



INSTRUCTION AND ASSEMBLY MANUAL



Type 180 1.8m Antenna System with AZ/EL Cap Mount

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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.

DANGER!!!

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 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.

DATE	DESCRIPTION	REV.
12/91	Changed cover, pages 1, 8, 10 & 21. ECN 9001901	A
11/94	Changed Cover, pages 1, 2, 4, 8, 21, 22 & 23. ECN 9002573	C
8/98	Revised all pages. ECN 9004170	D
3/02	Changed page 12. ECN 9005969	E

**VSAT ANTENNA/MOUNT/LNB
LIMITED TWELVE (12) MONTH WARRANTY**

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

Claimants under this Warranty shall present their claims along with the defective equipment to CHANNEL MASTER immediately upon failure. Non-compliance 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. CHANNEL MASTER DOES NOT AUTHORIZE ANY PERSON TO ASSUME FOR IT THE OBLIGATIONS CONTAINED IN THIS WARRANTY AND CHANNEL MASTER 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 CHANNEL MASTER 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 CHANNEL MASTER 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.

INTRODUCTION

This manual covers the assembly and installation of the Channel Master 1.8m SMC offset antenna system. 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.

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, contact:

England: CHANNEL MASTER
Premier Business Park, Croft Head Road
Off Philips Road, Whitebirk Industrial Estate
Blackburn, Lancashire England BB1 5UE
(0254) 680444 • Fax (0254) 672299

VSAT Customer Service, CHANNEL MASTER
1315 Industrial Park Drive
Smithfield, N.C. 27577 U.S.A.
(919) 989-2205

BOLT TORQUE

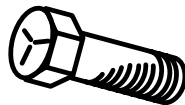
GOLD COLOR							BLACK OR SILVER COLOR							
Grade 8.8 (8G)	Grade 5						Grade 2							
M6	5/16"	3/8"	1/2"	5/8"	3/4"	1"	#10	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
4 ft-lbs	18 ft-lbs	31 ft-lbs	75 ft-lbs	150 ft-lbs	250 ft-lbs	583 ft-lbs	32 ft-lbs	6 ft-lbs	11 ft-lbs	20 ft-lbs	43 ft-lbs	92 ft-lbs	124 ft-lbs	259 ft-lbs
5.4 N-m	24 N-m	42 N-m	102 N-m	203 N-m	339 N-m	790 N-m	3.6 N-m	8 N-m	15 N-m	27 N-m	58 N-m	125 N-m	168 N-m	351 N-m

Grade 8.8



APPLY 4 FT-LBS (5.4 N-m)
OF TORQUE TO M6 BOLT

Grade 5



APPLY 18 FT-LBS
OF TORQUE TO 5/16 BOLT

Grade 2



APPLY 11 FT-LBS (15 N-m)
OF TORQUE TO 5/16 BOLT

EXCEPTIONS TO THE CHART ABOVE:

1/2" x 4" -	Round Head Square Neck Bolt (Securing Antenna to AZ/EL Cap)	- 20 Ft-lbs (27 N-m)
M6 x 20 -	Hex Head Bolt (Securing Clamp to Junction Block)	- 4 Ft-lbs (5.4 N-m)
M6 x 30 -	Hex Head Bolt (Securing Side Feed Legs to Junction Block and Antenna)	- 4 Ft-lbs (5.4 N-m)

INTRODUCTION

Recommendations for Site Selection, Assembly Tools Required for assembly, a Pre-installation Checklist and a Hardware Sorter have been included in this section to help you prepare for installing the 1.8m Offset Antenna System.

Read this section to insure optimum antenna performance and to make the assembly and installation process as efficient as possible by having the tools and materials at hand.

SITE SELECTION

The main objective of conducting a site survey, utilizing a compass and clinometer, is to choose a mounting location on the roof or ground that will give you the greatest amount of swing for azimuth and elevation for present as well as future use.

A pre-installation site survey is strongly recommended because it can alert you to any "look angle", soil, 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" at the satellite. A site with a clear, unobstructed view facing south, southeast or southwest 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° to the left and right, above and

below your selected "look angle". 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.

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).

Before Roof Mount installation, it must be determined that the roof used for mounting the antenna is structurally sound. If in doubt, have it checked by an architect or structural engineer. It is the customer's responsibility that proper construction techniques and applicable codes are adhered to. 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.

ASSEMBLY TOOLS REQUIRED

1 - Compass	1 - Torque Wrench	1 - 10mm Nut Driver
1 - Precision Clinometer	1 - Ratchet Wrench (1/2" Drive)	1 - 7/16" Nut Driver
1 - 9" Magnetic Level	1 - 3/4" Socket (1/2" Drive)	
1 - Philips Screwdriver	1 - 3/4" Deep Socket (1/2" Drive) For bottom two Rd. Hd. Sq. Nk. Bolts securing Antenna to AZ/EL Cap	

PRE-INSTALLATION CHECKLIST

ALL INSTALLATIONS:

- Grounding Rod Clamp and Grounding Block: As required by the National Electric Code or local electric code.
- Ground Wire: #10 solid copper or as required by the National Electric Code or local electric code. (Length required)
- Coaxial Cable: (Size and length required)

GROUND POLE INSTALLATIONS (refer to page 4):

- Concrete: (See Ground Pole Section for quantity.)
- #3 Rebar: (See Ground Pole Section for quantity.) Deformed steel per ASTM A615, Grade 40 or 60.

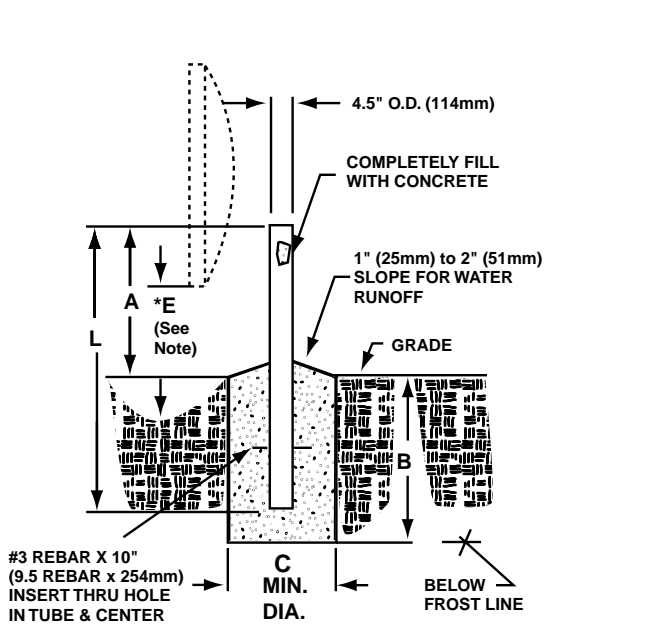
GROUND POLE INSTALLATION

Soil conditions vary and you should consult with a local professional engineer for modifications, if any, to suit local soil conditions and code requirements.

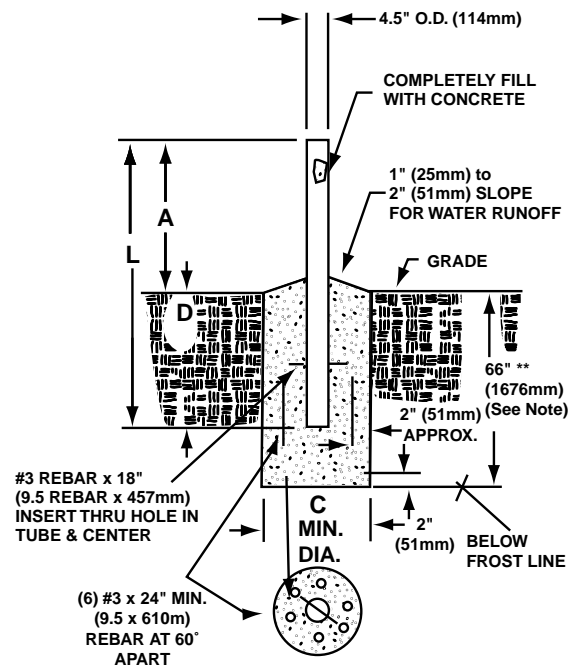
Designs based on allowable vertical soil bearing pressure of 2000 psf and 125 mph wind velocity. Minimum compressive strength of concrete shall be 2500 psi at 28 days.

DESIGNS SHOWN BELOW DO NOT REPRESENT AN APPROPRIATE FOUNDATION FOR ANY SPECIFIC LOCALITY OR ANTENNA INSTALLATION. THEY ARE PROVIDED FOR REFERENCE PURPOSES ONLY.

PIER FOUNDATION



DEEP FROST LINE



Concrete Dimension					Concrete Volume
L	A	B	C	E	
96"	50"	53"	36"	16.7"	1.1 YD ³ (.84m ³)
(2438)	(1270)	(1359)	(914)	(424)	
mm in () parentheses					
Antenna Size: 1.8m					
*NOTE: Clearance increases at elevations greater than 23°					

Concrete Dimension				Concrete Volume
L	A	D	C	
96"	53"	43"	29"	.94 YD ³ (.72m ³)
(2438)	(1359)	(1092)	(737)	
mm in () parentheses				
Antenna Size: 1.8m				
**NOTE: 66" (1676mm) may be increased, concrete & length of rebar will increase accordingly.				

ASSEMBLY AND INSTALLATION

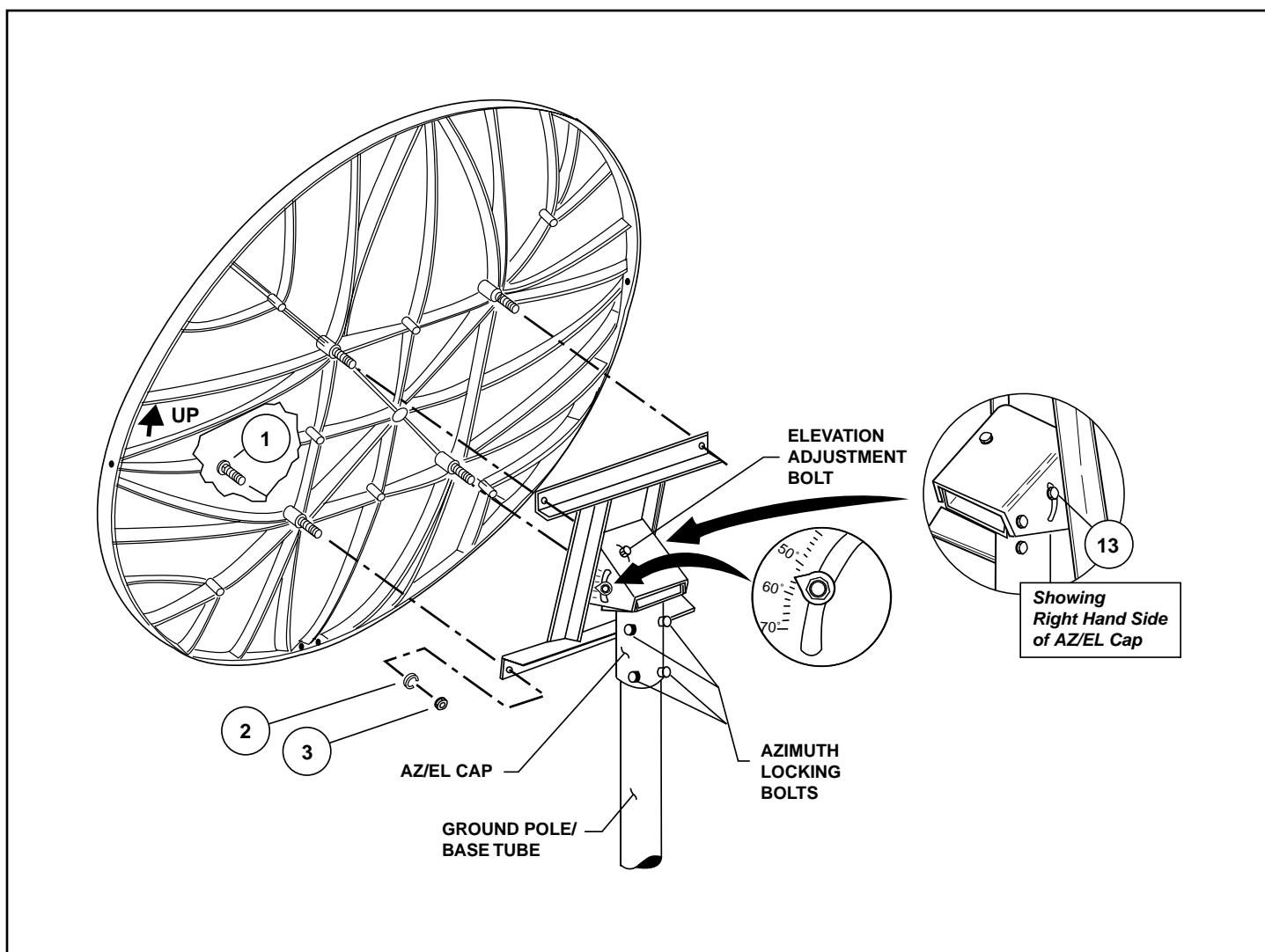


FIG. 1.0 - INSTALLING AZ/EL CAP AND ANTENNA

NOTE: 10mm tools fit M6 hardware. Recommendations for Site Selection, Assembly Tools Required for assembly, a Pre-Installation Checklist and a Hardware Sorter are provided in this manual for your convenience.

The AZ/EL cap can be installed on a ground pole or roof mount support. Mount should be assembled and in place, or ground pole set, before installing the AZ/EL cap.

NOTE: For ground pole installations, allow concrete to cure before proceeding with installation.

The AZ/EL cap is factory preassembled; therefore, no assembly is required.

INSTALLING AZ/EL CAP ON GROUND POLE

Back out (**do not remove**) the four azimuth locking bolts from AZ/EL cap. Install cap onto top of ground pole or base tube. To hold the AZ/EL cap in place while installing antenna, temporarily tighten one of the azimuth locking bolts.

INSTALLING ANTENNA TO AZ/EL CAP

On right hand side of AZ/EL cap housing, loosen flange lock nut (13) one full turn, loosen other nuts, on both sides of AZ/EL cap housing, a quarter turn. Turn elevation adjustment bolt counterclockwise and increase elevation setting to approximately 50° or 60°. Refer to Figure 1.0. **NOTE: Bolts will be tightened and torqued during antenna alignment procedure. Do not tighten at this time, leave bolts loose.**

Insert ½" x 4" round head bolts (1) into antenna mounting holes, as shown in Figure 1.0. Lift antenna and align mounting bolts with holes in AZ/EL cap and place antenna down on AZ/EL cap. Secure with ½" lock washers (2) and hex nuts (3). Torque to 20 ft-lbs (27 N-m).

IMPORTANT: For correct orientation of antenna the "UP" arrow must be as shown in Figure 1.0.

FEED & FEED LEGS INSTALLATION

Refer to Manufacturer's Instructions to assemble and install feed assembly.

Insert bottom feed leg (33) into clamp (39) and align alignment hole in feed leg with alignment pin inside clamp. Install bottom feed leg (33) with clamp (39) onto bottom edge of antenna, securing with two 1/4" x 3/4" round head square neck bolts, lock washers and hex nuts (35, 36 and 38). Do not tighten.

NOTE: Bottom feed leg is the one with open round ends on both ends and a lance on one end and alignment hole in opposite end. Insert end with hole into bottom feed leg clamp (39).

Install side feed legs (30) to sides of antenna (37) as shown in Figure 1.1. Secure with silver color, 1/4" hex bolt, flat washer, lock washer and hex nut (34, 32, 35 and 36). Do not tighten.

Insert one side feed leg (30) into junction block (29) and secure with M6 x 30mm hex bolt and flat washer (31 and 32). Do not tighten.

NOTE: M6 hex bolts are gold color and are packed with washers (27 and 32) in bag with junction block (29).

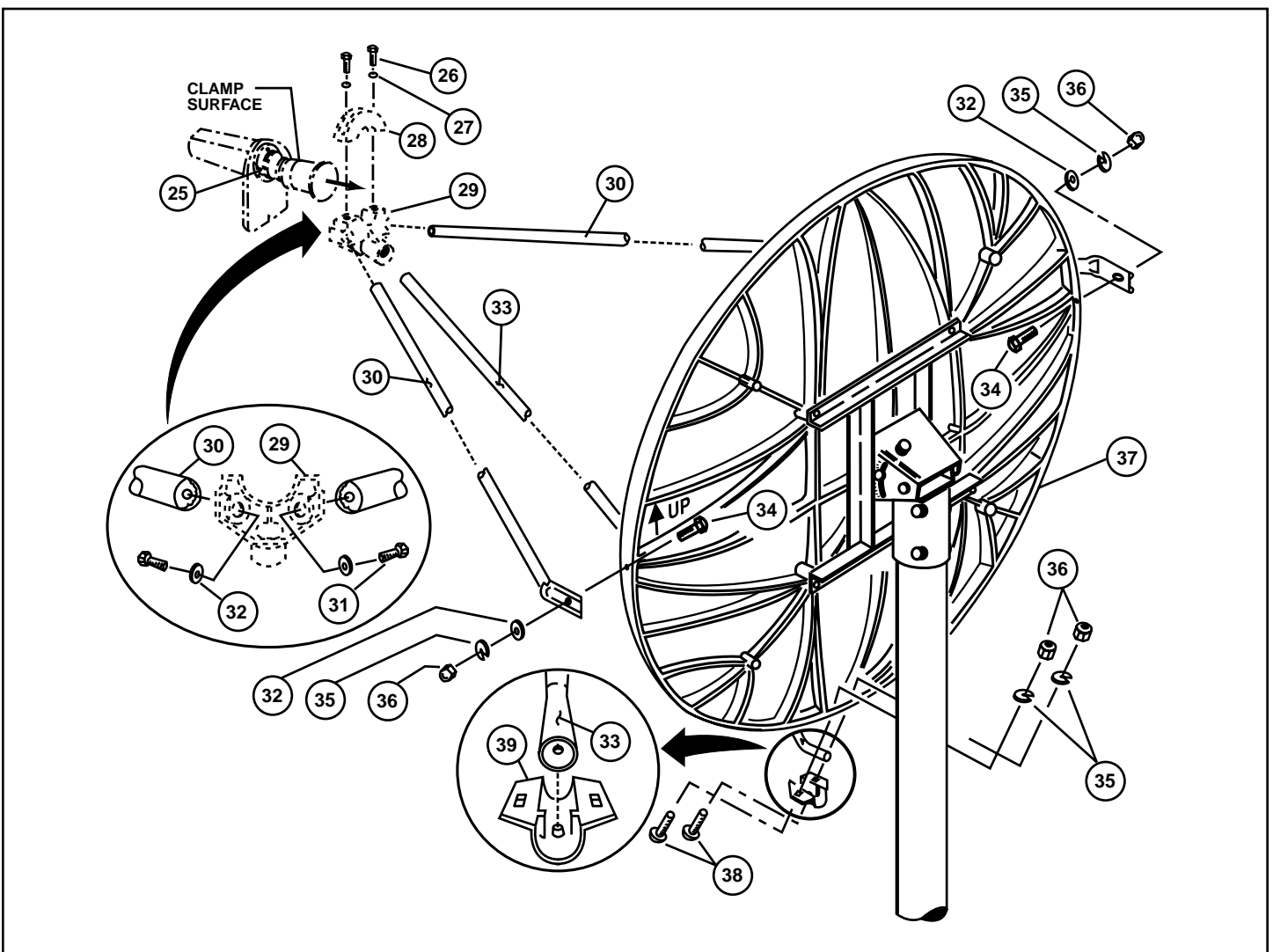
Insert bottom feed leg (33) into junction block (29) until lance on leg is engaged.

Insert opposite side feed leg (30) into junction block (29) and secure with M6 x 30mm hex bolt and flat washer (31 and 32).

IMPORTANT: Tighten and torque hardware securing side feed legs and bottom feed leg to junction block and antenna to 4 ft-lbs (5.4 N-m).

Refer to Manufacturer's Instructions to assemble and install feed assembly.

Use bottom feed leg as conduit and route coaxial cable up thru leg. Leave approximately 12" of length beyond junction block. Install "F" connector onto cable for assembly to LNB.



ANTENNA ALIGNMENT PROCEDURE

Three adjustments necessary to align the antenna are:

- 1- Elevation, refer to Figure 2.0.
- 2 - Azimuth, refer to Figure 2.1.
- 3 - Polarization of the Feed, refer to Figure 2.2.

ELEVATION ALIGNMENT

IMPORTANT: The following bolts should have been loosened during the “Installing Antenna and AZ/EL Cap” procedure, if not loose, loosen now: Bolts in curved slots (both sides of AZ/EL housing), and elevation pivot bolts (14) on both sides of AZ/EL housing 1/4 turn (refer to Figure 2.0). Turn elevation adjustment bolt (9) clockwise to decrease elevation or counterclockwise to increase elevation. Align the pointer (6) with appropriate mark at the desired elevation reading. Refer to Figure 2.0. This will be an approximate setting. Optimum setting achieved when fine tuning.

PRELIMINARY SETUP

- 1 - Loosen all four azimuth locking bolts (15).
- 2 - Simultaneously snug tighten both top bolts to an equal depth, then 1/8 turn, centering cap on pole.
- 3 - Repeat Step 2 for bottom bolts.

NOTE: Preliminary setup aligns mount squarely on ground pole/base tube to prevent tilting during alignment.

AZIMUTH ALIGNMENT

This procedure outlines an easy method of adjusting the four azimuth locking bolts (15) without tilting the AZ/EL cap on ground pole/base tube. Tilting will make azimuth and elevation adjustments difficult. **CAUTION: Do not overtighten bolts during preliminary setup because scarring the ground pole/base tube will make Fine Tune Adjustment difficult.**

- 1 - Loosen the top and bottom azimuth locking bolts (15) 1/8 turn. Minimum loosening will allow azimuth rotation on pole without tilting.
- 2 - Obtain azimuth for your satellite from Charts. Rotate the antenna and AZ/EL cap, pointing it to the correct compass reading for your location and satellite. Refer to Figure 2.1. Slowly sweep the antenna in azimuth until a signal is found, if desired signal is not found, increase or decrease elevation setting and repeat the azimuth sweep.
- 3 - Final Lock Down: Tighten progressively (1/8 turn each) all four azimuth locking bolts (15). Repeat until 85-95 ft-lbs torque is reached.

POLARIZATION OF FEED

Polarization of feed is obtained by using 10mm nut driver and loosening two M6 clamp bolts (26) and turning feed. Align alignment mark on clamp with “0” (zero) mark on feed horn scale (refer to Figure 2.2). Turn the feed assembly clockwise or counter clockwise to obtain the correct polarization setting for your location. Make sure clamp is installed with arrow pointed toward antenna as shown in Figure 2.2. Torque bolts (26) securing half clamp to junction block to 4 ft-lbs (5.4 N-m) maximum (refer to Figure 2.2).

FINE TUNING

Snug tighten hex nuts in curved slots and pivot bolts (refer to Figure 2.0). 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. Tighten and torque all hardware (refer to Torque Chart on page 2).

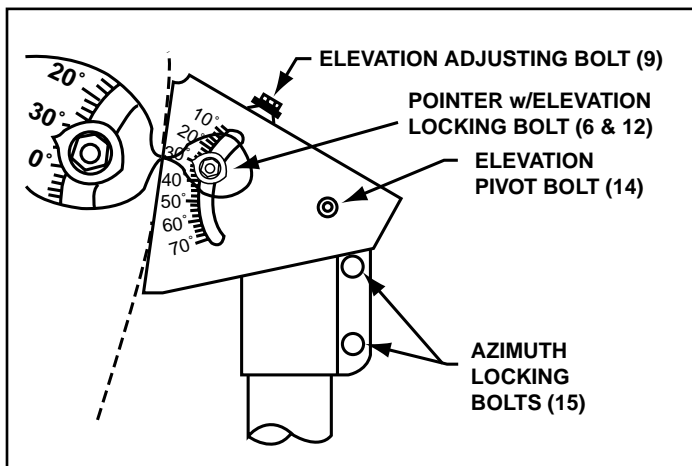


FIG. 2.0 - SETTING ANTENNA ELEVATION

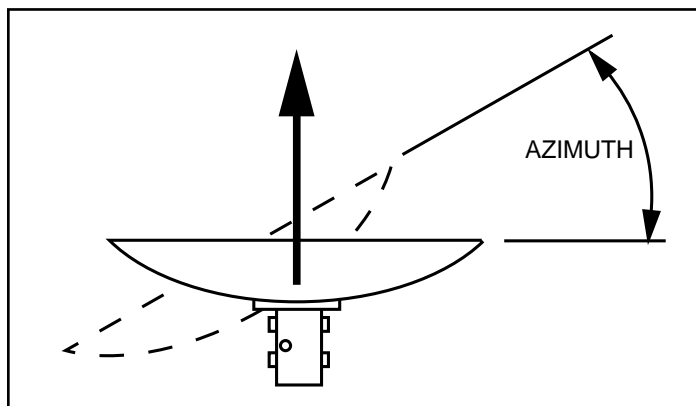


FIG. 2.1 - ROTATING ANTENNA FOR AZIMUTH

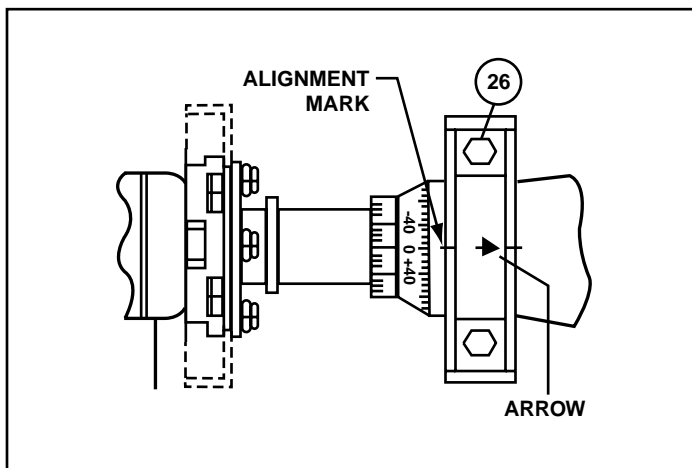


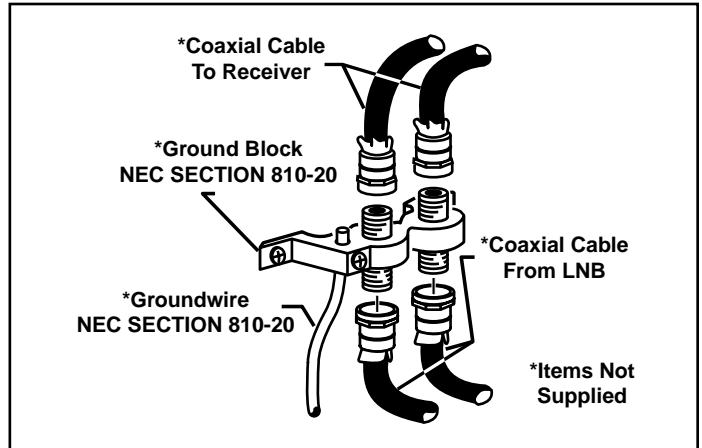
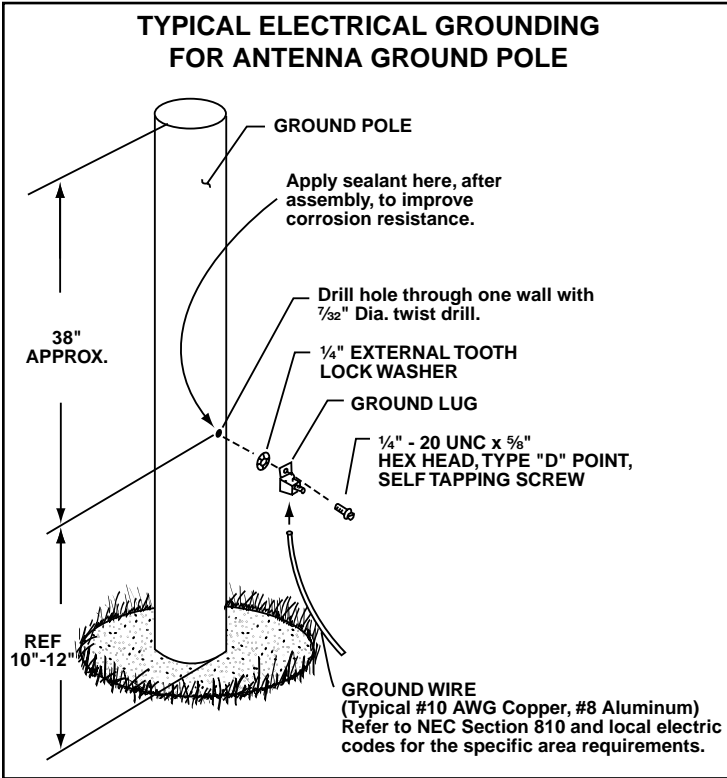
FIG. 2.2 - POLARIZATION OF FEED

GROUNDING

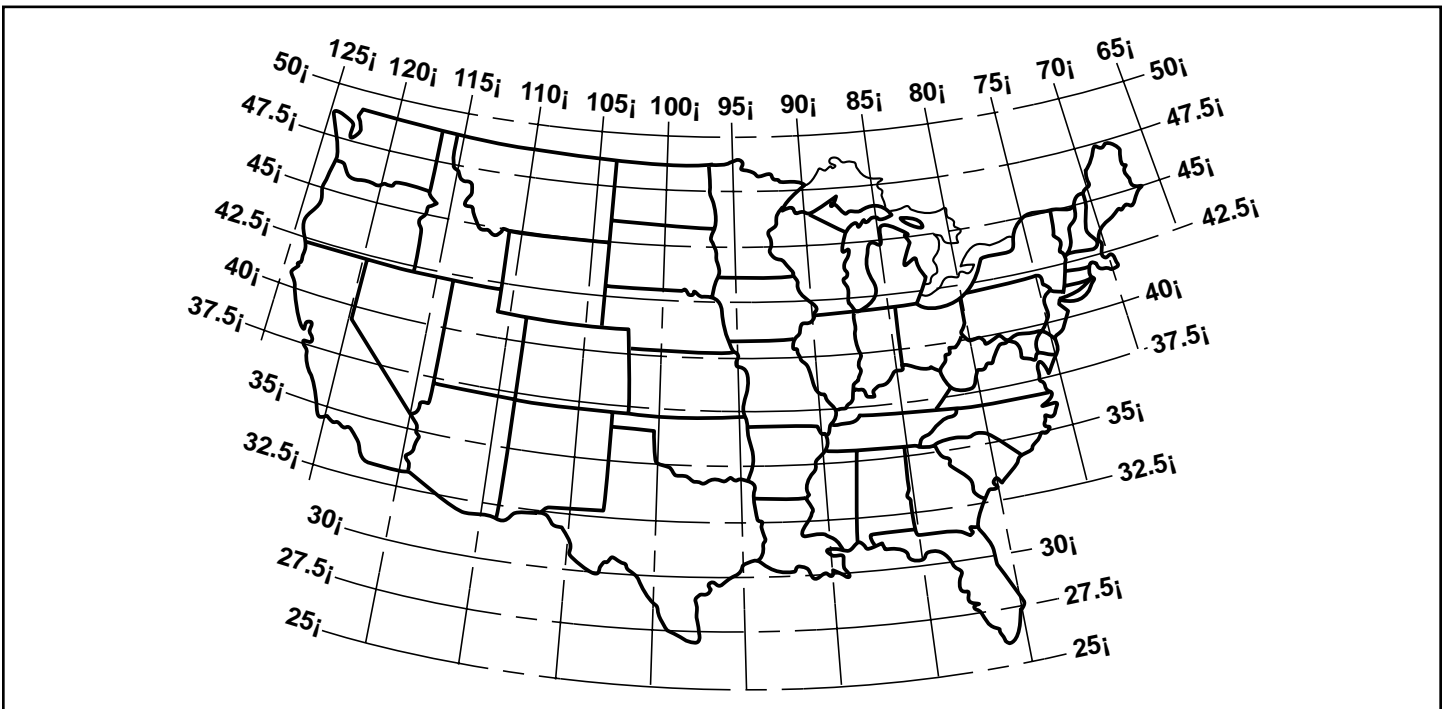
**ALL INSTALLATIONS TO CONFORM TO
THE LATEST ISSUE OF THE
NATIONAL ELECTRIC CODE.**

Ground pole, antenna mount assembly and feed cables must be grounded in accordance with current National Electric Code and local electric codes to protect from surges due to nearby lightning strikes.

Clamps that provide a solid connection between ground wire and ground source should be used.



GROUNDING FEED CABLES



POLARIZATION CHART

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

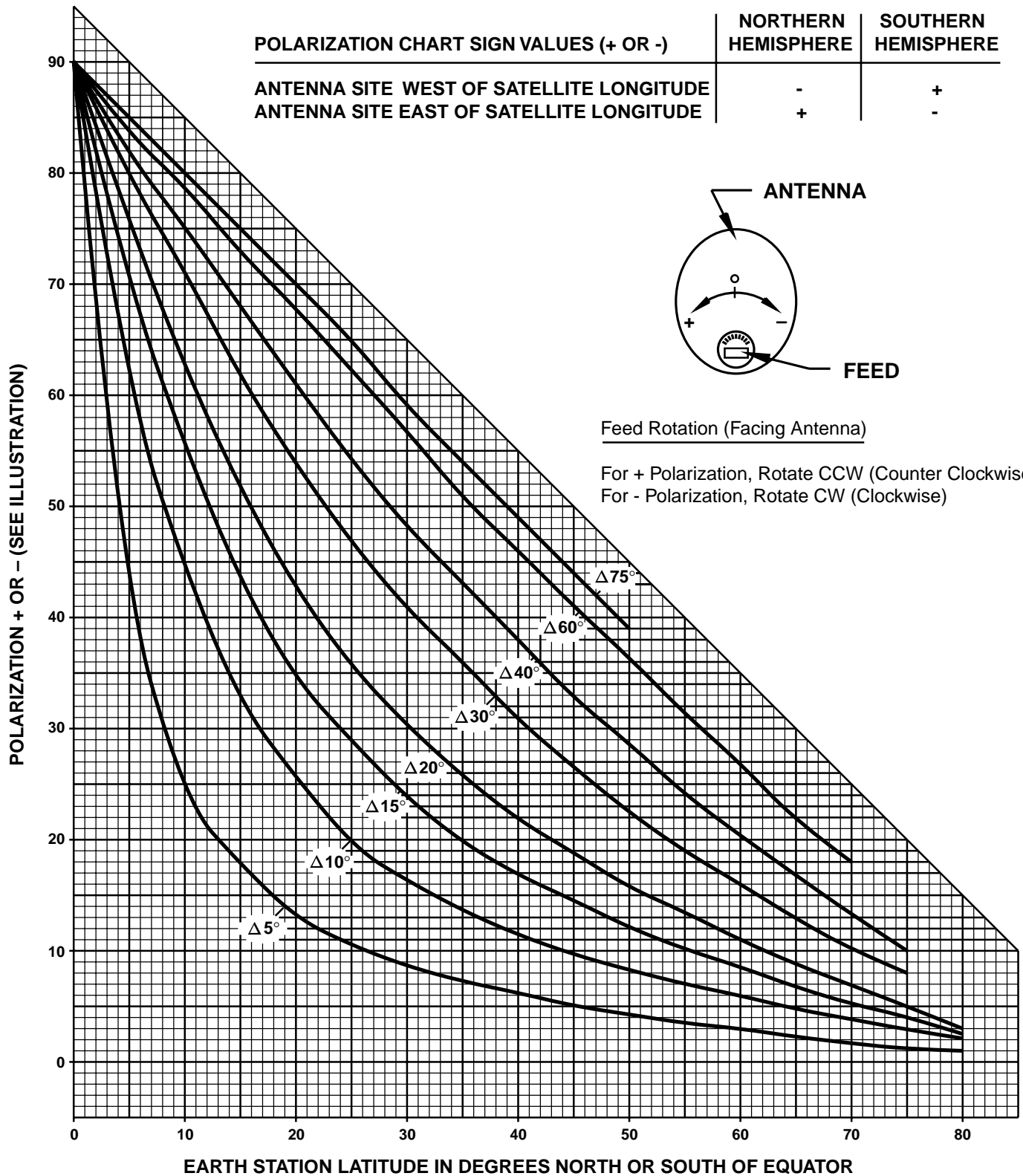


CHART 1

ELEVATION CHART

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

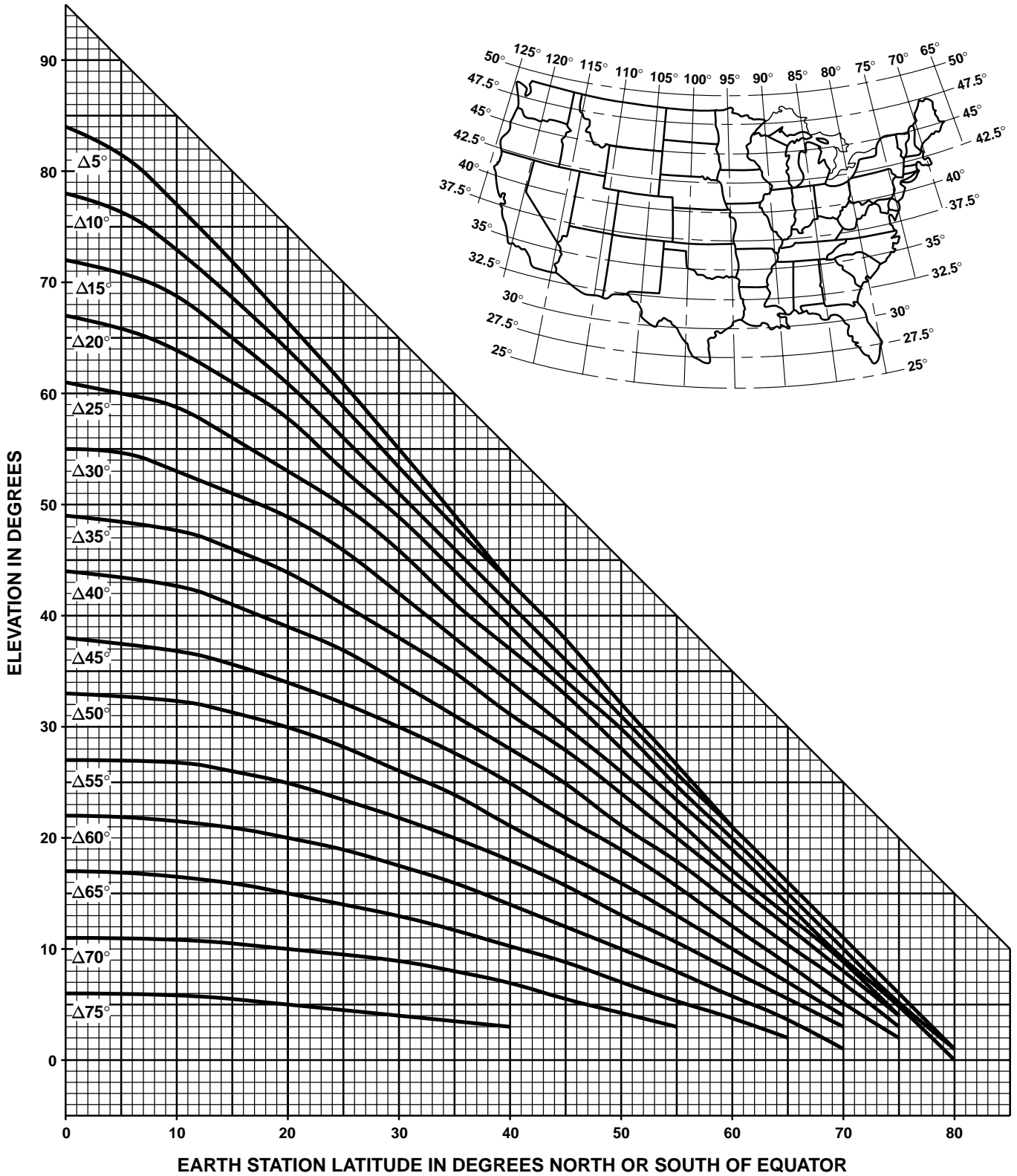


CHART 2

AZIMUTH CHART

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

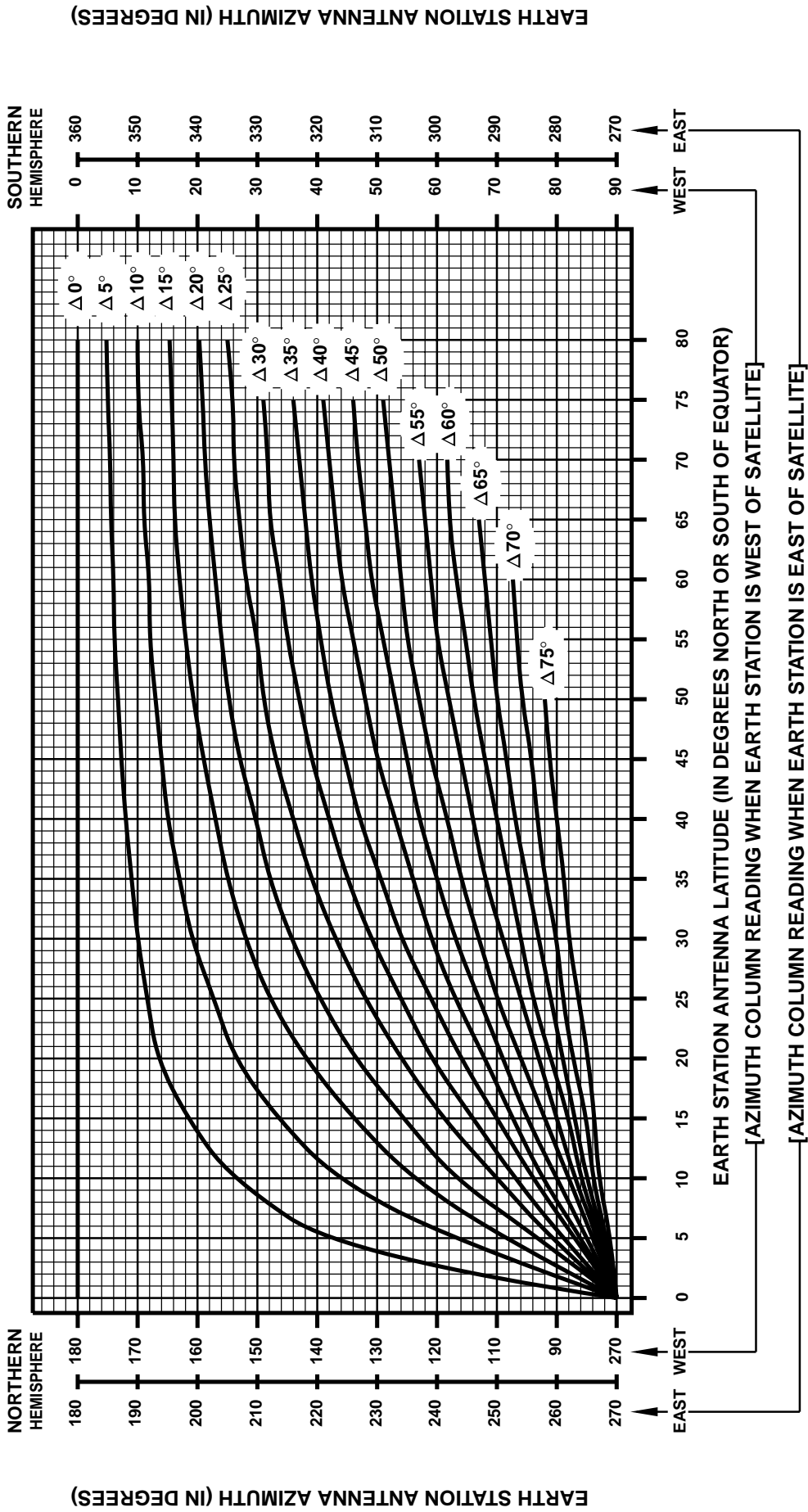


CHART 3

PARTS AND HARDWARE

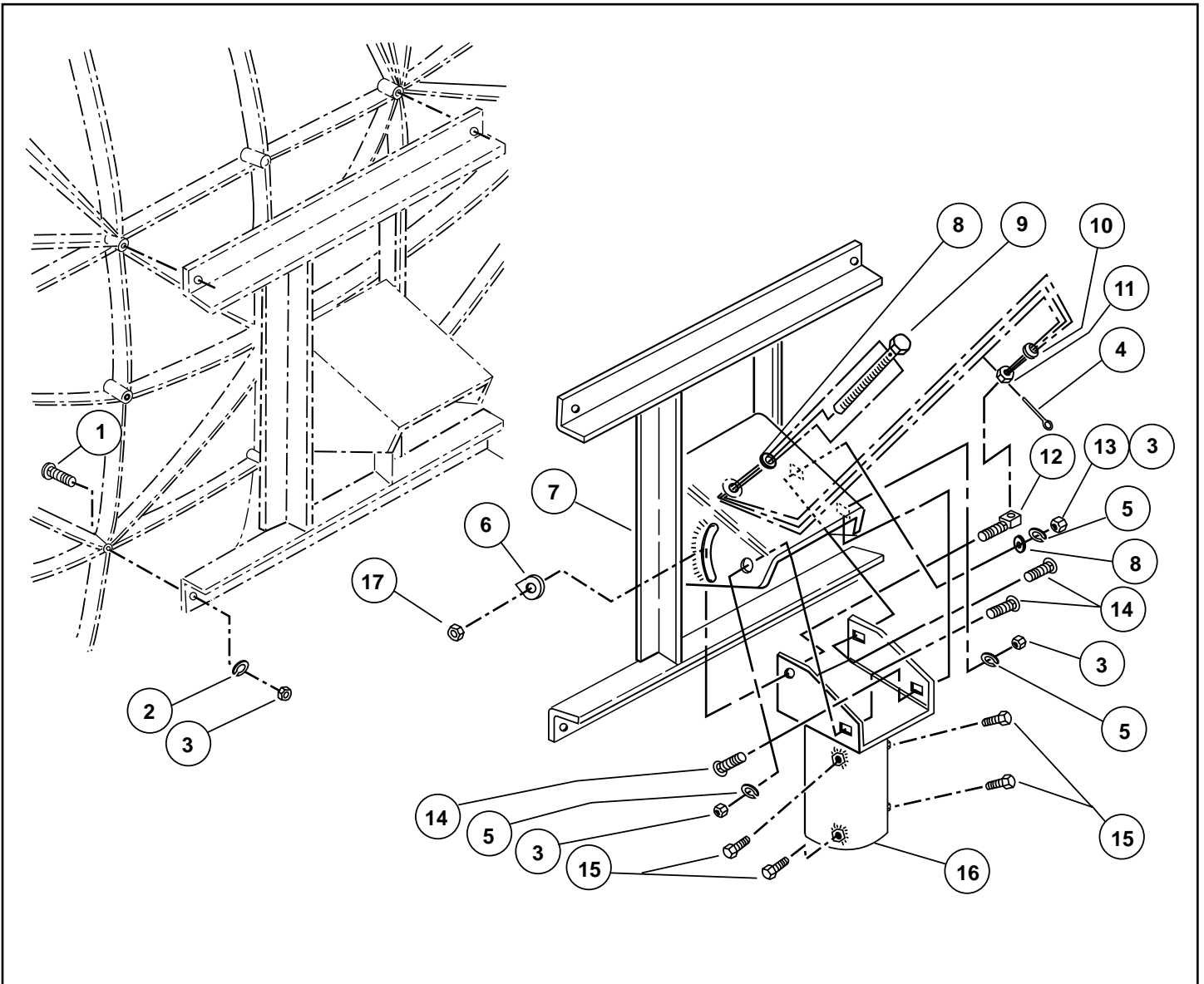


FIG. 3.0 - AZ/EL CAP

NO.	DESCRIPTION	QTY.
1	RD HD SQ NK BOLT, 1/2" x 3.75"/4.00", GALV.	4
2	LOCK WASHER, S.S., 1/2"	4
*3	HEX NUT, 1/2", GALV.	6
4	COTTER PIN, S.S., 1.00"	1
*5	LOCK WASHER, 1/2", GALV.	2
6	POINTER	1
7	AZ/EL BACKFRAME ASSEMBLY	1
8	FLAT WASHER, 1/2"	1
9	HEX HD SCREW, SPCL, 1/2" X 7"	1

NO.	DESCRIPTION	QTY.
10	SPHERICAL WASHER	1
11	CASTLE NUT, 1/2"	1
12	SWIVEL NUT, 1/2"	1
13	SERR. FLANGE NUT, 1/2"	1
14	RD HD SQ NK BOLT, 1/2" x 1 1/4"	3
*14	RD HD SQ NK BOLT, 1/2" X 1 1/2", GALV.	3
15	HEX HD BOLT, 1/2" x 1 1/4", GD 5, GALV.	4
16	YOKE CAP ASSEMBLY	1
17	HEX LOCK NUT, 1/2"	1

*Used with galvanized mount only.

PARTS AND HARDWARE

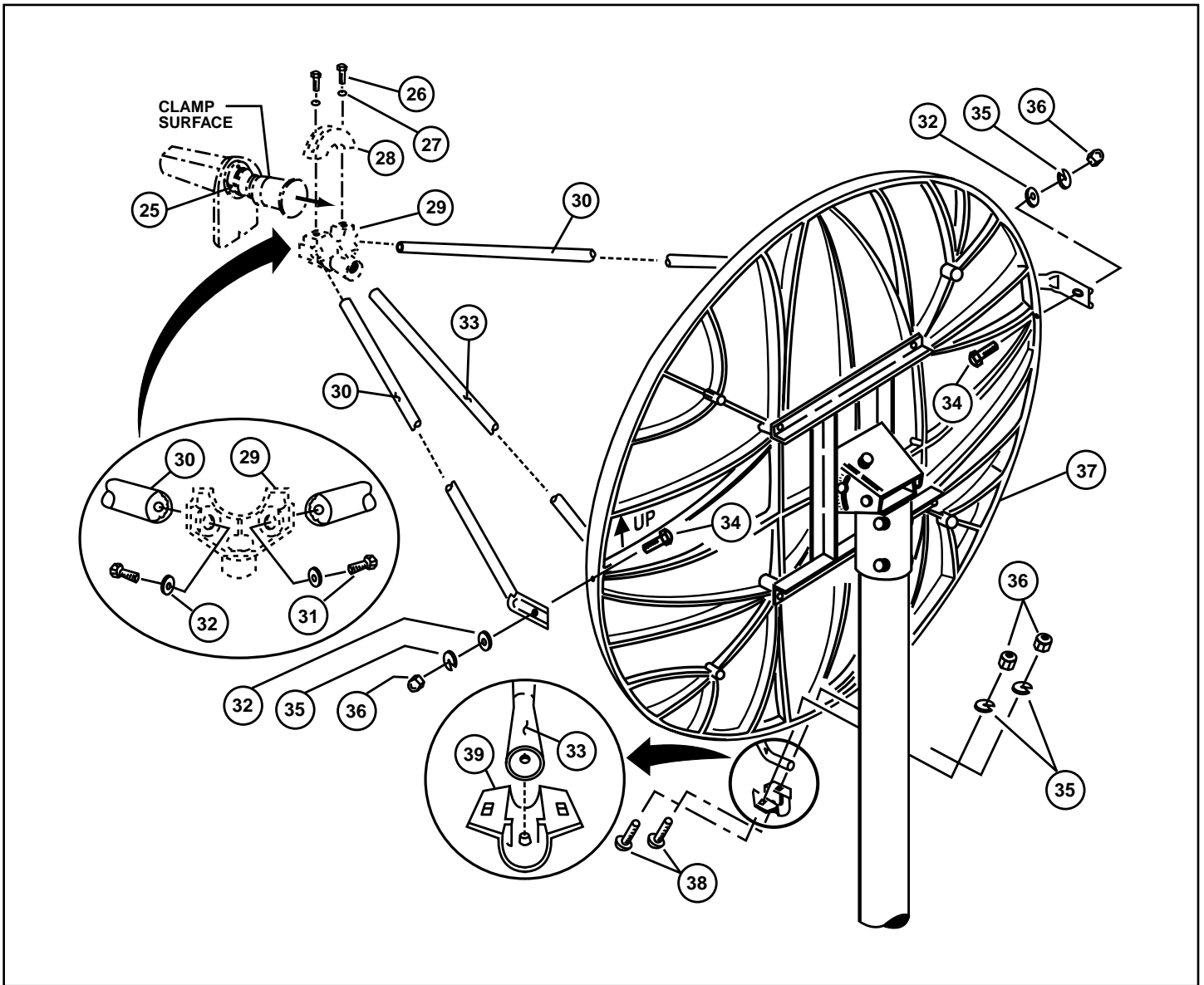


FIG. 3.2 - ANTENNA AND FEED SUPPORT LEGS

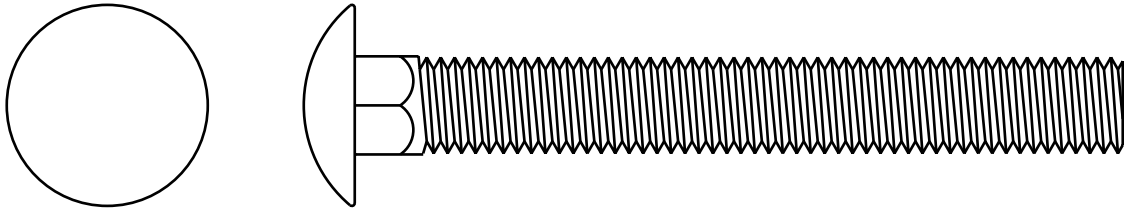
NO.	DESCRIPTION	QTY.
* 25	FEED HORN	1
* 26	HEX HD BOLT, M6 x 20mm	2
* 27	FLAT WASHER M6	2
* 28	CLAMP	1
* 29	JUNCTION BLOCK	1
30	SIDE FEED LEG	2
31	HEX HD BOLT M6 X 20mm	4
32	FLAT WASHER, 1/4" x 3/4" O.D., S.S.	4

NO.	DESCRIPTION	QTY.
33	BOTTOM FEED LEG	1
34	HEX BOLT 1/4" x 3/4", S.S.	2
35	LOCK WASHER 1/4", S.S.	4
36	HEX NUT, 1/4"-20, S.S.	4
37	ANTENNA (SMC) OFFSET 1.8m	1
38	RD HD-SQ NK BOLT, 1/4" x 3/4", S.S.	1
39	CLAMP, BOTTOM FEED LEG	1

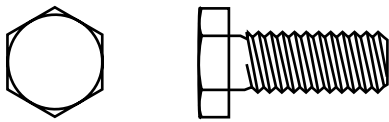
* Supplied with feed assembly.

HARDWARE SORTER

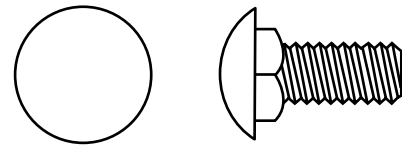
NOTE: 10mm Tool fits M6 hardware.



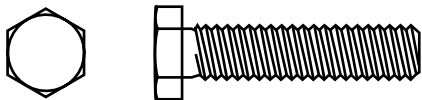
ROUND HEAD SQUARE NECK BOLT, 1/2" x 4.0", GALV.
ITEM 1



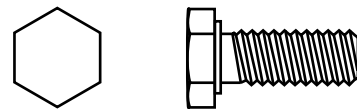
HEX HEAD BOLT, M6 x 20mm
ITEM 26



ROUND HD SQ NECK BOLT, 1/4-20 UNC x 3/4", SS
ITEM 38



HEX HEAD BOLT, M6 x 30mm
ITEM 31



HEX HEAD BOLT, 1/4" x 3/4", SS
ITEM 34

*Hardware illustrations are true size.
Place actual hardware on top of illustration to identify.*