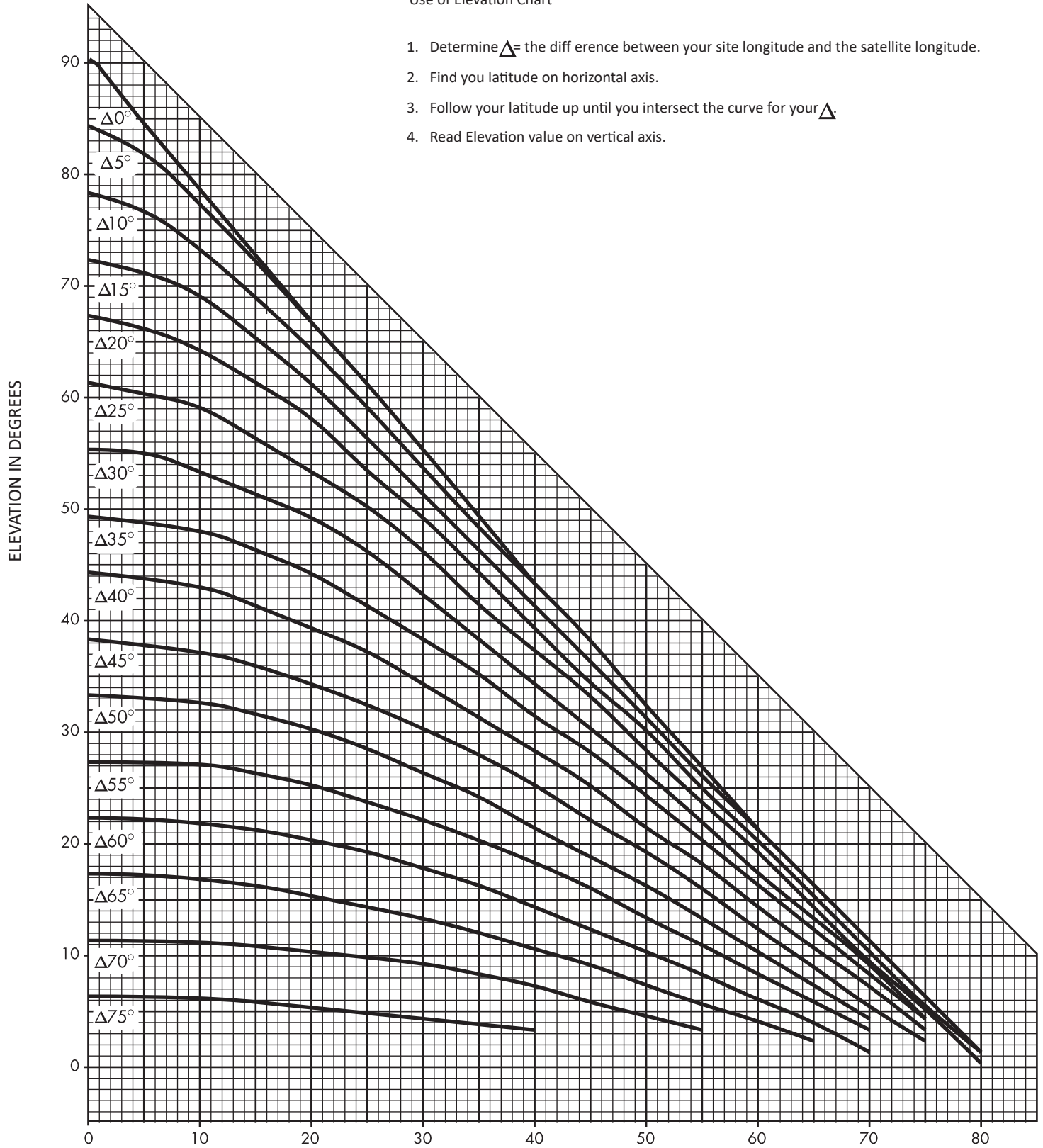
M_O based on 945 mm (37.2 in) from mounting surface of center line of antenna. Values shown represent maximum forces for any wind direction and include 1.5 FS. Height and exposure factors from uniform building code are NOT included. Center line based on 36" max. height of mounting post.

POLARIZATION CHART

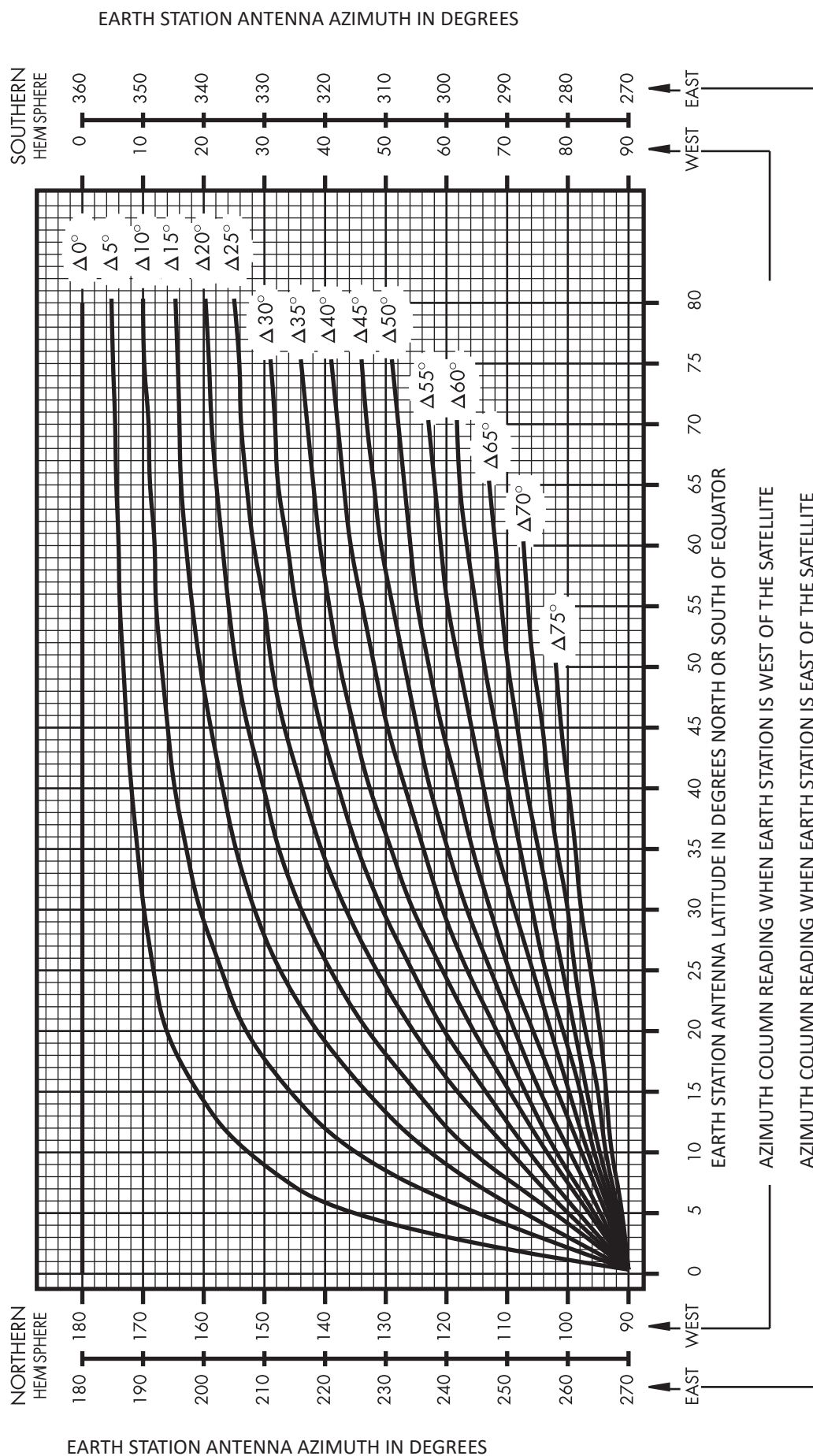


Use of Elevation Chart

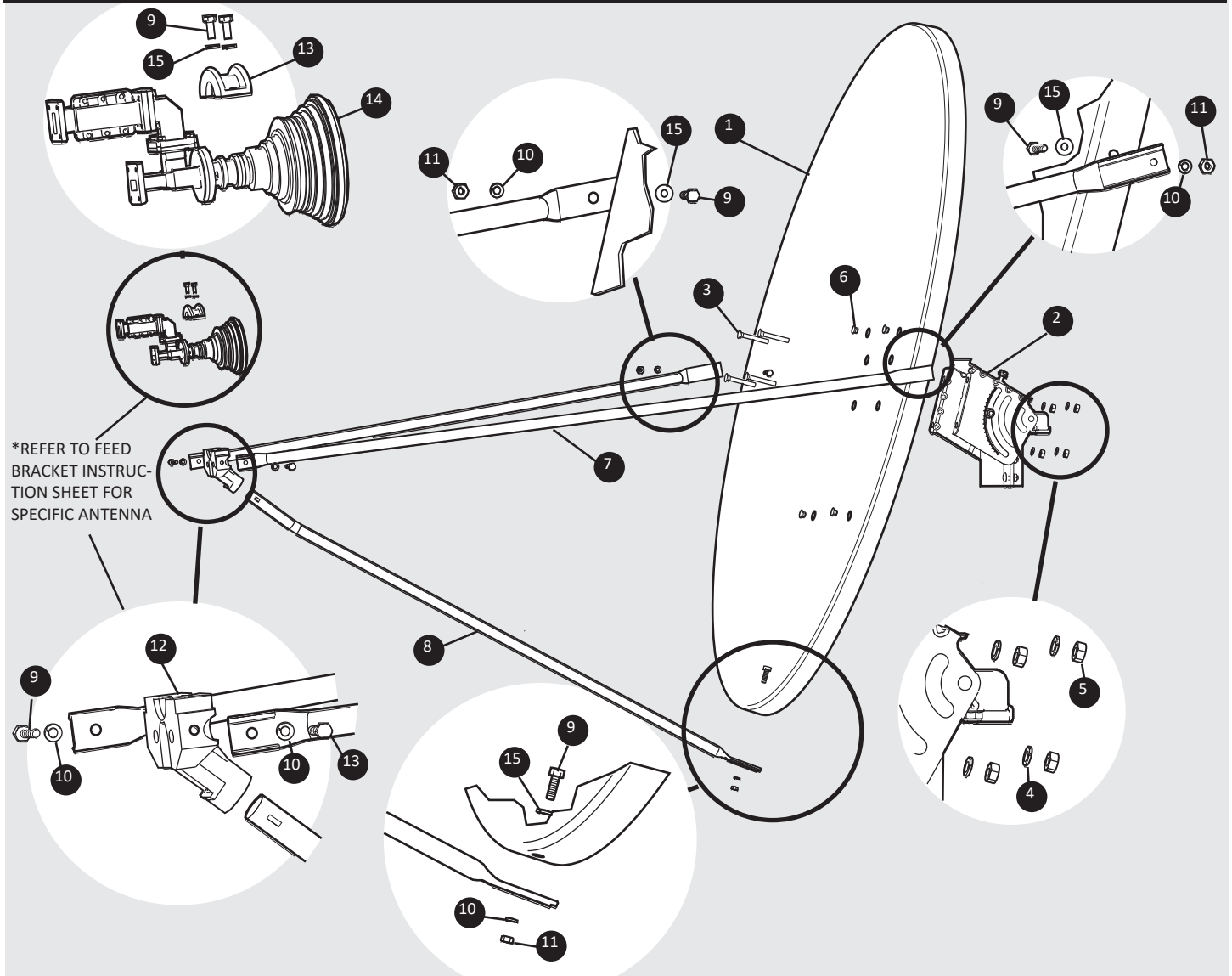
1. Determine Δ = the difference between your site longitude and the satellite longitude.
2. Find your latitude on horizontal axis.
3. Follow your latitude up until you intersect the curve for your Δ .
4. Read Elevation value on vertical axis.



" Δ " IS THE DIFFERENCE BETWEEN THE EARTH STATION
ANTENNA SITE LONGITUDE AND THE SATELLITE LONGITUDE



PARTS LIST



NO.	DESCRIPTION	QTY.
1	96cm Reflector or 1.2m Reflector	1
2	Azimuth/Elevation Assembly	1
3	M8 x 60mm Plow Bolt	4
4	M8 Stainless Steel Lock Washer	4
5	M8 x 1.25 Hex Head Nut	4
6	Plug Cap	4
7	96cm or 1.2m Side Feed Leg	2
8	96cm or 1.2m Bottom Feed Leg	1
9	M6 x16 Stainless Steel Hex Head Bolt	7
10	M6 Stainless Steel Lock Washer	5
11	M6 x 1 Hex Head Nut	3
12	Junction Block	1
13	Mouting Block Clamp	1
14	Feed Assembly	1
15	M6 Flat Washer	5

PERIODIC INSPECTION & MAINTENANCE

To ensure peak performance of the antenna system and to maintain validity of the warranty, the user should perform a periodic inspection every 6 months or following any severe weather event. As a minimum the following items should be inspected.

1. Installation Mount

Check for loose hardware - tighten if necessary.

Check integrity of anchor bolts or hardware securing mount to the building or foundations

Check ballast of Non-Penetrating Roof Mounts - cracked or broken blocks must be replaced.

Check hardware and structural members for signs of corrosion - repair or replace as needed

2. Antenna Back Structure or Az/El Mount

Check for loose hardware - tighten if necessary.

Check for signs of structural damage such as bending or cracking

Check hardware and structural members for signs of corrosion - repair or replace as needed

3. Reflector

Check integrity of bolts securing reflector to back structure or az/el mount. Tighten any loose hardware.

Check for signs of damage such as cracking. Inspect reflector face for impact damage.

Check hardware for signs of corrosion - repair or replace as needed.

4. Feed Support Structure

Check for loose hardware - tighten if necessary.

Check for signs of structural damage such as bending.

Check hardware and structural members for signs of corrosion - repair or replace as needed.

5. Feed & RF Components

Check for loose hardware - tighten if necessary.

Check hardware for signs of corrosion - repair or replace as needed.

Check feed lens or window for damage or signs of leaking.

Check waveguide connections between feed and RF electronics.

6. Electrical

Check for loose cables and connectors - tighten if necessary.

Check for tight grounding connections.

Check cables for weathering or cracks.