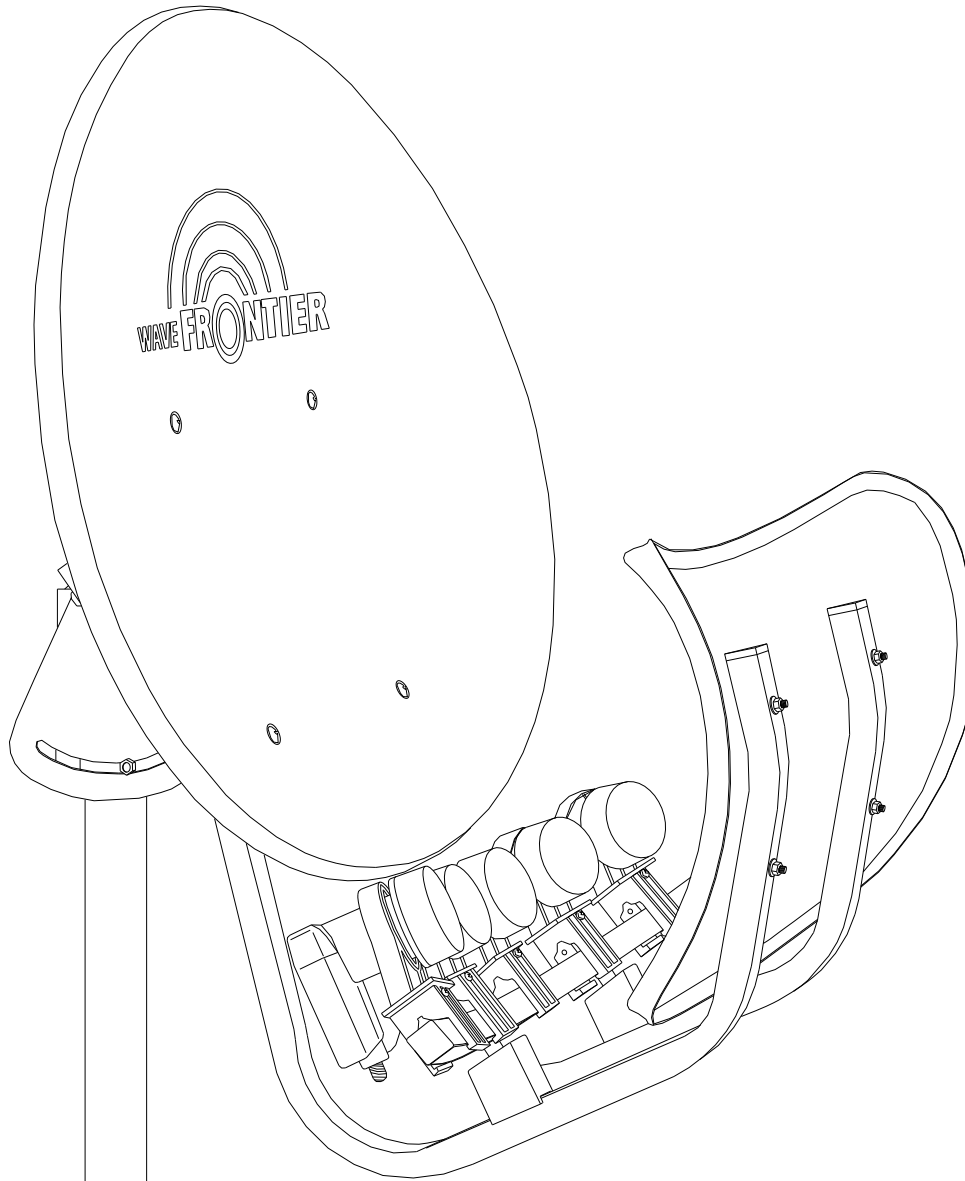
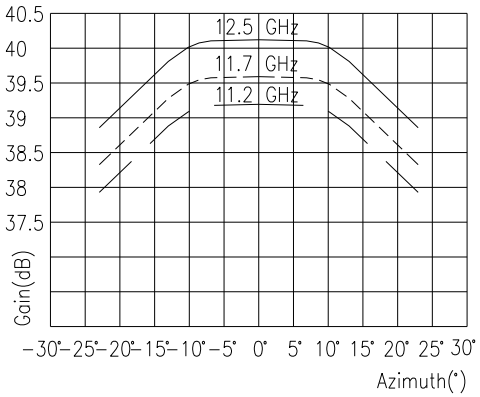


Installation Manual for **Toroidal 90** Multi-beam satellite antenna



It is developed by toroidal formula while other existing existing satellite antennas apply parabolic formula. Signals reflected twice through the main reflector and sub reflector form a focal line created by focal points along the bottom of the main reflector and it makes TOROIDAL function as a multi-beam antenna. It is able to replace several single-beam antennas because it receives couples of broadcast & communication satellites at the same time. It is applicable world-wide.

1. Antenna Gain Graph

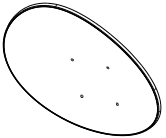
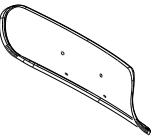
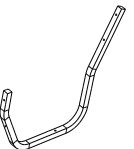
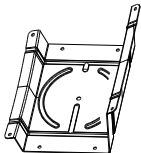
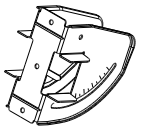
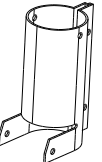
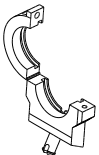
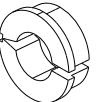


* Figures acquired through repeated field tests.

2.Specifications

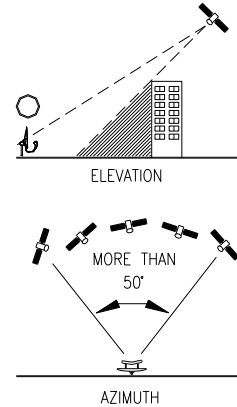
Model		TOROIDAL90
Main Reflector	Height	96.7 cm
	Width	108.6 cm
Sub Reflector	Height	36.1 cm
	Width	83.6 cm
Reception Frequency		10.70 ~ 12.75 GHz
Antenna Gain (at 12.5 GHz)		40.10dB (at 0 deg, Azimuth)
		39.20dB (at 20deg, Azimuth)
Azimuth (at Tilt 0 deg)		± 25 deg (Total 50 deg)
LNB Installation		1 ~ 14 EA
Efficiency		65% ~ 80%
Polarization		Linear & Circular
Material		Galvanized Steel
Finish Coating		Polyester powder coating
Operating Temperature		-30°C / +60°C
Relative Humidity		0% ~ 90%
Damage Winds		60 m/sec
Operating Winds		45 m/sec
Acceptable Pole Diameter		60 mm

3. Hardware Sorter

NO.	ITEM (DESCRIPTION)	NO.	ITEM (DESCRIPTION)	NO.	ITEM (DESCRIPTION)	NO.	ITEM (DESCRIPTION)
	Main Reflector		Sub Reflector		Support Arm		LNBF Guide
A1		A2		A3		A4	
	1EA		1EA		2EA		1EA
	Back Mount Tilt		Back Mount Elevation		Weaving Tube		LNBF Guide Seat
A5		A6		A7		A8	
	1EA		1EA		1EA		2EA
	Holder Supporter		LNBF Ku Band Holder		LNBF Ku Band Adapter		Support Arm Cap
A9		A10		A11		A12	
	5EA		5EA		5EA		4EA
						Enduring Tube	
						A13	
							1EA
B1	M6*12 CROSS-HEAD CAP SCREW 	4EA					
B2	M6*35 CROSS-HEAD CAP SCREW 	4EA					
B3	M6*35 HEX-HEAD CAP SCREW 	4EA					
B4	M6*37 CROSS-HEAD CAP SCREW 	2EA					
B5	M5*15 CROSS-HEAD CAP SCREW 	2EA					
B6	M5*15 PAN-HEAD CAP SCREW 	15EA					
B7	M8*20 SQUARE SCREW 	2EA					
B8	M8*20 HEX-HEAD CAP SCREW 	1EA					
B9	M8*80 HEX-HEAD CAP SCREW 	1EA					
B10	M6*20 SQUARE SCREW 	2EA					
B11	M8*12 SQUARE SCREW 	2EA					
B12	M6 HEX-HEAD NUT 	14EA					
B13	M8 HEX-HEAD NUT 	6EA					
B14	Ø8 PLATE WASHER 	2EA					
B15	Ø8 SPRING WASHER 	2EA					

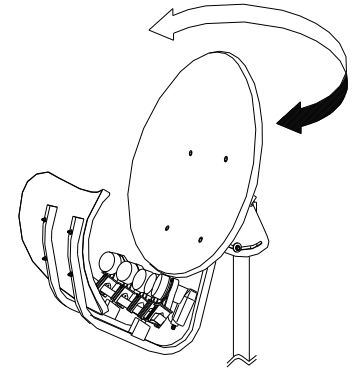
4.How to aim TOROIDAL for satellites

☐ MOUNTING LOCATION



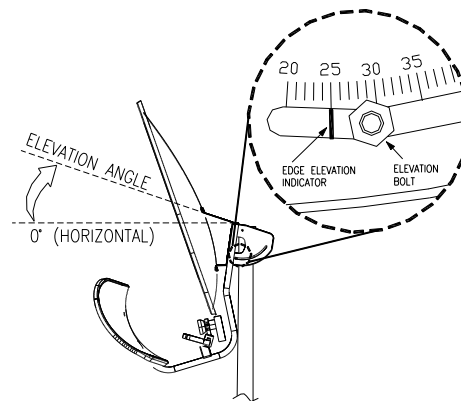
- ① Decide where to mount TOROIDAL.
- ② In order to determine if you have a clear line-of-sight to the satellites, you will need the azimuth and elevation angles.

1 AZIMUTH ANGLE SETTING —



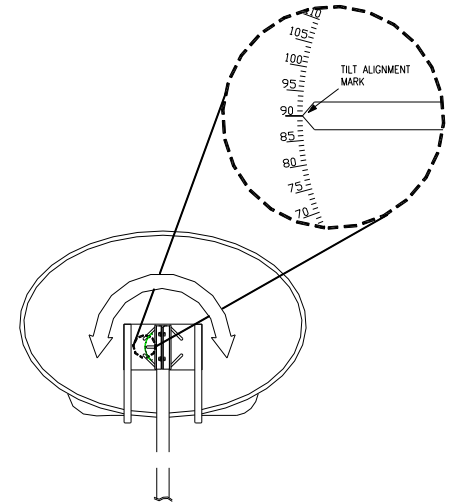
- ① Find out the azimuth angle of the central satellite among the satellites you wish to receive.
- ② Put TOROIDAL toward the azimuth angle found in ① with a compass.

2 ELEVATION ANGLE SETTING



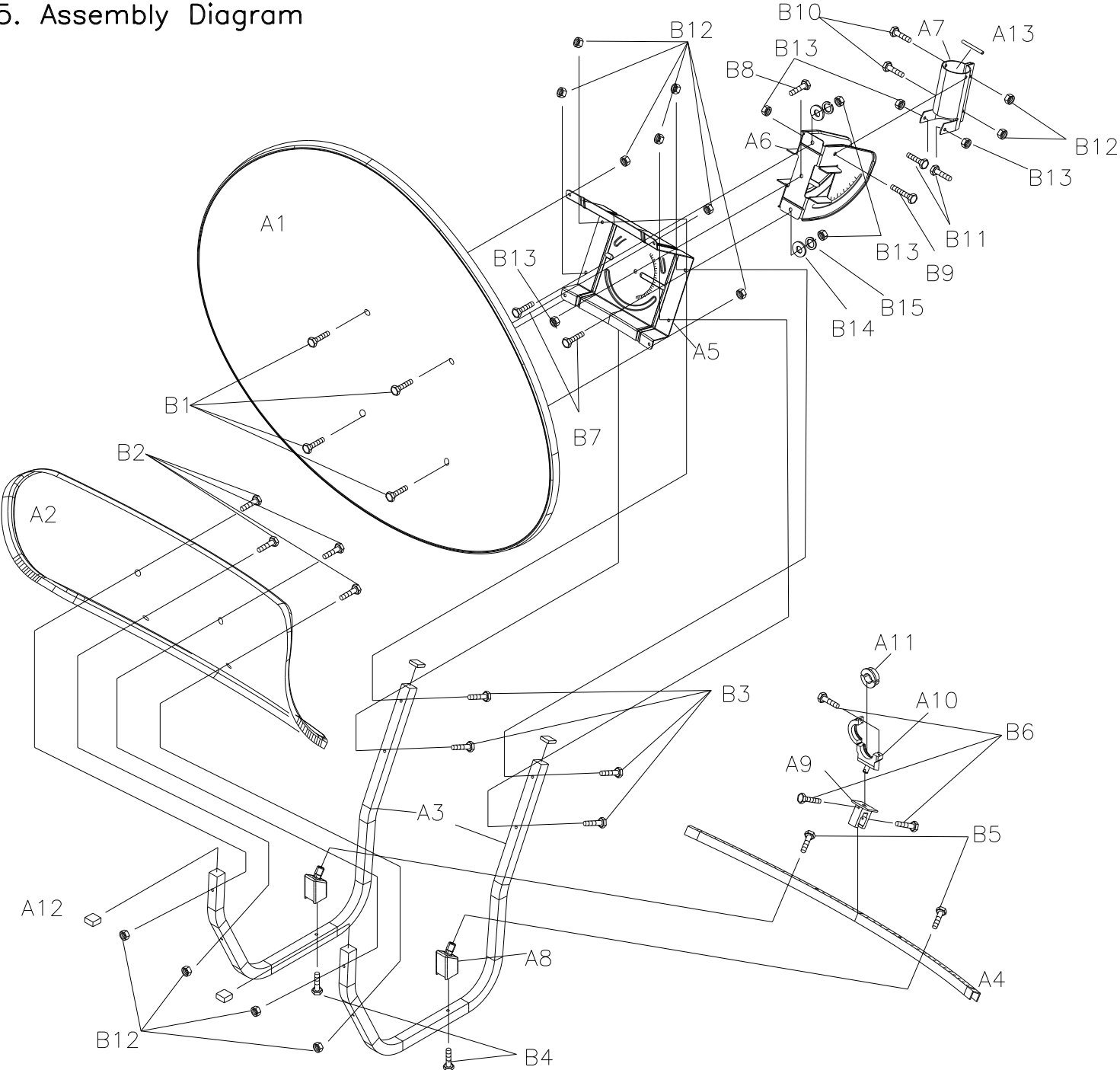
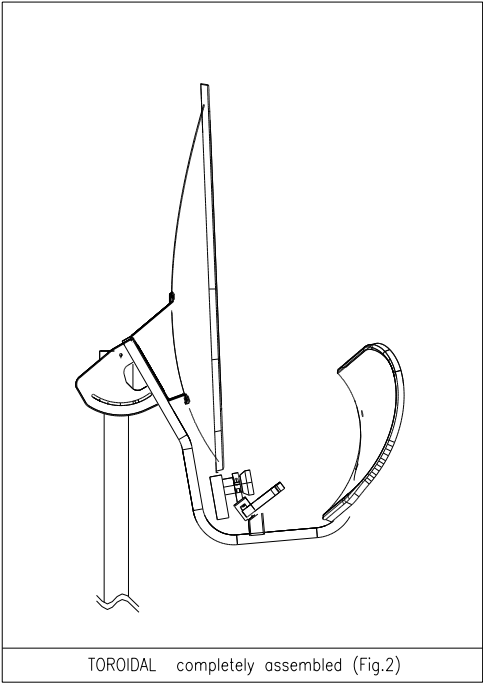
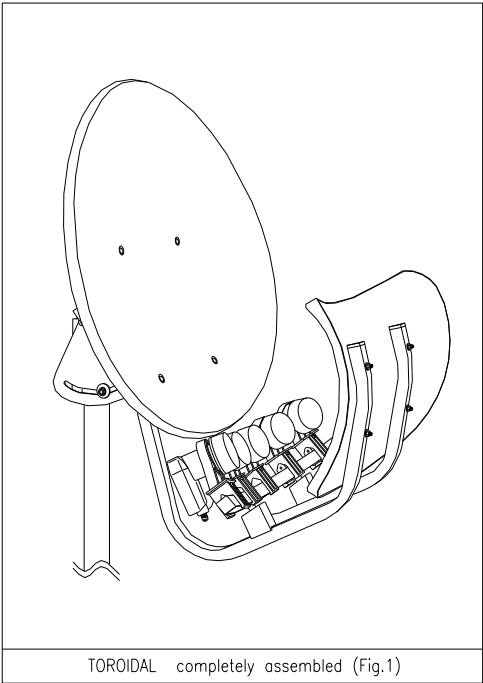
- ① Find out the elevation angle of the central satellite among the satellites you wish to receive.
- ② Shift TOROIDAL up or down to meet the elevation angle found in ① looking at the elevation angle indicator on the back mount.

3 TILTING

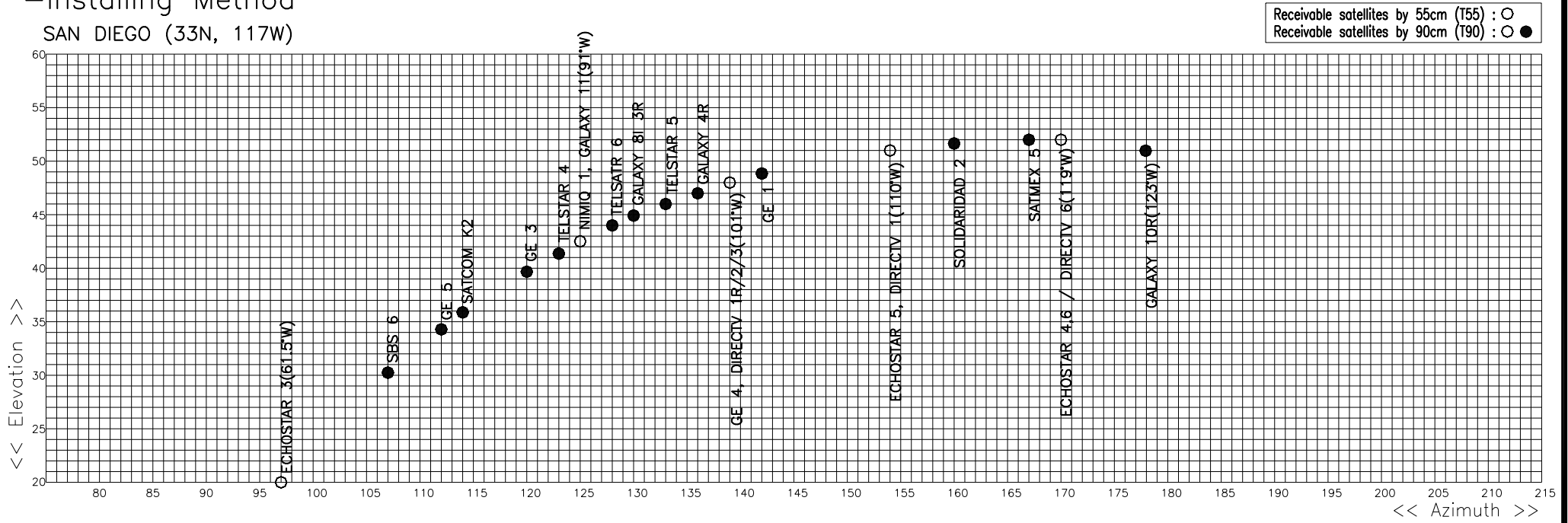


- ① Measure the tilt angle of the satellites.
- ② Turn TOROIDAL to meet the tilt figure.

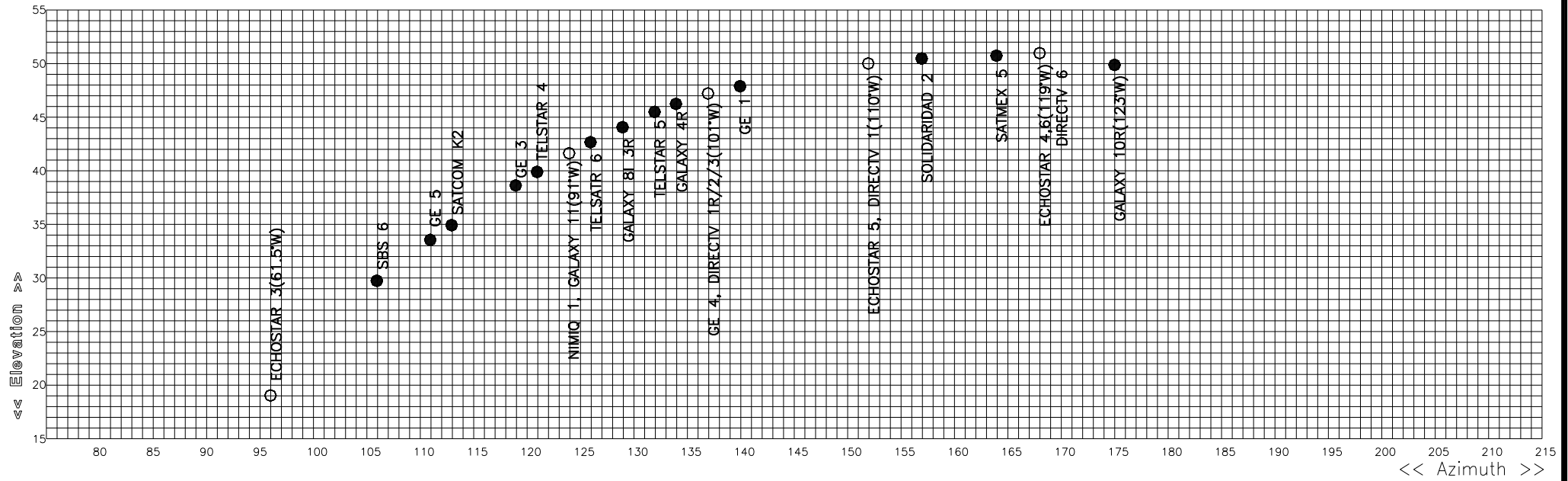
5. Assembly Diagram



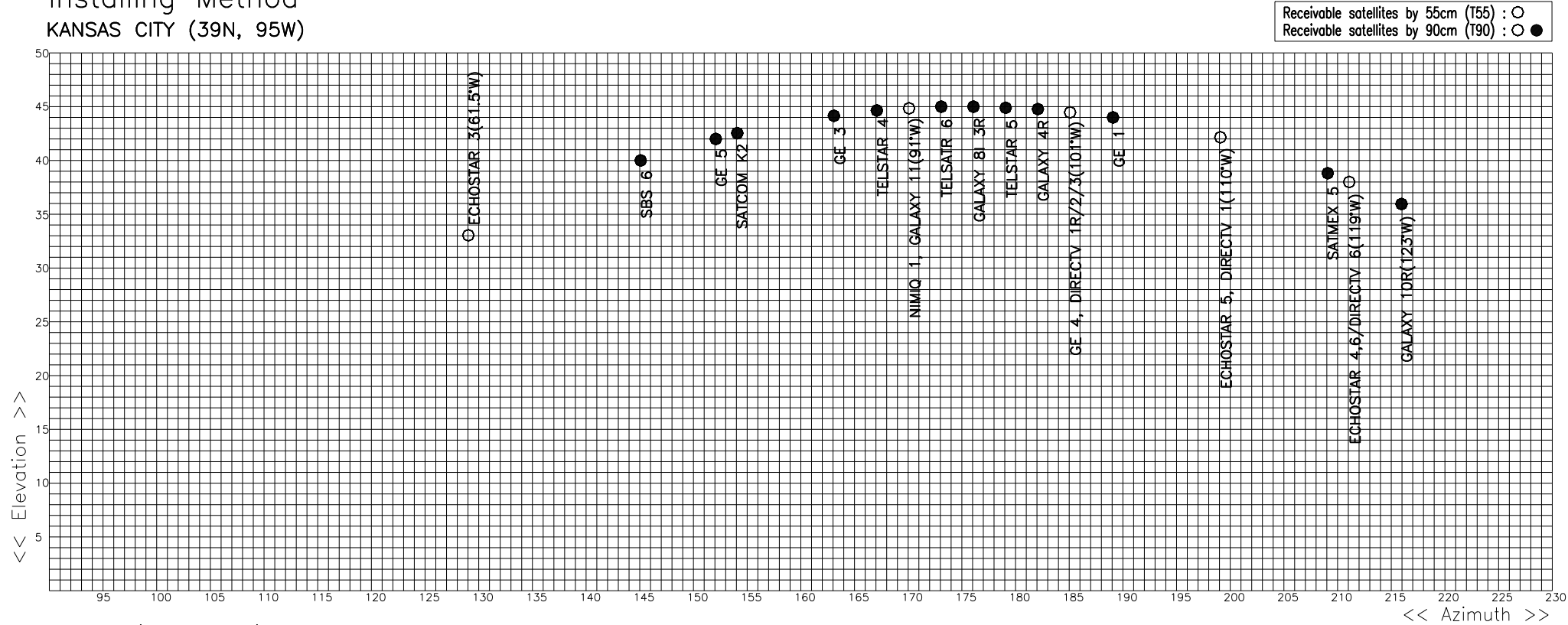
—Installing Method SAN DIEGO (33N, 117W)



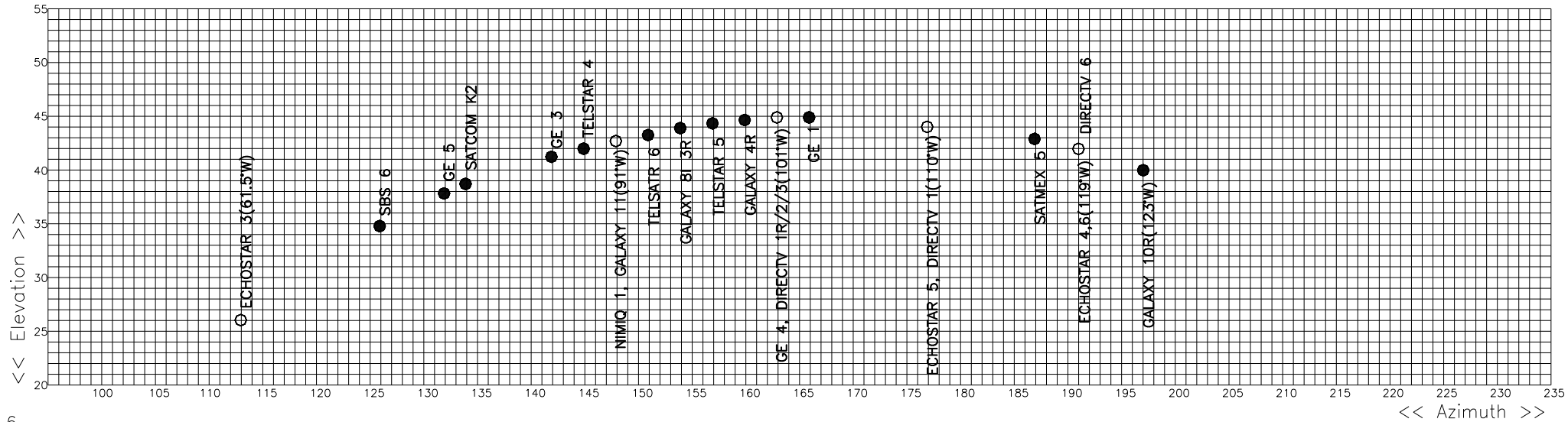
L.A (34N, 118W)



—Installing Method
KANSAS CITY (39N, 95W)

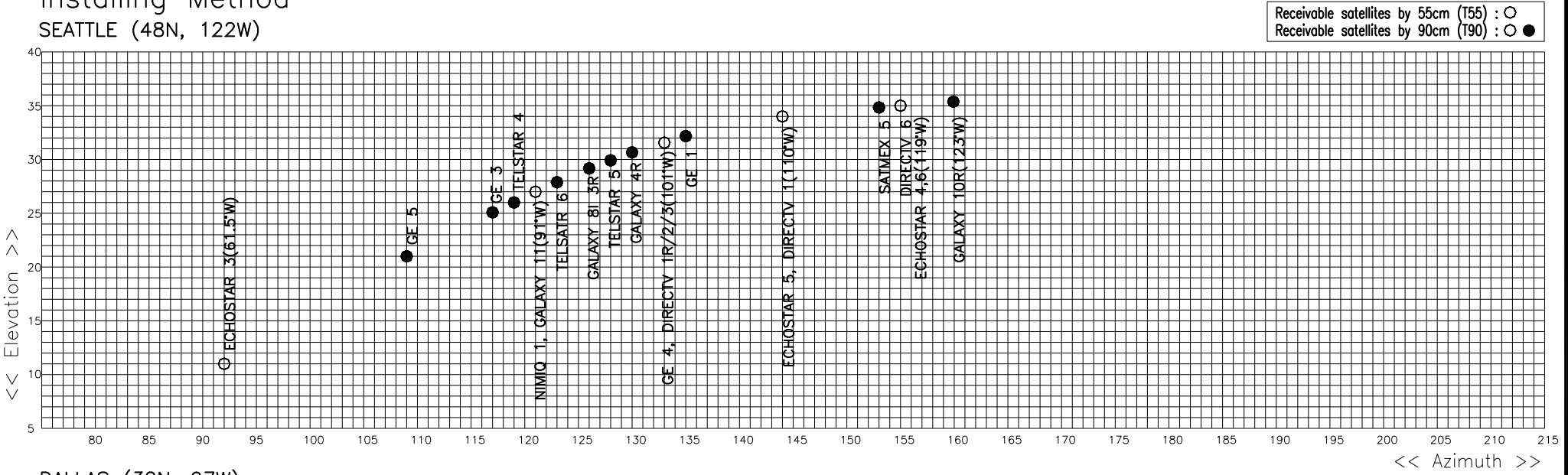


DENVER (40N, 105W)

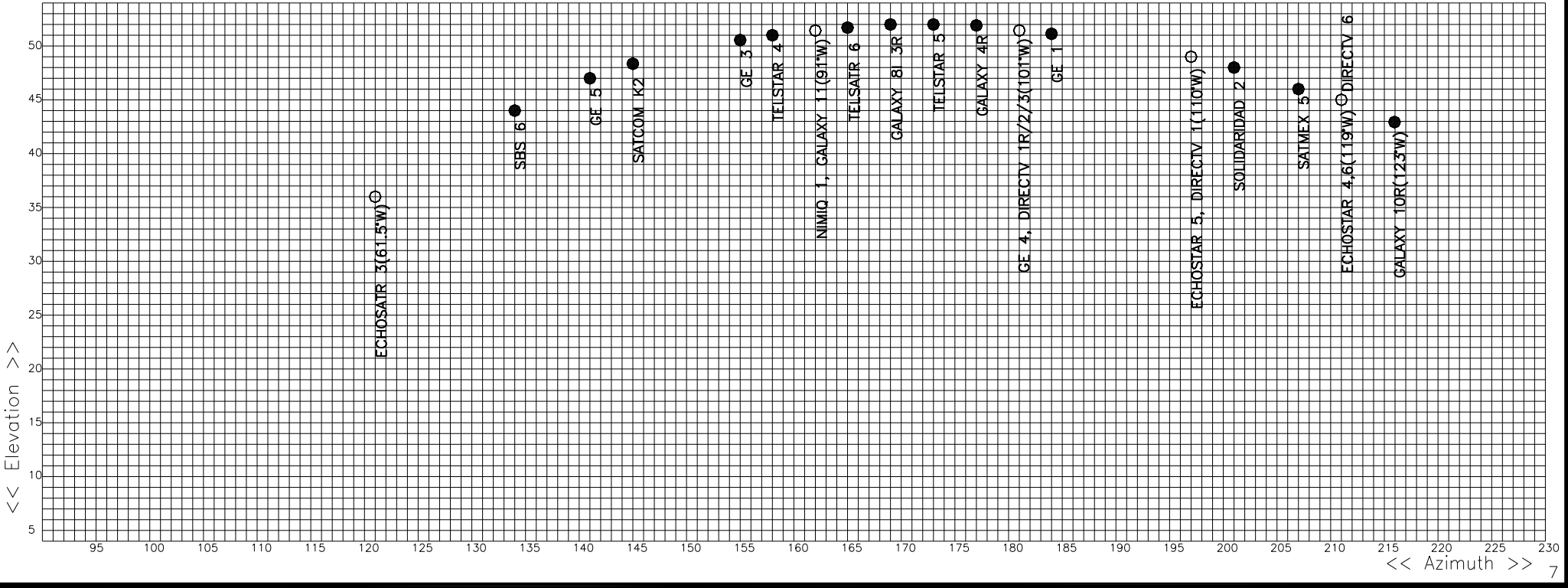


—Installing Method

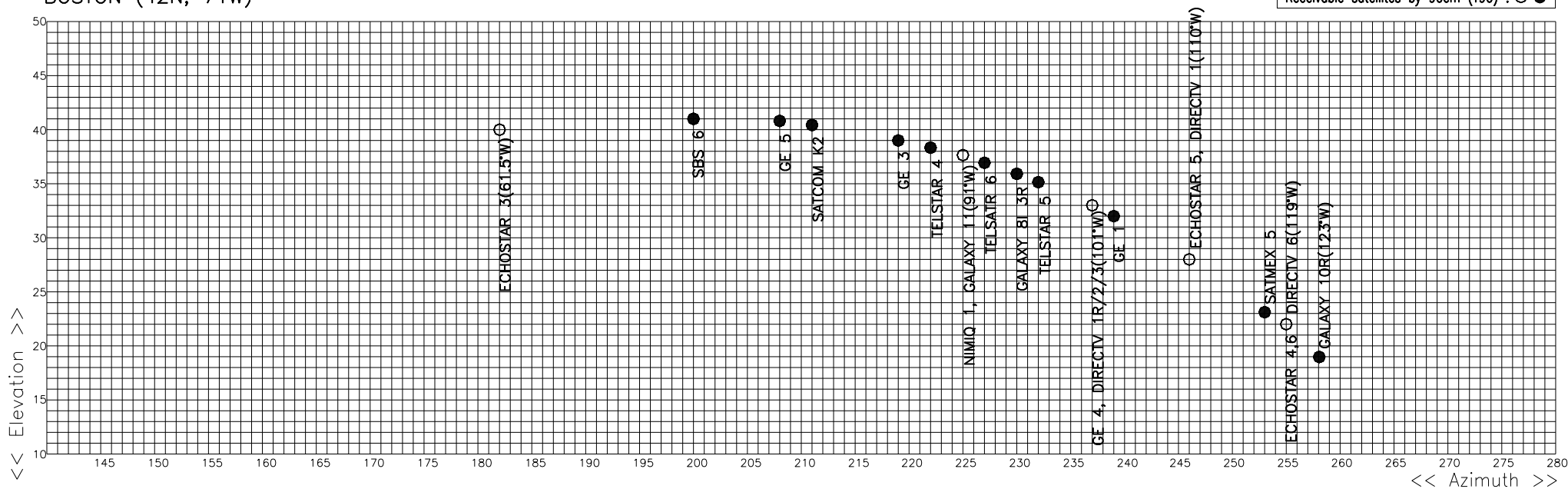
SEATTLE (48N, 122W)



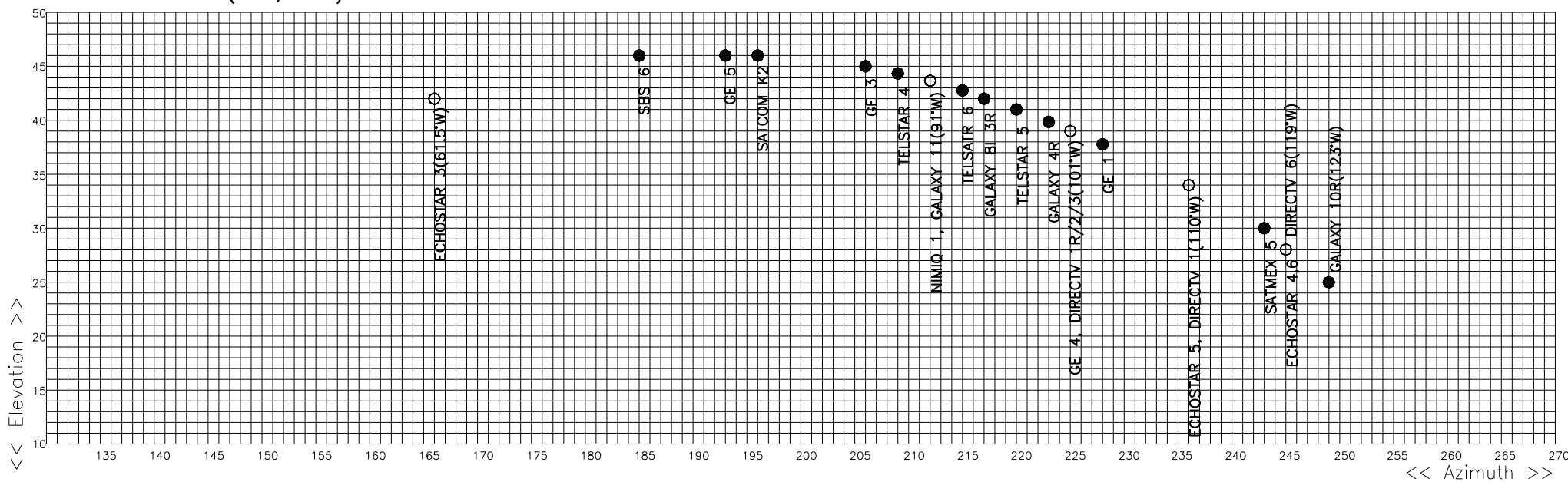
DALLAS (32N, 97W)



—Installing Method BOSTON (42N, 71W)

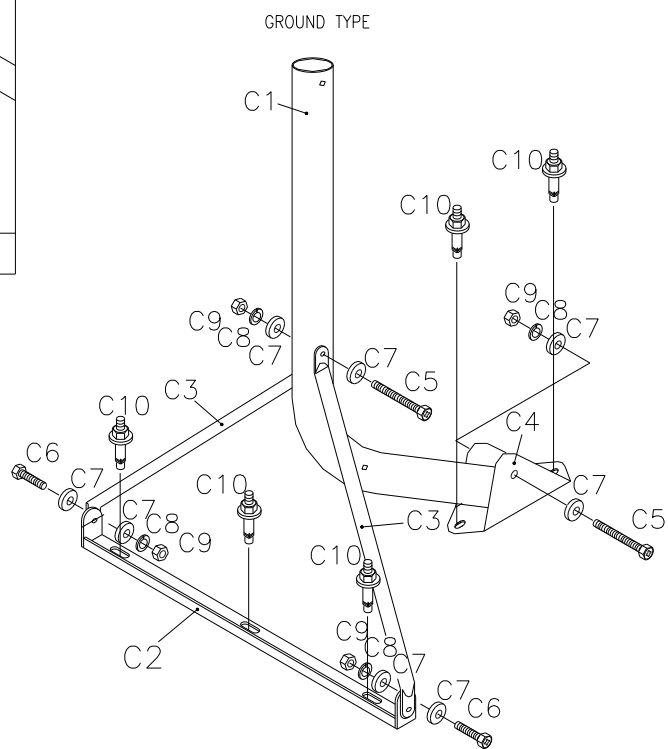
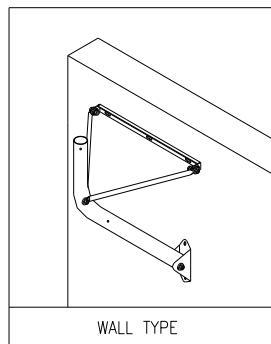


WASHINGTON D.C (39N, 77W)



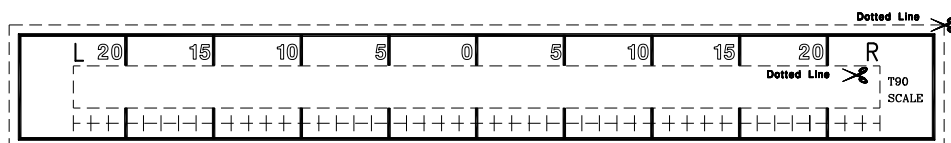
– INSTALL KIT (FOR TOROIDAL 90)

NO	DESCRIPTION	Q'TY	REMARK	NO	DESCRIPTION	Q'TY	REMARK
C1	POLE STAND 60	1		C6	M8*25 HEX HEAD BOLT	2	
C2	BKT STAND L600	1		C7	ø8 FLAT WASHER	8	
C3	SUPPORT L523	2		C8	ø8 SPRING WASHER	4	
C4	BKT STAND 60	1		C9	M8 HEX HEAD NUT	4	
C5	M8*90 HEX HEAD BOLT	2		C10	ø8*38 EXPENDING MASONRY BOLT	5	



MODEL : WU60-3

MEMO



Cut off the scale on the left
and apply it to installing TOROIDAL Ant.



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