AvL TECHNOLOGIES

Operation and Maintenance Manual

MODEL 1278K Mobile VSAT Antenna System

Contents Subject to Change
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SECTION 1 — OVERVIEW

TECHNICAL DESCRIPTION

The Model 1278K Mobile VSAT Antenna System is a three axis positioner featuring the simple, rugged AvL cable drive system which produces very low backlash, high-stiffness and high-reliability when driven by a low backlash, gear box with DC motors. All drive components are high-strength steel, housed in lubricated-for-life housings, which results in the most reliable, no maintenance, stiff system with the minimum of weight. The polarization drive rotates the feed assembly +/95° with lightweight gear motor. A 20 lb. (9kg) HPA may be located on the feed boom.

AvL CABLE DRIVE SYSTEM

The patented AvL cable drive sytem utilizes highly reliable aircraft control cables in a redundant configuration to achieve a zero backlash, light-weight, very stiff drive system. It achieves this high-tech performance using low-tech components by wrapping the cable around the drive capstan several times before wrapping the larger drive drum. The method used to wrap the capstan results in a minimum free length of cable. The load in the cable on the main drum is exponentially reduced as it is wrapped around the drum. Therefore, the total elongation of the cable when under load is minimized. The AvL Cable Drive system results in stiffness of up to 10 times that of comparable gear or
harmonic drive systems. The cables are pretensioned and spring loaded at the main drum attachment point which eliminates backlash at installation and from any cable stretch in the future.

SECONDARY DRIVE SYSTEM

The Az and El AvL cable drive systems are driven by a low backlash worm gear set with a 40:1 ratio. The factory low backlash of the worm gear set is reduced further by the AvL cable drive ratio resulting in a lash of only .06 dB seen by the RF system. The gear sets are housed in a sealed housing which allows the gear set to be continuously lubricated in synthetic oil which maximizes gear efficiency and minimizes wear.

MOTOR DRIVES

Lightweight, reliable, DC motors with integral gearbox are used for the az, el and pol drives. These motors were selected because they provide the best torque-to-weight ratio as well as allowing dual speed operation for slewing and peaking. These motors produce constant torque over the speed range with no cogging at low speeds, which ensures smooth operation when peaking antenna. The 24V DC design provides current limiting torque control and will allow vehicle battery operation if necessary.

RF WAVEGUIDE

The positioner is designed so that the up-link BUC can be installed on the feed boom.

CONTROLLER

The TracStar Systems controller is manufactured by TracStar Systems, Inc. an antenna and controller manufacturer. Complete operating instructions can be found in the TracStar Controller Operating Instructions included on the accompanying disk.

CONSTRUCTION

Except for the drive components and bearings, all metal components are aluminum or stainless-steel.

Model 1278K MOBILE VSAT
1.2M MOTORIZED VEHICULAR MOUNT

Reflector	1.2 Meter
Optics	Offset, Prime Focus, .8 f//d
Drive System	Patented AvL Cable Drive Positioner
Mount Geometry	Elevation over Azimuth
Polarization	Rotation of Feed

Electrical RF	**Receive**	**Transmit**
Frequency Range	10.95-12.75 Ghz	13.75-14.5 Ghz
Gain (Midband)	42.0 dBi	43.2 dBi
VSWR	1.30:1	1.30:1
Beamwidth (degrees)		
-3 dB	1.4	1.2
-10 dB	2.5	2.1
First Sidelobe Level (Typical)	-19 dB	-22 dB
Radiation Pattern Compliance	FCC §25.209, ITU-R S.528.5	
Antenna Noise Temperature	30° K at 30° Elevation	
Polarization	Linear Orthogonal Standard, Optional Co-pol	
Power Handling Capability	40 Watts	
Cross Pol Isolation		
On-Axis (minimum)	35 dB	35 dB
Off-Axis (within 1 dB BW)	26 dB	28 dB
Off-Axis (peak)	22 dB	25 dB
Feed Port Isolation - TX to Rx	75 dB	
Satellite System Compliance	FCC and PanAmSat Worldwide	

Controllers

Optional Upgrades	
Auto-acquisition	One-button acquisition of selected satellite including peaking and optimization of cross pol (certified for auto-commissioning on most satellite services)
Size	Single Rack Unit for Auto-acquisition
Input Power	110/240 VAC, 1 ph, 50/60 Hz, 6/3A peak, 1A continuous

Reflector Options

Reflector Back Cover

Mechanical

Az/El Drive System	Patented AvL Cable Drive System
Polarization Drive System	Stainless Steel Chain Drive
Reflector Material	Glass Reinforced Plastics
Travel	
Azimuth	400°
Elevation	True elevation readout from calibrated inclinometer
Mechanical	0° to 90° of reflector boresight
Electrical	Standard limits at 5° to 65° (CE Approval) or 5° to 90°
Polarization	±95°
Speed	
Slewing/Deploying	2°/second
Peaking	0.2°/second

Motors	24V DC Variable Speed, Constant Torque
RF Interface	
BUC Mounting	Feed Boom
Waveguide	Grove Flexible Waveguide From Feed
Coax	2-RG59 run from feed to base plus 25 ft. (8 m)
Electrical Interface	25 ft. (8 m) Cable with Connectors for Controller
Manual Drive	Handcrank on Az and El Axii
Weight	115 to 125 lbs. (52 to 57 kg) depending on options selected
Stowed Dimensions	74 L x 49 W x 17 H inches (188 L x 125 W x 43 H cm)

Environmental

Wind	
Survival	
Deployed	65 mph (121 kmph)
Stowed	80 mph (161 kmph)
Operational	45 mph (72 kmph)
Pointing Loss in Wind	
20 mph (32 kmph)	0.5 dB Typical
30 Gusting to 45 mph (48 to 72 kmph)	1.0 dB Typical
Temperature	
Operational	±5° to 125°F (-15° to 52° C)
Survival	-40° to 140°F (-40° to 60° C)

SECTION 2 — INSTALLATION AND SET-UP Model 1278K K Mobile VSAT

2.1 GENERAL

The AvL Model 1278K Mobile VSAT positioner has been fully tested with the TracStar Systems controller prior to shipment. All position feedback, limit sensing, limit switches and motor speeds have been calibrated or set. The positioner needs only to be deployed and the coax and control cables connected to the controller.

Figure 2.1

1. Model 1278K Mobile VSAT shown in stowed position. (Figure 2. 1)

2. Connecting the coax cable first, make the appropriate electrical connections. (Figure 2.2.)

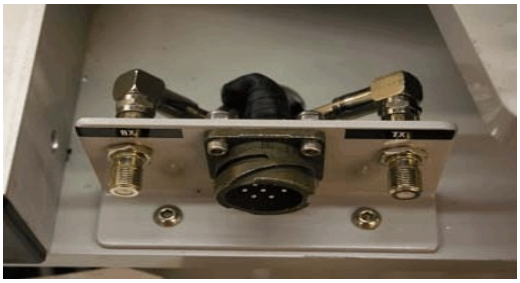


Figure 2.2

3. Press “+” on TracStar hand-held controller and hold for 3 seconds until unit begins deploying.

Figure 2. 3 shows the unit fully deployed.

Figure 2.3

2.2 INSTALLATION TO VEHICLE

The 1278K Mobile VSAT positioner is attached to a base plate and rail assembly, that can be mounted to a variety of different vehicle configurations. Angle clips are furnished with positioner unit to allow unit to be mounted to vehicle rack system provided by customer. (See Interface drawing.)

2.3 CONTROLLER OPERATING INSTRUCTIONS

The TracStar Systems controller applies advanced motor control capability in a cost effective controller. The controller is configured to require only two commands – Deploy and Stow. When the controller receives the Deploy command the antenna is raised to a preset elevation angle where it scans in azimuth until approximate southern direction is determined. It then pauses to collect GPS information of latitude and longitude. It quickly calculates az, el and pol angles to North Star satellite. It scans in anticipated direction of North Star satellite until it is found. This usually takes less than one minute. It verifies it has found the North Star satellite, and then peaks up on signal. Once the North Star satellite is determined the satellite of service az, el and pol angles are calculated from North Star satellite including accommodating for any tilt in the vehicle. The controller then precisely commands the antenna to the satellite of service.

1.1 To activate system, turn on power to the TracStar Systems In-Door Unit (IDB)

1.2 The display should read "Ready". Press the + key to begin a satellite acquisition. To Stow the antenna, press and hold the "-" key for 3 seconds. There will be a 3 second delay before the antenna begins to stow to ensure that transmit is disabled.

1.3 If at any time, either during an acquisition (Display reads "Run"), while locked or during a stowing operation (Display reads "Stow"), the user may stop the motion by pressing the Start/Stop, + or – key.

Controller Quick Start Guide

Deploy:

1. From the READY screen, press "+".
2. The antenna will move to the deploy position.
3. If the reflector is removable, the controller will display COMPASS DISH ERROR.
4. Install the reflector, feed and cables as required, and press "+" again.

Auto-Acquisition: The antenna will now begin the acquisition cycle. The antenna will step through the following sequence:

Determine direction of south
Get GPS data
Locate reference satellite
Peak on reference satellite
Locate data satellite
Peak on data satellite

When complete, the display will indicate "LOCK ON xxx" where '*xxx*' is the longitude of the data satellite.

Stow:

1. From the READY screen, press "-".
2. The antenna will move to the reflector removal position and display REMOVE REFLECTOR.
3. Remove the reflector and feed as required, and press "-" again.
4. The antenna will move to the stow position.

Change Polarization:

Setting the POLARITY (horizontal or vertical downlink):

1. From the READY screen, press "→" three times to move to the POLARITY screen.
2. The blinking cursor will be over "HorzDN" or "VertDN".
   2.1 Press "+" to change the downlink polarity from H to V.
   2.2 Press "ENTER" to save the value.

Changing the REF Satellite: (In case of blockage of pre-programmed REF satellite)

1. From the READY screen, press "→" once to move to the "REF satellite screen".
2. The blinking cursor will be over the primary REF satellite's Xd longitude.
3. Press "+" to scroll through the list of REF satellites.
4. Press "ENTER" to save the newly selected REF satellite. (Blinking cursor moves to the secondary REF satellite's Yd longitude.)
5. Press "+" to scroll through the list of REF satellites.
6. Press "ENTER" to save the second newly selected REF satellite.

Jogging the Antenna:

1. From the READY screen, press "MAIN" once to reach the USER SETUP screen.
2. From the USER SETUP screen press "→" once to move to JOG.
3. Press "ENTER" to move the cursor to the speed item FAST or SLOW.
4. Press "+" to change from FAST to SLOW as desired.
5. Press "ENTER" to move the cursor to the desired axis (A is AZ, E is elevation, P is pol).
6. Press START/STOP button to activate the motors. (The "jog" displayed in the upper left will change to upper case.)
7. Press "+" or "-" to move the axis one unit. (One unit in FAST is 1.0 degrees and one unit in SLOW is 0.2 degrees.)
8. Press and hold "+" or "-" to move the axis continuously. ("+" moves AZ clockwise as view from the top, EL up and POL clockwise as viewed from behind the reflector.)
9. The index displayed next to each axis counts up or down 1 unit each time the "+" or "-" is pressed. If the index reaches 99 or –99, the axis will not move any further. Press START/STOP button twice to reset the index.

Note: The controller will automatically acquire the either Satellite A or Satellite B depending upon which is selected in step 2 above.

THE FOLLOWING FUNCTIONS (*) REQUIRE A CHANGE IN PASSWORD (CODE 13) IN THE TracStar Systems CONTROLLER:

1. From the READY screen, press "MAIN" twice to get TECH SET UP screen.
2. Press the "+" button until it reads 13 and then press "ENTER" to save the code.
3. Press "MAIN" once to get back to the READY screen.

*** Changing the DATA satellite *:**

1. From the READY screen, press " →" twice to move to the "DATA satellite" screen.
2. The blinking cursor will be over "SatA/SatB".
   2.1 Press "+" to change the DATA satellite from A to B.
3. Press "ENTER" to move the blinking cursor to "Satellite A".
   3.1 Press "+" or "-" to change the longitude value for DATA satellite A.
   3.2 Press "ENTER" to save the value.
4. Press "ENTER" to move the blinking cursor to "Satellite B.
   4.1 Press "+" or "-" to change the longitude value for DATA satellite B.
   4.2 Press "ENTER" to save the value.

*** Manual GPS Entry** (This can be used if the automatic GPS system fails):

1. From the READY screen, press "MAIN" four times to reach the GPS screen.
2. The blinking cursor will be over NORMAL.
3. Press "+" to change to MAN.
4. Press "ENTER" to save the value.
5. Press "+" until the desired latitude is displayed.
6. Press "ENTER" to save the value and move to the LONG item.
7. Press "+" until the desired longitude is displayed.
8. Press "ENTER" to save the value.

*** Manual Compass Entry** (This can be used if the automatic compass system fails):

1. From the READY screen, press "MAIN" five times to reach the "COMPASS" screen.
2. The blinking cursor will be over "NORMAL".
3. Press "+" to change to MAN.
4. Press "ENTER" to save the value.
5. Either jog the AZ or physically move the entire antenna to point approximately south.
6. Press ""MAIN"" to return to the READY screen.

Complete operating instructions will be found in the TES75 and TES960 controller manual.

SECTION 3 - AZIMUTH POSITIONING SYSTEM

3,1 AZIMUTH BEARING

The azimuth platform sits on top of a ball bearing platform with a dynamic and static moment capacity of over four times the worst-case wind load specification. It is surrounded by double seal to protect the bearing platform, which is permanently lubricated. This rests on the azimuth drum and the azimuth cables wrap around the drum and capstan.

Because of the excess capacity, low rpm, and low number of cycles compared to the bearings B10 design life, no wear is expected. No maintenance should be required over the life of the positioner.

3.2 AZIMUTH GEAR BOX

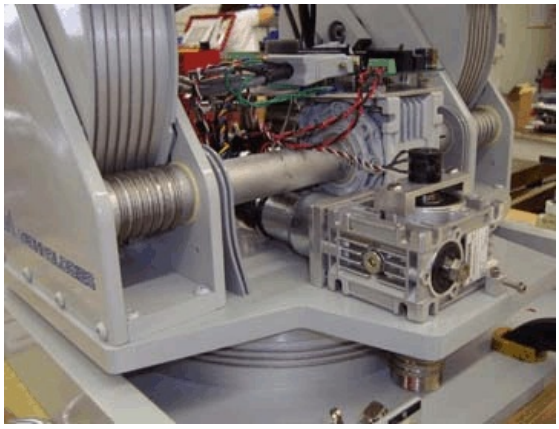


Figure 3.1

The azimuth gearbox is a low backlash worm gear box. The worm gear drive isolates any backlash in the motor drive from the system. In addition, since it is a 40:1 ratio it will not back drive, eliminating any need for a brake on the drive train. (Fig. 3.1)

The motor drives the input worm via a quill/female hole and square key. The worm shaft is extended with a hex shape installed for the hand crank. The azimuth capstan is secured to the output shaft with a square key knurl plus permanent locktite to eliminate any backlash between the capstan and gearbox.

The low backlash is achieved by selective fit of the worm and worm gear. The nominal backlash for the gearbox is 30’ which is reduced by the AvL cable drive to less than 4’of the beam of the antenna. The gearbox contains synthetic oil filled half way to the level plugs. Because of the design capacity of the gearbox, low rpm and limited cycles experienced by the system, no maintenance is required.

3.3 AZIMUTH MOTOR

The azimuth drive motor is a 24 DC motor with integral 30:1 spur gear train. An optical encoder is mounted to other end of motor output shaft to provide real time positional information to TracStar Systems controller.

The motor armature rotates at up to 3000 rpm causing a high frequency noise that will vary depending of the loading condition of the motor.

The maximum output speed is 100 rpm. The output shaft is "D" shaped with a special adapter with a slot for a square key.

Since the low backlash worm gear drive isolates the backlash from the motor, any backlash between the shaft adapter, square key or motor gear train will not be seen by the reflector bore sight. The motor is mounted to an adapter plate that is bolted to gearbox with (4) screws.

No maintenance of the azimuth motor is required.

3.4 AZIMUTH AvL CABLE DRIVE

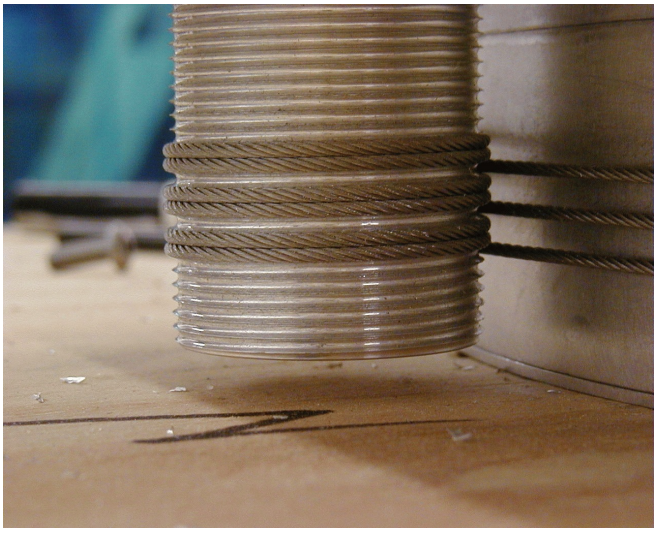


Figure 3.2

The patented azimuth AvL cable drive produces a drive system with zero backlash high stiffness, no wear, no lubrication, and maximum reliability. The system consists of three 5/64 7x19 stainless steel aircraft control cables reverse wrapped twice around the grooved capstan (Figure 3.2) and once around the drum, with solid connections on one end and high force Belleville springs on the other end. One cable has the capacity to withstand a 80mph wind load. The additional cables are used to provided increased stiffness and drive redundancy. **If a cable becomes damaged during usage, cut off cable and continue to use positioner. Replace cable when time permits at your maintenance facility.**

The cables are sized to last the life of the positioner. No replacement from wear is expected. The springs package at one end will automatically compensate for any elongation of the cable.

Cable position should be checked as per periodic maintenance schedule in Section 7. If cables have drifted, manually move cables using blunt instrument on azimuth drum until correct position is obtained. (Figure 3.2)

At installation, the Belleville springs are collapsed until no “air” is seen between the springs. (Figure 3.3) You should check this condition yearly to account for the slow settling of the cable strands. Use 3/8 box-end wrench to tighten the nut. Be sure not to over tighten.

Figure 3.3

3.5 AZIMUTH POSITION FEEDBACK

The azimuth position feedback is produced by a 10 turn, 1K-ohm potentiometer driven by the output shaft of the worm gear box. (Fig 3.1) Since the AvL cable drive has no backlash, the position feedback is as accurate (1%) as the resolution (.3°) and accuracy of the potentiometer and the backlash between the potentiometer and the azimuth capstan. The potentiometer is sealed and rated for IP 65 environment - wind, rain, dust, etc. In addition, a optical encoder mounted to output shaft on motor and provides redundant feedback on azimuth position. Since the AvL cable drive has no backlash, the position feedback is as accurate as the resolution and accuracy of the potentiometer, encoder and the backlash between the potentiometer and the output shaft of the worm gear box.

The potentiometer is mounted on a bracket that straddles the az gear box. The azimuth potentiometer is slotted and driven with a cross pin in the az capstan. The potentiometer is mechanically centered at the travel position (5 turns from either end) when az platform is in the az stow position. This is accomplished by loosening the 1/2" nut, which secures the potentiometer to the bracket. The controller may also electrically zero the potentiometer. The limits are controlled by using inputs from the potentiometer and optical encoder together and are set in and controlled by the TracStar Systems controller.

The AvL has the mechanical capability of ±400º or ±200º from stow position.

3.6 AZIMUTH STOW SWITCH

The TracStar System controller uses the az potentiometer voltage to determine limits. Therefore, the AvL positioner is equipped with only an azimuth stow position switch. Limit switch mounting holes are provided if needed for other brand controllers.

Figure 3.4

The azimuth stow switch is mounted on the azimuth platform accessible from under az/el cover. (Fig 3.4) The switch is fixed relative to the mounting surface and is actuated by magnet located on the azimuth bearing clamp ring.

Since the controller drives to 0° az after sensing the stow switch, the az stow position can be varied by either changing the zero position of the az potentiometer or zero voltage of the controller.

Rotation Direction Convention : + is clockwise (CW) viewed from above mount. - is counter clockwise (CCW) viewed from above mount.

NOMINAL AZIMUTH LIMITS

Model 1278K Mobile VSAT (With 400° AZ) +210° / -190°

Notes:

1) The limits should be set after the potentiometer has been centered as described above. If the potentiometer is moved from this position, the limits should be reset.
2) The az angle displayed by the controller is affected by several parameters in the controller. (These include az Scale Factor, az Reference Position).
3) While setting the limits, watch the az capstan to make sure it does not run into the spring block at the end of the cables.
4) The angles at the limits in the chart shown above are for nominal values of these parameters, and the values actually displayed by the controller at the limits may vary.

SECTION 4 — ELEVATION POSITIONING SYSTEM

4.1 ELEVATION PIVOT ASSEMBLY

The elevation pivot assembly consists of two elevation drum assemblies pivoting between two clevis blades assemblies. The drum shafts pivot in hi-tech plastic bushings. No maintenance is required. If squeaking noise is heard, simply spray silicone lubricant with “straw” nozzle down between the drum side and clevis plate on to the pivot shaft.

4.2 ELEVATION GEAR BOX

The elevation gearbox is a low backlash (30’) worm gear box. The worm gear drive isolates any backlash in the motor drive from the system. In addition, since it is a 40:1 ratio it will not back drive, eliminating any need for a brake on the drive train.

The motor drives the input worm via a quill/female hole and square key. The worm shaft is extended with a hex shape adapter for the hand crank. The dual elevation capstans are driven with a square key and clamped to the gearbox shaft to eliminate backlash.

The gearbox contains synthetic oil filled half way to the level plugs. Because of the design capacity of the gearbox, low rpm and limited cycles, no maintenance is required.

4.3 ELEVATION MOTOR

The elevation drive motor is a 24V DC motor with integral 32:1 spur gear train. The motor armature rotates at up to 3300 rpm causing a high frequency noise that will vary depending of the loading condition of the motor. (Fig. 4.1) An optical encoder is mounted to other end of motor output shaft to provide real time positional information to TracStar Systems controller.

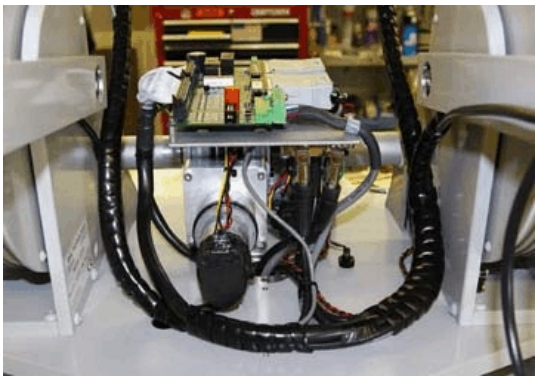


Figure 4.1

The maximum output speed is 104 rpm. The output shaft is a standard keyed shaft. The output torque capacity of the motor is rated for the operational wind load.

Since the low backlash worm gear drive, isolates the backlash from the motor, any backlash between the square key and motor gear train will not be seen by the reflector bore sight. No maintenance of elevation motor is required.

4.4 ELEVATION AvL CABLE DRIVE

The patented elevation AvL cable drive produces a zero backlash, high stiffness, no wear, no lubrication, and drive system with maximum reliability. The system consists of 12 1/16, 7x19 stainless steel aircraft control cables reverse wrapped three times around the capstan with solid connections on one end and high force, Belleville springs on the other end. Eight cables have the capacity to withstand a 75 mph wind load. The additional cables are used to provided increased stiffness and drive redundancy**. If a cable becomes damaged during usage, cut off cable and continue to use positioner. Replace cable when time permits at your maintenance facility.**

The cables are sized to last the life of the positioner. The springs will automatically compensate for any elongation of the cable.

The position should be checked per the periodic maintenance schedule in Section 6. If the cables have drifted, manually move cables using blunt instrument on elevation drums until correct position is obtained.

At installation the Belleville springs are collapsed until no "air" is seen between the springs. You should check this condition yearly to account for the slow settling of the cable strands. Use pliers to hold stud and 1/4 box end wrench to tighten nut**. Be sure not to over tighten. Tighten until springs are almost fully collapsed.**

4.5 ELEVATION POSITION FEEDBACK

The elevation position feedback is produced by an electronic inclinometer and encoder mounted on output shaft of motor. Since the AvL cable drive has no backlash, the position feedback is as accurate as the resolution and accuracy of the clinometer and encoder. The clinometer has a resolution of 0.1 degrees with and accuracy/linearity of 1% in the 0-45º range and monotonic in the 45-90º range. The clinometer is rated for an outdoor environment. The encoder also provides precise feedback on units position during operation. The limits are controlled by using inputs from the potentiometer and optical encoder together and are set in and controlled by the TracStar Systems controller.

The clinometer mounted in the pol motor box, which provides additional weather protection. (Fig 4.2)

4.6 ELEVATION STOW SWITCH

The elevation stow, the east elevation pivot assemblies under the drum. (Fig 4.1) The switch is fixed to pivot wall and are actuated by a cam profile machined into the drum side plates. The elevation stow switch is adjusted by using needle nose pliers and bending the limit switch lever as needed.

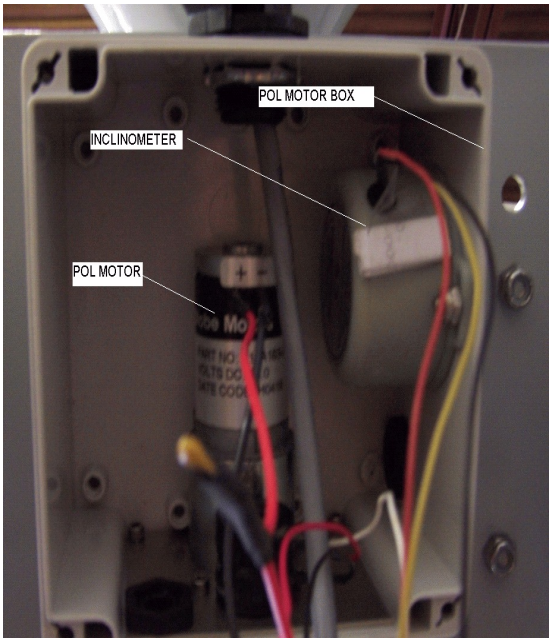


Figure 4.2

SECTION 5— FEED AND POLARIZATION POSITIONING SYSTEM

5.1 GENERAL

The Feed assembly consists of feed boom, upper and lower feed brackets, feed housing, RF components and polarization drive housing. The pivot connection at the end of the feed is made with brash bushings. A piece of 18" flex wave-guide is used at the end of the wave-guide tube to the OMT and connects to the BUC. The chain drive assembly and 12V DC motor rotate the feed/OMT. Position feedback is from a 10-turn potentiometer.

5.2 FEED

The feed assembly consists of an inclinometer, feed horn and OMT with male pivot bushings. The male bushings pivot in delrin female bushings at each end of the OMT. These bushings are mounted to mounting plate. The pol drive sprocket attaches to the OMT and the wave-guide attaches to other end with M6 screws at the rear flange of the OMT. The feed/polarization drive is mounted underneath pol mounting plate in feed box with gear on outside and driving pol sprocket to rotate feed.

5.3 POLARIZATION DRIVE

The feed/polarization drive is mounted underneath pol mounting plate in the pol drive box with a drive sprocket mating to the motor shaft, which extends through the feed drive box. The polarization drive motor) is a 12 VDC gear motor. Small gear is attached to the end of the motor shaft, that drives small gear to drive the position potentiometer. The controller travel limits are +/- 95 degrees for a 2 port. See TracStar Systems Controller Manual section 3.3).

If the chain becomes loose, re-tighten wire at chain joint. No maintenance of the polarization motor/assembly is required.

The polarization drive is replaced by a complete unit including the motor, motor sprocket /gear, chain, elevation inclinometer, potentiometer and gear, and drive sprocket.

5.4 POLARIZATION POSITION POTENTIOMETER

The polarization feedback is produced by a 10 turn, 1K-ohm potentiometer driven by the motor gear, and mounted in the feed box and shaft extends outside the box. The resolution and accuracy is 0.3 degrees. The potentiometer is rated for IP 65 environment, wind, rain, and dust, etc. The potentiometer is mechanically set at the one-half travel position, (5 turns from either end) and will read approximately 500ohms at 0 degrees pol (stow). The potentiometer may be set using the controller the voltage reading pol stow will read 2.5V at 0 degrees. See TracStar Systems Controller Operating Instructions included on the accompanying disk.

5.5 POLARIZATION LIMITS

TracStar Systems Controller uses the polarization potentiometer voltage to determine limits. The controller drives to 0° pol when it stows. The AvL positioner has the mechanical capability of +/-92.5 degrees per section 3.3 of the TracStar Systems Controller Manual. If the Controller Fails to terminate power to the motor and the system is driven to a hard limit stop, the DC motor will stall. To correct, reset the pol jam error in the controller.

5.6 FEED ASSEMBLY

The feed assembly consists of the feed, the polarization drive, and the polarization potentiometer. The elevation inclinometer is also mounted on the inside of feed motor drive box.

The feed assembly is installed as a complete unit and secured to lower feed bracket. (Fig. 5.1) The feed horn is mechanically positioned with a template within 1/8" of the theoretical focal point of the reflector. This positioning assures the RF System provides the gain and FCC compliance as stated in the specifications.

Figure 5.1

SECTION 6 — MAINTENANCE

6.1 GENERAL

The AvL Model 1278K Mobile VSAT is designed such that any wear should never degrade performance below specifications and essentially no maintenance will ever be required. However, since it is impossible to ascertain or test for all possible environments, the following check up is recommended each year. If any problems are observed, refer to the appropriate section.

6.2 ANNUAL INSPECTION

AZIMUTH

- Check for unusual noise in azimuth bearing and azimuth gearbox, and azimuth motor.
- Run in azimuth and check for unusual noise in azimuth motor.
- Check position of azimuth drive cables on capstan at 0°az
- Check drive cables for damage.
- Run both az limits and observe cable tracking.
- Check for excessive backlash in gearbox.
- Inspect cable terminations.
- Inspect az potentiometer

.

ELEVATION

- Hand crank in elevation - the unit should hand crank easily.
- Unit should hand crank with approximately 50-75 in-lbs. torque.
- Check for unusual noise in elevation pivot bearings and elevation gearbox.
- Run in elevation and check for unusual noise in elevation motor. (Run to limits)
- Check position and tracking of elevation drive cables.
- Check drive cables for damage.
- Check oil level in gearbox.
- Remove backing structure covers and inspect cable terminations. Tighten springs if more than .010 gap exists between spring sets. Tighten with an open-end 7/16” wrench and using Visegrip pliers holding stud.
- Inspect elevation limit switches.

POLARIZATION

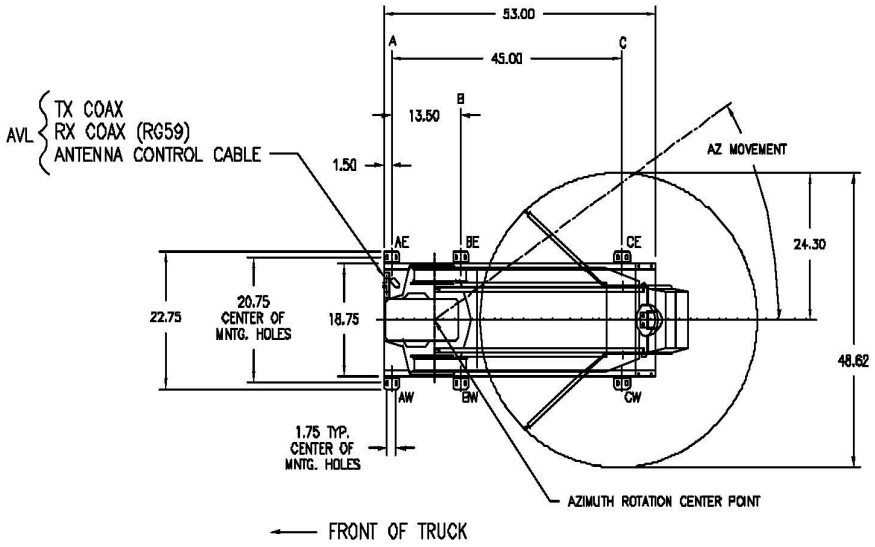
- Run in polarization and check for unusual noise in polarization gearing or motor.
- Inspect polarization potentiometer.
- Inspect wave-guide for any damage, dents, or cracks.

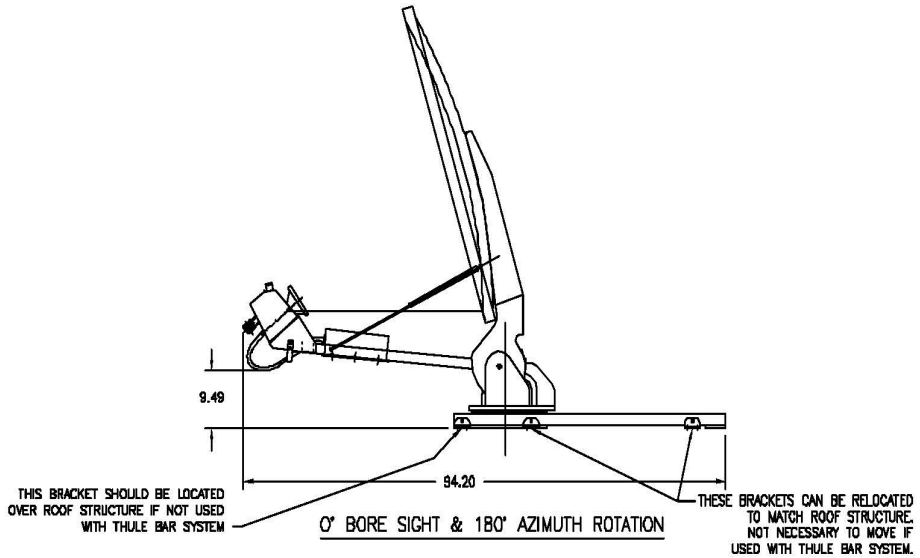
6.3 SPARE / REPLACEMENT PARTS

Since no maintenance is required, only electrical parts are recommended as spares. These parts will not fail from activity, but may fail from environmental exposure.

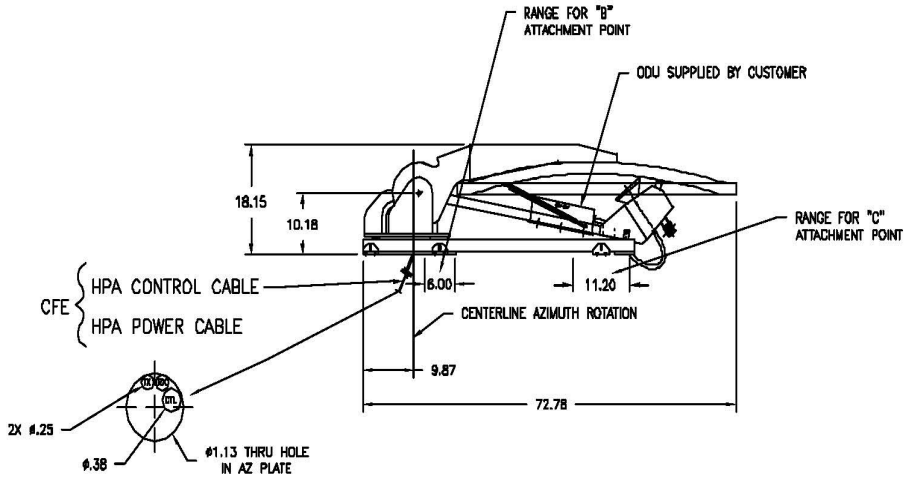
Description	Manufacture	Manufacture Part No.
Limit Switch (Long Arm)	Omron	D2VW-5L2-1HS
Potentiometer, 1k, 10T	ETI	MW20B-2982-1K
Clinometers	Lucas	02111-002-000
Optional		
WR75 Super flex 18"	Microtech	MTES75-502-N-18B
Elevation Motor	Globe	455A888
Azimuth Motor	Globe	455A889
Polarization Motor	Globe	415A886

SECTION 7 - INTERFACE DRAWING



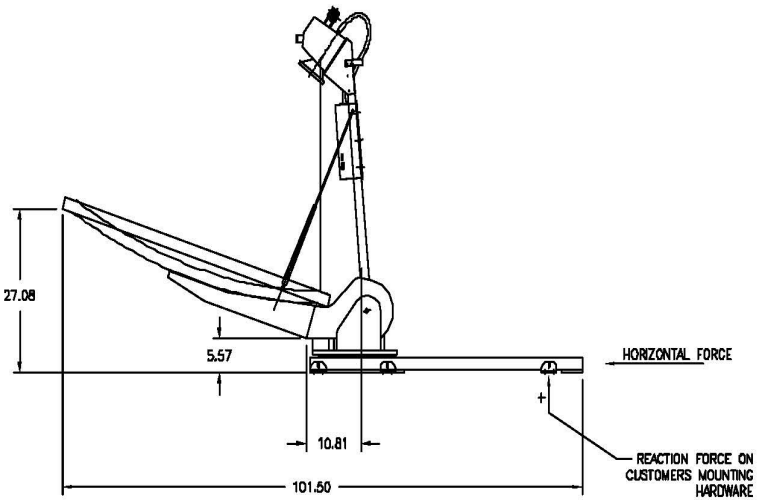


0° BORE SIGHT & 180° AZIMUTH ROTATION



AVAILABLE CABLE CLEARANCE

STOW POSITION



90° BORE SIGHT & 0° AZIMUTH ROTATION

NOTES:

1) LOADS AT 60MPH
   MAX WEIGHT 150 LBS.
   MAX HORIZONTAL FORCE 250 LB.
2) ANTENNA OUTLINE DRAWING ONLY
   FOR ENGINEERING DRAWINGS CONTACT AVL TECHNOLOGIES

REACTION FORCES IN POUNDS AT 60 MPH WIND WITH ANTENNA DEPLOYED

LOAD CASE	AE	BE	CE	AW	BW	CW
AZ = 0°	-189	+189	+76	-189	+189	+76
AZ = 45°	+66	+204	+76	-159	-66	-76
AZ = 90°	+159	+159	+76	-159	-159	-76
AZ = 180°	+189	-189	-76	+189	-189	-76

MULTIPLY ABOVE FORCES BY MPH^2/60^2 TO DETERMINE LOADING AT ANOTHER WIND SPEED.

AVL TECHNOLOGIES
ASHEVILLE, NC

STD. TOLERANCE (INCHES) .XX = ±0.02, .XXX = ±0.005, .XXXX = ±0.0005, ANGLES = ±0.5	3RD ANGLE PROJECTION	DRAWN	VBR	8/19/03
		CHECKED		
ASSEMBLY				
MATERIAL		HARDNESS		
		FINISH		
TITLE	MODEL 1278 INTERFACE			
SCALE: NTS	SIZE: B	ASSY QTY	FAB QTY	DRAWING NO.: 128-243-801 REV: 2