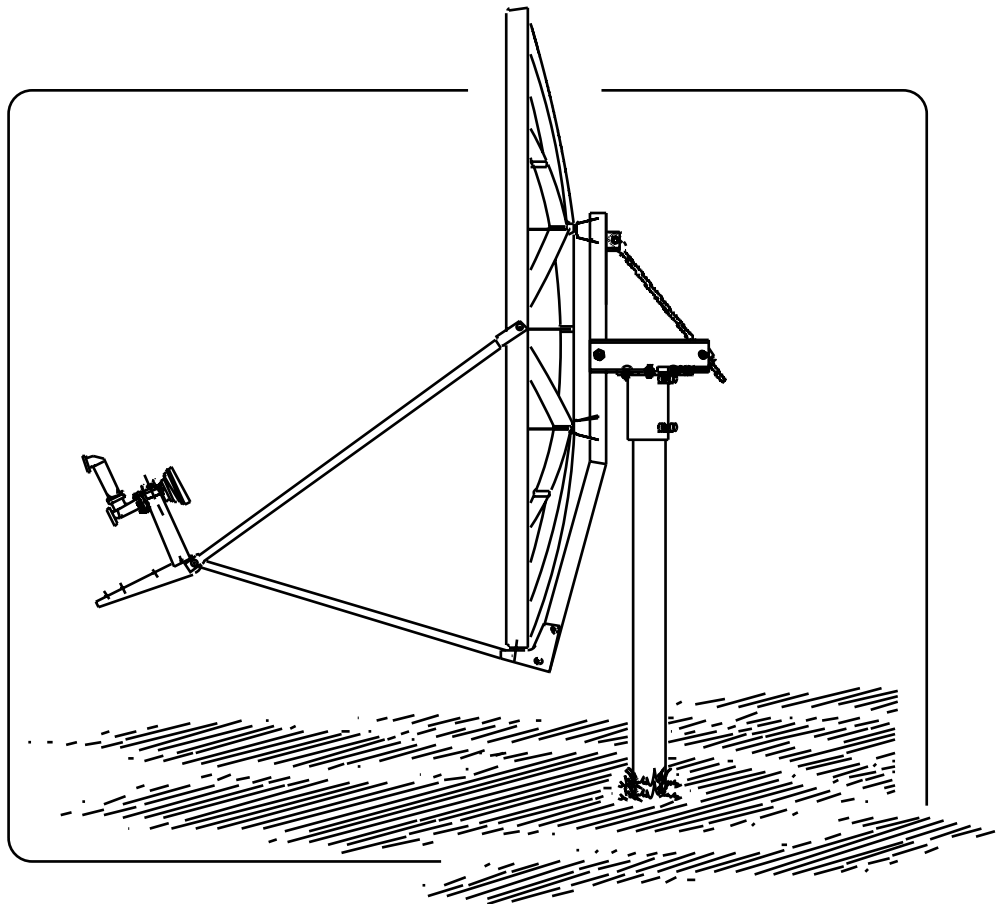




INSTRUCTION AND ASSEMBLY MANUAL



TYPE 183 1.8m Offset Tx/Rx Antenna System

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8000660-02
ECN 9000000
5/03



US Sales Office • 1315 Industrial Park Drive, Smithfield, NC 27577 USA • Telephone: (919) 989-2205 • Fax: (919) 989-2200
Germany Sales Office • Göppingerstr. 1, 75179 Pforzheim, Germany • Telephone: +49 (0) 7231-14557-0 • Fax: +49 (0) 7231-14557-10

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.

DANGER!!!

WATCH FOR WIRES! You can be killed if this product comes near power lines. 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 it 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 a dish on windy days or serious, even fatal accidents may occur. Channel Master 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. Channel Master will not accept liability for any damage caused by a satellite system due to the many unknown variable applications.

Assembly Tools Required

- | | |
|--|--|
| 1 - Compass | 1 - 30mm or 1 ³ / ₁₆ " Box End/Open End Wrench |
| 1 - Clinometer | 1 - 10mm Box End/Open End Wrench |
| 1 - 220mm or 9" Magnetic Bubble Level | 1 - 10mm Socket (For Torque Wrench) |
| 1 - Torque Wrench
(CAPACITY 5N-m-130N-m) | 1 - 19mm or 3/4" Deep Socket (13mm or 1/2" Drive) |
| 1 - 24mm or 1 ⁵ / ₁₆ " Deep Socket | 1 - 30mm (1.25") Adjustable Wrench |
| 1 - Ratchet Wrench (13mm or 1/2" Drive) | 1 - 10mm or 1 ³ / ₁₆ " Nutdriver |
| | 1 - 30mm Socket (13mm or 1/2" Drive) |

PREINSTALLATION MATERIALS CHECKLIST

Grounding Rod Clamp & Grounding Block - As Required by National Electric Code or local codes.

Ground Wire - As Required by National Electric Code or local codes (length required).

Coaxial Cable - Size and length required.

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 Windloads" in the Appendix "B" on page 15.

BOLT TORQUE

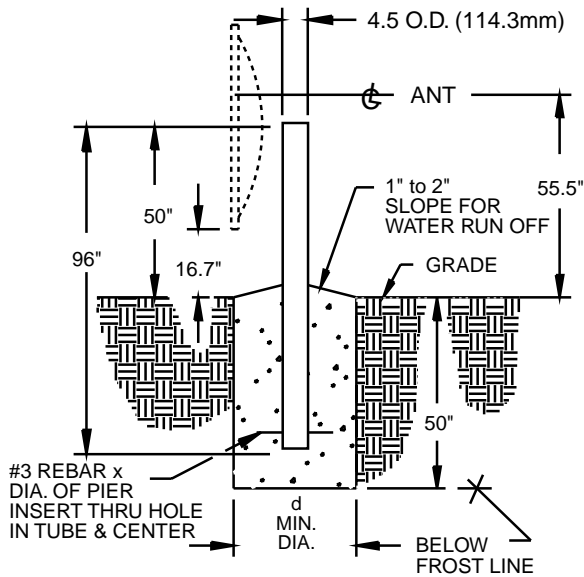
DIN CLASS 5.6						DIN CLASS 8.8		
M6	M8	M12	M16	M20	M22	M8	M12	M16
5 N-m	15 N-m	51 N-m	125 N-m	168 N-m	230 N-m	24 N-m	90 N-m	203 N-m
4	11	38	92	124	170	18	66	150
Ft-Lbs	Ft-Lbs	Ft-Lbs	Ft-Lbs	Ft-Lbs	Ft-Lbs	Ft-Lbs	Ft-Lbs	Ft-Lbs

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

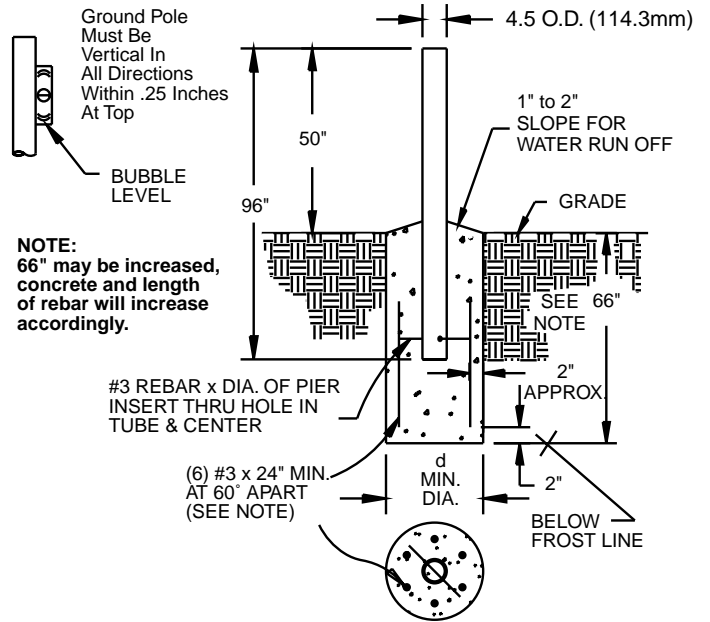
EXCEPTIONS TO ABOVE CHART:

- M12 x 100mm Round Head Square Neck Bolts securing Antenna to Mount. Torque to 27 N-m (20 ft-lbs.)
- M12 x 130mm Hex Head Bolts securing Feed Support to Backframe Tube. Torque to 47 N-m (35 ft-lbs.)

GROUND POLE INSTALLATION - 4.50" O.D.



PIER FOUNDATIONS



DEEP FROST LINE FOUNDATIONS

<u>WIND VEL.</u>	<u>DIM "d"</u> <u>Inches (mm)</u>	<u>CONC VOL.</u> <u>CUYD (Cu Meter)</u>	<u>DIM "d"</u> <u>Inches (mm)</u>	<u>CONC VOL.</u> <u>CUYD (CU Meter)</u>	<u>GROUND POLE</u>
100 MPH	30" (762)	.80 (.61)	24" (610)	.70 (.54)	"A"
125 MPH	37" (934)	1.2 (.92)	30" (762)	1.0 (.76)	"B"

POLE SPECIFICATIONS:

Ground Pole "A" - 4.50 O.D. SCH 40 (4.026 I.D.) Steel - (Metric = 114.3 O.D. x 102.3 I.D. mm)

Ground Pole "B" - 4.50 O.D. SCH 80 (3.826 I.D.) Steel - (Metric = 114.3 O.D. x 97.2 I.D. mm)

NOTE:

1. Poles are not supplied (purchased locally to ASTM A501) and must be field drilled 5/8 Dia. for M10 #3 rebar, drilled .218 (5.55mm) for 1/4-20 self tapping grounding screw and galvanized or painted for protection.
2. Pole and foundation design based on the following criteria:
 - a. Uniform building code Exposure C and 1.5 stability factory.
 - b. Vertical soil pressure of 2000 pounds per square foot. (9765 Kilograms/meter square)
 - c. Lateral soil pressure of 300 pounds per square foot. (1465 Kilograms/meter square)
 - d. Concrete compressive strength of 2500 pounds per square inch (176 Kg/Cm²) in 28 days.

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

ASSEMBLY AND INSTALLATION

1 - Place yoke cap assembly (25) onto ground pole. Assemble channel and assembly to yoke cap assembly with (4) M12 x 35mm Rd. Hd. Sq. Nk. (Item 27), flat washers and hex nuts (5 & 26) as shown in Figure 1.0. Loosen trunnion bolts.

Secure azimuth adjusting bolt (23) to yoke cap assembly with M12 x 30mm hex bolt, lock washer and hex nut (4, 5 & 10). Point yoke cap assembly south and temporarily secure to ground pole with locking bolts (Refer to Fig. 1.2).

2 - Assemble bottom tube (14) to backframe (28) as shown in Figure 1.1. Torque M12 Bolt (29) to 35-40 ft-lbs (47-54 N-m).

3 - Install backframe assembly onto yoke cap assembly. Secure with M20 x 140mm 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 13° and above elevation. If elevation is less than 13°, pivot trunnion 180°. Reinstall M22 hex nut (7). Do not tighten. (Refer to Figure 1.3)

4 - Run up M22 hex nuts (7) on elevation screw (6) and place backframe in birdbath position. (Refer to Fig. 1.3)

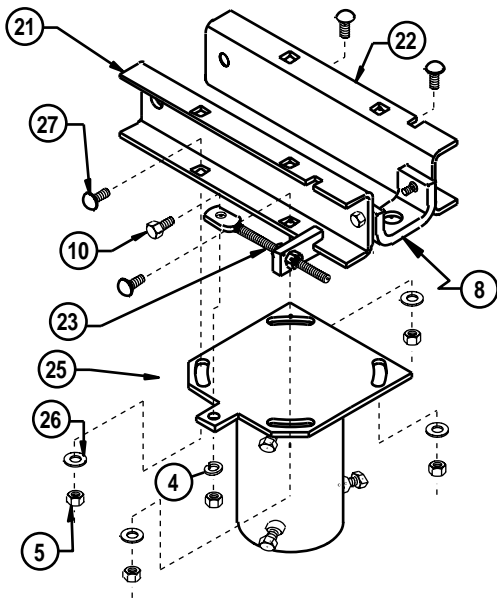


FIGURE 1.0

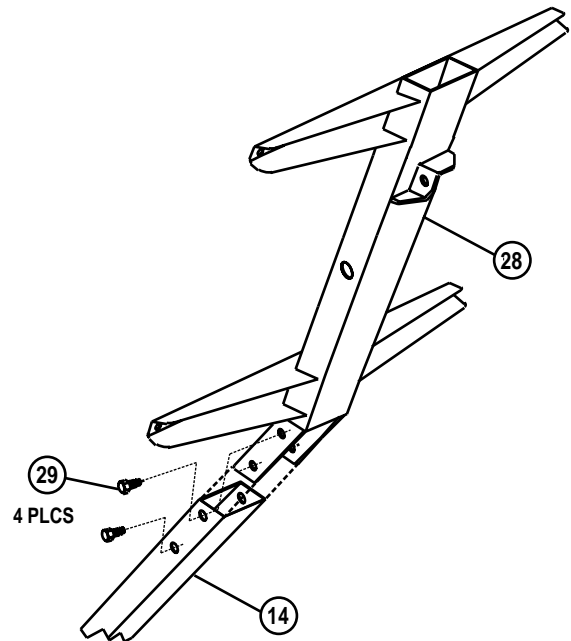


FIGURE 1.1

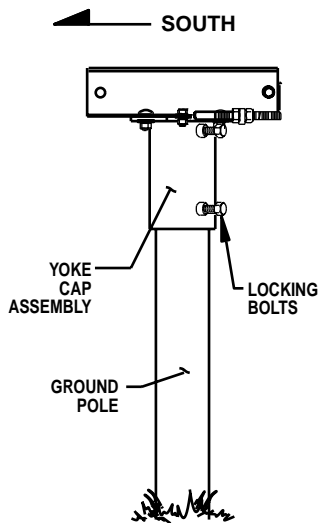


FIGURE 1.2

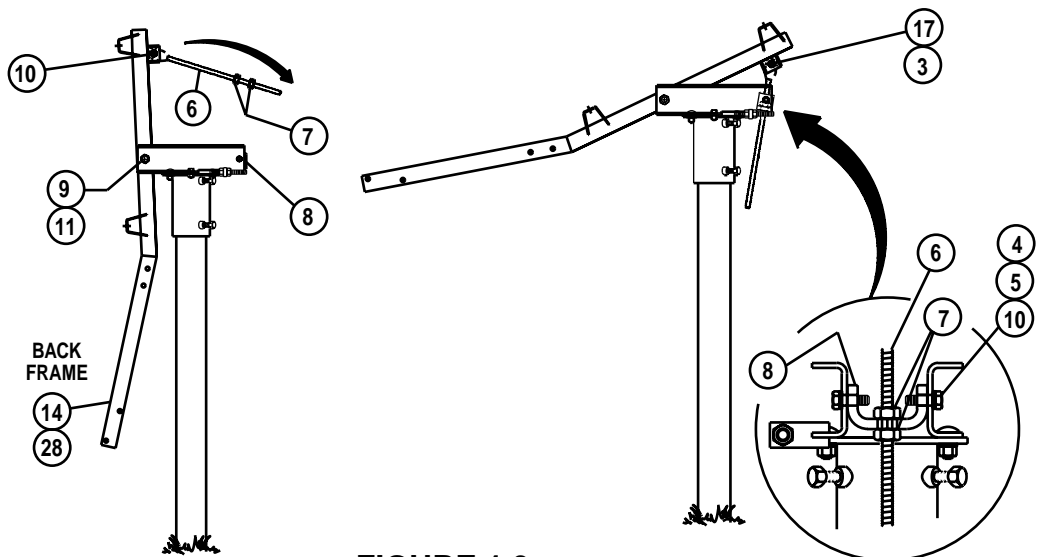


FIGURE 1.3

5 - Insert four M12 x 100mm 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 20 Ft-lbs (27 N-m). Refer to Figure 1.4. Torque cross arm bolts (12) (Figure 1.1) 4 places to 40-45 ft-lbs (58 N-m).

IMPORTANT: "UP" arrow on reflector must be as shown in Figure 1.4. Make sure Round Head Square Neck Bolts are seated correctly before securing reflector to backframe. Pre-torque (4) M12 x 35mm Round Head Square Neck Bolts (Item 27) to 8-10 ft-lbs (12 N-m). (Refer to Fig. 1.0)

6 - Install M6 x 40mm 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 1.5)

7 - Assemble feed support tube (19) onto backframe and secure with two M12 x 130mm hex bolts (12).

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

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 1.6) Leave these bolts loose.

8 - Swing reflector down by loosening nuts (7) on elevation screw (6). When reflector is in a convenient position, (approximately 20°), snug tighten nuts on elevation screw. (Refer to Figure 1.3)

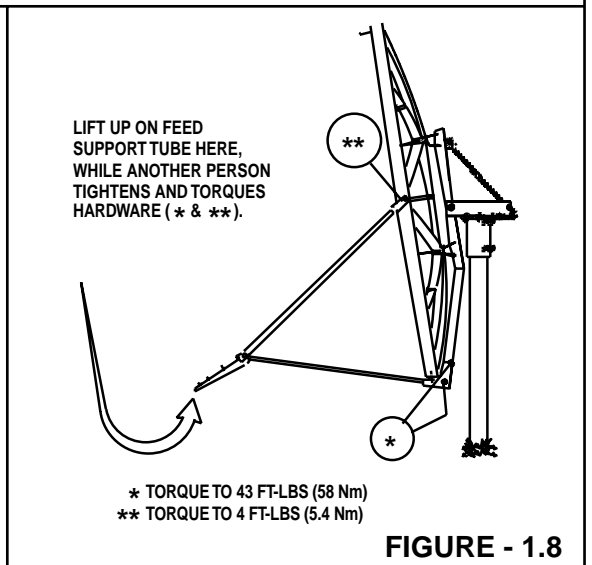
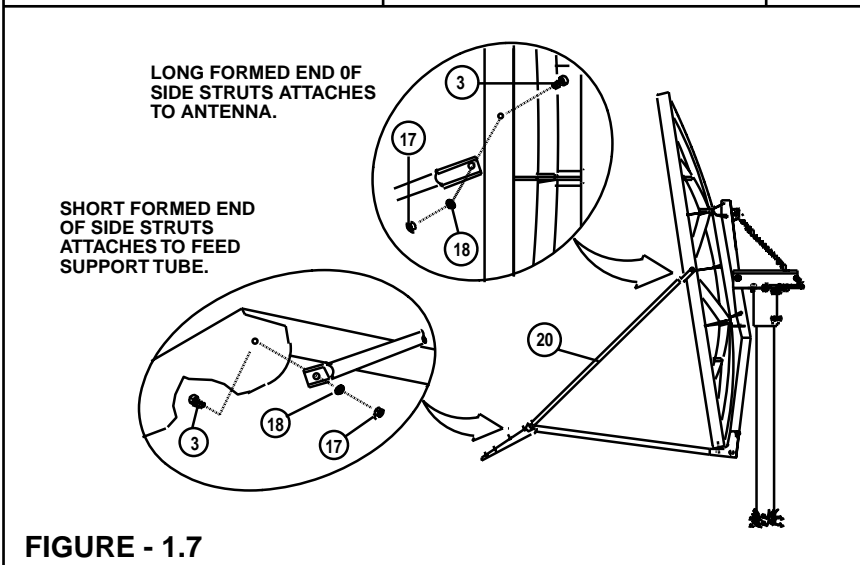
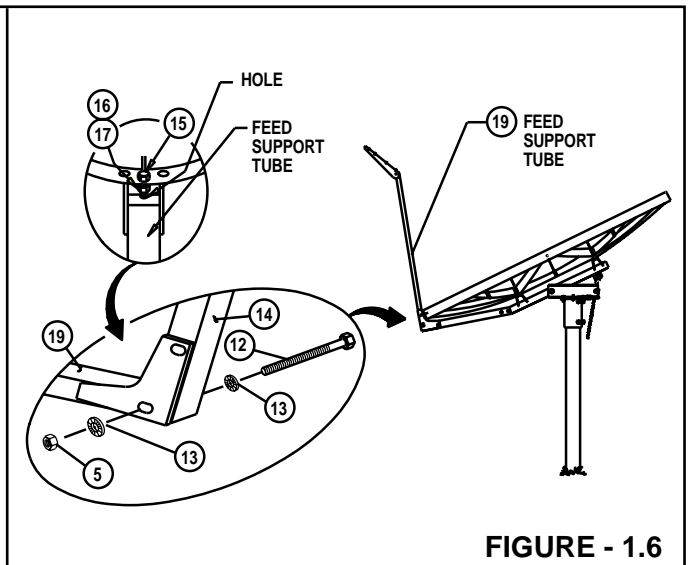
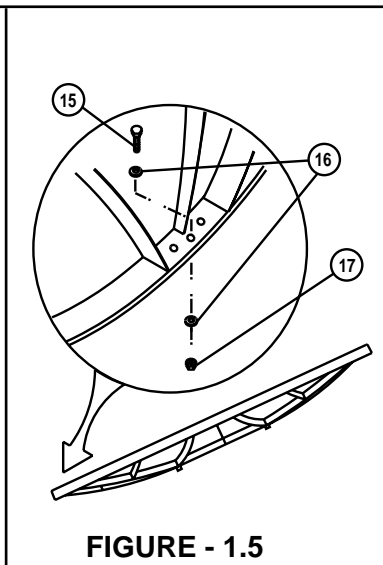
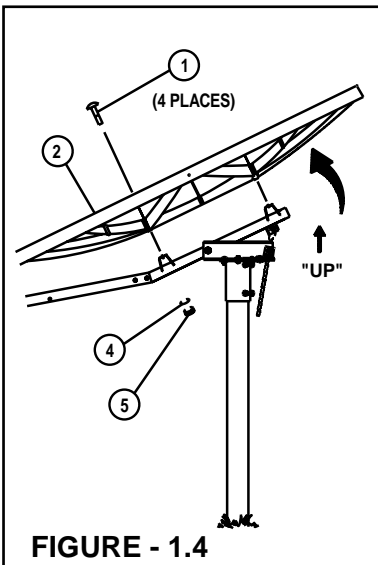
9 - Install left and right side struts (20) onto reflector as shown in Figure 1.7.

Attach long formed end of side strut (20) to reflector rim by inserting M6 x 20mm 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 20mm hex bolt, lock washer and hex nut (3, 18 & 17).

10 - **IMPORTANT:** Without using excessive pressure, lift feed support tube vertically, just enough to relieve all loads off side struts, while another person tightens and torque's M12 hex bolts (*) securing feed support tube to backframe to 35 Ft-lbs (47 N-m) and M6 hex head bolts (**) securing side struts to reflector to 4 Ft-lbs (5.4 N-m). (Refer to Figure 1.8)

11 - Install Feed/Feed Horn per instructions provided with these items.



GROUNDING

TYPICAL ELECTRICAL GROUNDING FOR ANTENNA GROUND POLE

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. Figures 2.0 and 2.1 illustrates 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.

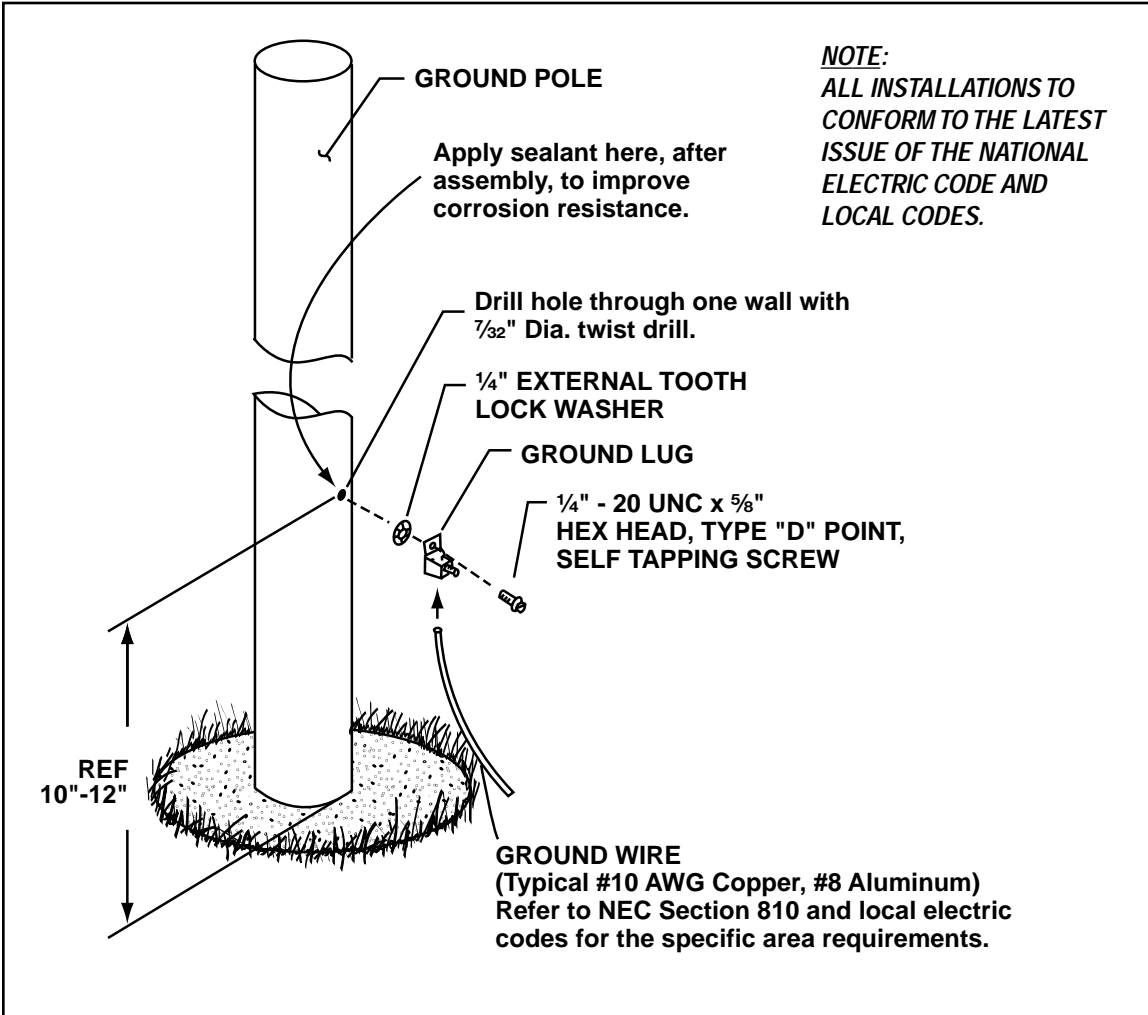


FIGURE - 2.0

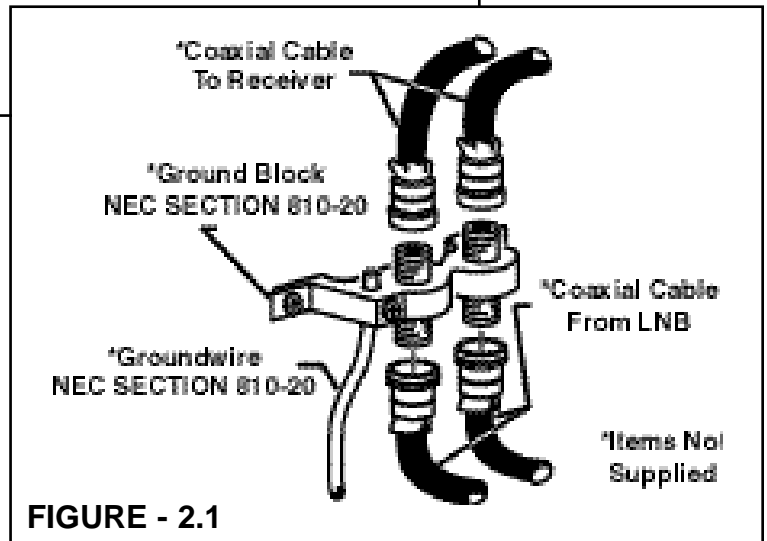


FIGURE - 2.1

ANTENNA ALIGNMENT PROCEDURE

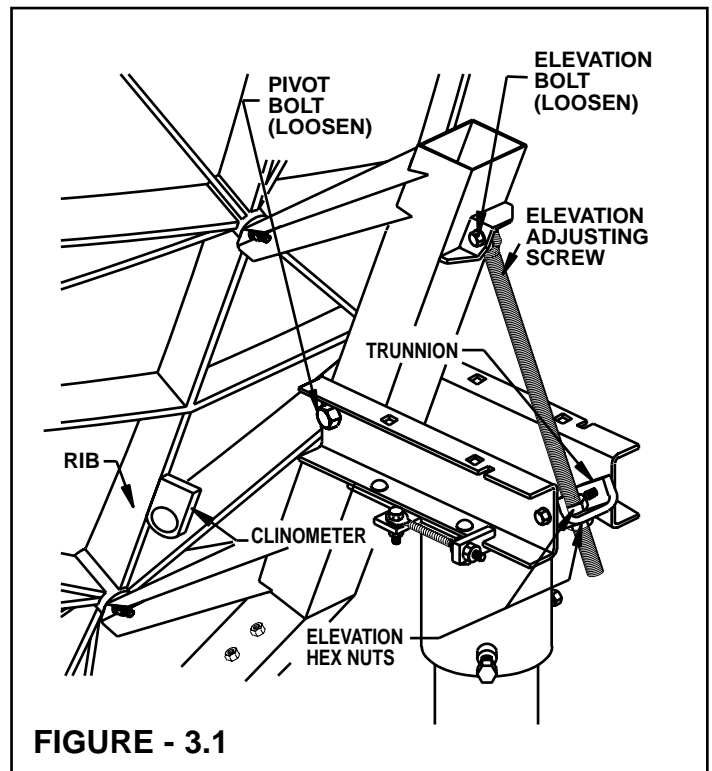
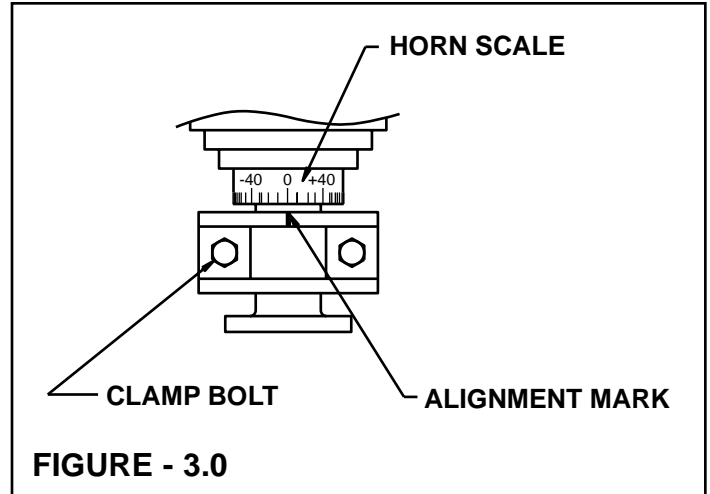
Alignment with the satellite is obtained by setting polarization, elevation, and azimuth. Charts 1, 2 & 3 are to determine the values for your earth station antenna site. "ΔL" is the difference between the earth station antenna site longitude and the satellite longitude. Use "ΔL" and your earth station 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 in Chart 1. Align marks on the horn clamp and appropriate mark on the horn scale. Polarization chart assumes antenna system polarization is Tx vertical and satellite vertical Pol is perpendicular to plane of geostationary arc. For horizontal Tx of antenna, feed must be rotated 90° from values shown. (Starting point for polarization adjustment is 0°, as shown in Figure 3.0).

ELEVATION ADJUSTMENT

Use Chart 2 and determine your elevation setting. Using a clinometer, adjust the elevation by turning the elevation screw adjusting nuts until the desired elevation is obtained. Reference Figure 3.1. **Note: Degree values shown on the clinometer are mechanical; that is 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 14).** This is an approximate setting. Optimum setting will be achieved during the fine tuning.



AZIMUTH

Use Chart 3 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 (Ref. Fig. 3.2).

Rotate reflector and mount, pointing to the compass reading for your location (Ref. Fig. 3.2).

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.

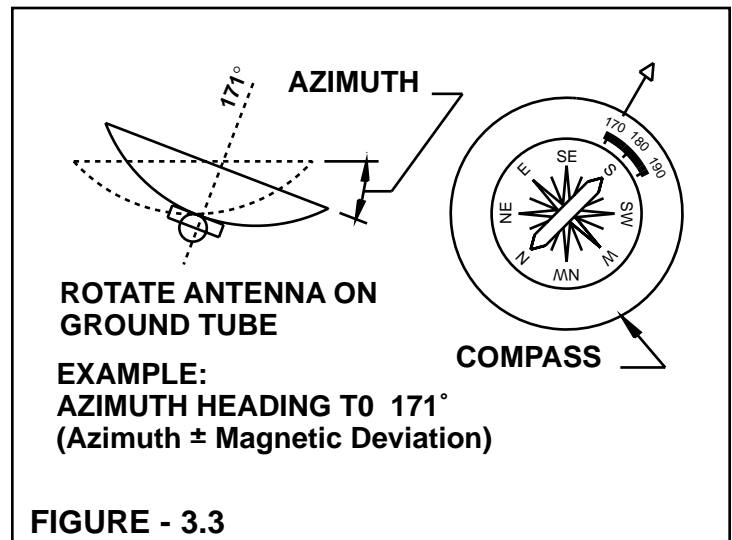
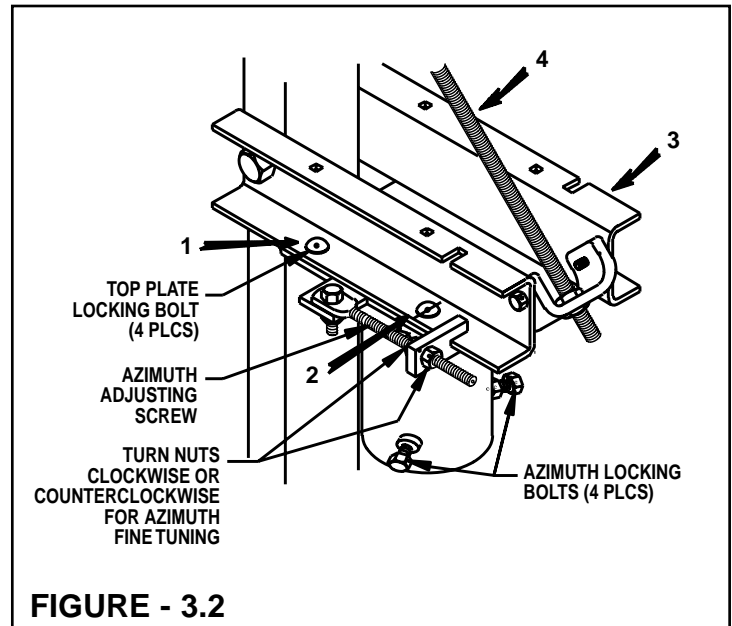
FINE TUNING

Progressively tighten and torque azimuth locking bolts to 75-85 Ft-lbs (108 N-m). The four top plate locking bolts are pre-torqued to 8-10 ft-lbs. (12 N-m), maintain this torque until after azimuth is fined 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 1, 3, 4 and 2 to 75 Ft-lbs., refer to Figure 3.2. Observe for maximum signal strength as elevation screw's M22 locking nuts are tighten.

Polarization tune may be checked by carefully and slowly rotating feed assembly in clamp. When maximum signal strength is found, gradually tighten clamp bolts (Fig. 3.0). 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 2.



POLARIZATION CHART

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

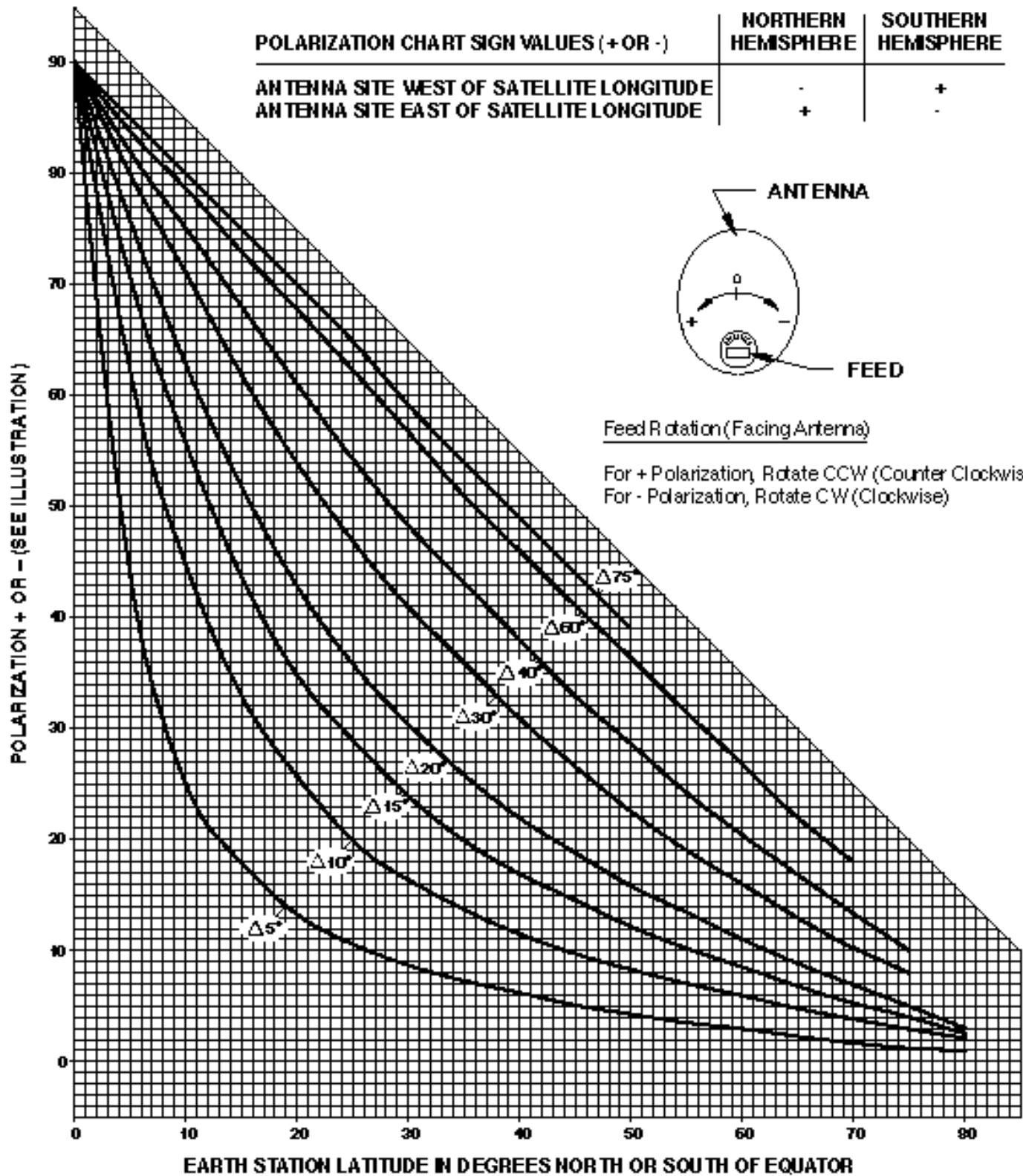


CHART 1

ELEVATION CHART

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

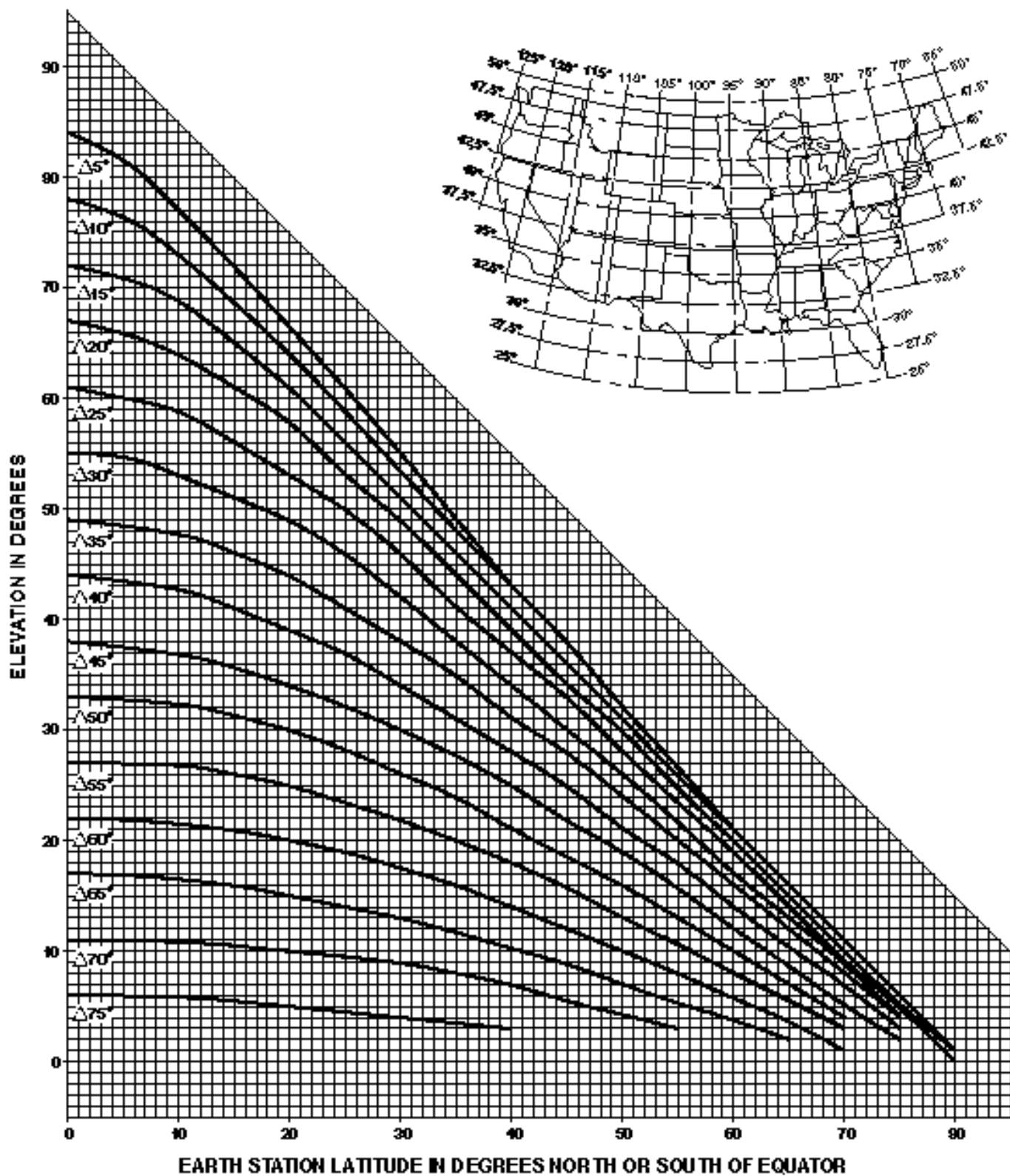


CHART 2

AZIMUTH CHART

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

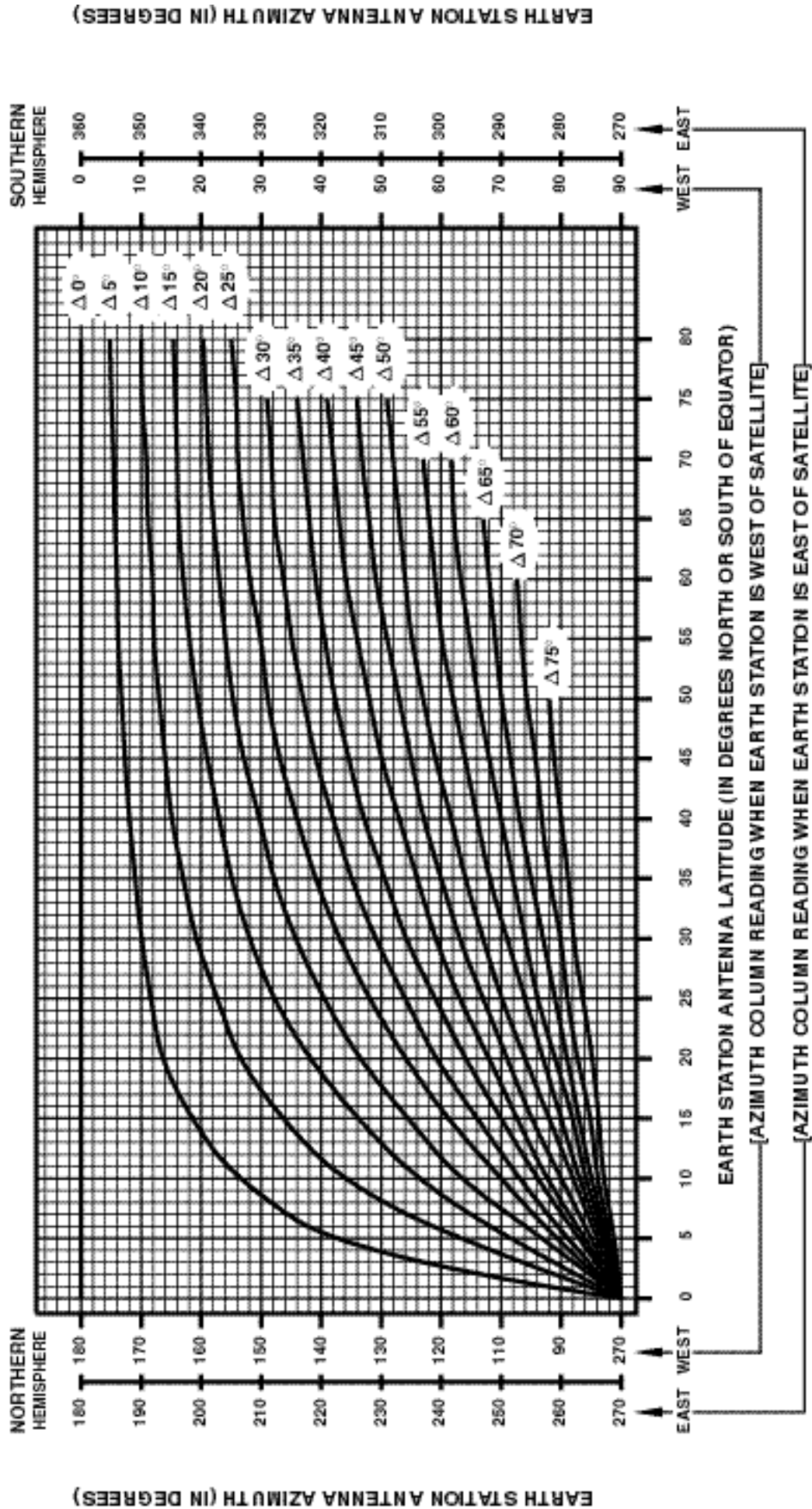
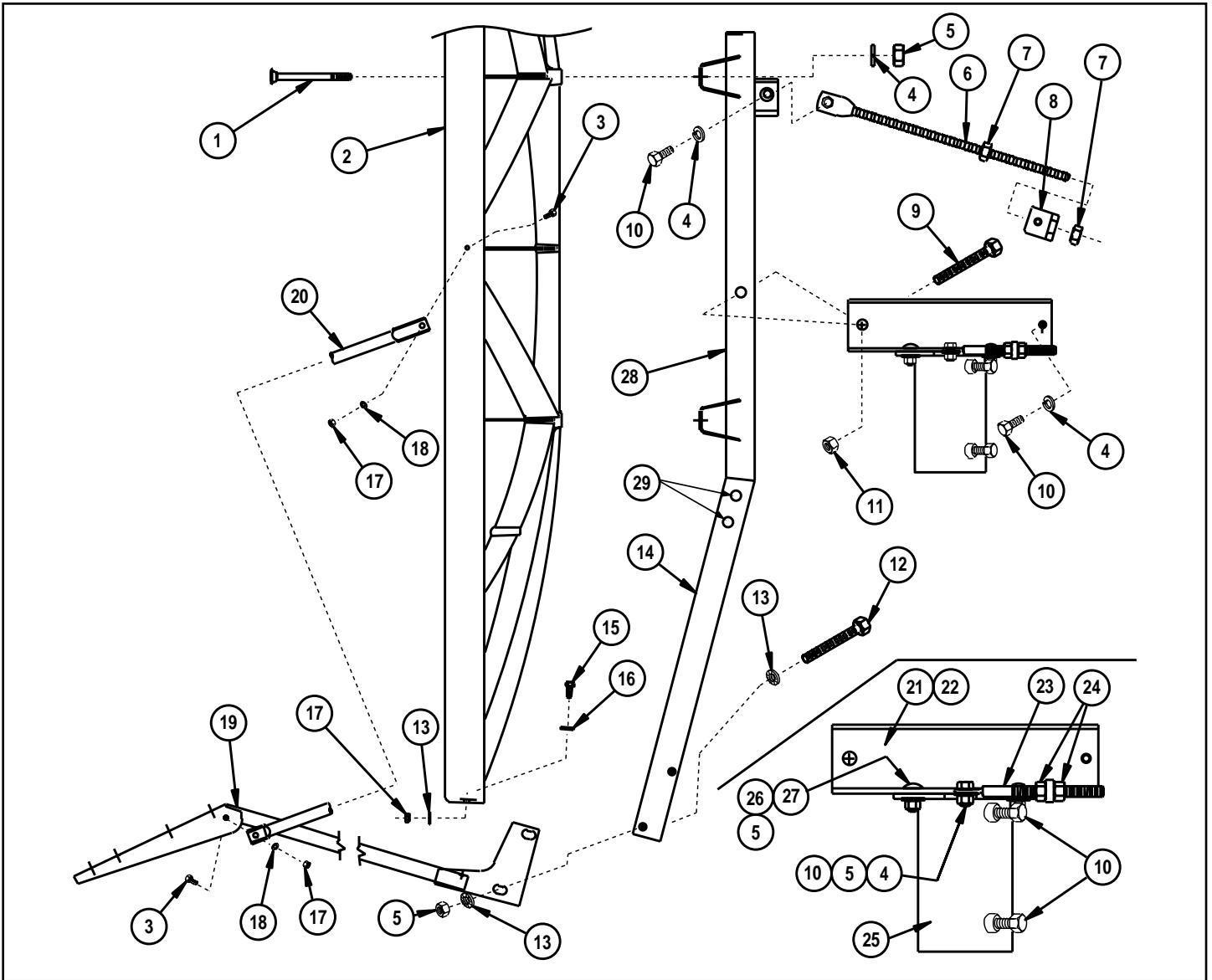


CHART 3

PARTS LIST



NO.	DESCRIPTION	QTY.
1	BOLT, CRG HD, GALV M12 X 100MM	4
2	REFLECTOR, 1.8m	1
3	BOLT, HEX HD, SS, M6 X 20MM	4
4	WASHER, LOCK, SS, M12	12
5	NUT, HEX, GALV, M12	15
6	SCREW, ELEVATION ADJ, GALV	1
7	NUT, HEX GALV, M22	2
8	TRUNNION	1
9	BOLT, HEX HD, GALV M20 X 140MM	1
10	BOLT, HEX HD, GALV M12 X 30MM	8
11	NUT, HEX, GALV M20	1
12	BOLT, HEX HD, GALV M12 X 130MM	2
13	WASHER, EXT TOOTH LOCK M12	4
14	BOTTOM BACKFRAME TUBE	1

NO.	DESCRIPTION	QTY.
15	BOLT, HEX HD, SS M6 X 40MM	1
16	WASHER, FLAT, SS M6	2
17	NUT, HEX, SS M6	5
18	WASHER, LOCK M6	4
19	WELDMENT, FEED SUPPORT TUBE	1
20	STRUT, SIDE FEED SUPPORT	2
21	WELDMENT, YOKE TOP PLATE	1
22	CHANNEL	2
23	AZIMUTH ADJ BOLT, M16	1
24	NUT, HEX, GALV M16	2
25	WELDMENT, YOKE CAP	1
26	WASHER, FLAT M12	4
27	BOLT, RD HD, SQ NK, M12 x 35mm	4
28	WELDMENT, BACKFRAME	1
29	BOLT HEX HD GALV., M12 x 18mm SPECIAL	4

MAINTENANCE

To ensure that the Tx/Rx Mount and 1.8m 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 - Tx/Rx MOUNT

- All bolts (if any loosening has occurred tighten and torque - refer to Torque Chart Page 2)
- Structural Damage
- Corrosion of galvanized steel members (if necessary, repair with cold zinc-rich galvanizing paint)

3 - 1.8m SMC OFFSET ANTENNA

- Bolts - M12 round head square neck, securing antenna to mount (Correct torque 20 Ft-lbs/27N-m)
- 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 2).
- Structural Damage
- Corrosion of galvanized steel members (if necessary, repair with cold zinc-rich galvanizing paint)

5 - FEED ASSEMBLY

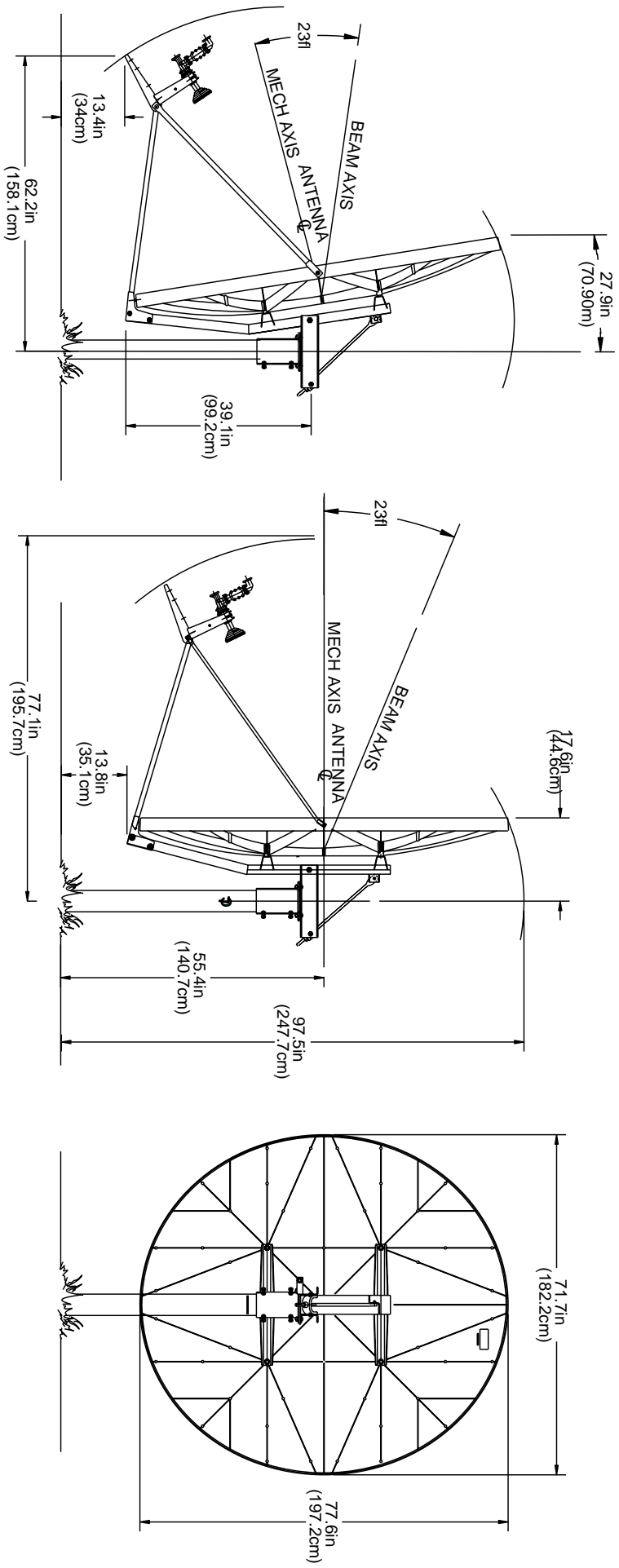
- All securing hardware
- Structural Damage
- Feed Horn Weather Cover - Physical Damage (if damaged, replace to prevent entry of water)

Upon inspection, make necessary repairs and replace any damaged parts.

For replacement parts, contact:

U.S.A. VSAT Customer Service
CHANNEL MASTER
1315 Industrial Park Drive
Smithfield, NC 27577
(919) 989-2205 ■ Fax (919) 989-2200

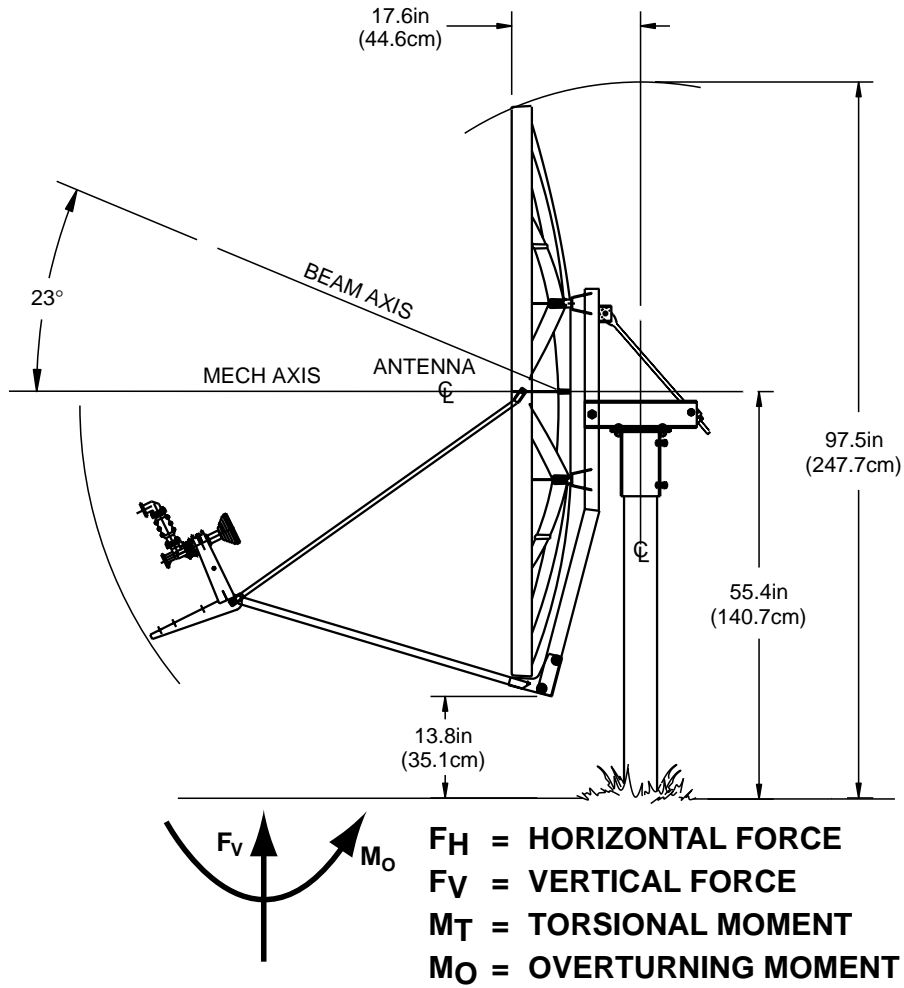
APPENDIX A



TYPE 183 1.8M OFFSET RX/TX ANTENNA SYSTEM

- NOTES:
- 1 - DIMENSIONS SHOWN ARE FOR MODEL 6854 GROUND POLE (4.5" OD, SCH 40, Fy = 50 KSI) OR 4", PIPE SCH 80, Fy = 36 KSI (4.5" OD X 3.83 ID) PURCHASED LOCALLY.
 - 2 - 50" TO TOP OF GROUND POLE MAY BE INCREASED TO 68" IF MODEL 6861 GROUND POLE (4.5" OD SCH 80, Fy = 70 KSI) IS USED. CONCRETE MUST BE INCREASED ACCORDINGLY (THIS WOULD INCREASE ALL VERTICAL DIMENSIONS BY 18").
 - 3 - CERTIFIED FOR 130 MPH WIND SURVIVAL.

APPENDIX B



ELEVATION DEGREES		FORCE (POUNDS)*		MOMENTS (FOOT-POUNDS)**	
MECH.	BEAM	F _H	F _V	M _T	M _O
0	23	1824	-47	1073	8,436
10	33	1726	-365	1035	7,983
20	43	1677	-710	984	7,756
30	53	1519	-1008	892	7,025
40	63	1337	-1215	756	6,184
50	73	1166	-1337	635	5,393
60	83	972	-1398	491	4,496
70	93	729	-1082	378	3,372

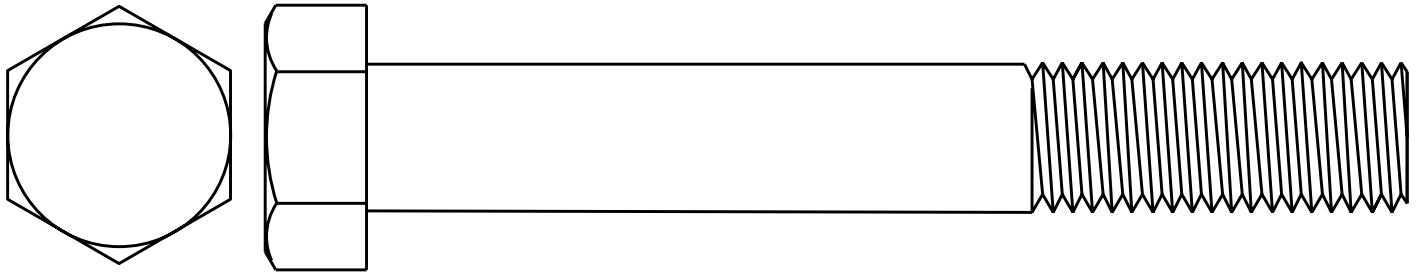
M_O Based on 55" (140.7cm) From Mounting Surface to C of Antenna.

*Kg = Pounds x .45359

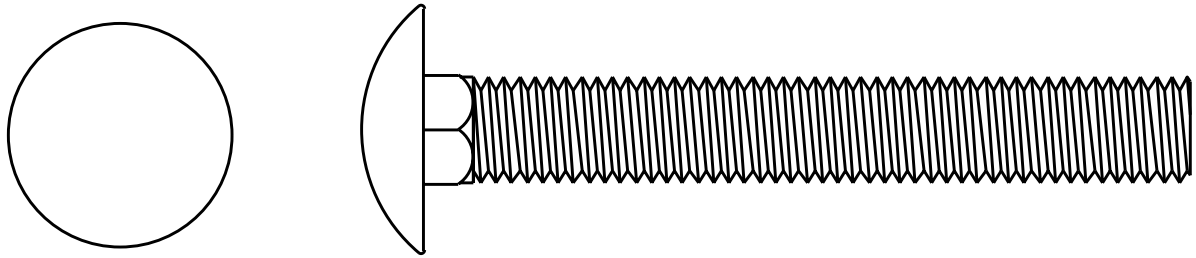
**N-m = Foot-Pounds x 1.35582

Values shown above represent maximum forces for any wind direction.
Height and exposure factors from the uniform building code are NOT included.

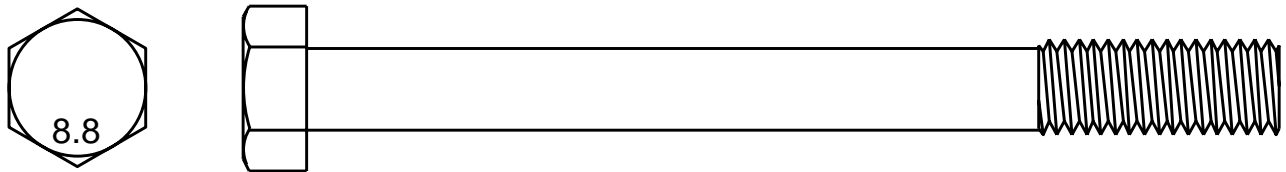
HARDWARE SORTER



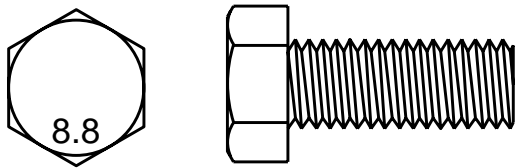
HEX (PIVOT) BOLT, GALV. M20 x 140mm
ITEM 9



ROUND HD SQ NK BOLT, GALV. M12 x 100mm
ITEM 1

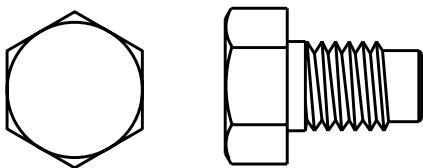
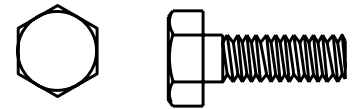


HEX HD BOLT, GALV. M12 x 130mm CLASS 8.8
ITEM 12



HEX HD BOLT, GALV. M12 x 30mm CLASS 8.8
ITEM 10

HEX HD CAP SCREW, SS
M6 x 20mm
ITEM 3



HEX HD BOLT, GALV. M12 x 18mm
ITEM 29

HEX HD CAP SCREW, SS
M6 x 40mm
ITEM 15

