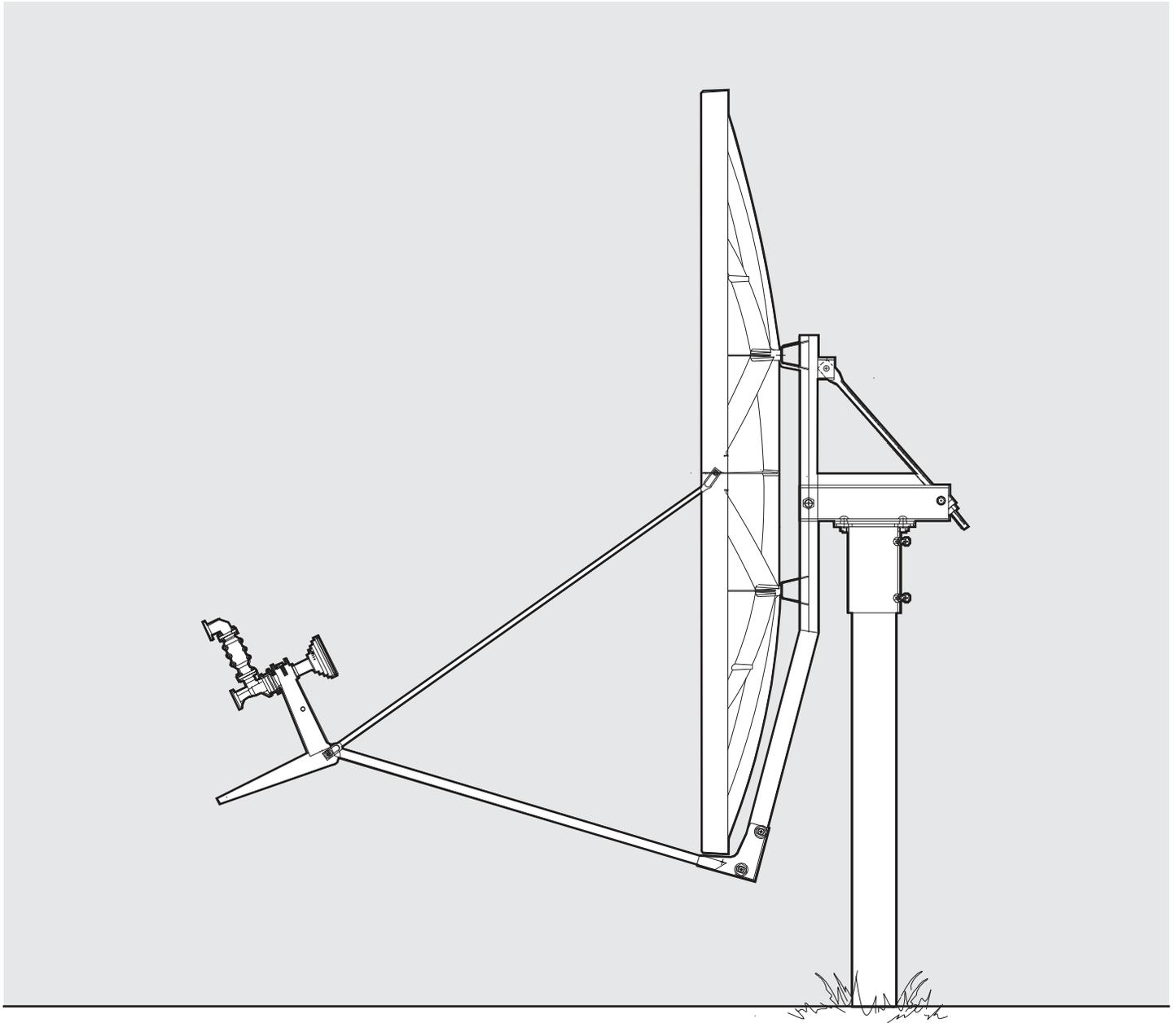


Type 183

1.8 Meter Transmit Receive Antenna System



MANUAL REVISION HISTORY

DATE	DESCRIPTION	REVISION
01/06	9007262	Rev A
07/07	5074382	Rev B
01/08	5077506	Rev C
03/10	725	Rev D
04/11	EC-01063	Rev E

WARRANTY

SKYWARE GLOBAL VERY SMALL APERTURE TERMINAL (VSAT) PRODUCTS TWELVE (12) MONTH LIMITED WARRANTY

Seller warrants that all SKYWARE GLOBAL 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.** SKYWARE GLOBAL 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. SKYWARE GLOBAL will not accept liability for any damage caused by a satellite system due to the many unknown variable

PRE INSTALLATION CONSIDERATIONS

DESCRIPTION:

The 1.8 Meter Transmit-Receive Antenna System is designed for two-way satellite communications, and is suitable for commercial or consumer use.

TOOLS REQUIRED:

Compass	19 mm or 3/4 in Deep Socket (1/2 in or 13 mm Drive)
Clinometer	Ratchet Wrench (1/2 in or 13 mm Drive)
228 mm or 9 in Magnetic Bubble Level	10 mm Nut Driver
Torque Wrench (Capacity 5 - 237 N-m) (4 - 175 ft-lb)	10 mm Box/Open End Wrench
30 mm (1.25 in) Adjustable Crescent Wrench	10 mm Socket (For Torque Wrench)
24 mm or 15/16 in Deep Socket (1/2 in or 13 mm Drive)	30 mm Deep Socket (1/2 in or 13 mm Drive)

ADDITIONAL INSTALLATION MATERIALS (Not Included with Antenna)

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 required).

RG-6 Coaxial Cables from antenna to indoor unit(s).

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.

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 (see page 4). To assist in the foundation design, refer to "Antenna Wind loads" in the Appendix "B" on page 18.

BOLT TORQUE

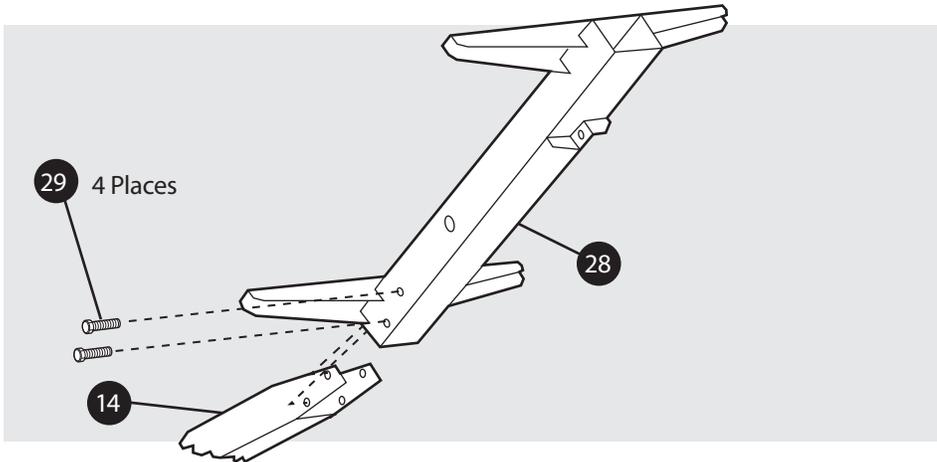
DIN CLASS 5.6						DIN CLASS 8.8		
M6	M8	M12	M16	M20	M22	M8	M12	M16
5 N-m	15 N-m	51 N-m	125 N-m	168 N-m	230 N-m	24 N-m	90 N-m	203 N-m
4 ft-lb	11 ft-lb	38 ft-lb	92 ft-lb	24 ft-lb	170 ft-lb	18 ft-lb	66 ft-lb	150 ft-lb

Head marking 5.6 or 8.8, if no head marking use DIN Class 5.6 values in above chart.

EXCEPTIONS TO ABOVE CHART:

- M12 x 100 mm round head square neck bolts securing antenna to mount. Torque to 27 N-m (20 ft-lb).
- M12 x 130 mm hex head bolts securing feed support to backframe tube. Torque to 47 N-m (35 ft-lb).

ASSEMBLY AND INSTALLATION



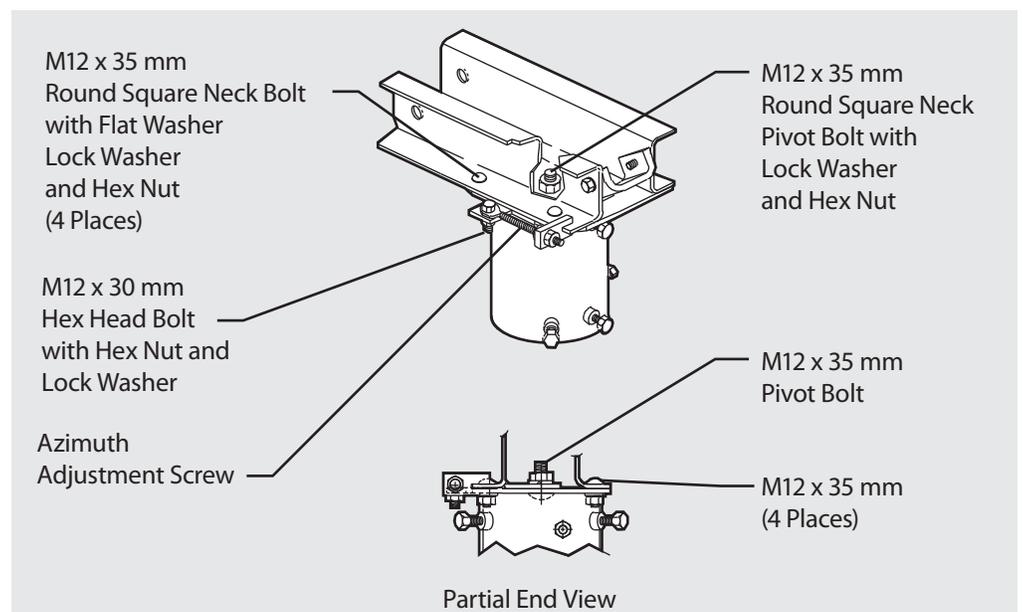
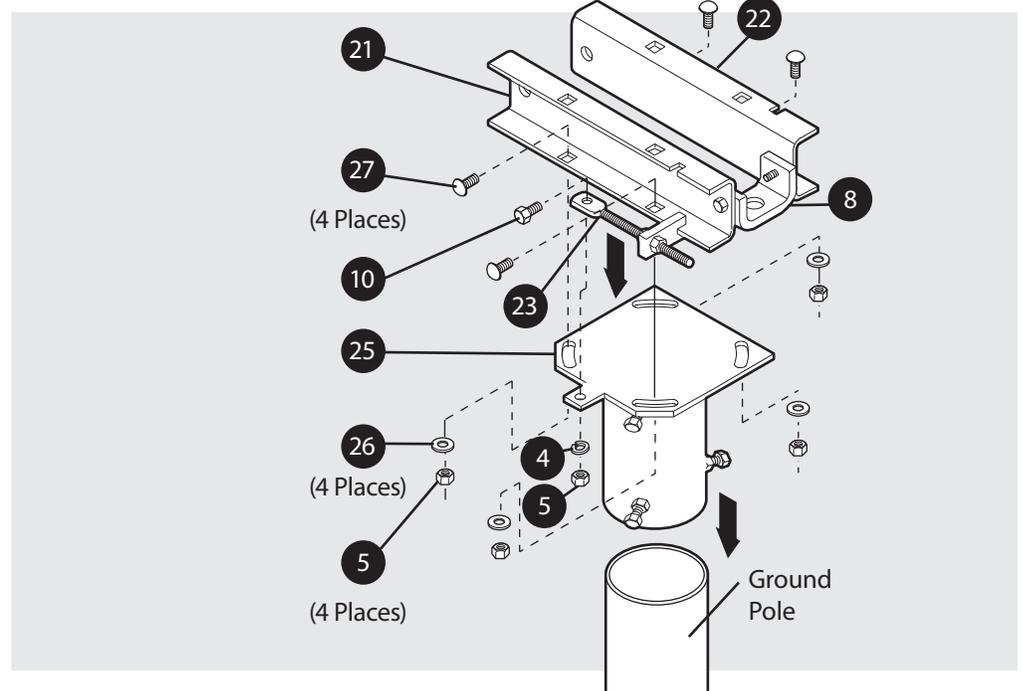
Backframe Tube

Assemble bottom tube (14) to backframe (28) with four M12 x 19 mm hex bolts (29), as shown.

Torque to 47-54 N-m (35-40 ft-lb).

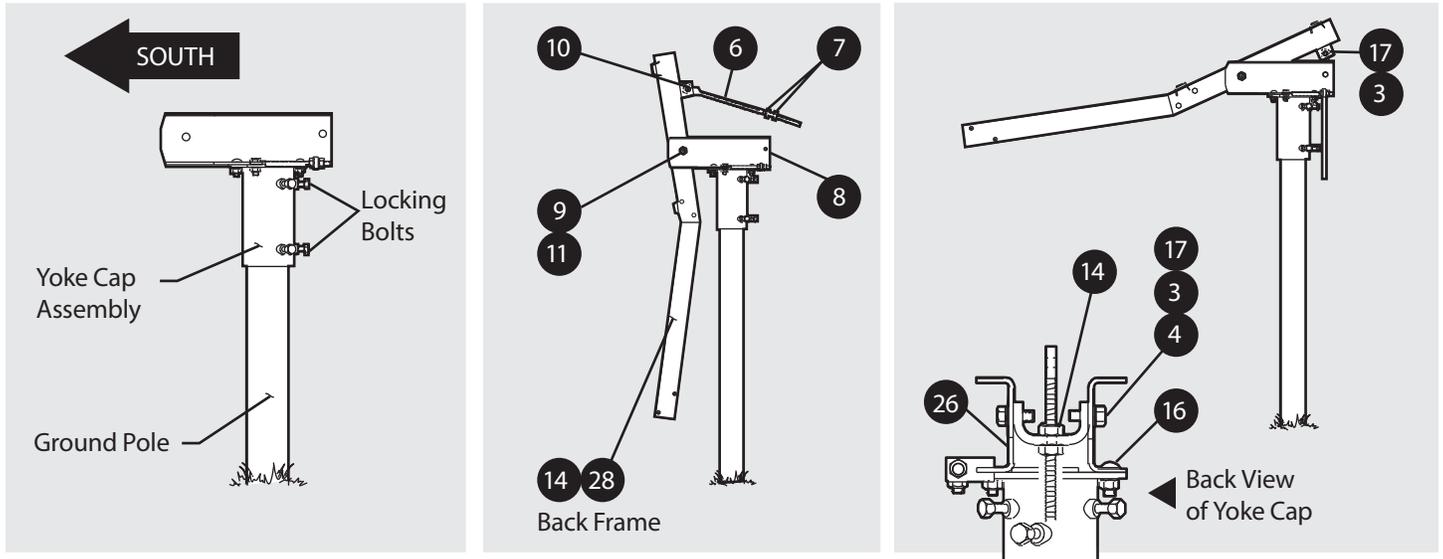
Yoke Cap Assembly

Place yoke cap assembly (25) onto ground pole. Mount channel to yoke cap assembly with four M12 x 35 mm round head square neck bolts (Item 27), flat washers and hex nuts (5 & 26) as shown. Loosen trunnion bolts. Secure azimuth adjusting bolt (23) to yoke cap assembly with M12 x 30 mm hex bolt, lock washer and hex nut (4, 5 & 10).



Yoke Cap and Backframe Assembly

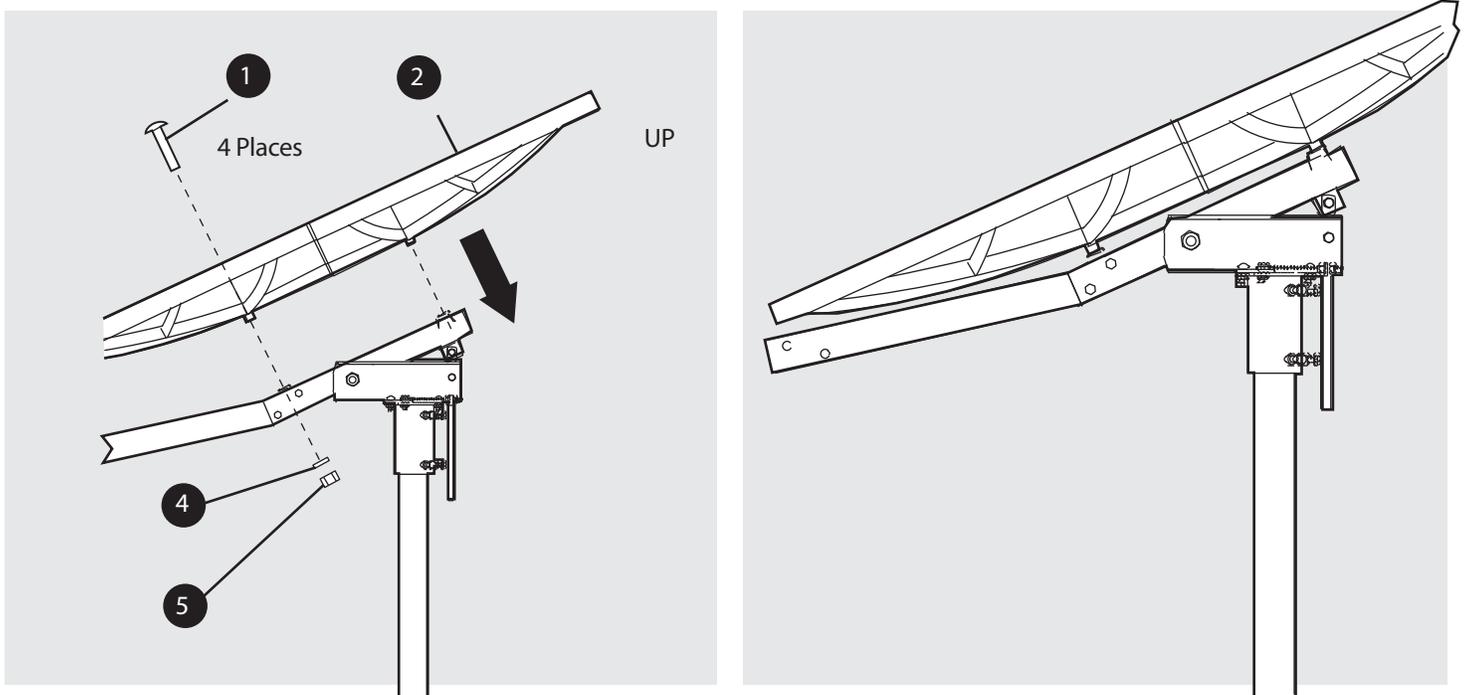
Point yoke cap assembly south and temporarily secure to ground pole with locking bolts. Push M12 x 35 mm round head square neck pivot bolt through center square hole in cap top plate and attach channel assembly. Secure with M12 hex nut and lock washer. Torque to 11-15 N-m (8-11 ft-lb). Assemble bottom tube (14) to backframe (28) as shown. Torque M12 x 19 mm special bolt (29) to 47-54 N-m (35-40 ft-lb). Install backframe assembly onto yoke cap assembly. Secure with M20 x 140 mm hex bolt and hex nut (9 & 11). Loosen M12 hex bolt (10) and remove one M22 hex nut (7) from elevation adjusting screw (6) and insert into trunnion (8). Trunnion (8) in position shown is for 12° and above elevation. If elevation is less than 13°, pivot trunnion 180 degrees. Reinstall M22 hex nut (7). Do not tighten. Run up M22 hex nuts (7) on elevation screw (6) and place backframe in birdbath position.



Antenna Installation

Insert four M12 x 100 mm round head square neck bolts (1) into reflector (2) and place reflector onto backframe. Secure reflector to backframe with four M12 lock washers and hex nuts (4 & 5). Tighten and torque to 27 N-m (20 ft-lb). Torque cross arm bolts (12) 4 places to 58 N-m (40-45 ft-lb).

IMPORTANT: "UP" arrow on reflector must be as shown. Make sure round head square neck bolts are seated correctly before securing reflector to backframe. Pre-torque (4) M12 x 35 mm round head square neck bolts (Item 27) to 12 N-m (8-10 ft-lb).



Feed Support Tube

Install M6 x 40 mm hex bolt (15) with flat washer (16) into bottom hole in reflector rim (2) and secure with M6 flat washer and M6 hex nut (16 & 17). (Refer to Figure 1.1)

IMPORTANT: M6 x 40 mm hex bolt (15) in bottom of reflector rim, fits into hole on top of support tube lower end for positioning.

Assemble feed support tube (19) onto backframe and secure with two M12 x 130 mm hex bolts (12) with M12 tooth lock washer. (13)

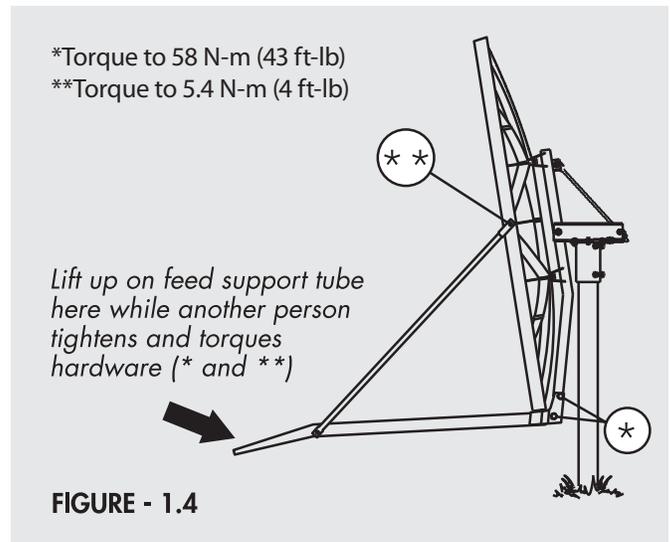
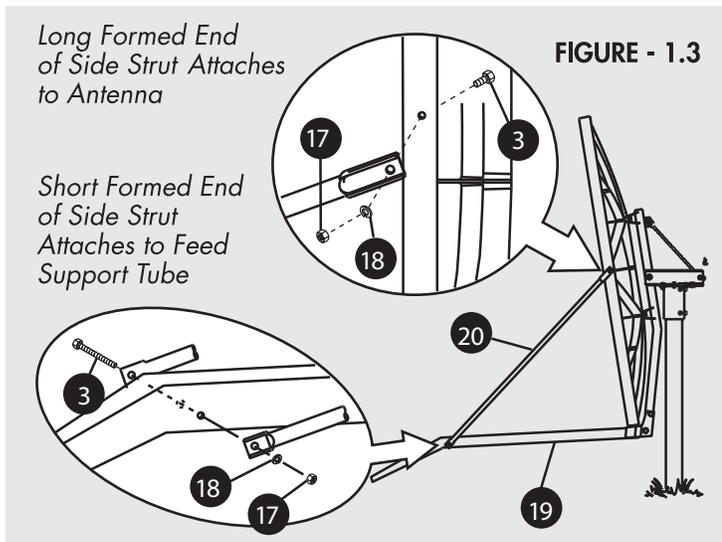
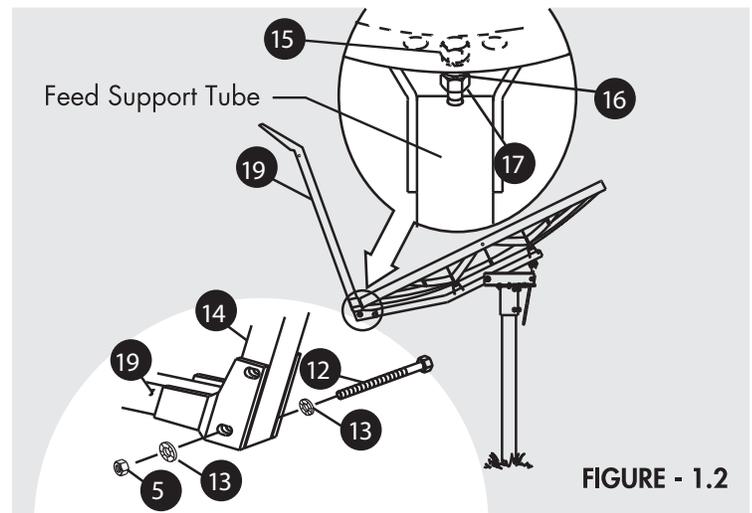
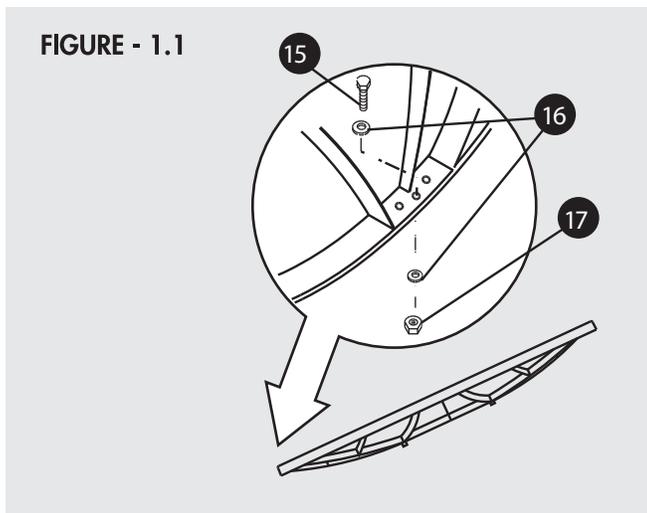
NOTE: M12 tooth washer (13) must be assembled on bolts (12), with one under head of bolts and one under hex nuts (4). (Refer to Figure 1.2) Leave these bolts loose.

Swing reflector down by loosening nuts (7) on elevation screw (6). When reflector is in a convenient position, (approximately 20 degrees), snug tighten nuts on elevation screw.

Install left and right side struts (20) onto reflector as shown in Figure 1.3. Attach long formed end of side strut (20) to reflector rim by inserting M6 x 20 mm hex bolt (3) thru inside of rim and secure snug, but free to pivot with M6 lock washer and hex nut (18 & 17). Attach short formed end of side struts (20) to feed support tube using M6 x 20 mm hex bolt, lock washer and hex nut (3, 18, 17).

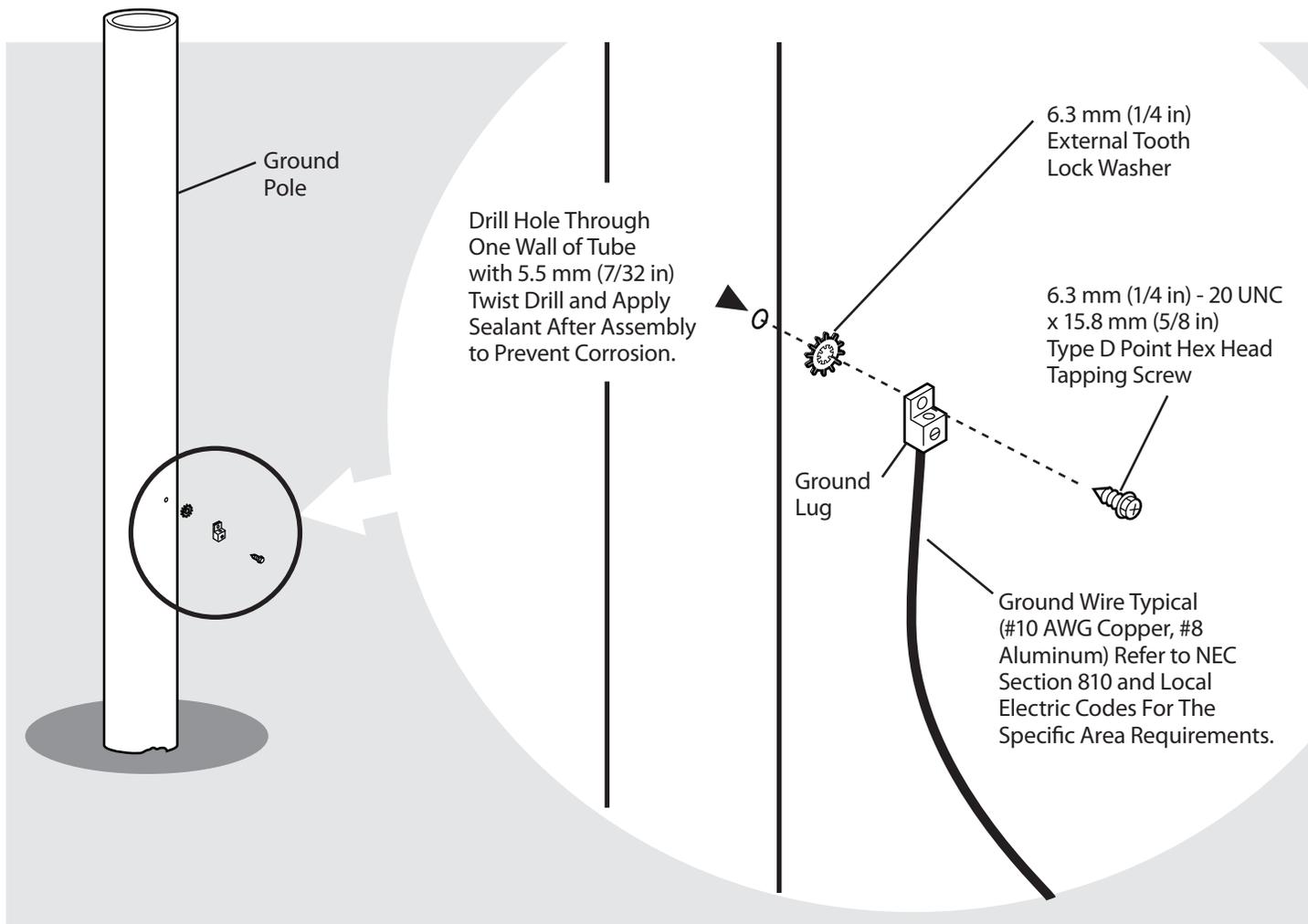
IMPORTANT: Without using excessive pressure, lift feed support tube vertically, just enough to relieve all loads off side struts, while another person tightens and torques M12 hex bolts (*) securing feed support tube to backframe to 47 N-m (35 ft-lb) and M6 hex head bolts (**) securing side struts to reflector to 5.4 N-m (4 ft-lb). (Refer to Figure 1.4)

Install feed/feed horn per instructions provided with these items.



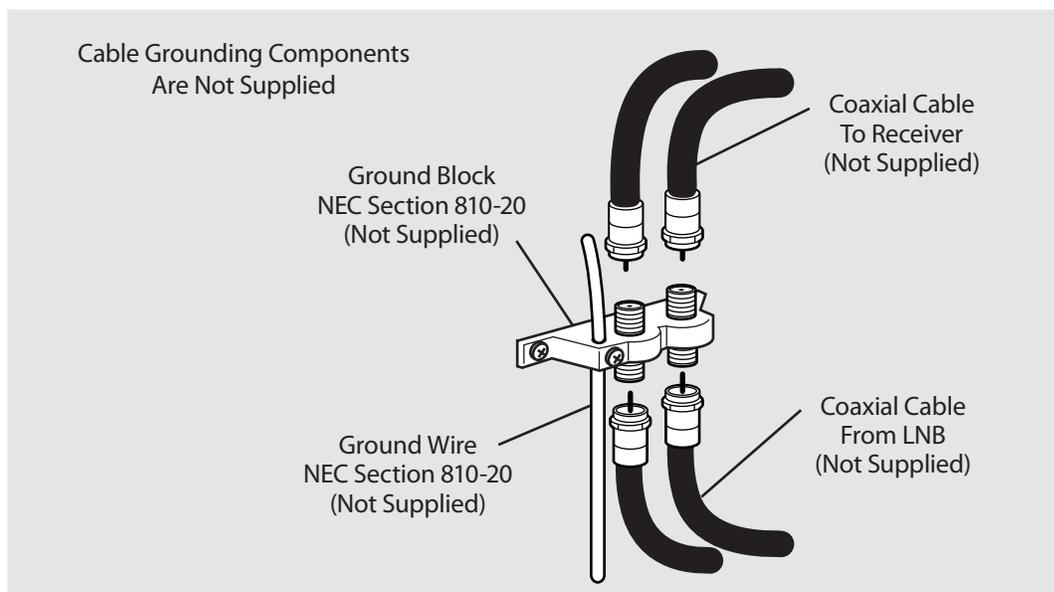
GROUNDING INSTRUCTION FOR GROUND POLE

NOTE: All installations to conform to the latest issue of the National Electric Code and local codes.



NOTE: All installations to conform to latest issue of National Electrical Code. Ground antenna mount assembly and feed cables in accordance with current National Electrical code and local codes.

These illustrations depict typical grounding methods for the ground pole and feed cables. Clamps that provide a solid connection between ground wire and ground source should be used. Tighten and torque all hardware.



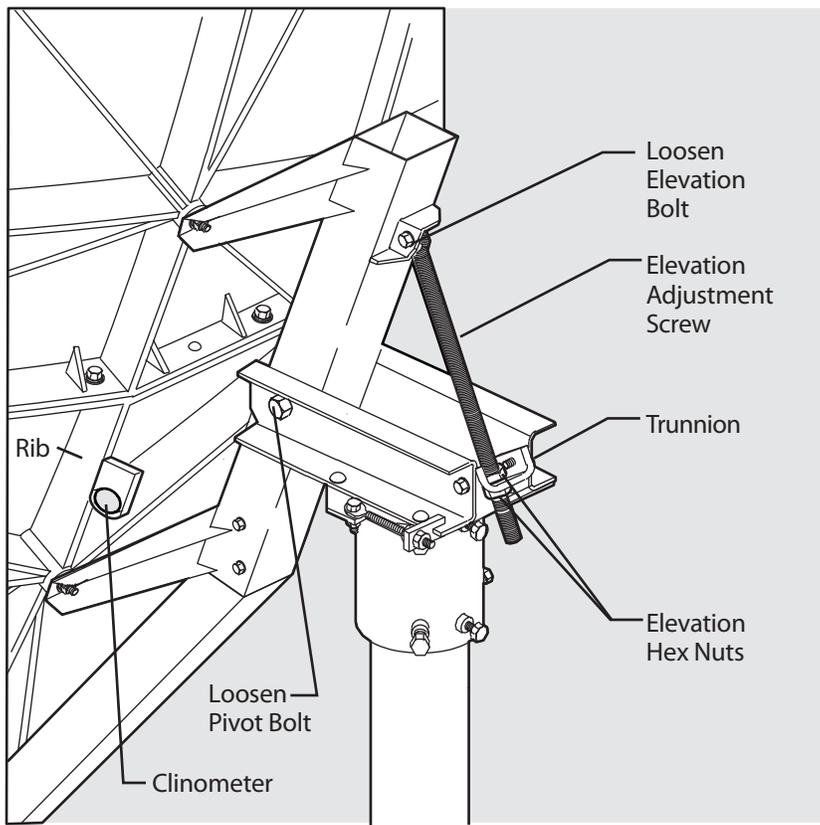
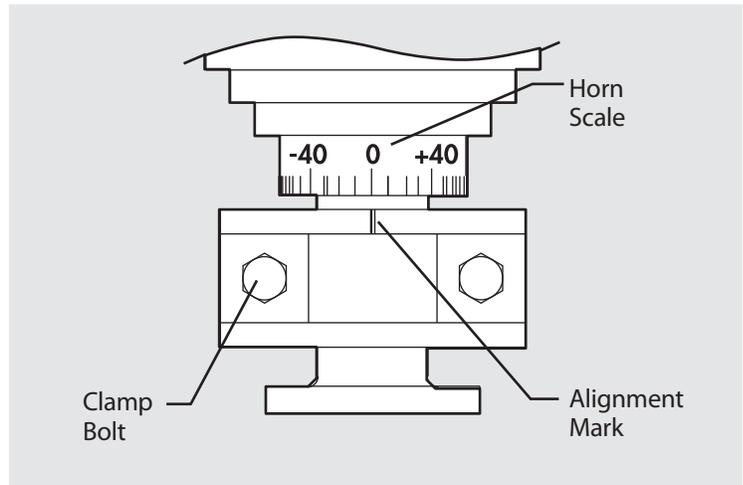
ANTENNA ALIGNMENT PROCEDURE

Satellite Alignment

Alignment with the satellite is obtained by setting polarization, elevation, and azimuth. Charts are provided on page 11, 12 and 13 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 counter clockwise, depending on being east or west of the satellite as shown in Polarization Chart on page 11. Align marks on the horn clamp and appropriate mark 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°).



Elevation Alignment

Use Elevation Chart on page 12 and determine your elevation setting. Using a clinometer, adjust the elevation by turning the elevation screw adjusting nuts until the desired elevation is obtained.

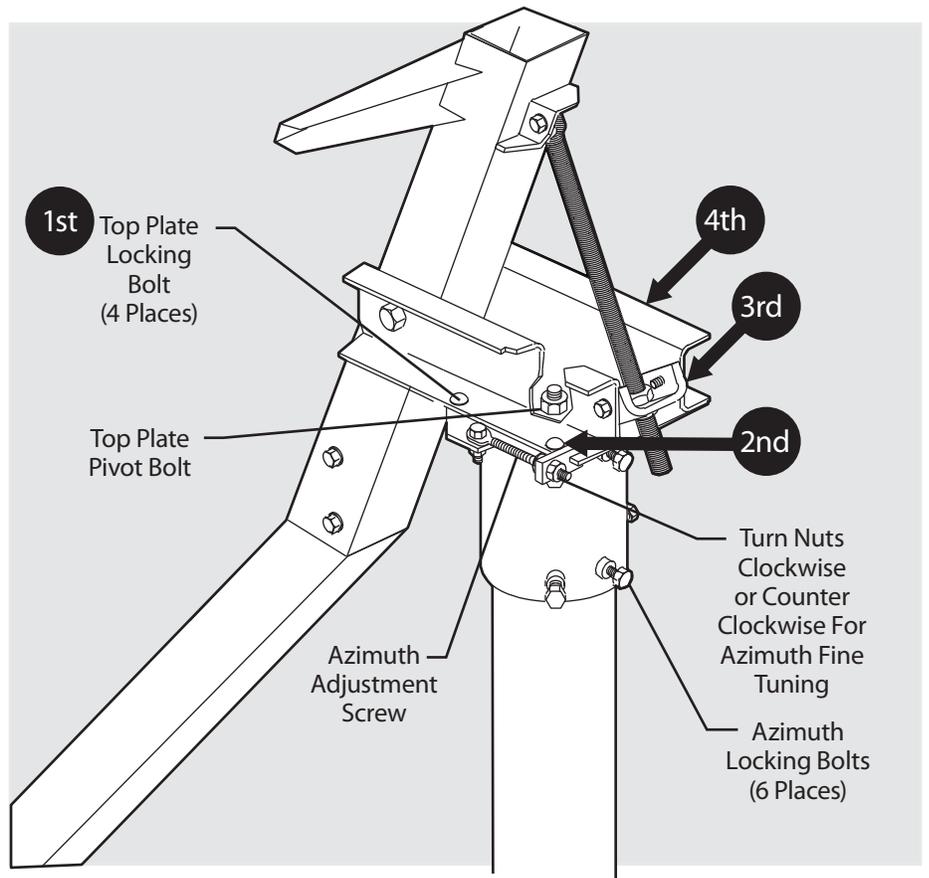
Note: Degree values shown on the clinometer are mechanical. When the reflector face is vertical, mechanical elevation is 90° or axis is 0° , while the beam elevation (signal) axis is 22.62° . Therefore, as the reflector is tilted, remember to compensate for the 22.62° offset angle to get the correct beam elevation. (See Appendix A, Outline Drawing, Page 18). This is an approximate setting. Optimum setting will be achieved during the fine tuning.

Azimuth

Use Azimuth Chart on page 13 and determine your azimuth setting. Values in chart must be adjusted for magnetic deviation for your location for correct compass reading.

Equally tighten the six azimuth locking bolts until snug. This will allow the reflector to rotate with slight resistance.

Rotate reflector and mount, pointing to the compass reading for your location. Slowly sweep the reflector in azimuth until signal is found. If desired signal is not found, increase or decrease elevation setting and repeat the azimuth sweep. Tighten locking bolts.



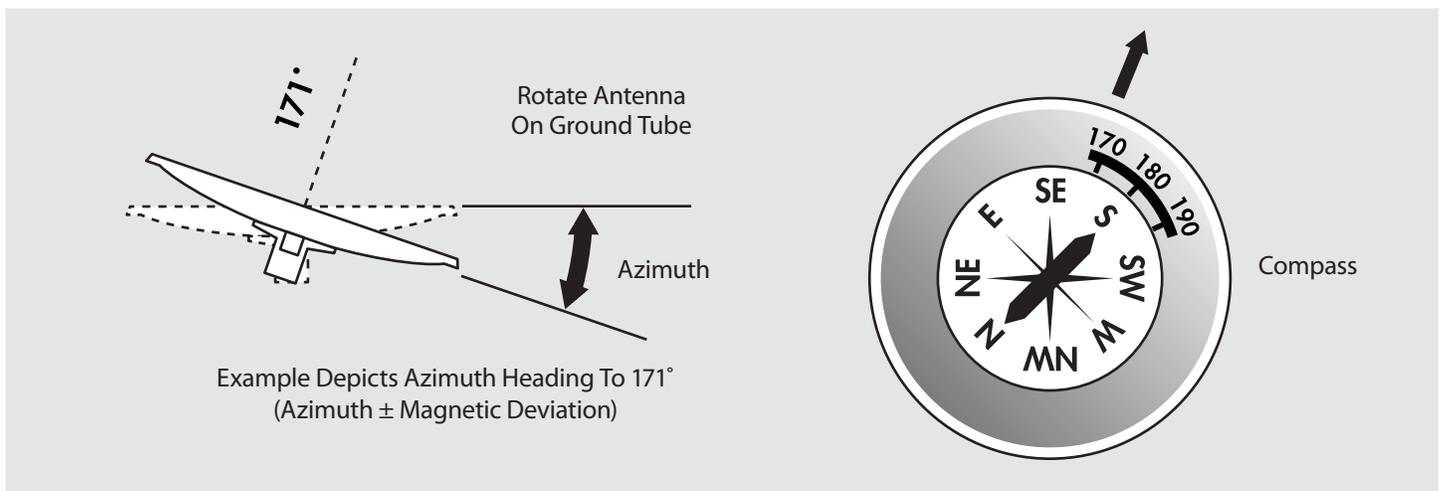
Fine Tuning

Progressively tighten and torque azimuth locking bolts to 100-115 N-m (75-85 ft-lb). The four top plate locking bolts are pre-torqued to 11-15 N-m (8-11 ft-lb). Maintain this torque until after azimuth is fine tuned.

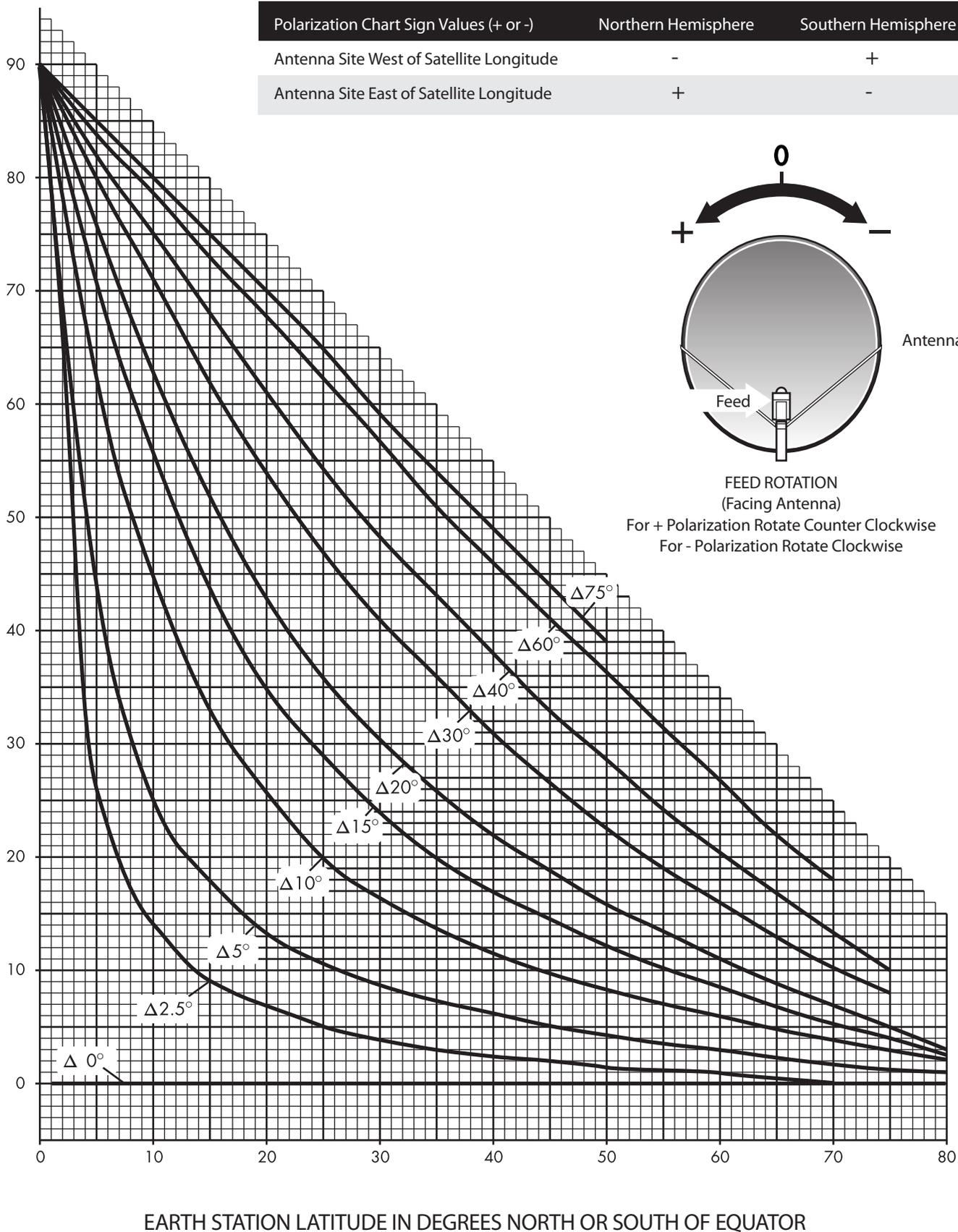
Use a signal strength measuring device for final adjustments to obtain maximum antenna performance. Alternate between elevation and azimuth fine tuning to reach maximum signal strength, until no improvement can be detected. Gradually tighten (1/8 turn increments max.) top plate bolts in sequence 1st, 2nd, 3rd and 4th to 100 N-m (75 ft-lb). Observe for maximum signal strength as elevation screws M22 locking nuts are tightened.

Polarization tune may be checked by slowly rotating feed assembly in clamp. When maximum signal strength is found, gradually tighten clamp bolts. If a signal on the opposite polarity is available, this signal should be minimized.

Tighten and torque all hardware. Refer to Torque Chart on Page 3.



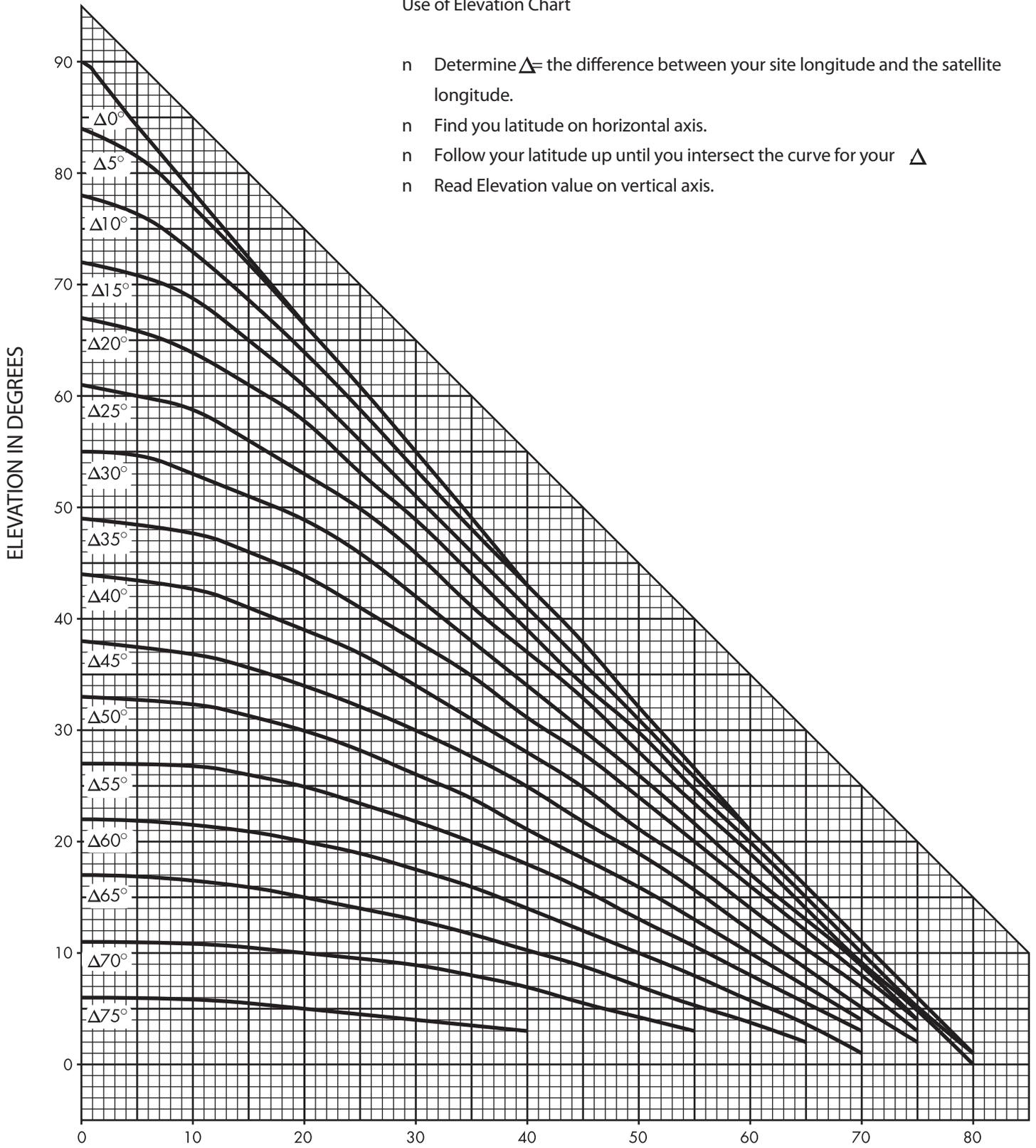
POLARIZATION CHART



ELEVATION CHART

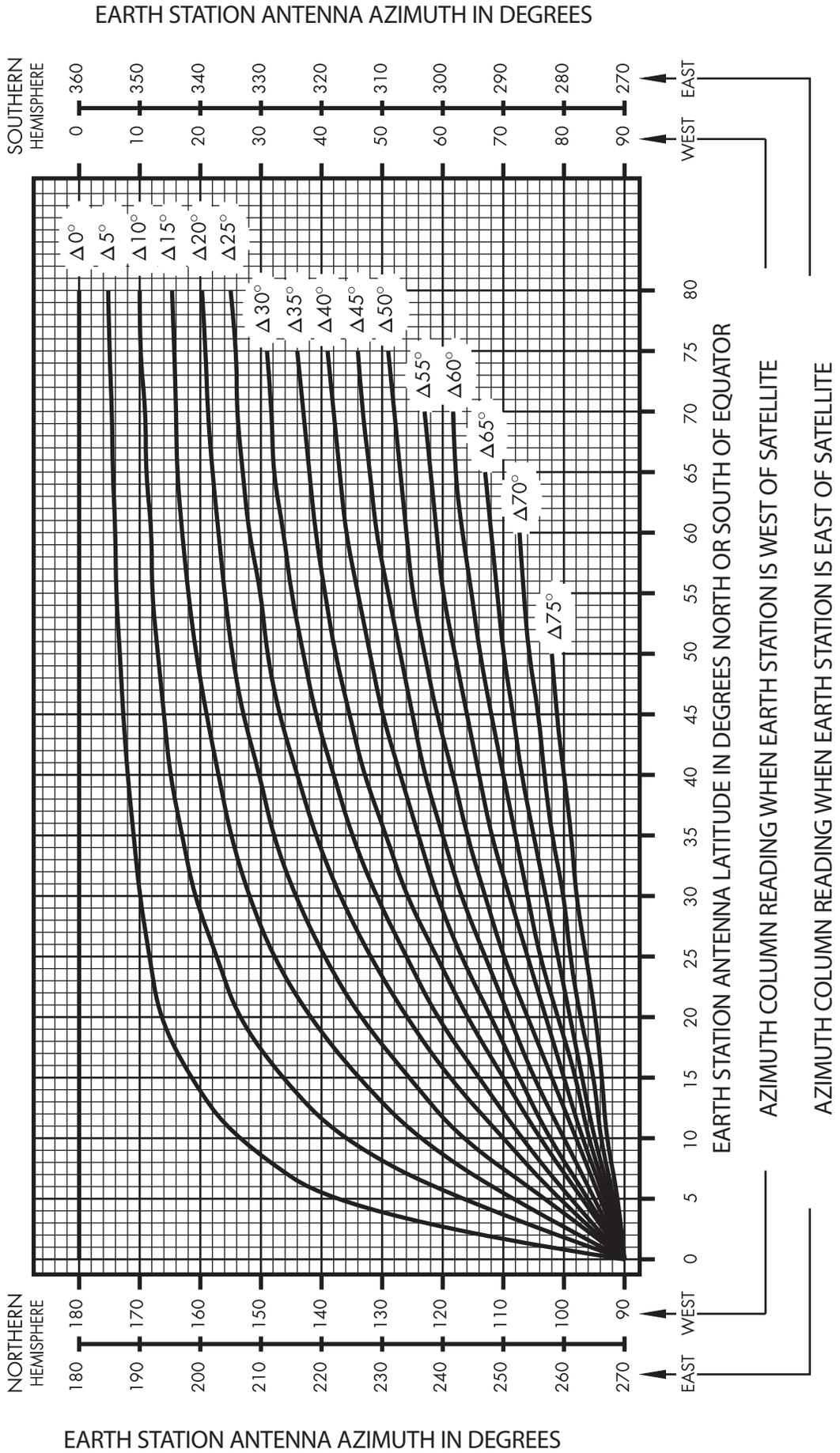
Use of Elevation Chart

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

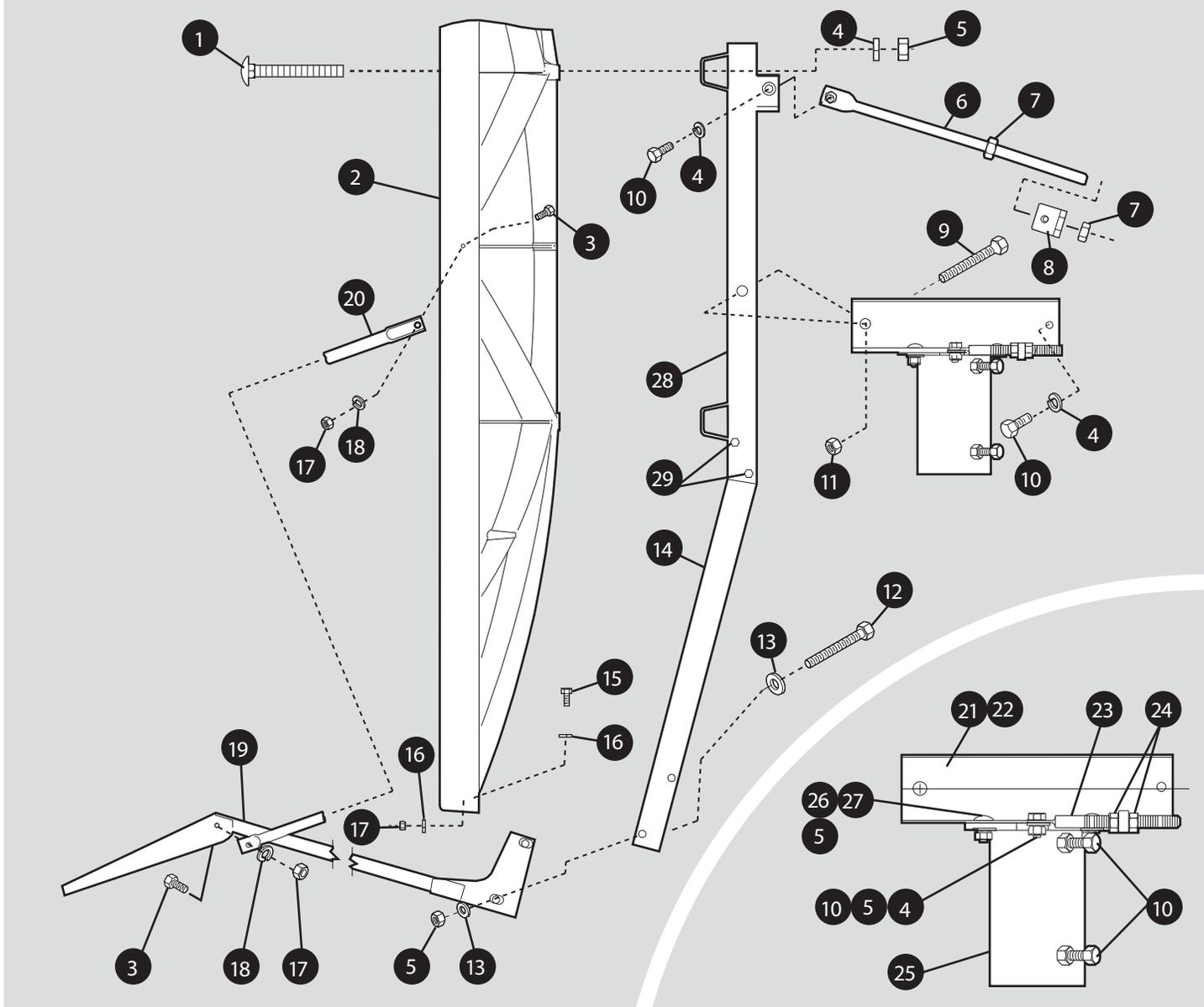


AZIMUTH CHART

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



PARTS LIST



NO.	DESCRIPTION	QTY.	NO.	DESCRIPTION	QTY.
1	M12 x 100 mm Carriage Head Bolt	4	16	M6 Flat Washer	2
2	1.8 Meter Reflector	1	17	M6 Hex Nut	5
3	M6 x 20 mm Hex Head Bolt	4	18	M6 Lock Washer	4
4	M12 Lock Washer	13	19	Feed Support Tube Weldment	1
5	M12 Hex Nut	16	20	Side Feed Support Strut	2
6	Elevation Adjustment Screw	1	21	Top Yoke Plate Weldment	1
7	M22 Hex Nut	2	22	Channel	2
8	Trunnion	1	23	M16 Azimuth Adjustment Bolt	1
9	M20 x 140 mm Hex Head Bolt	1	24	M16 Hex Nut	2
10	M12 x 30 mm Hex Head Bolt	8	25	Yoke Cap Weldment	1
11	M20 Hex Nut	1	26	M12 Flat Washer	4
12	M12 x 130 mm Hex Head Bolt	2	27	M12 x 35 mm Round Head Square Neck Bolt	5
13	M12 External Tooth Lock Washer	4	28	Backframe Weldment	1
14	Bottom Backframe Tube	1	29	M12 x 19 mm Special Hex Head Bolt	4
15	M6 x 40 mm Hex Head Bolt	1			

To ensure that the transmit/receive mount and 1.8 m SMC Offset Antenna is operating efficiently and at an optimum, moderate maintenance is required. We recommend conducting as routine maintenance inspection every six months or as needed, if unusual circumstances occur, such as severe weather conditions, falling objects and vandalism.

The following checklist is provided for your convenience.

MAINTENANCE INSPECTION CHECKLIST

1 FOUNDATION

Structural Damage

2 TRANSMIT RECEIVE MOUNT

All bolts (if any loosening has occurred tighten and torque - refer to Torque Chart Page 3)

Structural Damage

Corrosion of galvanized steel members (if necessary, repair with cold zinc-rich galvanizing paint)

3 1.8 METER SMC OFFSET ANTENNA

Bolts - M12 round head square neck, securing antenna to mount (Correct torque 27 N-m/20 ft-lb)

Structural Damage

4 BOTTOM FEED SUPPORT TUBE, SIDE FEED SUPPORT STRUTS AND ORU BRACKET

All bolts (if loosening has occurred tighten and torque - refer to Torque Chart on Page 3).

Structural Damage

Corrosion of galvanized steel members (if necessary, repair with cold zinc-rich galvanizing paint)

5 FEED ASSEMBLY

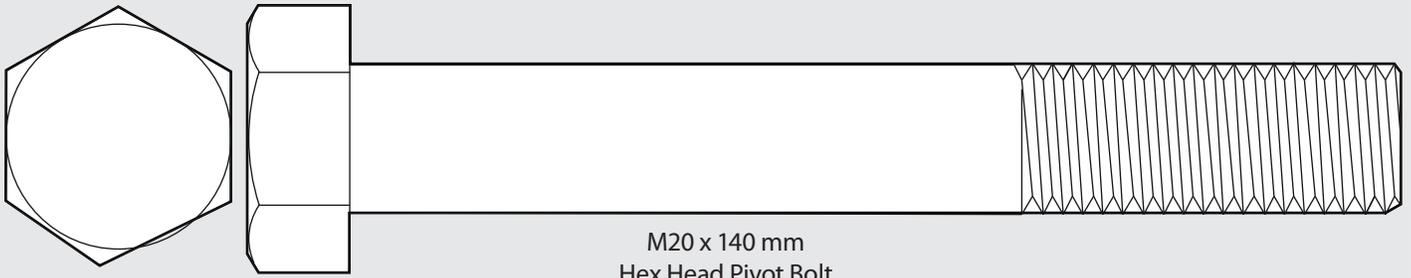
All securing hardware

Structural Damage

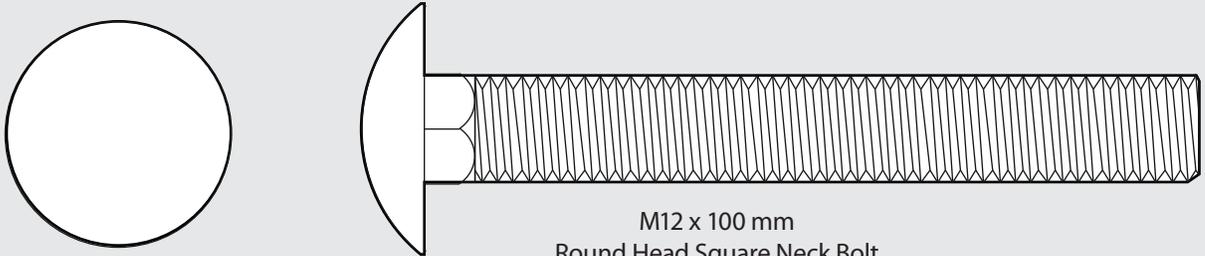
Feed Horn Weather Cover - Physical Damage (if damaged, replace to prevent entry of water)

Upon inspection, make necessary repairs and replace any damaged parts. For replacement parts, contact SKYWARE GLOBAL at the address located on the front of this manual.

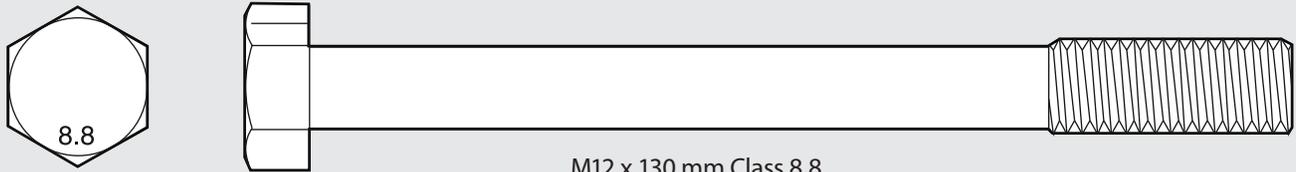
All hardware is depicted actual size. Place hardware on picture to verify identity.



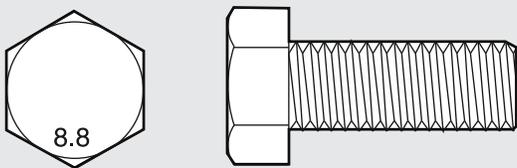
M20 x 140 mm
Hex Head Pivot Bolt
Item 9



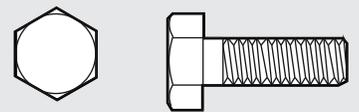
M12 x 100 mm
Round Head Square Neck Bolt
Item 1



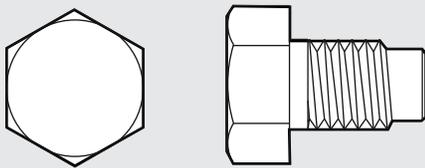
M12 x 130 mm Class 8.8
Hex Head Bolt Item 12



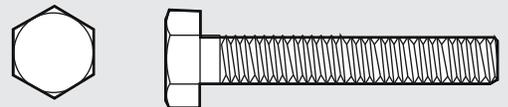
M12 x 30 mm
Class 8.8 Hex Head Bolt
Item 10



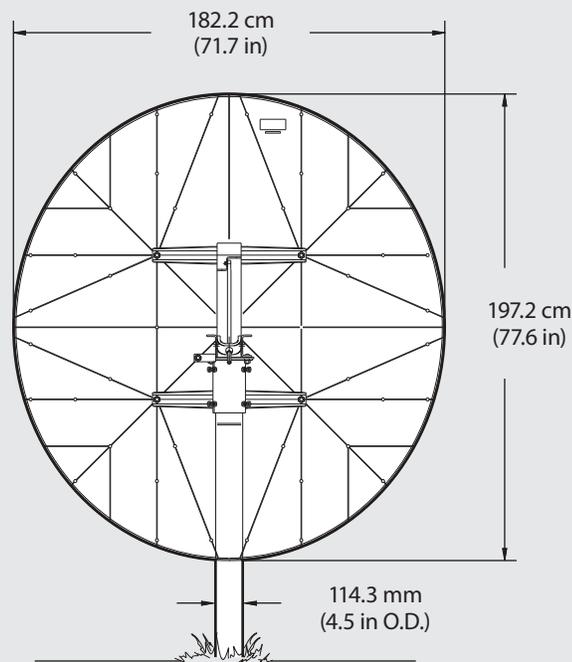
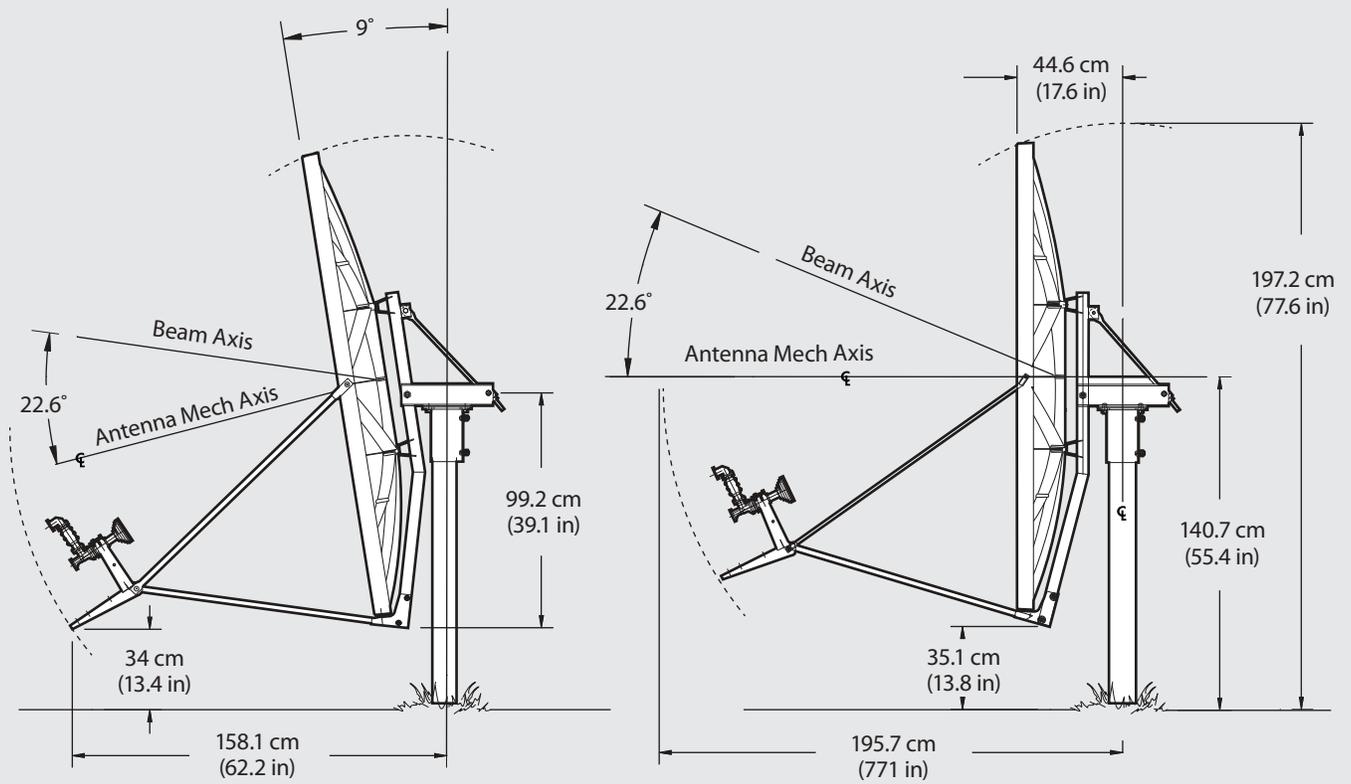
M6 x 20 mm
Hex Head Cap Screw
Item 3



M12 x 19 mm
Hex Head Bolt
Item 29

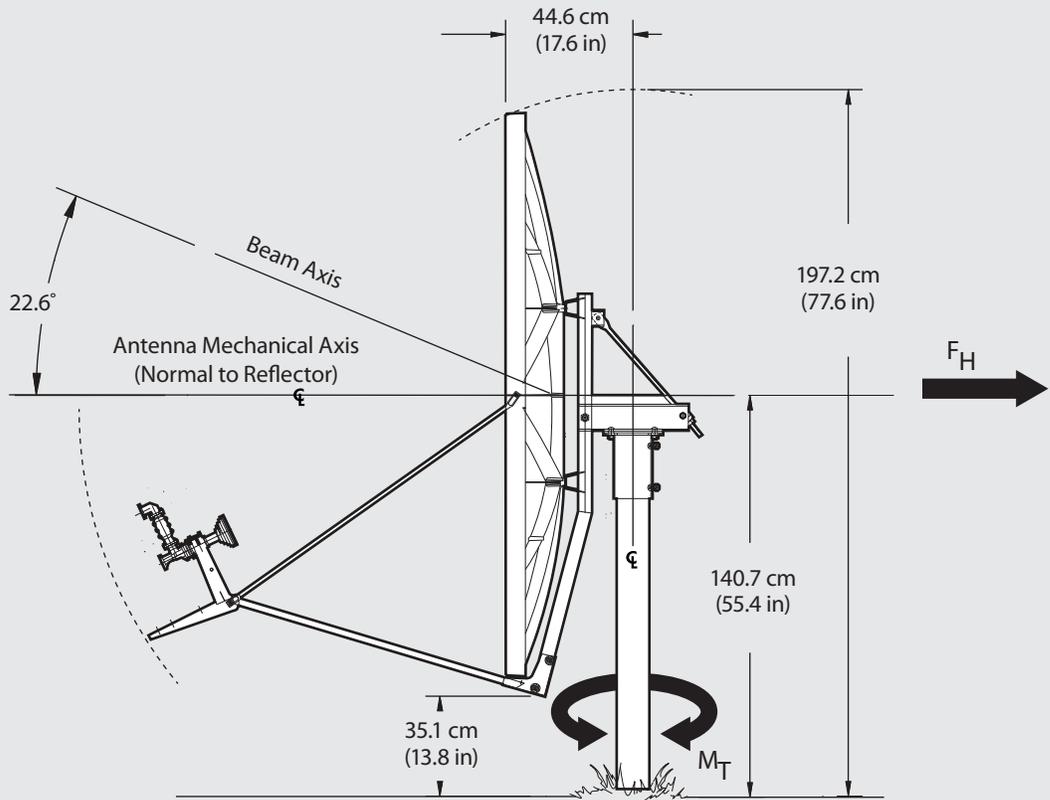


M6 x 40 mm
Hex Head Cap Screw
Item 15



Type 183 1.8 Meter Offset Receive Transmit Antenna System

APPENDIX B (125 mph Survival Wind Loads for Type 183)



F_H = Horizontal Force
 F_V = Vertical Force
 M_T = Torsional Moment
 M_O = Overturning Moment

Elevation Degrees		Force N (Pounds)		Moments N-m (Foot-Pounds)	
Mechanical	Beam	F_H	F_V	M_T	M_O
0	23	8,114 (1,824)	-209 (-47)	1,455 (1,073)	11,438 (8,436)
10	33	7,678 (1,726)	-1,624 (-365)	1,403 (1,035)	10,823 (7,983)
20	43	7,460 (1,677)	-3,158 (-710)	1,334 (984)	10,516 (7,756)
30	53	6,757 (1,519)	-4,484 (-1,008)	1,209 (892)	9,525 (7,025)
40	63	5,947 (1,337)	-5,405 (-1,215)	1,025 (756)	8,384 (6,184)
50	73	5,187 (1,166)	-5,947 (-1,337)	861 (635)	7,312 (5,393)
60	83	4,324 (972)	-6,219 (-1,398)	666 (491)	6,096 (4,496)
70	93	3,243 (729)	-4,813 (-1,082)	512 (378)	4,572 (3,372)

M_O Based on 140.7 cm (55") from mounting surface to center of reflector.
 Values shown above represent maximum forces for any wind direction.
 Height and exposure factors from the uniform building code are NOT included in above values.

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