APPENDIX B - MOUNT SPECIFIC DATA
For
Vertex/RSI 2.4 m SF

This appendix describes RC3000 operations unique for the Vertex/RSI 2.4m. SF mount. Differences between this version and the operation described in the "baseline" RC3000 manual are noted on a paragraph by paragraph basis.

1.1 Manual Organization

This appendix is provided as a supplement to the baseline RC3000 manual. The corresponding paragraphs in the baseline RC3000 manual are referred to when data specific to the SF mount are described.

1.2 RC3000 Features

All basic features of the RC3000 are utilized to provide the operations for the SF mount. Some features have been modified (as described below) to customize operations for the SF deployable antenna.

Hardware Configuration. A RC3000A version of hardware is utilized for this mount.

Software Configuration. The mount model will be designated as **VC**. Software will be designated as RC3K-VC-xxx.

1.3.2 System Interface Requirements

The Vertex SF interface differs from baseline RC3000 interface requirements as follows:

1) no azimuth angle sensor is present

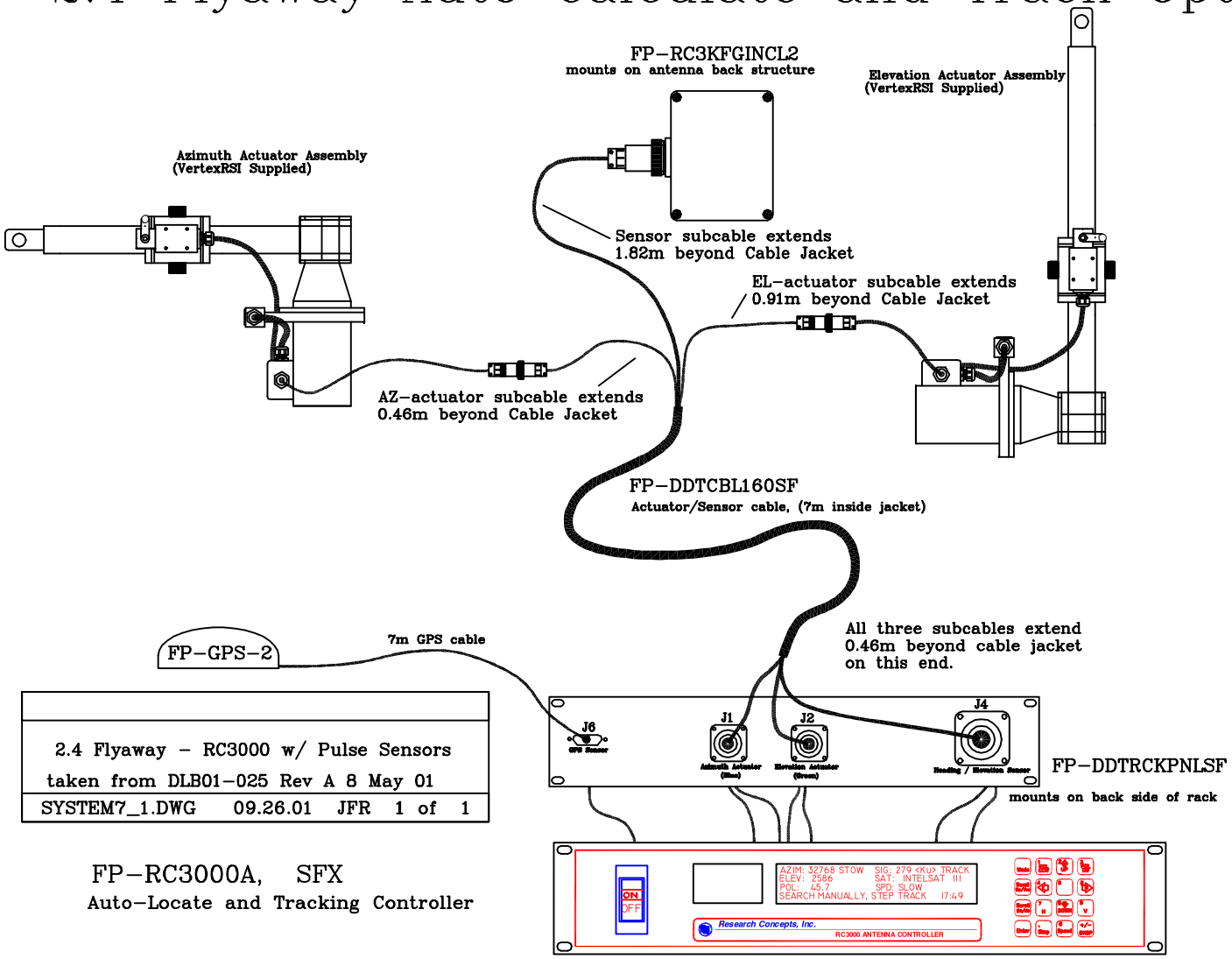
2) high resolution pulse sensors are present on the azimuth and elevation axis to support inclined orbit tracking

3) No limit switch feedback is provided from azimuth or elevation

4) No Polarization axis control

The following diagram shows the RC3000 connected to the relevant components of the Vertex SF mount system.

2.4 Flyaway Auto Calculate and Track Option



2.4 Flyaway - RC3000 w/ Pulse Sensors
taken from DLB01-025 Rev A 8 May 01
SYSTEM7_1.DWG 09.26.01 JFR 1 of 1

FP-RC3000A, SFX
Auto-Locate and Tracking Controller

1.3.3 Operational Overview

The baseline RC3000 modes are modified to accommodate the operational scenario for the Vertex SF mount. The following provides an overview of the intended operational sequence. Detailed description of the each mode will be provided in section 3.

POWER UP. After the RC3000 is powered up, the controller enters MENU mode. The MENU selections for the SF mount are shown below:

```
1-CALCULATE 2-SETUP 3-POINT        MENU
4-SEARCH    5-STORE
8-PACK      9-LAT/LON               UTC
<0-9>SELECT <MODE>MANUAL         14:37:23
```

CALCULATE. This mode provides pointing data to the selected satellite as an aid in initially positioning the mount.

```
POS:   39°01N  94°49W             CALCULATE
SAT:TELSTAR 4   89.0W           MAG: 167.2
<1>MANUAL <2>PRESET              EL:  44.4
<1-3>SELECT SAT SOURCE H:  82.9 V:  -7.1
```

CALCULATE mode determines the magnetic heading and elevation (RF look angle) required given the current latitude and longitude of the mount. Latitude and longitude may be obtained dynamically via the GPS receiver or entered manually via the LAT/LON mode. CALCULATE mode also determines nominal horizontal and vertical (H/V) polarization angles as an aid in orienting the polarization axis.

The CALCULATE mode may be skipped if other data (operational orders, other software programs, etc.) are available to indicate which direction the mount should be positioned in order to find the required satellite.

SETUP. After attaching the actuators on the mount, the SETUP mode automatically extends the azimuth and elevation actuators to their “midpoint” positions.

This step is required to initialize the relative azimuth and elevation pulse counts. The azimuth actuator is positioned to its midway position so the most azimuth range of motion is available for finding the selected satellite.

```
AZIM: 10553                          SETUP
ELEV: 17837
 CONFIRM SETUP POSITION
<MODE>RETURN TO MENU
```

POINT. POINT mode calculates a pointing solution to the required satellite. The selected satellite is shown along with the pointing solution required for the current latitude and longitude and heading of the mount. The user may select another satellite either manually or from a list. Upon selection of another satellite, a new pointing solution will be automatically calculated.

After the pointing solution is calculated, the user may initiate an automatic movement to that approximate position.

```
POS:   39°01N  94°49W 138.4          POINT
SAT:TELSTAR 4   89.0W           TRU: 170.8
1-MANUAL 2-PRESET 3-SATLIST      EL: 44.4
<1-3>SELECT SAT SOURCE  READY TO LOCATE
```

MANUAL. After performing a POINT operation, the controller transitions to MANUAL mode. In MANUAL mode the mount may be manually jogged in azimuth and elevation in order to peak up on the satellite. The relative signal strength indication (SS2:) will provide an aid in positioning the mount on the satellite.

At this time the user should make a positive identification of the satellite.

```
TRUE: 170.9(170.8) SS2: 50        MANUAL
ELEV:  44.5( 44.4) SAT:telstar 4
                   SPD:FAST          UTC
<0-9>JOG ANTENNA   <MODE>MENU   14:39:01
```

SEARCH. As an aid in finding an inclined orbit satellite, SEARCH mode performs an expanding spiral search pattern.

```
AZIM:10456                          SEARCH
ELEV:17429

SPIRAL SEARCH(CCW 12)          <STOP>HALT
```

STORE. After verifying the antenna is precisely on the intended satellite, the user may STORE the mount's azimuth and elevation angles for subsequent RECALLs.

If the satellite has been defined as having an inclined orbit, the TRACK mode will be automatically entered.

```
BRG: 155.9     750  SS2:735(Ku)   TRACK
ELEV:  42.0     750  SAT:BRASIL A1
                     STEP:PEAKING     SIG
JOGGING ANTENNA TO FIND MAXIMUM SIGNAL
```

PACK. When it is time to disassemble the mount, the PACK mode automatically retracts the actuators to their storage position in a manner similar to how the SETUP mode initially extended the actuators. PACKing the actuators causes the RC3000 to invalidate the calculated pointing solution and any existing track tables.

LAT/LON. This mode is provided to allow the user to manually enter the mount's latitude and longitude for use by the CALCULATE mode.

1.3.7 Drive System

Position Sensing and Limits. No azimuth or elevation limit switches are interfaced to the RC3000, azimuth and elevation software limits are implemented.

Jam and Runaway Sensing. Jammed and runaway sensing is based on pulse counts.

2.0 INSTALLATION

2.1 Equipment Mounting

As shown in the system diagram in 1.3.2, the fluxgate compass and the inclinometer are mounted together in a waterproof box. This box is mounted on the antenna's structure in a level position when the antenna's elevation RF look angle is 45 degrees.

2.2 Electrical Connections

Electrical connections between the RC3000 and the SF mount are made via an adapter panel (FP-DDTRCKPNLSF) and a cable assembly (FP-DDTCBL160SF). Schematics for the panel and cable are shown in section 4.2.

The following subparagraphs describe any unique items with respect to the SF system.

2.2.1 Power Entry. An automatic voltage sensing circuit allows either 115 or 230 VAC power to be supplied to this version of the RC3000 without reconfiguration of the power entry module.

2.2.2 Motor Drive. No polarization axis drive.

2.2.3 Drive Sense. Only the elevation inclinometer interface is supported. The azimuth and polarization inputs are jumpered within the RC3000 so that azimuth or polarization limit conditions are not generated.

2.2.4 Limit Switches. The limit switch inputs are internally jumpered within the RC3000 since no limit switches on the mount are supplied to the controller.

2.2.5 Signal Strength. AGC channel 2 is wired to the Vertex Digital Tracking Receiver as shown in this section of the baseline manual.

2.2.6 Navigation Sensors. The GPS receiver and Fluxgate Compass are wired as shown in the baseline manual.

2.2.7 Accessories. Outputs from this connector are available as described in the baseline manual.

2.2.8 RF Autopeak. This input is available but it is intended to only use the signal strength indication from the tracking receiver via AGC channel 2.

2.2.9 Hand Held Remote. This option is available.

2.2.10 Pulse Sensors. The azimuth and elevation pulse sensors are wired as shown in the baseline manual.

2.2.11 PC Remote Control. The remote control interface is wired as shown in the baseline manual.

2.2.12 Waveguide Switch. The optional waveguide switch module is not provided.

2.3 Initial Configuration

2.4 Final Calibration

Setup and calibration of the Vertex SF mount is unique compared to that described in the baseline manual for a vehicle mounted antenna.

Two procedures (Factory Setup and Operational Setup) are provided next to describe the unique actions required for the Vertex SF mount. The first procedure “Factory Setup” describes the tasks required when first attaching the controller to the antenna. The second “Operational Setup” describes the tasks required during a deployment for use.

Factory Setup

1) After the antenna has been assembled, mount the Compass Inclinometer box (RCI p/n FP-RC3KFGINCL2) to the antenna back structure. It should be mounted such that the antenna boresight elevation-angle is at 45 degrees when the top of the inclinometer box is level.

2) Mount the linear actuators on the antenna.

3) Connect the RC3000 controller to the antenna using the cable set and adapting rack panel. (RCI p/n FP-DDTCBL30SF and FP-DDTADPTRSF) The right-angle Amphenol connector mounts on the Compass-Inclinometer box. The Blue-marked Amphenol connector connects to the AZ actuator and the Green-marked Amphenol connector connects to the EL actuator.

4) Turn on the RC3000. From the MENU screen select “SETUP” (Item #2). SETUP will move the AZ and EL actuators to their retraction limits (UP Limit for Elevation and CCW Limit for Azimuth), set the RC3000 pulse counters to EL count = 20000 and AZ count = 10000 at that point, and then extend the actuators out to a value of EL count = 17837 and AZ count = 10553. AZ=17837 and EL=10553 is the midrange position. During this operation, monitor the antenna position and verify that no mechanical interference occurs on the mount. This operation may be halted with the “STOP” key. This operation also sets the AZ and EL actuator extension limits to their nominal values of EL ext. =15600 and AZ ext. = 11200.

5) From MANUAL mode, jog the antenna to the AZ CW and EL Down limits (actuators extended). Verify that the controller stops at the hard limit switch and not a soft limit. Press the Scroll Up key once to display the current AZ and EL pulse positions. Note these values for use in the next step.

6) Go to the CONFIG Mode; Go to the EXPERT ACCESS screen and enter the 5 digit, super-user access code. Then go to the AZIMUTH PULSE DRIVE screen. Subtract 20 from the AZ CW position value noted in Step 5 and enter the result at the CW prompt in this screen.

7) Go to the CONFIG Mode; ELEVATION PULSE DRIVE screen. Add 50 to the EL Down position value noted in Step 5 and enter the result at the DWN prompt in this screen.

8) From Manual Mode, jog the antenna until the top of the Compass/Inclinometer box is level within 0.2 degrees. Go to the Maintenance – Voltages Screen, read off and note the indicated elevation reference voltage.

9) Go to the Config Mode Elevation Calibration Screen. Enter the previously measured reference voltage at the REF_V prompt.

10) From Manual mode, move the antenna up in elevation about 20 degrees as indicated on the digital inclinometer. Note the EXACT difference in angle from step 8). Go to the Maintenance – Voltages Screen, read off and note the indicated elevation voltage.

11) Divide the difference in elevation voltages by the difference in elevation angles between steps 8) and 10). Multiply the result by 1000. This value should be around 50 and is the Elevation Scale Factor (SF) for the antenna.

12) Go to the Config Mode Elevation Calibration Screen. Enter calculated scale factor at the SF prompt.

13) From MANUAL mode, move the antenna to an elevation angle of 45 degrees indicated and approximately halfway between the azimuth CW and CCW limits. The compass/inclinometer box should be level within 1 degree.

14) Perform a compass calibration from the MAINTENANCE Mode item #9, FLX CAL. This involves rotating the antenna and pausing at 8 points around a circle. Please refer to the RC3000 Manual Section 3.3.2.9 for further details. Note the CAL QUALITY and MAG ENVIRONMENT results displayed on the RC3000 after the calibration.

15) Find the test satellite using the MENU Mode item #3 POINT. Positively identify the satellite.

16) Setup the Beacon Receiver for the given satellite.

17) Follow the RC3000 signal strength adjustment procedure described in the RC3000 manual Section 2.4.3. This procedure requires finding a strong satellite signal, measuring the beacon receiver output voltage and then looking at cold space and measuring the output signal. Alternatively, a DC voltage of the correct level may be injected into the RC3000 AGC pin on J2. The nominal setup will use AGC channel 2 of the RC3000.

18) The initial setup procedure is complete. Once these items are set within a controller, the controller, compass/inclinometer box, and beacon receiver should be considered a matched set. If the compass/inclinometer box is swapped, steps 1) through 14) must be performed to match the two items. If the Beacon Receiver is swapped, steps 15) through17) must be performed to match the two items. If the controller is swapped perform all steps.

19) Perform a Pack Operation.

Operational Setup

1) Deploy the electronics rack and turn on the power for the antenna controller. This will start the GPS receiver mounted near the electronics shelter and provide a Latitude-Longitude solution within a few minutes. The RC3000 CALCULATE (MENU Mode #1) screen may be used to determine the magnetic compass bearing to the chosen satellite if it is not already known. If the GPS receiver is not setup at the time the CALCULATE is performed, the LAT.LON (MENU Mode #9) may be used to type-in a value for the antenna latitude and longitude.

2) Assemble the antenna according to the instructions furnished. If actuator motion is required use a hand-crank or a hand-held jogbox, available from RCI. The antenna should be sited such that the Azimuth range is centered in the direction of the chosen satellite.

3) Connect the cables between the RC3000 adapter rack panel and the antenna system. These three cable go to the AZ / EL actuators and the Compass / Inclinometer Box mounted on the antenna back structure.

4) From the RC3000 MENU screen perform a SETUP (#2) function. This will position the actuators to their mid-range positions. While SETUP is operating monitor the actuator positions and verify that there is no mechanical interference. Automated antenna motions may be interrupted at any time using the STOP key.

5) From the Menu screen, perform a POINT (#3) function using the chosen satellite. This will position the antenna at the “best guess” azimuth and elevation angles toward the satellite.

6) From the MANUAL mode, find the chosen satellite. Alternatively, a spiral search may be implemented from the MENU screen (item #4). Verify that the satellite found is correct satellite.

7) From MANUAL mode, peakup on the satellite and set the polarization angle (if required). Verify that a received signal strength value greater that 200 is displayed on the RC3000 screen after SS: .

8) From the MENU Screen, select the STORE (item #5). Verify that the satellite information is correct. If the satellite is an inclined orbit satellite, the controller will begin step-tracking.

9) The Controller will step-track for the first sidereal day and then drop into memory track mode. It will continue in memory track indefinitely.

10) When the operation is completed. The antenna can be disassembled according to the instructions. As an aid to disassembly, the PACK function (item #8) may be selected from the MENU mode. The PACK function returns the two actuators to their retraction limits.

3.0 Detailed Operation

3.1.1 Modes

While the basic functionality of the RC3000 is as described in the baseline manual, several modes are customized and several modes are unique for operation with the VC version mount.

3.2.1 Manual Mode

Since no azimuth angle sensor is present, MANUAL mode will display a heading readout based on current data from the fluxgate compass.

```
TRUE: 141.1(157.6) SS2:579         MANUAL
ELEV: -67.5( 42.4) SAT:telstar 402
                   SPD:FAST           UTC
<0-9>JOG ANTENNA   <MODE>MENU    14:25:47
```

TRUE: 141.1(157.6)

The TRUE field shows the current true heading of the mount along with the target true heading of the latest target calculated by the POINT mode.

The true heading displayed is derived from the magnetic heading coming from the fluxgate compass added with the calculated magnetic variation. The magnetic heading is reported by the compass once a second. **Note that the compass filters (dampens) its output and therefore it may take multilple seconds for the heading value to settle following movement of the mount.**

Whenever the RC3000 detects an incorrect data stream from the compass **** is displayed for the heading. The **** display will usually be displayed for a couple of seconds when Manual mode is first entered. After the data sentence is initially correctly parsed, the valid (numerical) display of heading should persist. If the invalid display persists, the interface to the compass should be checked.

MAG:137.2

When no magnetic variation has been calculated (no valid lat/lon available), the TRUE field will change to MAG to display the current magnetic heading being output from the fluxgate compass.

AZIM: 10553 ELEV: 17837

When the Scroll Up/Yes key is pressed in MANUAL mode, the data toggles between heading and elevation angles to display the current pulse counts for the azimuth and elevation axis. When displaying pulse counts the TRUE or MAG field changes to AZIM.

3.2.2 Menu Mode

MENU mode provides a customized selection of functions. As described in the baseline manual, pressing the Mode key will move to MANUAL mode.

```
1-CALCULATE 2-SETUP 3-POINT        MENU
4-SEARCH    5-STORE 6-RECALL 7-DELETE
8-PACK      9-LAT/LON               UTC
<0-9>SELECT <MODE>MANUAL        14:37:23
```

The following subparagraphs describe how the various modes are customized for the operation of the Vertex SF mount.

3.2.2.1 DEPLOY

3.2.2.2 STOW

The STOW and DEPLOY modes described in the baseline manual are intended for use by vehicle mounted antennas. For the Vertex SF mount, STOW and DEPLOY have been replaced by SETUP and PACK modes that are more appropriate for a deployable mount.

Setup Mode

The SETUP mode automatically moves the actuators to their “midpoint” position in preparation for initial positioning of the mount.

The opening screen of the SETUP mode asks the user to confirm that the actuator movement is to start. If the actuators are not in a safe position for them to be extended, they should be put in a safe position before pressing the Enter key.

```
                                    START
<MODE>RETURN TO MENU

<ENTER>INITIATE MOVEMENT
```

When the SETUP movement is initiated, the first action is to move the azimuth actuator to the fully compressed position. During this movement the message “RETRACTING AZIM ACTUATOR <STOP>HALT” is displayed.

NOTE: During all movements the name of the actuator (AZIM/ELEV) that is currently being commanded to move will flash. At the beginning of the SETUP function the pulse count value for azimuth and elevation actuators will be set to 10000 and 20000 respectively.

Several seconds after becoming fully compressed, the controller will sense that movement has “jammed” and will begin extending the actuator to the SETUP position. After sensing the “jammed” condition the number of counts is reset to 10000 for azimuth and 20000 for elevation. The number of counts the actuator extends to is set in the SFX configuration screen (see 3.3.1.3.14 of this appendix).

```
AZIM: 10553                          SETUP
ELEV: 16345

RETRACTING ELEV ACTUATOR     <STOP>HALT
```

When both actuators have been extended to their setup position the following screen appears.

```
AZIM: 10553                          SETUP
ELEV: 17837
 CONFIRM SETUP POSITION
<MODE>RETURN TO MENU
```

PACK MODE

The PACK mode automatically moves the tracking actuators to their storage position.

PACK mode operates much in the same way the SETUP mode does. The number of counts the actuators extend to after jamming is set by the AZ_PACK and EL_PACK configuration items.

NOTE: As soon as the user initiates PACK movement, several items are invalidated to signal that the current pointing solution, mount position and track tables can no longer be considered proper.

3.2.2.3 LOCATE

Two versions of the LOCATE mode described in the baseline manual are provided for the Vertex SF mount. Unique characteristics of CALCULATE and POINT modes are described next.

Calculate

CALCULATE mode determines a pointing solution (magnetic heading and elevation look angle) to the selected satellite given the present latitude and longitude.

```
POS:   39°01N  94°49W           CALCULATE
SAT:TELSTAR 4   89.0W         MAG: 167.2
1-MANUAL 2-PRESET 3-SATLIST    EL:  44.4
<1-3>SELECT SAT SOURCE H:  82.9 V:  -7.1
```

If the GPS receiver is connected to the RC3000, CALCULATE mode will automatically acquire latitude and longitude from it. The user may also manually insert a latitude and longitude via the LAT/LON mode described later.

CALCULATE mode will determine the magnetic variation for the given latitude, longitude and date. The azimuth part of the pointing solution will be displayed as a magnetic heading (MAG:) since CALCULATE is intended to be used as an aid in initially positioning the mount.

Even though no polarization movement is provided, CALCULATE does display nominal horizontal (H) and vertical (V) polarization angles. Section 1.3.8 of baseline manual should be reviewed for definition of the sign convention for polarization used by the RC3000.

Point

POINT mode operates in a very similar fashion to how LOCATE is described in the baseline manual.

```
POS:   39°01N  94°49W 138.4          POINT
SAT:TELSTAR 4   89.0W          TRU: 170.8
1-MANUAL 2-PRESET 3-SATLIST     EL:  44.4
<1-3>SELECT SAT SOURCE  READY TO LOCATE
```

Differences between POINT and the baseline LOCATE modes are:

1) When POINT mode is entered, a new latitude, longitude and heading will be always be obtained from the GPS receiver and fluxgate compass. This way the azimuth pointing solution is always calculated with respect to the current orientation of the mount.

2) When the automatic movement to the target position is initiated, the movement is based on the number of pulse counts from the current position. This is because there is no azimuth angle sensor present and the filtered heading readout from the compass is too slow for useful feedback to an automatic movement routine.

NOTE: Due to the slight non-linearity in translating pulse counts to actual angles of movement, the automatic movement to a target azimuth position may not be absolutely precise. This imprecision will be slight compared to potential error of several degrees in the initial magnetic heading from the fluxgate compass.

Search

SEARCH mode is provided as an automatic way to search for an inclined orbit satellite. SEARCH mode functions as described in section 3.2.2.4 “Spiral Search Autopeak” of the baseline manual. SEARCH mode will begin the spiral search from the current location of the mount.

3.2.2.4 STORE

3.2.2.5 RECALL

3.2.2.6 DELETE

STORE, RECALL and DELETE modes function as described in the baseline manual.

3.2.2.7 POSITION

Only the LAT/LON section of the baseline POSITION mode is made available. LAT/LON mode is described in section 3.2.2.7.1 of the baseline manual.

LAT/LON is intended to be used to supply latitude and longitude to the CALCULATE mode in case the GPS receiver is not connected or malfunctioning.

The heading portions of the POSITION mode are not available since the POINT mode will use the current heading of the mount in its calculation of pointing angles.

3.2.2.8 SETTINGS

No SETTINGS mode is applicable to the operation of the Vertex SF mount.

NOTE: in case of an azimuth of elevation jammed condition, the axis may be reset via the DRIVE RESET mode described in section 3.3.2.2 of the baseline manual.

3.2.2.9 TRACK

3.2.2.10 REMOTE

TRACK and REMOTE modes perform as described in the baseline manual.

3.3 Programming Group

All programming group modes described in the baseline manual are provided.

In addition to the baseline modes, one unique configuration mode (CONFIG-SFX) is provided for programming the final positions of the SETUP and PACK functions.

3.3.1.3.14 SFX

When scrolling through the configuration menu system, this mode will be shown as “SFX-AZ/EL SETUP/PACK TARGETS”.

The CONFIG-SFX screen allows the user to set the target positions for the SETUP and PACK modes.

```
                                CONFIG-SFX
AZ_SETUP:10553  AZ_PACK:10000
EL_SETUP:17837  EL_PACK:20000
AZIMUTH SETUP TARGET(10000-20000 PULSES>
```

AZ_SETUP: 10553
AZIMUTH SETUP TARGET(10000-20000 PULSES>

This field allows the user to set the target position that the SETUP mode extends the azimuth actuator.

EL_SETUP: 17837
ELEV SETUP TARGET(10000-20000 PULSES>

This field allows the user to set the target position that the SETUP mode extends the elevation actuator.

AZ_PACK:10000
AZIMUTH PACK TARGET<10000-20000 PULSES>

This field allows the user to set the target position that the PACK mode extends the azimuth actuator.

EL_PACK:20000
ELEV PACK TARGET<10000-20000 PULSES>

This field allows the user to set the target position that the PACK mode extends the elevation actuator.

3.3.1.2 Reset Defaults

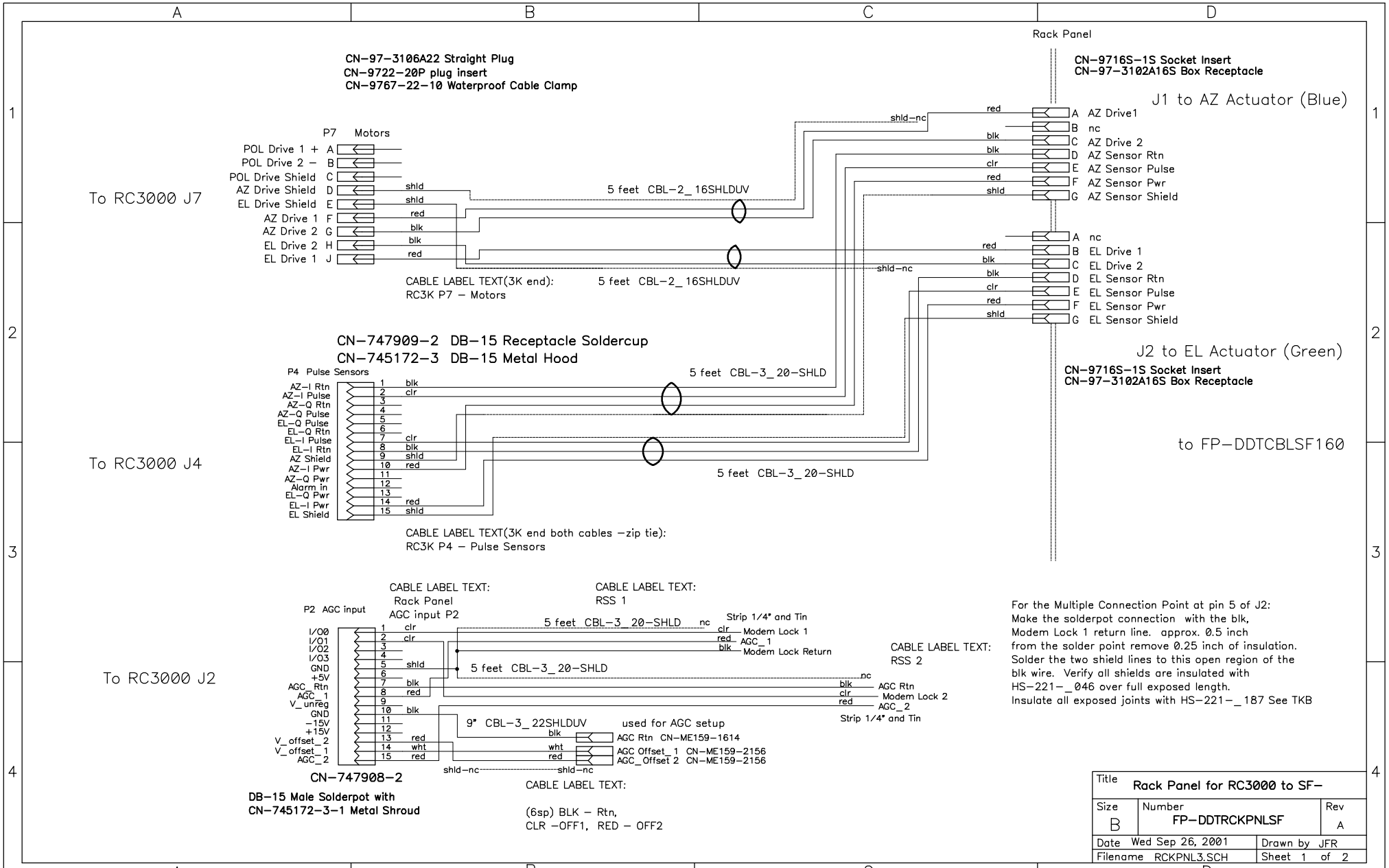
The following table supplies the default configuration item values for this mount. Space has also been provided to record installation specific changes to the configuration items. Note: recording of installation specific changes to defaults may prove valuable when trying to restore system configuration.

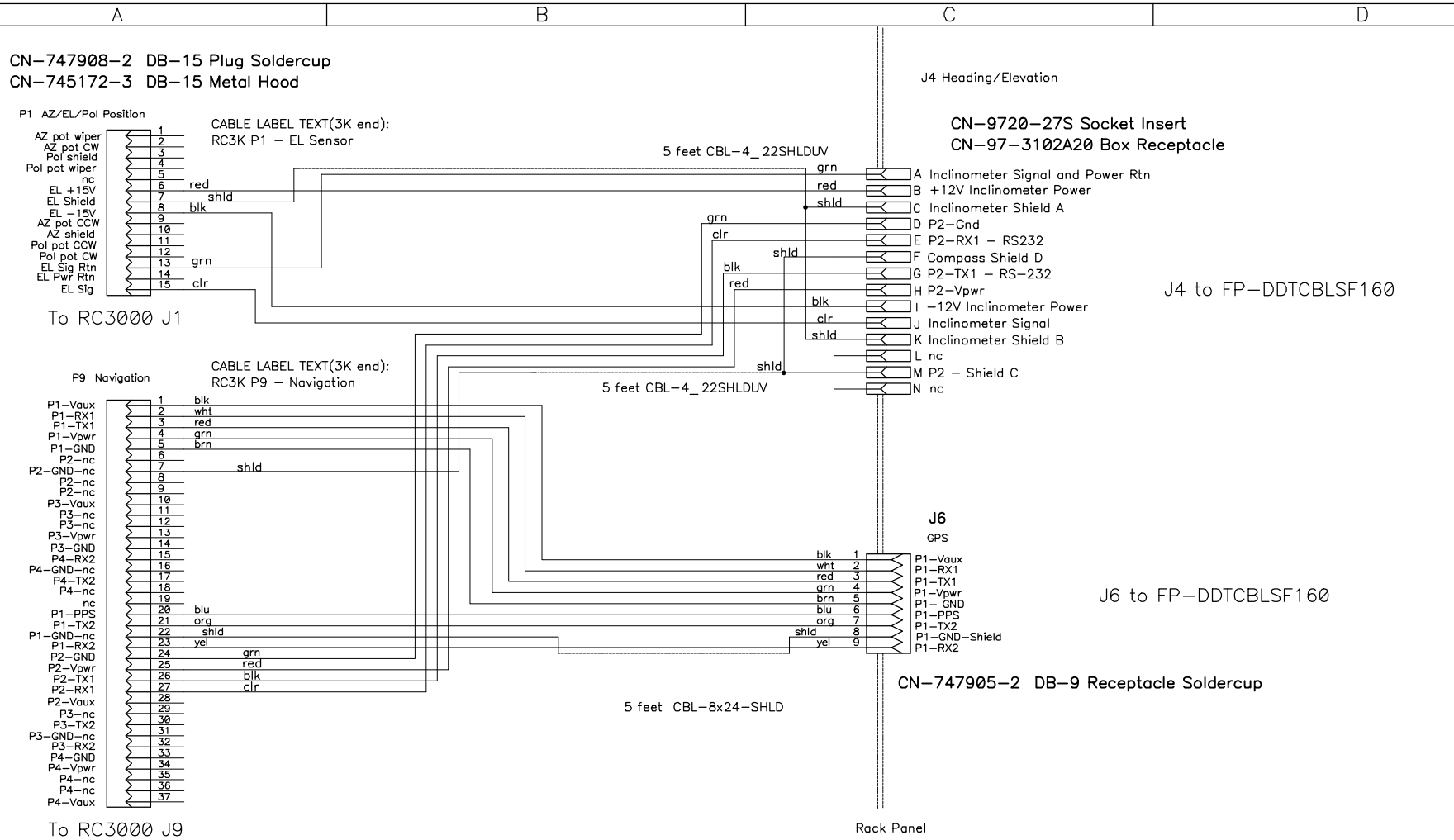
CONFIGURATION ITEM	VC	COMMENTS	INSTALL VALUE
SYSTEM DEFINITION			
GPS_present	1		
Compass_present	1		
Initial_mode	2		
antenna_size_cm	244		
Waveguide_present	0		
ELEVATION CALIBRATION			
Zero Voltage	3.00	Set during calibration	
Elev_offset	0.0		
Up_elev_limit	90		
Down_elev_limit	0		
Elevation_Scale_Factor	50.00	Set during calibration	
Elevation_look_configuration	1		
AZIMUTH CALIBRATION			
Zero Voltage	2.50		
Azim_offset	0.0		
ccw_azim_limit	0		
Cw_azim_limit	360		
Azim_Scale_Factor	75.00		
POLARIZATION CALIBRATION			
Zero Voltage	2.50		
Polarization_Offset	0.0		
CW Polarization Limit	90.0		
CCW Polarization Limit	90.0		
Pol_Scale_Factor	37.50		
Polarization_type	1	1=Circular=> No Pol Axis	
H/V_Reference	1		
Default Horizontal Position	-45.0		
Default Vertical Position	45.0		
Pol_Automove_Enable	1		
SIGNAL PARAMETERS			
Channel 1 Polarity	1		
Channel 1 Threshold	100		
Channel 1 Delay	0.1		
Channel 1 Lock Type	0		
Channel 2 Polarity	1		
Channel 2 Threshold	100		
Channel 2 Delay	0.1		
Channel 2 Lock Type	0		
AUTOPEAK			
Autopeak Enabled	0		
Signal Source	3	3=SS2	
RF Band	1	1=Ku	
Spiral Search AZ Limit	3		
Spiral Search EL Limit	3		
Spiral Signal Threshold	200		
Scan Range Limit	8		
Scan Signal Threshold	200		

CONFIGURATION ITEM	VC	COMMENTS	INSTALL VALUE
AZIMUTH POT DRIVE			
Fast/Slow Threshold	2.5		
Maximum Position Error	0.20		
Coast Threshold	0.1		
Maximum Retry Count	3		
AZIMUTH PULSE DRIVE			
Pulse Scale Factor	1604		
CW Pulse Limit	11200	Set during calibration	
CCW Pulse Limit	10010		
Fast/Slow Threshold	50		
Maximum Position Error	0		
Coast Threshold	3		
Maximum Retry Count	3		
AZIM DRIVE MONITORING			
Jam Slop	1		
Runaway Slop	200		
Fast Deadband	1000		
Slow Deadband	500		
ELEV POT DRIVE			
Fast/Slow Threshold	3.0		
Maximum Position Error	0.2		
Coast Threshold	0.4		
Maximum Retry Count	3		
ELEV PULSE DRIVE			
Pulse Scale Factor	3128		
UP Pulse Limit	19990		
Down Pulse Limit	15600	Set during calibration	
Fast/Slow Threshold	50		
Maximum Position Error	0		
Coast Threshold	3		
Maximum Retry Count	3		
ELEV DRIVE MONITORING			
Jam Slop	1		
Runaway Slop	200		
Fast Deadband	1000		
Slow Deadband	500		
POL POT DRIVE			
Fast/Slow Threshold	2.0		
Maximum Position Error	0.5		
Coast Threshold	0.3		
Maximum Retry Count	3		
POL DRIVE MONITORING			
Jam Slop	1		
Runaway Slop	200		
Fast Deadband	1000		
Slow Deadband	500		

CONFIGURATION ITEM	VC	COMMENTS	INSTALL VALUE
TRACK			
Search Enable	0		
Max Track Error	3		
Search Width	4		
Peakup Holdoff Time	120		
Track Signal Source	3	3=SS2	
Signal Sample Time	2		
REMOTE CONTROL			
Remote Enabled	1		
Bus Address	50		
Baud Rate	6		
Jog	20		
STOW / DEPLOY			
AZ STOW	0.0		
EL STOW	-67.5		
PL STOW	0.0		
AZ DEPLOY	0.0		
EL DEPLOY	20.0		
PL DEPLOY	0.0		
PL ENABLED	1		
SFX UNIQUE			
AZ_SETUP	10553	Approximate azimuth midpoint	
EL_SETUP	17837	Approximate elevation midpoint	
AZ_PACK	10000	Fully retracted	
EL_PACK	20000	Fully retracted	
SHAKE		Not Applicable	

4.2 Schematics


Rack Panel
CN-97-3106A22 Straight Plug
CN-9722-20P plug insert
CN-9767-22-10 Waterproof Cable Clamp
CN-9716S-1S Socket Insert
CN-97-3102A16S Box Receptacle
J1 to AZ Actuator (Blue)
P7 Motors
POL Drive 1 + A
POL Drive 2 - B
POL Drive Shield C
AZ Drive Shield D
EL Drive Shield E
AZ Drive 1 F
AZ Drive 2 G
EL Drive 2 H
EL Drive 1 J
To RC3000 J7
5 feet CBL-2_16SHLDUV
A AZ Drive1
B nc
C AZ Drive 2
D AZ Sensor Rtn
E AZ Sensor Pulse
F AZ Sensor Pwr
G AZ Sensor Shield
A nc
B EL Drive 1
C EL Drive 2
D EL Sensor Rtn
E EL Sensor Pulse
F EL Sensor Pwr
G EL Sensor Shield
CABLE LABEL TEXT(3K end):
RC3K P7 - Motors
CN-747909-2 DB-15 Receptacle Soldercup
CN-745172-3 DB-15 Metal Hood
P4 Pulse Sensors
AZ-I Rtn
AZ-I Pulse
AZ-Q Rtn
AZ-Q Pulse
EL-Q Pulse
EL-Q Rtn
EL-I Pulse
EL-I Rtn
AZ Shield
AZ-I Pwr
AZ-Q Pwr
Alarm in
EL-Q Pwr
EL-I Pwr
EL Shield
To RC3000 J4
5 feet CBL-3_20-SHLD
J2 to EL Actuator (Green)
CN-9716S-1S Socket Insert
CN-97-3102A16S Box Receptacle
to FP-DDTCBLSF160
CABLE LABEL TEXT(3K end both cables -zip tie):
RC3K P4 - Pulse Sensors
CABLE LABEL TEXT:
Rack Panel
AGC input P2
CABLE LABEL TEXT:
RSS 1
P2 AGC input
I/O0
I/O1
I/O2
I/O3
GND
+5V
AGC_Rtn
AGC_1
V_unreg
GND
-15V
+15V
V_offset_2
V_offset_1
AGC_2
To RC3000 J2
5 feet CBL-3_20-SHLD
Strip 1/4" and Tin
Modem Lock 1
AGC_1
Modem Lock Return
CABLE LABEL TEXT:
RSS 2
AGC Rtn
Modem Lock 2
AGC_2
Strip 1/4" and Tin
9" CBL-3_22SHLDUV
used for AGC setup
AGC Rtn CN-ME159-1614
AGC Offset_1 CN-ME159-2156
AGC_Offset 2 CN-ME159-2156
CN-747908-2
DB-15 Male Solderpot with
CN-745172-3-1 Metal Shroud
CABLE LABEL TEXT:
(6sp) BLK - Rtn,
CLR -OFF1, RED - OFF2
For the Multiple Connection Point at pin 5 of J2:
Make the solderpot connection with the blk,
Modem Lock 1 return line. approx. 0.5 inch
from the solder point remove 0.25 inch of insulation.
Solder the two shield lines to this open region of the
blk wire. Verify all shields are insulated with
HS-221-_046 over full exposed length.
Insulate all exposed joints with HS-221-_187 See TKB
Title
Rack Panel for RC3000 to SF-
Size
B
Number
FP-DDTRCKPNLSF
Rev
A
Date Wed Sep 26, 2001
Drawn by JFR
Filename RCKPNL3.SCH
Sheet 1 of 2



NOTES:

Drill and Paint M-2URCKPNL2 Plate to specifications in M-RCKPNL3.DWG
Individually insulate each connection with CN-FIT-105-1/8

Title: Rack Panel for RC3000 to SF-		
Size: B	Number: FP-DDTRCKPNLSF	Rev: A
Date: Wed Sep 26, 2001		Drawn by: JFR
Filename: RCKPNL3.SCH		Sheet 2 of 2

31′ CBL−2xACT_FG_I

Blue Outer Jacket − subcable

CN−973106A16S Straight Plug
CN−97−16S−1P plug insert
CN−9767−16−6 waterproof cable clamp

CN−97−3106A16S Straight Plug
CN−97−16S−1S socket insert
CN−9767−16−6 waterproof cable clamp

P1:C	blk	AZ Drive 2	blk
P1:A	red	AZ Drive 1	red
P1:F	yel	AZ Sensor Power	yel
P1:E	brn	AZ Sensor Pulse	brn
P1:D	blu	AZ Sensor Ground	blu
P1:G	shld	AZ Sensor Shield	shld

leave 18" outside of black jacket

leave 18" outside of black jacket

LABEL TEXT:

(4sp) FP−DDTCBLSF160
(1sp)P1 − Azimuth Actuator
(2sp)to DDTRCKPNLSF J1

LABEL TEXT:

(4sp) FP−DDTCBLSF160
(5sp) to AZDDT_ACT

Green Outer Jacket − subcable

CN−973106A16S Straight Plug
CN−97−16S−1P plug insert
CN−9767−16−6 waterproof cable clamp

CN−97−3106A16S Straight Plug
CN−97−16S−1S socket insert
CN−9767−16−6 waterproof cable clamp

P2:C	blk	EL Drive 2	blk
P2:B	red	EL Drive 1	red
P2:F	yel	EL Sensor Power	yel
P2:E	brn	EL Sensor Pulse	brn
P2:D	blu	EL Sensor Ground	blu
P2:G	shld	EL Sensor Shield	shld

leave 18" outside of black jacket

leave 36" outside of black jacket

LABEL TEXT:

(4sp) FP−DDTCBLSF160
(0sp)P2 − Elevation Actuator
(2sp)to DDTRCKPNLSF J2

LABEL TEXT:

(4sp) FP−DDTCBLSF160
(5sp) to ELDDT_ACT

Black Outer Jacket − subcable

CN−973106A20S Straight Plug
CN−97−20−27P plug insert
CN−9767−22−8 waterproof cable clamp

CN−973108A20 Right Angle Plug
CN−97−20−27P plug insert
CN−9767−22−8 waterproof cable clamp
CN−97−ORING20

leave 18" outside of black jacket

P4:A	Blk−A	Inclinometer Signal and Power Rtn	
P4:B	Red−A	+12V Inclinometer Power	
P4:C	shld−A	Inclinometer Shield A	
P4:D	Blk−D	P2−Gnd	
P4:E	Blu−D	P2−RX1 − RS232	
P4:F	shld−D	Compass Shield D	
P4:G	Grn−C	P2−TX1 − RS−232	
P4:H	Blk−C	P2−Vpwr	
P4:I	Blk−B	−12V Inclinometer Power	
P4:J	Wht−B	Inclinometer Signal	
P4:K	shld−B	Inclinometer Shield B	
P4:L	nc		nc
P4:M	shld−C	P2 − Shield C	
P4:N	nc		nc

leave 6 feet outside of black jacket

LABEL TEXT:

(4sp) FP−DDTCBLSF160
(0sp)P4 − Heading/Elevation
(2sp)to DDTRCKPNLSF J4

LABEL TEXT:

(4sp) FP−DDTCBLSF160
(2sp) to RC3KFGINCL2

CONNECTOR FINISHING
After connector installation, complete connector assembly using locktite − 262.
Trim cable−clamp screws back flush.
Install a 2" long piece of HS−221−1_50 over EACH connector to cover all but the coupling ring.

OUTER JACKET OPENING FINISHING
Install a NY−C−TIE 6" about 1" from the jacket opening on the Jacket side.
Inject Silicone Adhesive Sealant into the open jacket end.
Install another NY−C−TIE 6" about 1/2" from the jacket opening on the OPEN side.
Slide the 3" piece of HS−221−_75 over the opening and shrink.
Install the remaining 4" piece of HS−221−_75 to cover the preceeding peice.

CONNECTOR LABELING
After completion of cable, create labels according to the label text below on LBL−CBL−12xSHT.
Install label on specific cable end

Pull 30.5 feet from source roll

Leave 18" outside of black outer jacket on Rack Panel End
and 6′ outside on Antenna End.

Slide on a 3" piece of HS−221_75 AND a 4" piece of HS−221_75
on EACH end BEFORE installing connectors.

Title: VertexRSI SF−3K Cable Assembly		
Size: B	Number: FP−DDTDBL160SF	Rev: B
Date: Wed Sep 26, 2001	Drawn by: JFR	
Filename: SF_cabling7m_3K.sch	Sheet 1 of 1	

Rev C corrects connector sex, adds RC3000 pin numbers
Rev D setsup drawing for SF–

CN–9720–27P plug insert
CN–97–3108A20 Right–angle Plug
CN–97–ORING20
CN–9767–22–8 Waterproof Cable Clamp
CN–97–ORING20R

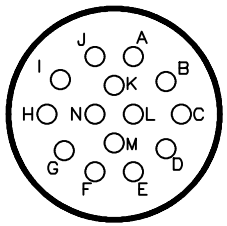
CN–9720–27S socket insert
CN–97–3102A20 Box Receptacle
CN–9760–20 Receptacle Cap with beaded chain

J1

to RC3000 pins:

J1:3	A Shield		C	nc
J1:14	BlkA		A	Blk
J1:6	RedA		B	Red
J1:8	BlkB		I	Gry
J1:15	WhtB		J	Blu
J1:7	B Shield		K	nc

Z1 Z–INCLIN: Gnd, +12V, –12V, SigOut, Incl.



This Diagrams part of DDTCBLSF160

4–pair w/ individual shields

Connector Pinout
20–27
14 #16 AWG pins
Looking into Plug End

Create a P/N label with the following text:
RC3KFGINCL2
(current date)

Install the label on the underside of the housing. Serialize. Engrave and Ink "J1" above the connector and "Front" with a direction arrow on the top/front of the enclosure. (See Assem. Photos)

+ – 45 deg. gimbaled SE–10

Z2 Z–FGKVHC100

nc	1	+18–+28Vin	
Wht	2	+8–+18Vin	
nc	3	nc	
Blk	4	Ground	
nc		1_RefV_S/C	
nc		2_Cos	
nc		3_Sin	
Yel		4_RS232in	
Grn		5_Ground	
Blk		6_Ground	
nc		7_nc	
nc		8_Strbin	
nc		9_DataOut	
nc		10_ClkOut	
Pnk		11_RS232out	
nc		12_DataOut	

N W E S

to RC3000 pins:

J9:7	C Shield		M	nc
J9:25	BlkC		H	Wht
J9:26	GrnC		G	Blk
J9:24	BlkD		D	Grn
J9:27	BluD		E	Blk
J9:7	D Shield		F	Pnk
unused			L	unused
unused			N	unused

NOTES:

Drill M–3KDDT–INCLFG Housing to specs in RC3KFGINCL2.DWG, install 4pcs SS–_312–18x1HH
Install Z–inclin and ginballed Z–FGKVHC100 on M–3KDDT–IF–PNL
Individually insulate each connection with CN–FIT–105–1/8
Install the Box Receptacle with 4 each SS–4–40X_50 SH, HD–NO–4 NUT and HD–NO–4 LW, w/ RTV

Title	3K FluxGate/Inclinometer Module		
Size A	Number FP–RC3KFGINCL2		Rev D
Date	Wed Sep 26, 2001	Drawn by	JFR
Filename	Hdng_elev2.sch	Sheet 1	of 1