

**Series 8010
7-Meter Electrical Installation
8861 Controller**

Technical Manual

**Manual Part No. 42S059C
April 2003**

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SECTION 1 GENERAL INFORMATION

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1-1 Installation and Calibration

SECTION 1 GENERAL INFORMATION

INTRODUCTION TO MANUAL

This manual contains information needed to properly locate and install the Model 8861 Antenna Controller, azimuth and elevation limit switches resolvers (LSR), and cable routing for the 7-Meter Earth Station Antenna. Section 1 provides general information, Section 2 provides installation instructions, and Section 3 provides the limit switch alignment procedures. (After installation is complete, refer to Manual #42S097 for the required software and calibration procedures for Model 8861 Antenna Controller.) All warnings and cautions should be reviewed before any procedures are performed. Failure to do so may result in personal injury or equipment damage.

ViaSat, Inc. makes every effort to ensure that the information contained herein is correct and complete.

INSTALLATION AND CALIBRATION

This manual is used in conjunction with the Calibration Software for Model 8861/62/64 Antenna Position Controller manual #42S097. The following list identifies the sequence of installation and calibration steps which should be followed when installing and calibrating a Model 8861 or Model 8862 Antenna Position Controller.

1. Install antenna position controller and all other electrical components and cables using Section 2 of this manual.
2. Apply power.
3. Connect computer to antenna position controller, initialize calibration program and perform Select Feed Type calibration task using Section 2 and 3 of the calibration software manual #42S097. (This is required to initialize the antenna position controller to the proper feed configuration for the specific antenna before the feed motors can be driven.)
4. Jog the antenna in azimuth and elevation to check motor rotation, and reverse motor wires to reverse motor rotation, if necessary.
5. Set azimuth and elevation limit switches.
6. Jog the feed axis (or both feed axes if a two feed system is used) using Section 3 of this manual.
 - a. Check motor rotation, reverse motor wires to reverse motor rotation, if necessary.
 - b. Check limit switches.

GENERAL INFORMATION

7. Perform antenna position controller calibration using the procedures contained in Section 3 of the calibration software manual #42S097.
 - a. Test limit switches
 - b. Peak up antenna and set look angle
 - c. Polarization Calibration
 - d. Find hard limits
 - e. Perform dynamic calibration
 - f. Optimize positioning on satellites and select desired satellites for saving to file
 - g. Save selected satellites and configuration
8. When a Model 8860 Antenna Tracking Controller is installed in the system, load selected satellites onto Model 8860 using Section 4 of the calibration software manual #42S097.

NOTE

If a failure indication is indicated after power is applied to the Model 8861 Antenna Position Controller, refer to Section 3 of the calibration software manual #42S097 for a complete list of all failures with remedies for each failure.

SECTION 2 INSTALLATION PROCEDURES

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- 2-1 What To Do About Visible Loss Or Damage**
- 2-1 What To Do About Concealed Damage**
- 2-2 How To Inventory Equipment Received**
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SECTION 2 INSTALLATION PROCEDURES

GENERAL

This section contains procedures for unpacking and installing the Model 8861 Antenna Controller, azimuth and elevation limit switches and data resolvers, and all associated hardware and cables for the 7-Meter Earth Station Antenna. General safety precautions and procedures are also described. After installation is complete, the calibration and alignment procedures contained in manual #42S097 should be performed prior to operation.

ViaSat thoroughly inspects and carefully packs all equipment before shipment. At the time of shipment, the carrier assumes responsibility for its safe delivery; therefore, do not return damaged units to ViaSat. Instead, file a claim with the carrier as noted in the paragraphs following the initial unpacking procedure given below:

1. Inspect shipping carton for visible damage.
2. Open the shipping carton.
3. Remove all packing material.
4. Inspect unit for visible damage.
5. Using packing list, check for missing items (see "How To Inventory Equipment Received" below).

WHAT TO DO ABOUT VISIBLE LOSS OR DAMAGE

Make a note of any loss or evidence of external damage on the freight bill or receipt, and have it signed by the carrier's agent. Failure to adequately describe such external evidence of loss or damage may result in the carrier refusing to honor a damage claim. The form required to file such a claim will be supplied by the carrier.

WHAT TO DO ABOUT CONCEALED DAMAGE

Concealed damage means damage which does not become apparent until the unit has been unpacked. The contents may be damaged in transit due to rough handling, even though the carton may not show external damage. If you discover damage after unpacking the unit, make a written request for inspection by the carrier's agent within 15 days of the delivery date, then file a claim with the carrier since such damage is the carrier's responsibility. If you follow these instructions carefully, ViaSat guarantees its full support of your claims to protect you against loss from concealed damage.

**HOW TO INVENTORY
EQUIPMENT
RECEIVED**

Check off each item received against that list on the packing slip included with the shipment, and verify that this list matches the purchase order. If any items are missing, please notify ViaSat immediately and return a copy of the packing slip with the missing item(s) circled.

**HOW TO RETURN
EQUIPMENT**

ViaSat Satellite Networks makes every reasonable effort to ensure that all items arrive safely and in working order. When equipment is received, which is not in working order, return the equipment to the factory for repair or replacement. Return the equipment according to the following procedure. This procedure will apply whenever equipment is returned for warranty or other services.

- a) Notify ViaSat Satellite Networks of the problem and request a Return Material Authorization (RMA) number and shipping instructions. For a current list of telephone and email contact information refer on Contact Information section of the ViaSat internet site (<http://www.viasat.com>).
- b) Tag or identify defective equipment and note defect and circumstances, if any. If known, reference sales order, purchase order, and date equipment was received.
- c) Reship equipment in original shipping container or use a strong shipping container to protect equipment during shipment.
- d) Package equipment using shock-absorbing material around all sides of equipment.
- e) Seal container securely and mark outside of container **FRAGILE**.

NOTE

ViaSat will not accept freight collect. Be sure to ship all items freight prepaid.

WARNING

Electrical shock from voltages used in this system can cause injury or death. Prior to making any electrical connections or performing maintenance and repair, ensure power is removed. Electrical connections should be made only by qualified personnel in accordance with local regulation.

**GENERAL
MECHANICAL
SAFETY SUMMARY**

These are general mechanical safety precautions that are not related to any specific procedure. They are recommended precautions that personnel must understand and apply.

WARNING

Installation or maintenance of antennas may require persons to work at elevated work stations. Whenever persons are working at eight or more feet above ground and not on a guarded platform, they should wear safety belts with at least one, and preferably two, lanyards, with the exception that trained and qualified persons may work up to 25 feet (7.6 meters) if on an approved ladder. In the sentence above, approved usually means that the ladder is tied off once the person has climbed but before work begins.

WARNING

Overhead hazards, either because items may fall or because a person may strike them unintentionally, are typical around construction sites or during installation of large antennas. It is prudent to adopt the following rules:

1. Never stand underneath anything while it is being hoisted.
 2. Always wear a hard hat, especially if someone is above you.
-

WARNING

Ensure that all electrical tools and equipment are properly grounded.

Emergency Plan

Have an emergency plan. Know the procedures for obtaining first-aid and fire-fighting assistance. Plan your work and maintain good housekeeping; the safety and quality of the product are at stake.

**GENERAL
ELECTRICAL
SAFETY SUMMARY**

These are general electrical safety precautions that are not related to any specific procedure. These are recommended precautions that personnel must understand and apply.

WARNING

Avoid shorting circuits when using metal tools. Some circuits have high current capability which, when shorted, will flash and may cause burns and/or eye injury.

Remove all jewelry and exposed metal objects from body and clothing before performing maintenance, adjustments, and/or troubleshooting. Before working inside the equipment, remove all power, unless power is required to perform procedures. Do not replace parts with power on.

Replacement of fuses or other parts must be done using identical types and ratings. Substitution of non-identical parts may cause safety and fire hazards.

Servicing this equipment may require working with protective covers removed and ac power connected. Extreme caution must be exercised during these procedures.

Death or severe injury may result if personnel fail to observe safety precautions.

Resuscitation Personnel working with or near hazardous chemicals or voltages should be familiar with modern methods of resuscitation.

RECOMMENDED TOOLS AND EQUIPMENT Table 2-1 lists the tools and equipment required for efficient and convenient installation.

Table 2-1. Tools and Equipment Required for Installation

Quantity	Description
1 Each	12-foot stepladder
2 Each	Small Allen wrench set
1 Set	Electrical tools (screw drivers, nut drivers, pliers, crimp tool, line-man pliers, needle nose pliers, channel lock pliers)
1 Each	Compass or similar measuring device

INSTALLATION PROCEDURES

The following information provides the installation procedures for the Model 8861 Antenna Controller, elevation limit switches and data resolver, azimuth limit switches and data resolver, and all associated hardware and cables for the 7-Meter Earth Station Antenna.

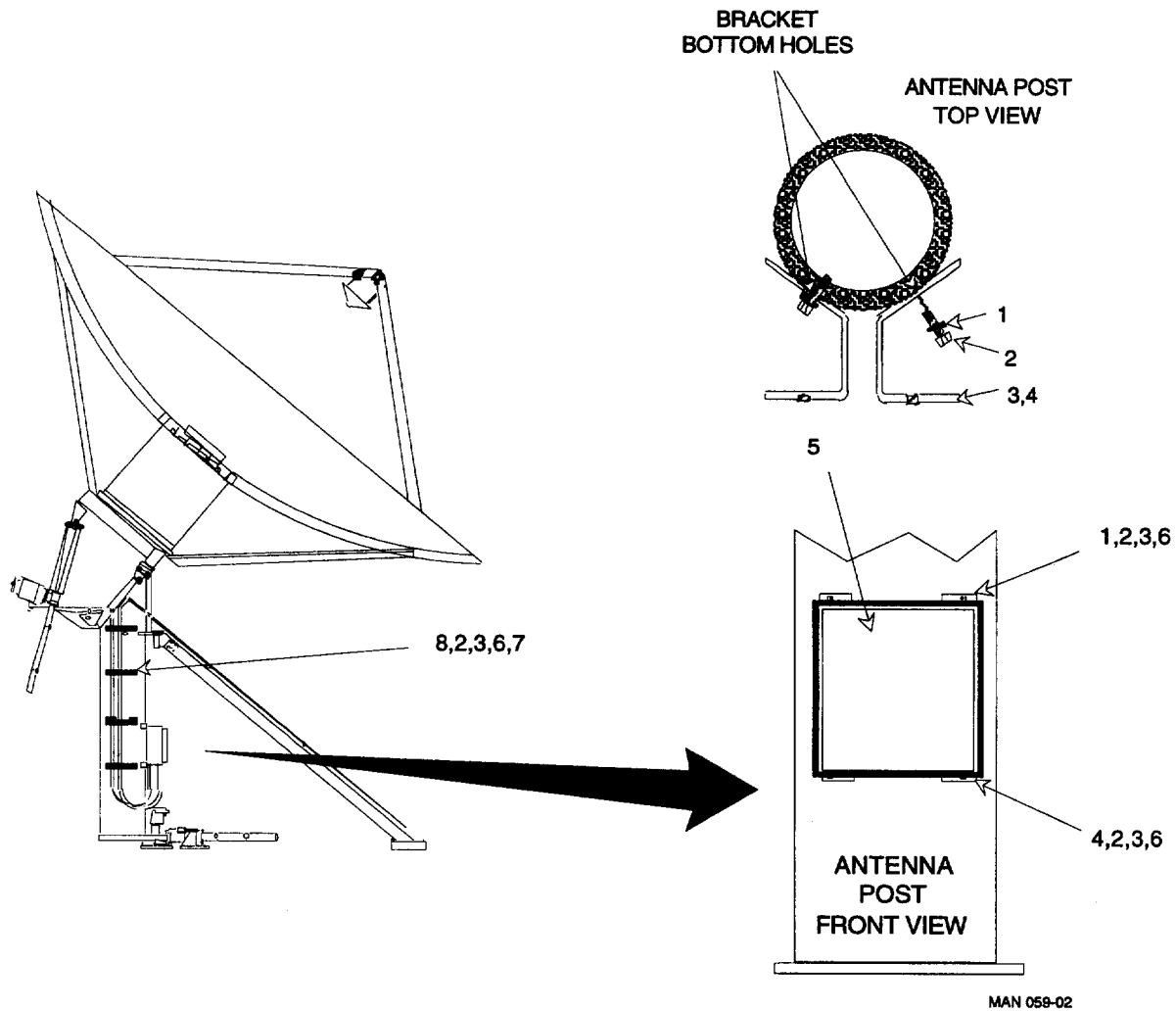
NOTE

The limit switches will be adjusted after the electrical installation is complete. Refer to Section 3 for limit switch alignment procedures. When this is complete, Model 8861 calibration procedures must be performed. Refer to manual #42S097 for the required software and calibration procedures.

Model 8861 Antenna Controller Installation

The Model 8861 Antenna Controller is mounted to the antenna post of the antenna structure. The configuration has four brackets bolted to the post. These four brackets provide a mounting surface which support the Model 8861 Antenna Controller. Perform the following procedure to install Model 8861 Antenna Controller.

1. Attach two top brackets (item 1 in Figure 2-1) to antenna post using two hex head screws (2) and two SST flat washers (3).
2. Attach two bottom brackets (item 4 in Figure 2-1) to antenna post using two hex head screws (2) and two SST flat washers (3).
3. Mount antenna controller assembly (5) to four brackets using four hex head screws (2), four SST flat washers (3), and four hex nuts (6).
4. Attach four brackets (8) to side of antenna post using four hex head screws (2), four SST flat washers (3), and four flat washers (7).



- | | |
|---|------------------------------------|
| 1. TOP MOUNTING BRACKET, 475716 | 5. MODEL 8861 CONTROLLER, 8861-XXX |
| 2. 0.31-18 X 1.0 SST HEX HEAD SCREW, 177571 | 6. 0.31-18 SST HEX NUT, 177581 |
| 3. 0.31 SST FLAT WASHER, 177192 | 7. 0.38 X 1.0 FLAT WASHER, 86197 |
| 4. BOTTOM MOUNTING BRACKET, 475717 | 8. BRACKET, 282976 |

Figure 2-1. Mounting Antenna Controller

**Elevation Limit
Switches/Resolver
Assembly
Installation**

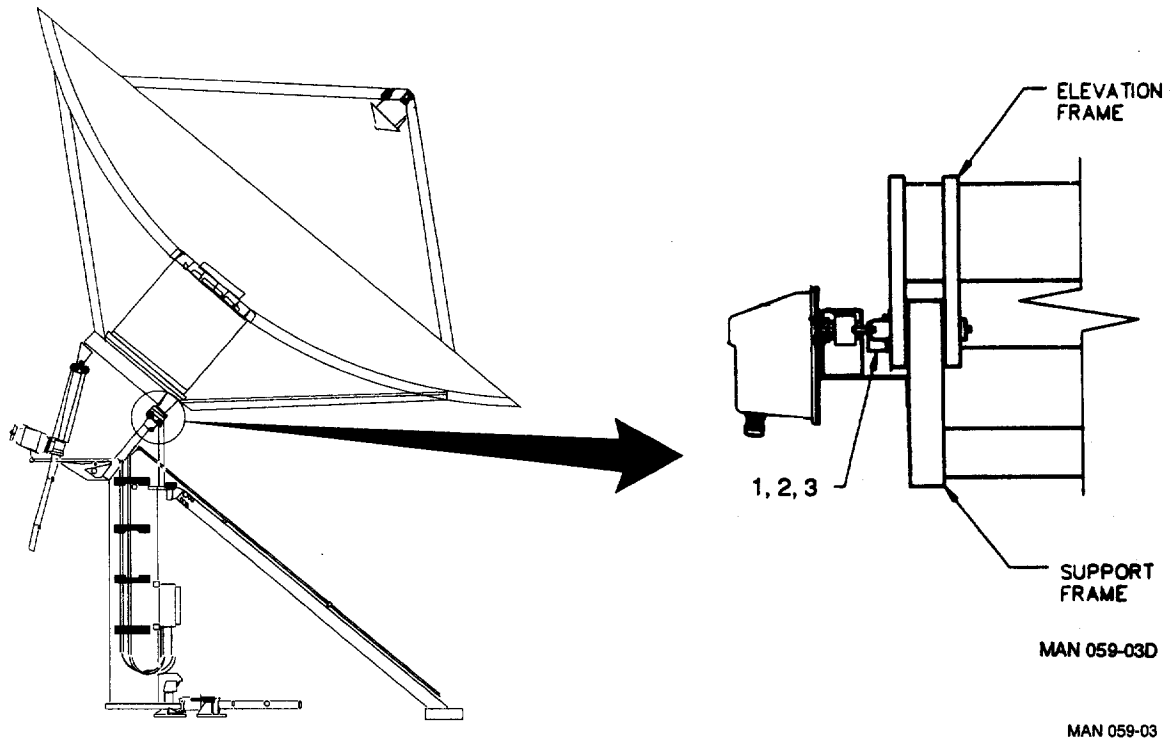
Install the elevation limit switches/resolver (LSR) assembly in accordance with the following procedure.

1. Remove LSR cover and remove any shipping restraining devices.
2. Drive elevation axis to center of travel (approximately 45°).
3. Adjust LSR limit stops and shaft position to the approximate location shown in Figure 3-1.

NOTE

Ensure LSR shaft turns freely prior to installation.

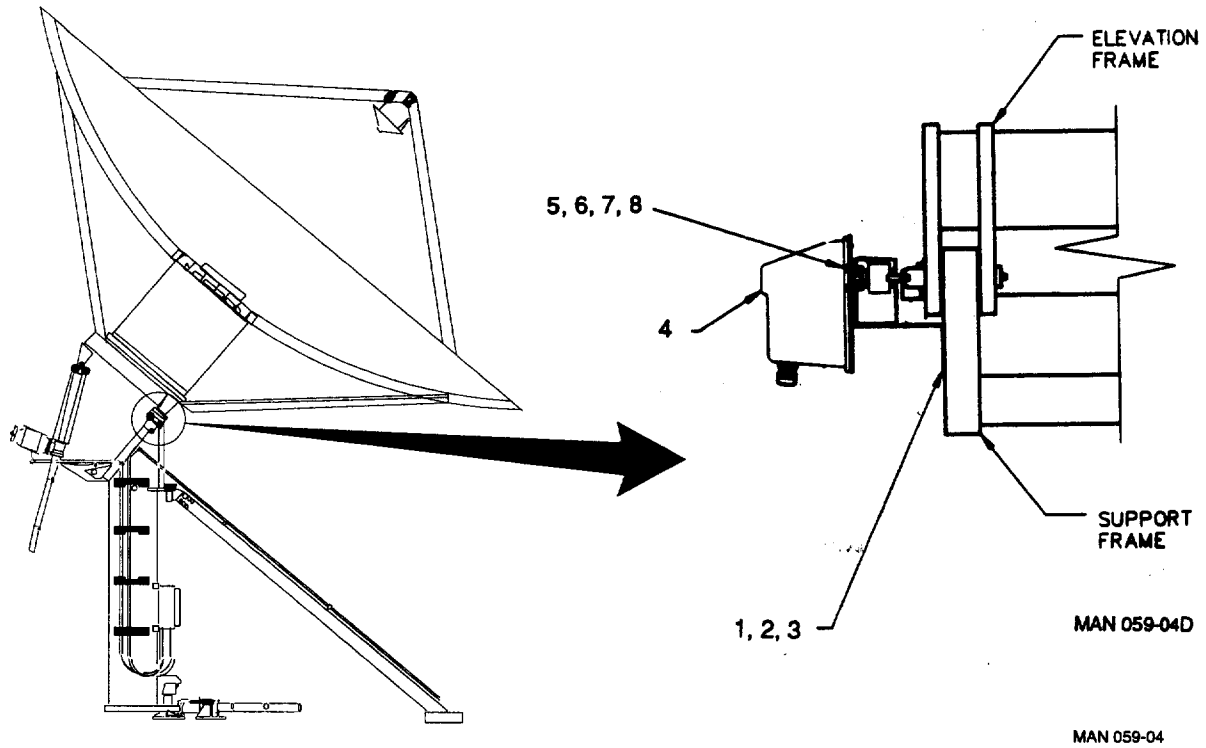
4. Attach elevation driver (item 1 in Figure 2-2) to left, facing antenna, using hex head screw (2) and flat washer (3).



1. ELEVATION DRIVER, 370187
2. 1/4 X 1/2-INCH HEX HEAD SCREW, 87257
3. 1/4-INCH FLAT WASHER, 76917

Figure 2-2. Mounting Elevation Driver Assembly

5. Attach elevation LSR bracket (item 1 in Figure 2-3) using two hex head screws (2) and two flat washers (3) as shown in Figure 2-3.
6. Mount elevation LSR assembly (4) using four SST screws (5), eight flat washers (6), four lock washers (7) and four hex head nuts (8) as shown in Figure 2-3.



- | | |
|---|--------------------------------------|
| 1. ELEVATION LSR BRACKET, 475831 | 5. 10-32 X 1.0-INCH SST SCREW, 72434 |
| 2. 1/4 X 1/2-INCH HEX HEAD SCREW, 87257 | 6. No. 10 FLAT WASHER, 73275 |
| 3. 1/4-INCH FLAT WASHER, 76917 | 7. No. 10 LOCK WASHER, 174557 |
| 4. LSR ASSY., 455579 | 8. No. 10-32 HEX HEAD NUT, 71503 |

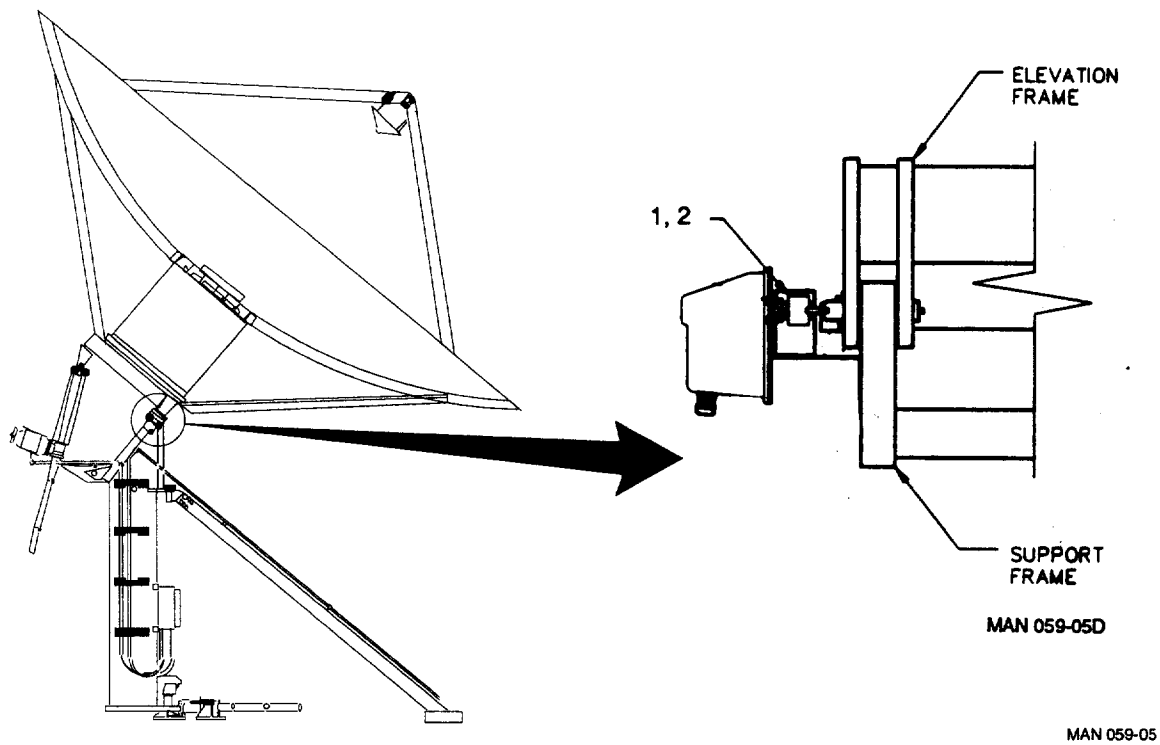
Figure 2-3. Mounting Elevation LSR Assembly

7. Mount flex disk coupling (item 1 in Figure 2-4) between LSR driver and LSR assembly using two split hub clamps (2) as shown in Figure 2-4. Do not tighten split hub clamps.

CAUTION

If the coupling is twisted or bent out of shape, excessive coupling wear and eventual breakage will occur. Ensure coupling is not bent or twisted.

8. Loosen four pan head screws securing LSR assembly to bracket and adjust LSR assembly so that LSR assembly shaft lines up with LSR driver shaft. Tighten four pan head screws to secure LSR assembly.



1. FLEX DISK COUPLING, 172172

2. 3/8 DIAMETER SPLIT HUB CLAMP, 172173

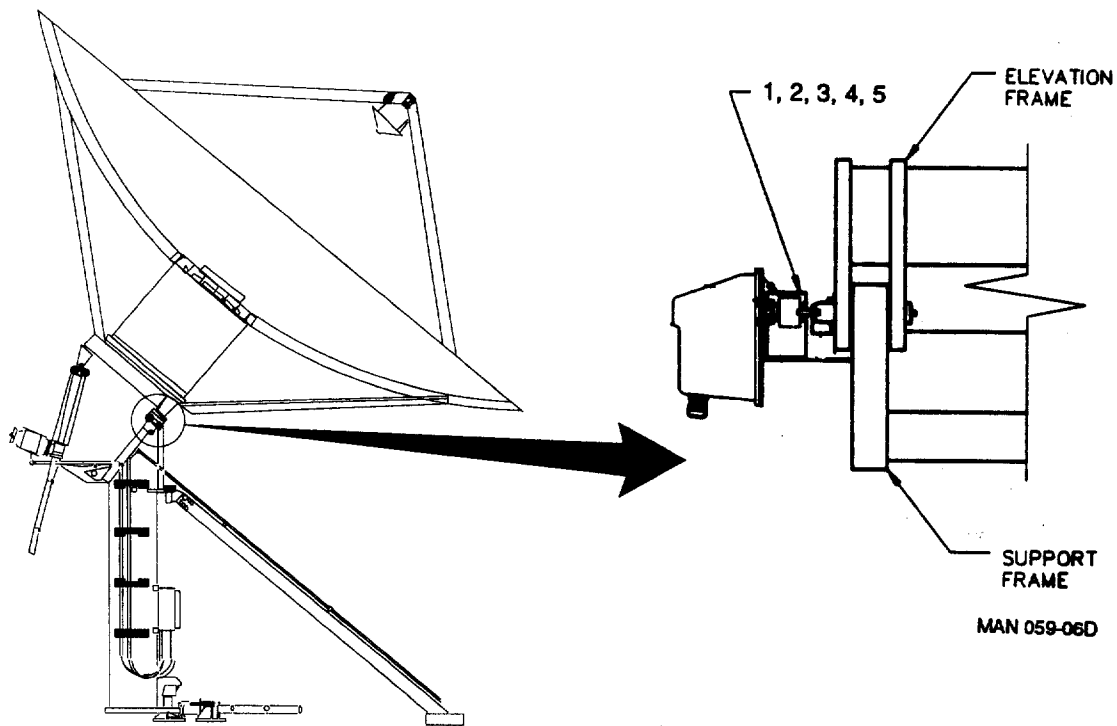
Figure 2-4. Connecting LSR Assembly To Elevation Driver

9. Ensure LSR shaft is in center of travel as shown in Figure 3-1 and tighten split clamps.
10. Attach elevation coupling guard (item 1 in Figure 2-5) using four pan head screws (2), eight flat washers (3), four lock washers (4), and four hex nuts (5).

CAUTION

If the appropriate plug is not removed, condensation will build up causing eventual LSR damage.

11. Remove lowest rubber plug from LSR assembly to allow for drainage.



- | | |
|--|----------------------------------|
| 1. ELEVATION COUPLING GUARD, 475832 | 4. No. 10 LOCK WASHER, 174557 |
| 2. 10-32 x 0.5 SST PAN HEAD SCREW, 72425 | 5. No. 10-32 HEX HEAD NUT, 71503 |
| 3. No. 10 FLAT WASHER, 73275 | |

Figure 2-5. Attaching Elevation Coupling Guard

**Azimuth Limit
Switches/Resolver
Assembly
Installation**

Install the azimuth limit switches/resolver (LSR) assembly in accordance with the following procedure.

1. Remove LSR cover and remove any shipping restraining devices.
2. Drive azimuth axis to center of travel.
3. Adjust LSR limit stops and shaft position to the approximate location shown in Figure 3-2.
4. Mount left side azimuth LSR bracket (item 1 in Figure 2-6) to azimuth bracket assembly using two hex head screws (2) and two flat washers (3).
5. Mount right side azimuth LSR bracket (4) to azimuth bracket assembly using two hex head screws (2) and two flat washers (3).
6. Insert azimuth driver (5) into center of azimuth center pivot pin and secure with two set screws (6).
7. Mount flex disk coupling (12) inside azimuth LSR bracket and attach to azimuth driver using split hub clamp (13) as shown in Figure 2-6.

CAUTION

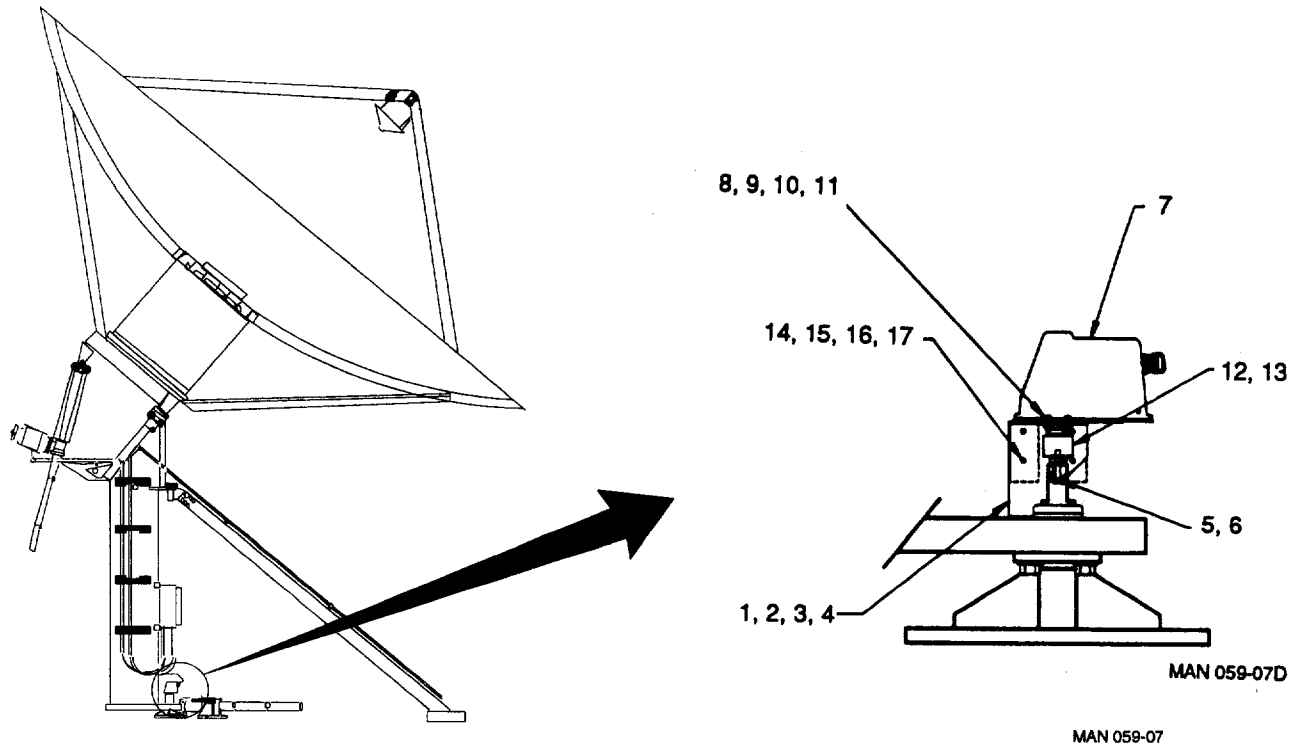
If the coupling is twisted or bent out of shape, excessive coupling wear and eventual breakage will occur. Ensure coupling is not bent or twisted.

8. Mount LSR assembly (7) to mounting bracket using four SST screws (8), eight flat washers (9), four lock washers (10), and four hex head screws (11). Do not tighten the top split hub clamp.
9. Ensure LSR shaft is in center of travel as shown in Figure 3-1 and tighten split clamps.
10. Attach two azimuth coupling guards (14) using eight pan head screws (15), eight flat washers (16), and eight lock washers.

CAUTION

If the appropriate plug is not removed, condensation will build up causing eventual LSR damage.

11. Remove lowest rubber plug from LSR assembly to allow for drainage.



- | | |
|--|---|
| 1. LEFT SIDE AZIMUTH BRACKET, 475713 | 10. No. 10 LOCK WASHER, 174557 |
| 2. 1/4-20 X 1/2-INCH HEX HEAD SCREW, 87257 | 11. No. 10-32 HEX HEAD NUT, 71503 |
| 3. 1/4 FLAT WASHER, 76917 | 12. FLEX DISK COUPLING, 172172 |
| 4. RIGHT SIDE AZIMUTH BRACKET, 475714 | 13. 3/8 DIAMETER SPLIT HUB CLAMP, 172173 |
| 5. AZIMUTH PIN DRIVER, 365132 | 14. AZIMUTH COUPLING GUARD, 475715 |
| 6. 0.25-20 X 0.25 SST SET SCREW, 75811 | 15. 10-32 x 0.5 SST PAN HEAD SCREW, 72425 |
| 7. LSR ASSY., 455579 | 16. No. 10 FLAT WASHER, 73275 |
| 8. 10-32 X 1.0-INCH SST SCREW, 72434 | 17. No. 10 LOCK WASHER, 174557 |
| 9. No. 10 FLAT WASHER, 73275 | |

Figure 2-6. Mounting Azimuth LSR Bracket, Driver, and LSR Assembly

ELECTRICAL INSTALLATION

The following procedures contain information on installing electrical cables and cable routing. Perform the following procedures to install the electrical cables on the 7-meter antenna.

WARNING

Electrical shock from voltages used in this system can cause injury or death. Prior to making any electrical connections, ensure power is removed. Electrical connections should be made only by qualified personnel in accordance with local regulation.

Motor Power Cable Installation

Perform the following procedures to assemble, route, and install the motor power cable assemblies. The procedure is divided into azimuth, elevation, and feed 1 cable assembly installation procedures. Some Model 8861's may be powered by -24V dc instead of the ac standard power. When a procedure is different for the dc version, the dc version of the procedural step is identified immediately following the ac version. If the procedural step does not identify either version, the step is applicable to both versions.

Azimuth Motor Power Cable Installation

1. On ac powered installations, cut 20-foot lengths of four 14 AWG wire (items 1, 2, 3, and 4 in Figure 2-7). On dc powered installations, cut 20-foot length of two 14 AWG wire (items 1 and 2 in Figure 2-8).
2. Cut 19-feet of 1/2-inch diameter flex conduit (5 in Figure 2-7 or item 3 in Figure 2-8).
3. Pull four wires through 1/2-inch flex conduit.
4. Remove electrical junction box cover on azimuth motor.
5. Slide wires and conduit through box fitting.
6. Connect conduit fitting to electrical junction box.
7. Strip wires insulation to 3/8-inch long.

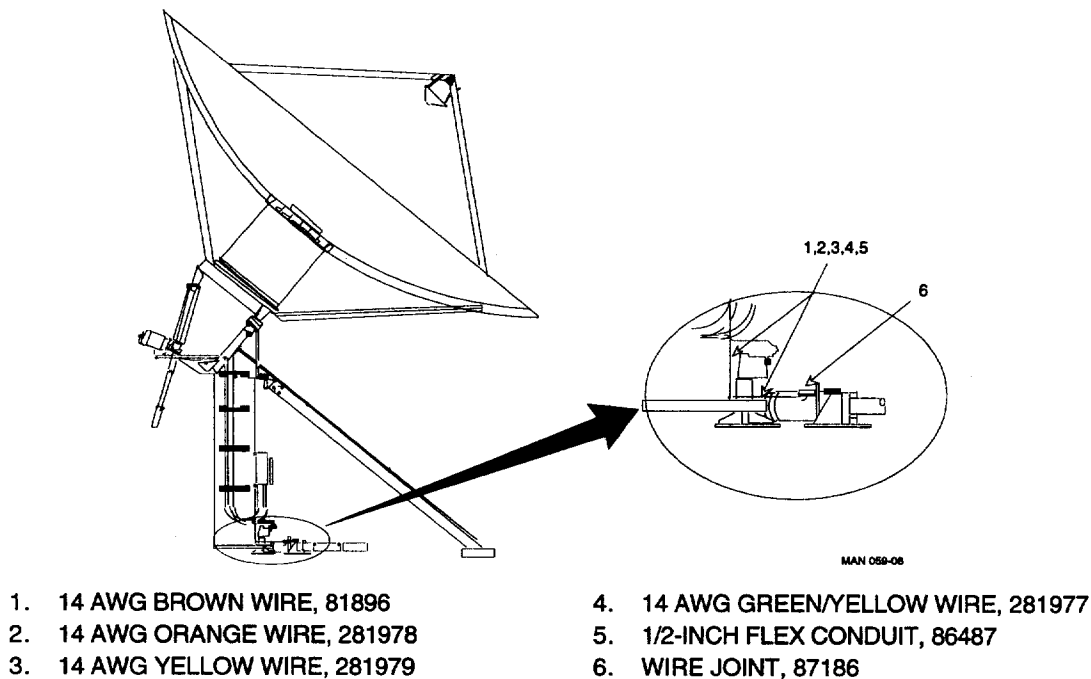


Figure 2-7. Azimuth Cable Routing Diagram, AC Powered Model 8861/8862

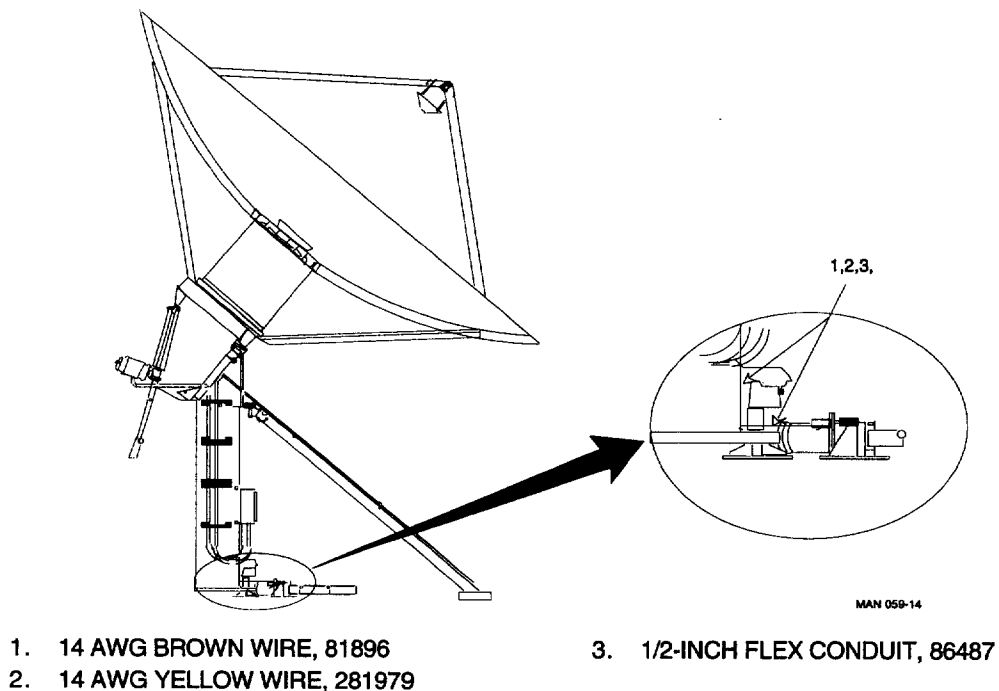
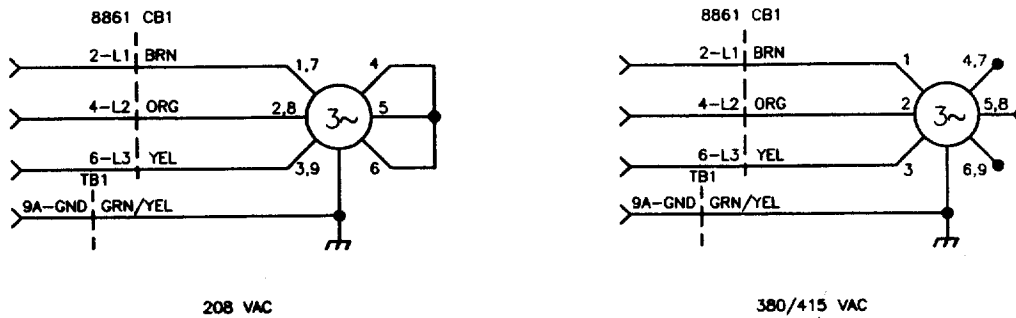


Figure 2-8. Azimuth Cable Routing Diagram, DC Powered Model 8861

8. On ac powered installations, twist strands to ensure conductor contour and twist onto motor wires using wire joints (7) matching colors, as indicated in Figure 2-9. Be careful when installing wires so that all strands on the terminal make proper connection. Since most motors are capable of operating at more than one voltage, refer to the motor nameplate for the connection matching the site line voltage. Some 380V or 415V, 50 Hz antennas are actually supplied with 460V, 60 Hz motors. In these instances, use the 460V connection. On dc powered installations, twist wires to ensure conductor contour and connect to motor terminals, as indicated in Figure 2-10. Be careful when installing wires so that all wires on the terminal make proper connection.



208 VAC

380/415 VAC

AZIMUTH

AZIMUTH AND ELEVATION MOTORS

(BALDOR-DUAL VOLTAGE)

TO REVERSE MOTOR ROTATION, SWAP ORANGE AND YELLOW WIRES.
WIRE MOTOR PER NAME PLATE DIAGRAM.

CAUTION: FOR USE WITH 8861 ONLY!
DO NOT USE FOR 8862.

Figure 2-9. Azimuth Motor Wiring, AC Powered Model 8861/8862, 483496

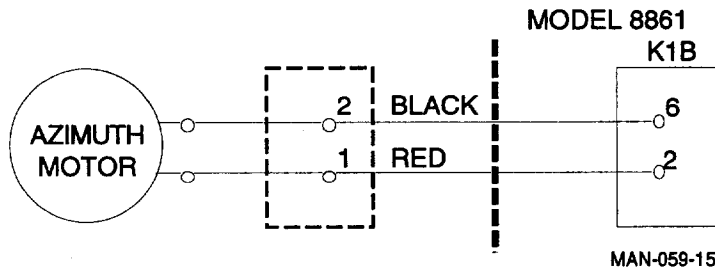


Figure 2-10. Azimuth Motor Wiring, DC Powered Model 8861

CAUTION

The cables need plenty of room to move during operation of antenna system; therefore, it is important not to secure the cable to any point other than those specified later in this procedure. Damage to the cables and/or equipment could result if the cables are not long enough during antenna movement.

9. Attach electrical junction box cover.
10. Leave some slack for antenna movement and secure elevation cable to azimuth cable on antenna leg using using 8-inch cable ties.
11. Secure azimuth cable to azimuth diagonal brace using 22-inch cable ties.
12. Cut wires and conduit to proper length leaving enough wire length to make connections inside controller.
13. Insert cable into bottom of antenna position controller and secure as illustrated in Figure 2-11.

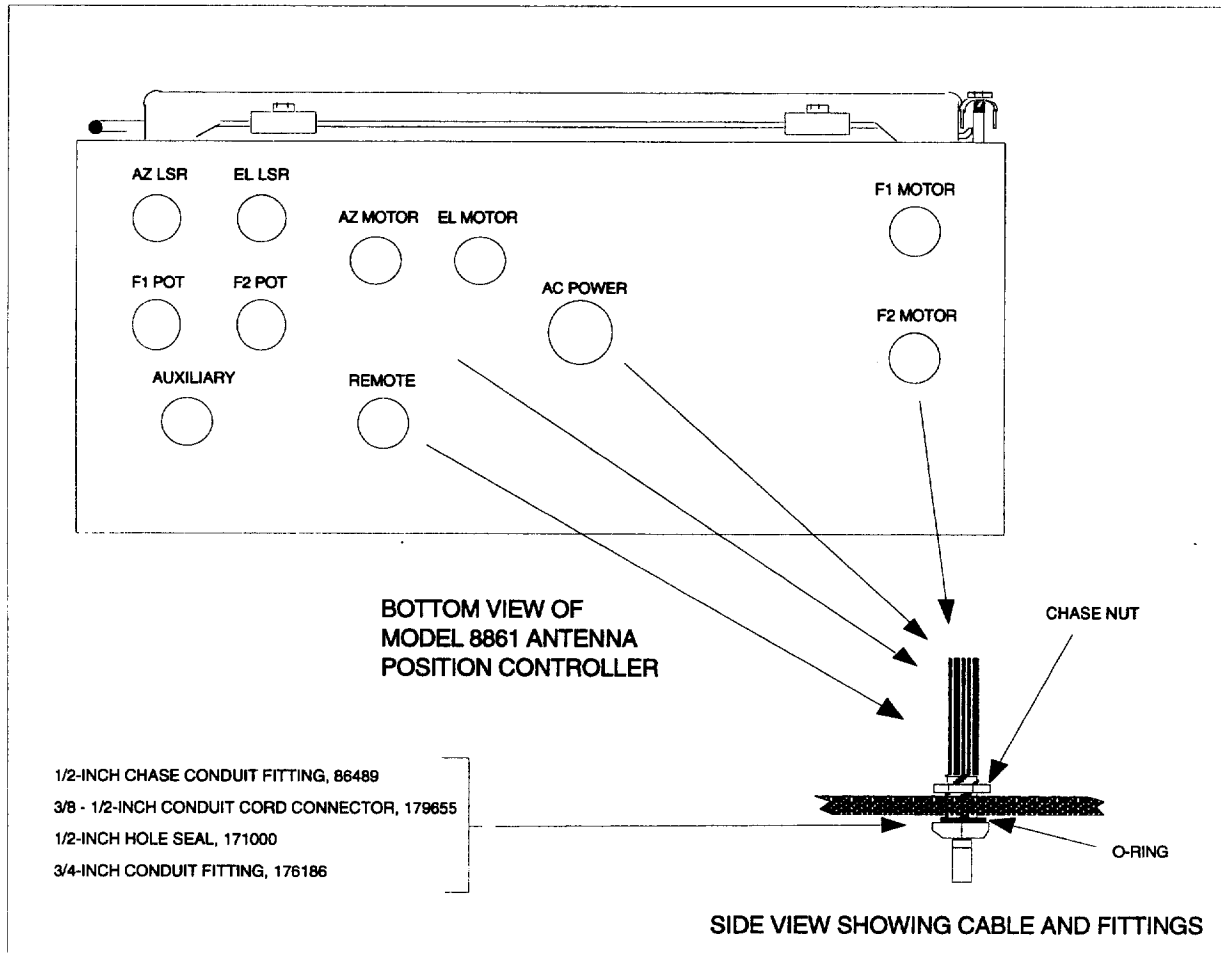
NOTE

This procedure pertains to an antenna position controller unit with 11 cable access holes. This unit has a kit installation number of 475849 and an installation drawing of 475848. If there are less than 11 cable access holes, the following procedures will have to be modified to comply with the appropriate antenna position controller. Another version of the unit has 7 access holes and a kit installation number drawing number of 456051. With this unit, use installation drawing number 456050 for specific information on installing cables to the antenna position controller.

14. Connect wires as indicated in Figure 2-9 and in accordance with Model 8861 Antenna Controller Technical Manual.

NOTE

When Model 8861 is initially powered up and antenna drive direction checked, it may be necessary to reverse the motor phasing for proper rotation. If necessary, reverse the positions of the orange and yellow wires on CB1 (ac version) or K1B (dc version). When the installation procedures contained in this manual are completed, the system will be calibrated and checked for reverse direction and other failures using Calibration Software For Model 8861/8862 Antenna Position Controller Technical Manual #42S097.



MAN 058-05

Figure 2-11. Model 8861 Cable Connections

Elevation Motor Power Cable Installation

1. On ac powered installations, acquire 40-foot lengths of four 14 AWG wire (items 1, 2, 3, and 4 in Figure 2-14). On dc powered installations, acquire 40-foot lengths of two 14 AWG wire (items 1 and 2 in Figure 2-15).
2. Cut 39-feet of 1/2-inch diameter flex conduit (5 in Figure 2-14 or 3 in Figure 2-15).
3. Pull four wires through 1/2-inch flex conduit.
4. Remove electrical junction box cover on elevation motor.
5. Slide wires and conduit through box fitting.

6. Connect conduit fitting to electrical junction box.
7. Strip wires insulation to 3/8-inch long.
8. On ac powered installations, twist strands to ensure conductor contour and twist onto motor wires using wire joints (7) matching colors, as indicated in Figure 2-12. Be careful when installing wires so that all strands on the terminal make proper connection. Since most motors are capable of operating at more than one voltage, refer to the motor nameplate for the connection matching the site line voltage. Some 380V or 415V, 50 Hz antennas are actually supplied with 460V, 60 Hz motors. In these instances, use the 460V connection. On dc powered installations, twist wires to ensure conductor contour and connect to motor terminals, as indicated in Figure 2-13. Be careful when installing wires so that all wires on the terminal make proper connection.

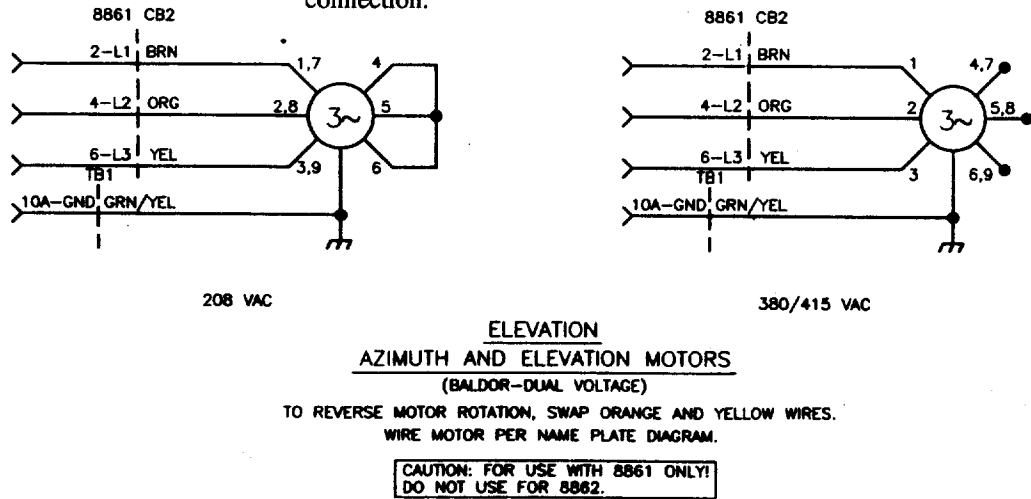


Figure 2-12. Elevation Motor Wiring, AC Powered Model 8861/8862

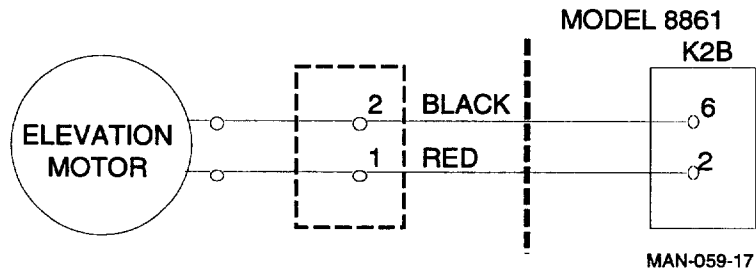
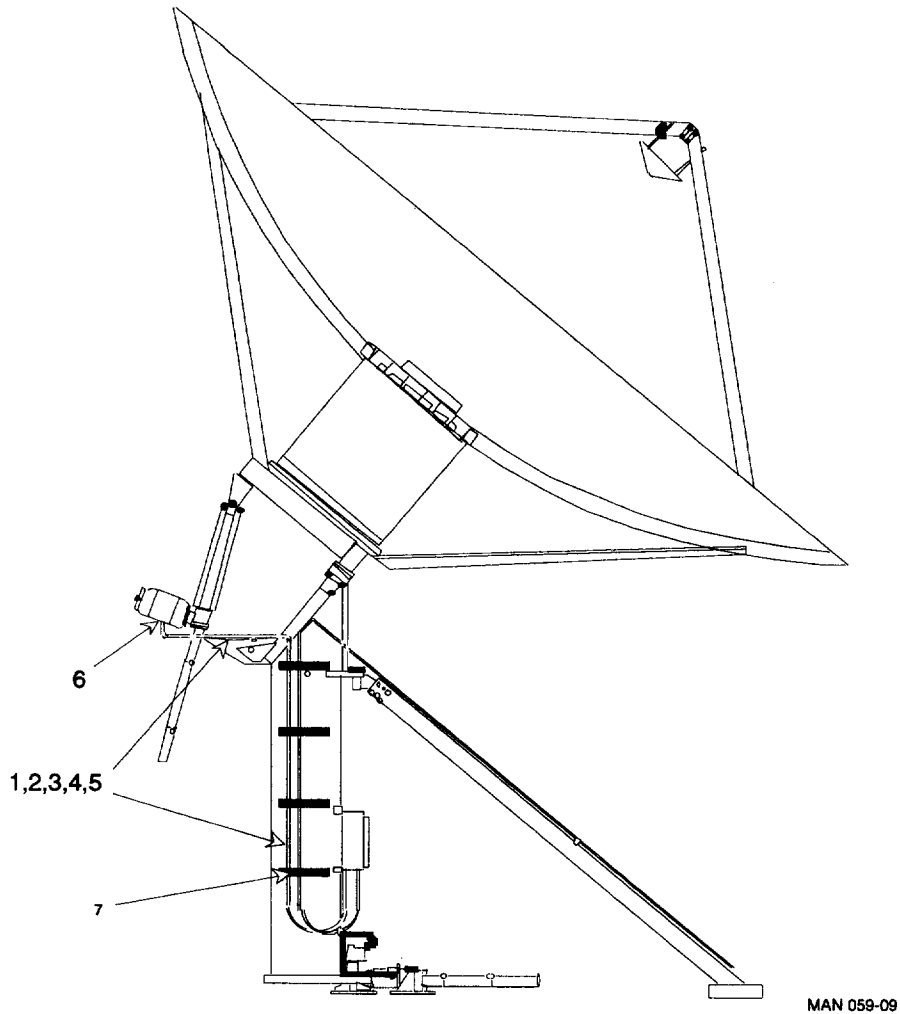
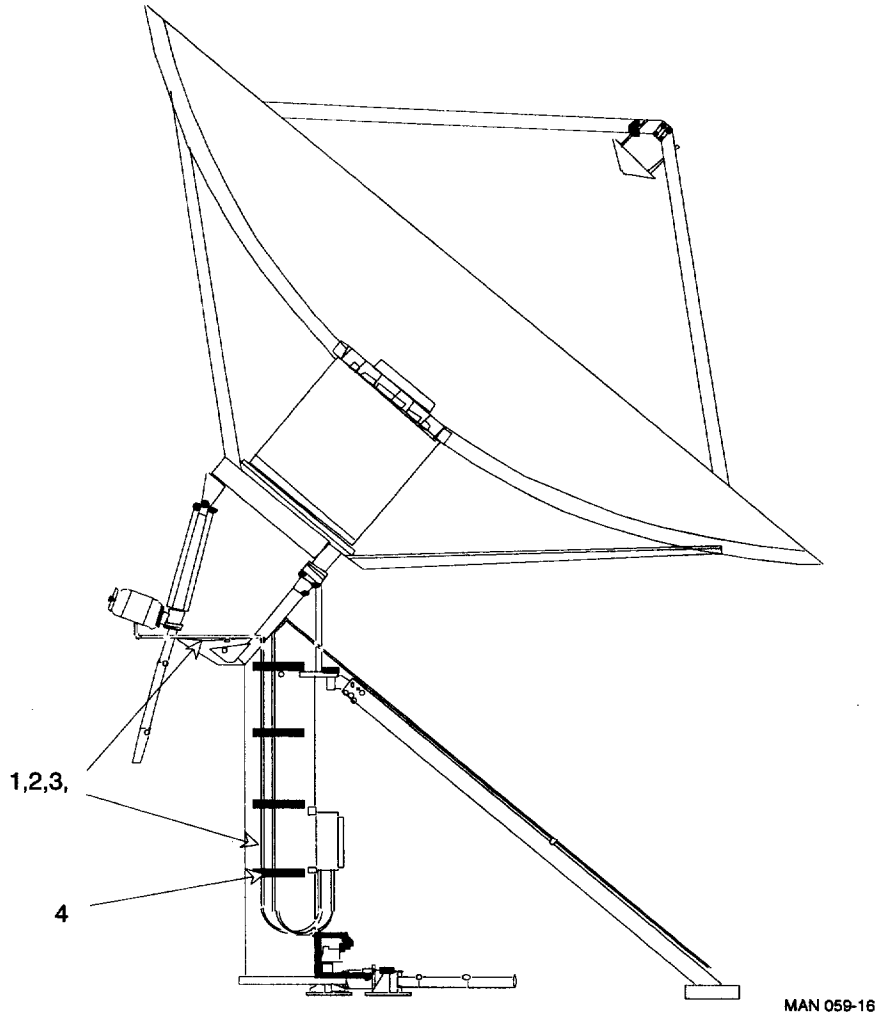


Figure 2-13. Elevation Motor Wiring, DC Powered Model 8861



- | | |
|-------------------------------------|------------------------------------|
| 1. 14 AWG BROWN WIRE, 81896 | 5. 1/2-INCH FLEX CONDUIT, 86487 |
| 2. 14 AWG ORANGE WIRE, 281978 | 6. WIRE JOINT, 87186 |
| 3. 14 AWG YELLOW WIRE, 281979 | 7. 1/2-INCH UNISTRUT CLAMP, 179776 |
| 4. 14 AWG GREEN/YELLOW WIRE, 281977 | |

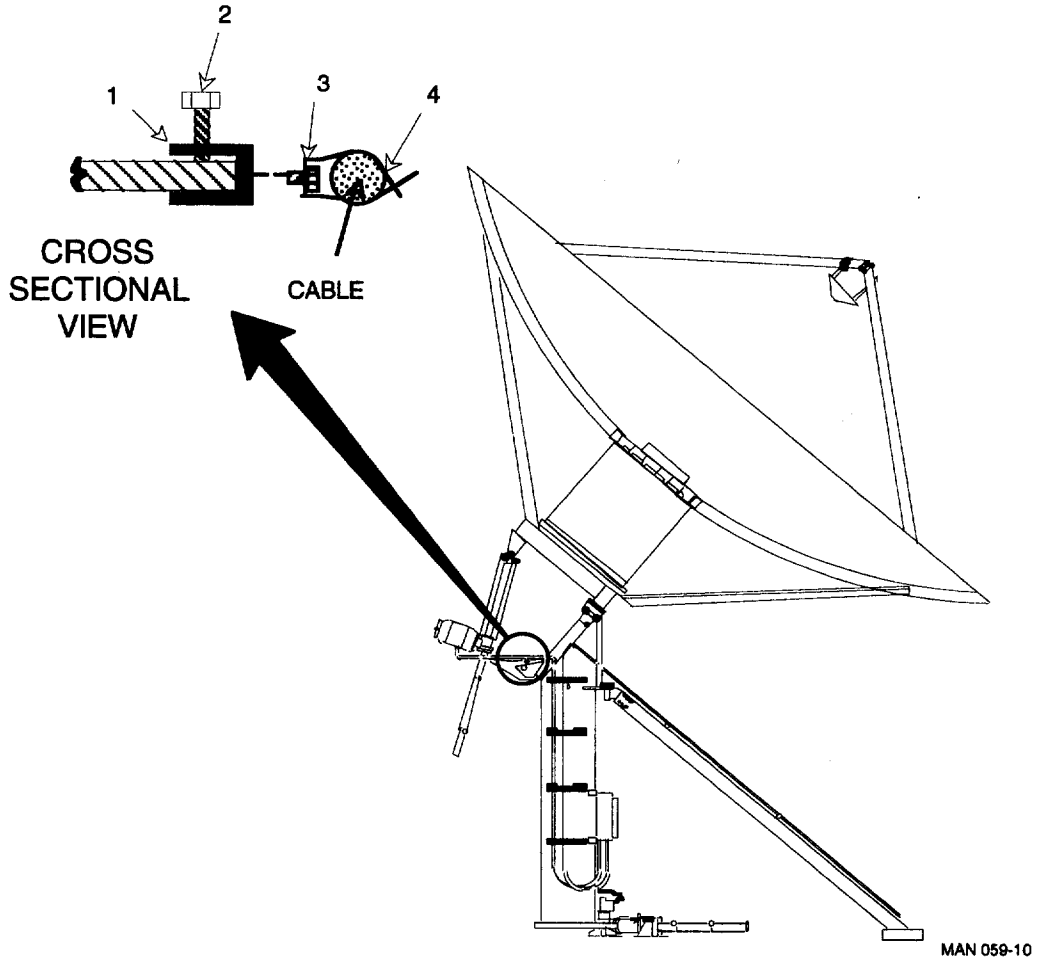
Figure 2-14. Elevation Cable Routing Diagram, AC Powered Model 8861/8862



- | | |
|-------------------------------|------------------------------------|
| 1. 14 AWG BROWN WIRE, 81896 | 3. 1/2-INCH FLEX CONDUIT, 86487 |
| 2. 14 AWG YELLOW WIRE, 281979 | 4. 1/2-INCH UNISTRUT CLAMP, 179776 |

Figure 2-15. Elevation Cable Routing Diagram, DC Powered Model 8861

9. Attach electrical junction box cover.
10. Route cable toward antenna leg where azimuth cable is attached.
11. Secure elevation cable to elevation pivot bracket using beam clamps and conduit cable clamp as illustrated in Figure 2-16.



1. BEAM CLAMP, 84738
2. BEAM CLAMP BOLT

3. 1/4 X 1/2-INCH PAN HEAD SCREW, 175796
4. CABLE TIE, 282055

Figure 2-16. Attaching Elevation Cable To Pivot Bracket

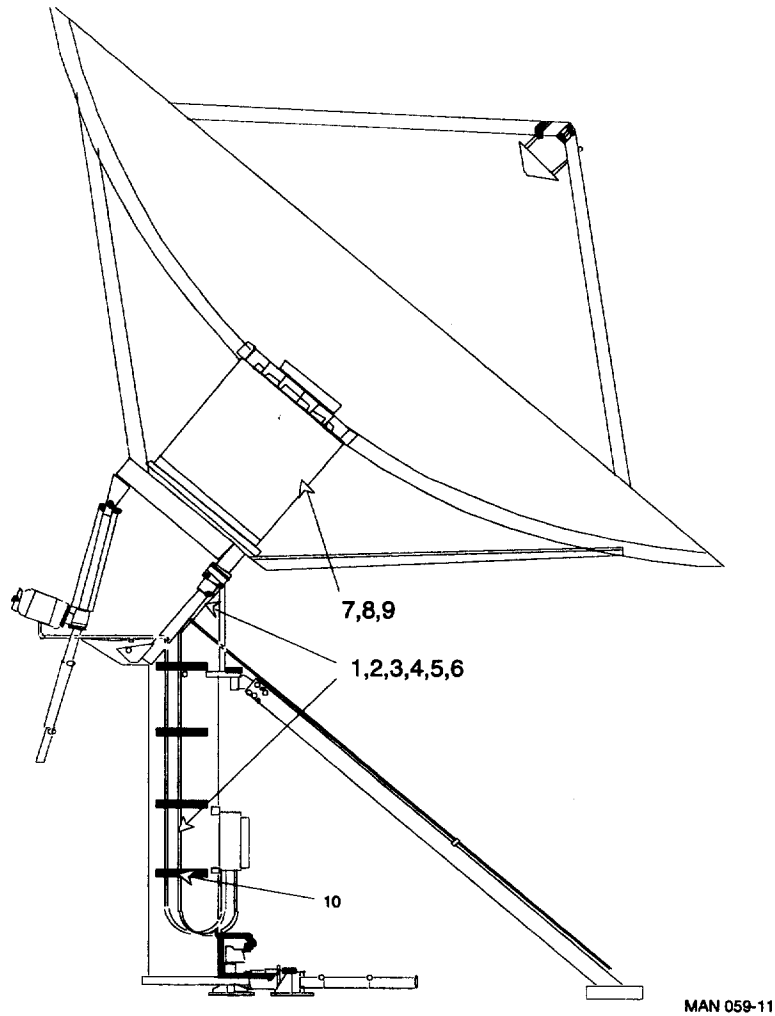
12. Route elevation cable down antenna post and secure to unistrut brackets on post using 1/2-inch unistrut clamp (item 7 in Figure 2-14 or item 4 in Figure 2-15).
13. Cut wires and conduit to proper length leaving enough wire length to make connections inside controller.
14. Insert cable into bottom of antenna controller and secure as illustrated in Figure 2-11.
15. Connect wires as indicated in Figure 2-12 and in accordance with Model 8861 Antenna Controller Technical Manual.

NOTE

When Model 8861 is initially powered up and antenna drive direction checked, it may be necessary to reverse the motor phasing for proper rotation. If necessary, reverse the positions of the orange and yellow wires on CB2 (ac version) or K2B (dc version). When the installation procedures contained in this manual are completed, the system will be calibrated and checked for reverse direction and other failures using Calibration Software For Model 8861/8862 Antenna Position Controller Technical Manual #42S097.

Feed Motor Power and Potentiometer Cable Installation

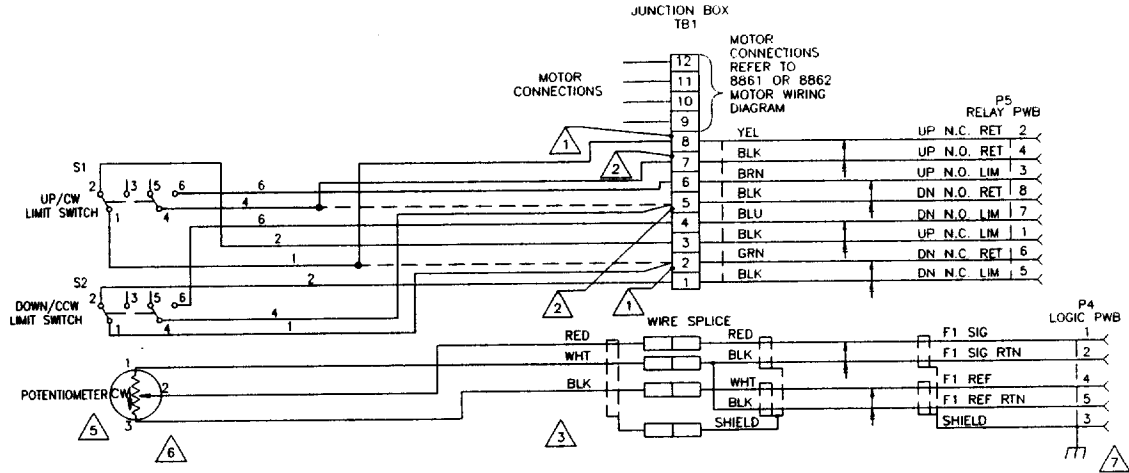
1. Cut 25 feet lengths of four 18 AWG wire (items 1, 2, 3, and 4 in Figure 2-17).
2. Cut 24-feet of 1/2-inch diameter flex conduit (6).
3. Pull four wires through 1/2-inch flex conduit.
4. Cut a 25 foot length of wire from 6-pair cable (5).
5. Slide cable through hole in lower panel on hub.
6. Remove electrical junction box cover for feed (polarization) motor.
7. Slide wires and conduit through conduit locknuts (8).
8. Slide wires and conduit through two cable grips (7). (The separate wires attach to the motor connections.)
9. Connect conduit locknuts to electrical junction box.
10. Strip wires insulation to 3/8-inch long.



- | | |
|-------------------------------------|-------------------------------------|
| 1. 14 AWG BROWN WIRE, 81896 | 6. 1/2-INCH FLEX CONDUIT, 86487 |
| 2. 14 AWG ORANGE WIRE, 281978 | 7. CABLE GRIP, 70423 |
| 3. 14 AWG YELLOW WIRE, 281979 | 8. CONDUIT LOCKNUT, 75452 |
| 4. 14 AWG GREEN/YELLOW WIRE, 281977 | 9. BUTT SPLICE, 179821 |
| 5. 6-PAIR CABLE, 171977 | 10. 1/2-INCH UNISTRUT CLAMP, 179776 |

Figure 2-17. Feed Cable Routing Diagram

11. Twist wires to ensure conductor contour and secure wires on barrier strip as indicated in Figure 2-18. Use butt splice (item 9 in Figure 2-17) as necessary.
12. Attach electrical junction box cover.
13. Route cable down antenna post.

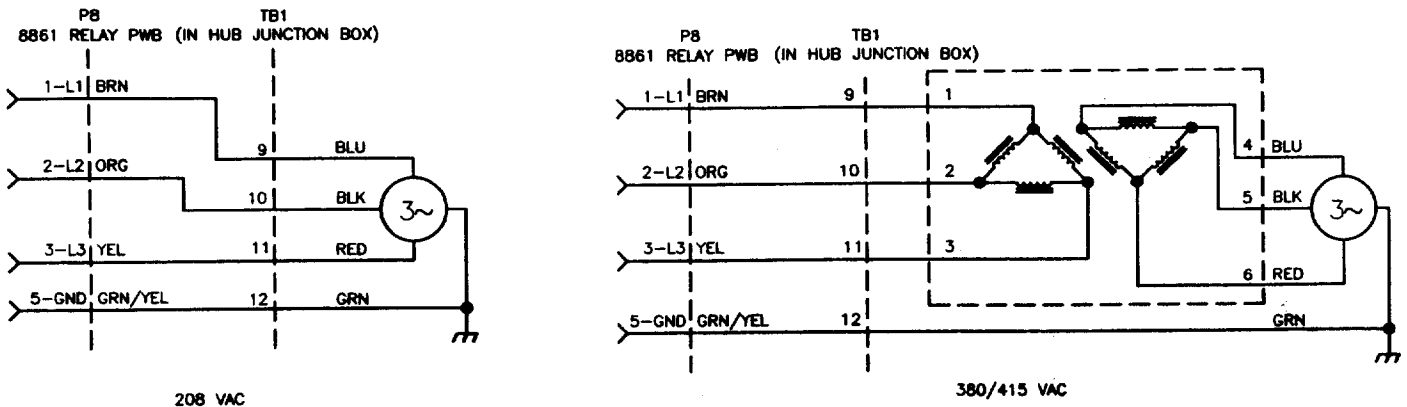


NOTES:

- 1 IDENTIFY WIRE FROM S1-1 TO TB1-2. MOVE TB1-2 END TO TB1-8. LEAVE OTHER WIRE AT TB1-2 AS IS.
- 2 IDENTIFY WIRE FROM S1-4 TO TB1-5. MOVE TB1-5 END TO TB1-7. LEAVE OTHER WIRE AT TB1-5 AS IS.
- 3 CUT OFF DATA POTENTIOMETER CONNECTOR AND DISCARD. MAKE WIRING CONNECTIONS WITH BUTT SPLICES INSIDE THE JUNCTION BOX.
- 4 VIEW ORIENTATION ESTABLISHED FROM LNA SIDE.
- 5 POTENTIOMETER IS WIRED SO THAT CLOCKWISE FEED ROTATION VIEWED FROM LNA SIDE OF FEED RESULTS IN INCREASING SIGNAL VOLTAGE WITH RESPECT TO RETURN. POTENTIOMETER SHAFT ROTATES CLOCKWISE VIEWED FROM ITS SHAFT END.
- 6 SHIELDS AND DRAIN WIRES ARE CUT OFF AT POT. END OF CABLE-NOT CONNECTED TOGETHER. UNSHIELDED PORTION OF CABLE SHOULD BE KEPT AS SHORT AS POSSIBLE. 2-3 IN. MAX.
- 7 AT PWB END, REMOVE APPROXIMATELY 3 IN. OF SHIELDS AND TWIST DRAIN WIRES TOGETHER WITH ONE END OF A 3 IN. GREEN WIRE. INSULATE EXPOSED SHIELDS WITH LARGE HEATSHRINK TUBING TO PREVENT SHORTING. ATTACH OTHER END OF 3 IN. GREEN WIRE TO NEAREST PWB MOUNTING SCREW WITH SPADE LUG.

6, 7, 9 METER CASSEGRAIN (FEED 1)

Figure 2-18. Feed Potentiometer and Limit Switch Wiring, 483497



6, 7 & 9 METER CASSEGRAIN FEED MOTOR (F1)
(ROBBINS AND MEYERS)

FOR 415 VAC OPERATION, TRANSFORMER IS PART NUMBER 478031. FOR 380 VAC OPERATION, TRANSFORMER IS PART NUMBER 364938. TRANSFORMER IS MOUNTED INSIDE HUB.

TO REVERSE MOTOR ROTATION, SWAP ORANGE AND YELLOW WIRES.

**CAUTION: FOR USE WITH 8861 ONLY!
DO NOT USE FOR 8862.**

Figure 2-19. Feed Motor Wiring, 483496

CAUTION

The cables need plenty of room to move during operation of antenna system; therefore, it is important not to secure the cable to any point other than those specified later in this procedure. Damage to the cables and/or equipment could result if the cables are not long enough during antenna movement.

CAUTION

It is extremely important that the direction of motor rotation be verified as correct by observing physical motion of the antenna, NOT resolver position display. Since the controller is designed to allow backing out of a limit condition, backward motor operation will not be stopped by the limit switches. Also, if a backup power source is available, its phasing must be verified to be the same as the primary power source.

14. Secure cable to post using four 1/2-inch unistrut clamps (item 10 in Figure 2-17).
15. Cut wires, cable, and conduit to proper length leaving enough wire length to route per Figure 2-20 and make connections inside controller.
16. Insert cable into bottom of antenna controller and secure as illustrated in Figure 2-11.
17. Strip 6-pair cable outer jacket and separate twisted wire pairs.
18. Route wire leads to correct connectors as illustrated in Figures 2-20.
19. Cut lengths of heat shrink tubing to cover wire pairs within 3 inches of connector plugs.
20. Connect wires in accordance with Figure 2-18 and Figure 2-19, and Model 8861 Antenna Position Controller Technical Manual.
21. Remove three inches of shields and twist shields together with one end of a three inch green wire. Insulate exposed shields with large heatshrink tubing, and insulate twisted shields with small heatshrink tubing to prevent shorting.

22. Position cables as indicated in Figure 2-20.
23. Attach the other end of the three inch green wire to the nearest PWB mounting screw with a spade lug.

NOTE

When Model 8861 is initially powered up and antenna drive direction checked, it may be necessary to reverse the motor phasing for proper rotation. If necessary, reverse the positions of the orange and yellow wires on P8 on the relay/power supply subassembly. When the installation procedures contained in this manual are completed, the system will be calibrated and checked for reverse direction and other failures using Calibration Software For Model 8861/8862 Antenna Position Controller Technical Manual #42S097.

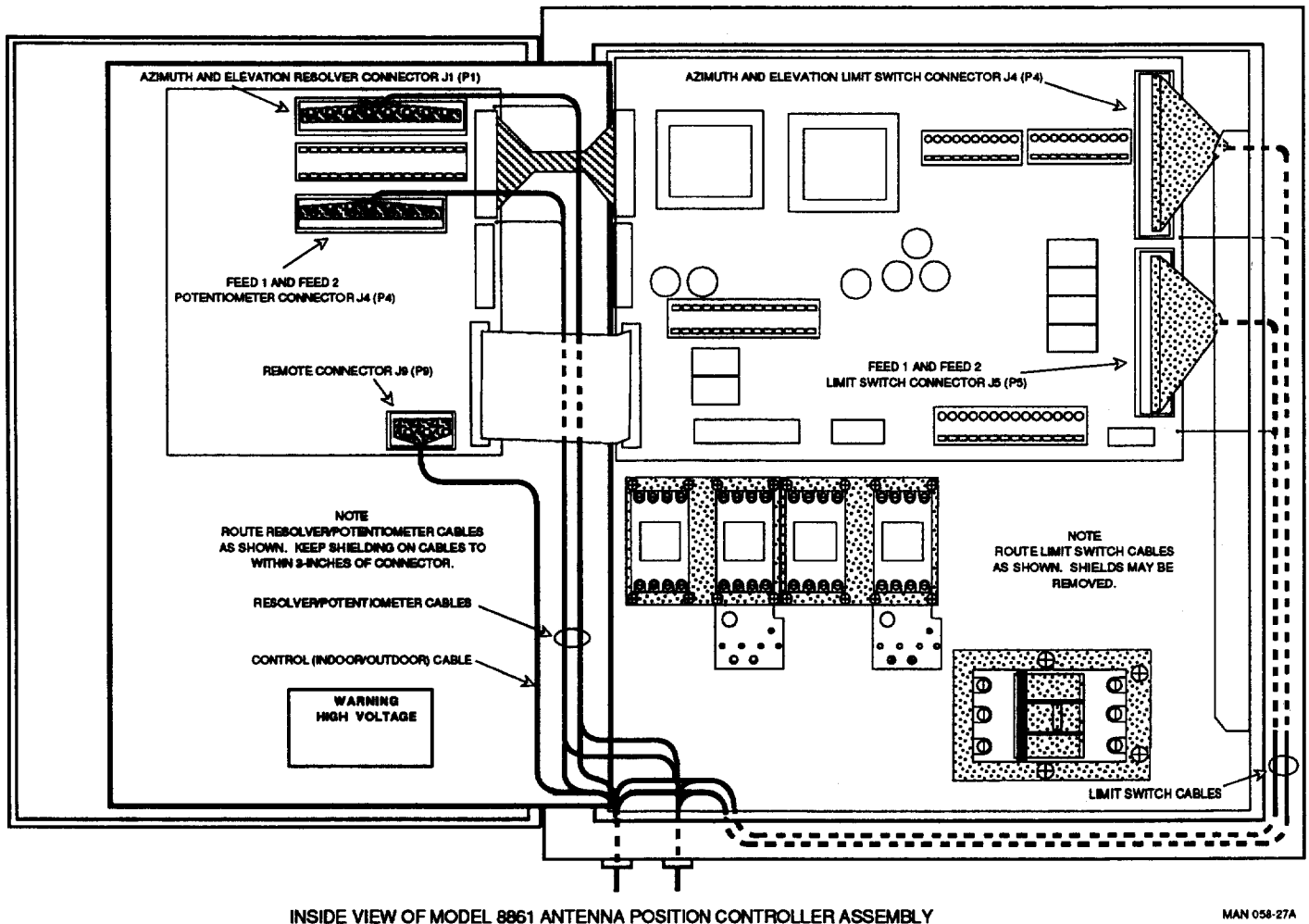


Figure 2-20. Model 8861 Antenna Signal Cable Routing Diagram

**LSR Cable
Installation**

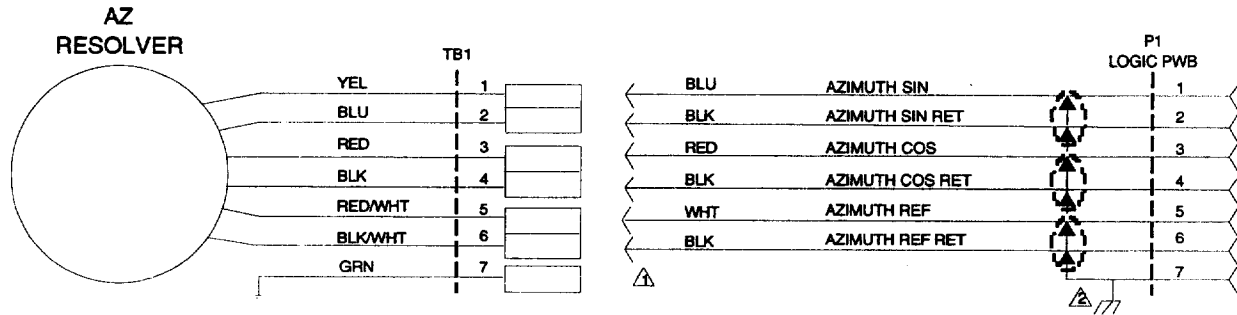
Perform the following procedures to route the LSR cable assemblies and install the cable assemblies in the Model 8861 Antenna Controller. The procedure is divided into azimuth and elevation LSR cable assembly installation procedures.

Azimuth LSR Cable Installation

CAUTION

It is extremely important that the direction of motor rotation be verified as correct by observing physical motion of the antenna, NOT resolver position display. Since the controller is designed to allow backing out of a limit condition, backward motor operation will not be stopped by the limit switches. Also, if a backup power source is available, its phasing must be verified to be the same as the primary power source.

1. Acquire 6-pair cable assembly (items 5 in Figure 2-17).
2. Remove azimuth LSR cover.
3. Remove three-inches of cable jacket and shielding. Cut the shields and drain wires off flush with the end of the cable jacket - they are not connected at the LSR end of the cable.
4. Ensure connector grommet is in place on cover.
5. Thread cable through the liquid tight connector until the cable jacket is extended 12-inches beyond inside of cover. Hand tighten connector.
6. Strip wires insulation to 3/8-inch long.
7. To connect azimuth resolver, twist wires to ensure conductor contour and terminate on terminal block (TB1), matching color code, as indicated in Figure 2-21.



⚠ SHIELDS AND DRAIN WIRES ARE CUT OFF FLUSH AT LSR END OF CABLE-NOT CONNECTED TOGETHER. UNSHIELDED WIRES AT TB1 SHOULD BE KEPT AS SHORT AS POSSIBLE, APPROXIMATELY 2 TO 3 INCHES.

⚠ AT PWB END, REMOVE APPROXIMATELY 3 INCHES OF SHIELDS AND TWIST DRAIN WIRES TOGETHER WITH ONE END OF A 3 INCH GREEN WIRE. INSULATE EXPOSED SHIELDS WITH LARGE HEATSHRINK TUBING AND INSULATE TWISTED DRAIN WIRES WITH SMALL HEATSHRINK TUBING TO PREVENT SHORTING. ATTACH OTHER END OF 3 INCH GREEN WIRE TO NEAREST PWB MOUNTING SCREW WITH SPADE LUG.

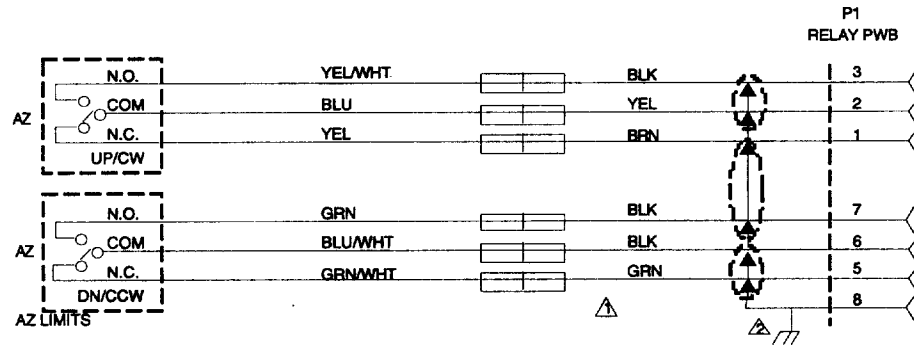
MAN 058-17A

Figure 2-21. Azimuth Resolver Wiring, 456057

CAUTION

For each axis and direction, the limit switch wiring breaks the relay coil circuit. Shorting these terminals to ground via metal parts in the LSR, or via exposed shields, may cause unexpected axis motion which cannot be stopped by the limit switches. This motion may result in damage to the antenna or nearby structures. Extreme care must be taken to ensure that the limit switch connections and shields are properly insulated. If the butt splices are crimped incorrectly, the plastic sleeve may be cut through, exposing the metallic conductor. If this happens, the splices should be replaced. Also, the shields should be twisted, cut to a length of no more than 0.5 in., and covered with tape or heat shrink tubing.

8. To connect limit switches, twist wires to ensure conductor contour and terminate to limit switch wires using butt splice (#179821) and matching color code as indicated in Figure 2-22.



⚠ SHIELDS AND DRAIN WIRES ARE CUT OFF FLUSH AT LSR END OF CABLE-NOT CONNECTED TOGETHER. UNSHIELDED WIRES AT TB1 SHOULD BE KEPT AS SHORT AS POSSIBLE, APPROXIMATELY 2 TO 3 INCHES.

⚠ AT PWB END, REMOVE APPROXIMATELY 3 INCHES OF SHIELDS AND TWIST DRAIN WIRES TOGETHER WITH ONE END OF A 3 INCH GREEN WIRE. INSULATE EXPOSED SHIELDS WITH LARGE HEATSHRINK TUBING AND INSULATE TWISTED DRAIN WIRES WITH SMALL HEATSHRINK TUBING TO PREVENT SHORTING. ATTACH OTHER END OF 3 INCH GREEN WIRE TO NEAREST PWB MOUNTING SCREW WITH SPADE LUG.

MAN 058-19B

Figure 2-22. Azimuth Limit Switch Wiring, 456057

9. Remove one of the rubber plugs at lowest point from outside cover to promote condensation drainage.
10. Install cover on resolver. Cover will be removed later to calibrate the resolver.
11. Route cable alongside azimuth motor cable and secure to azimuth motor cable using 8-inch cable ties.
12. Cut cable to proper length leaving enough wire length to route per Figure 2-20 and make connections inside controller.
13. Insert cable into bottom of antenna controller and secure as illustrated in Figure 2-11.
14. Strip 6-pair cable outer jacket and separate twisted wire pairs.
15. Route wire leads to correct connectors as illustrated in Figures 2-20.
16. Cut lengths of heat shrink tubing to cover wire pairs within 3 inches of connector plugs.
17. Connect wires in accordance with Figures 2-21 and 2-22 and Model 8861 Antenna Position Controller Technical Manual.

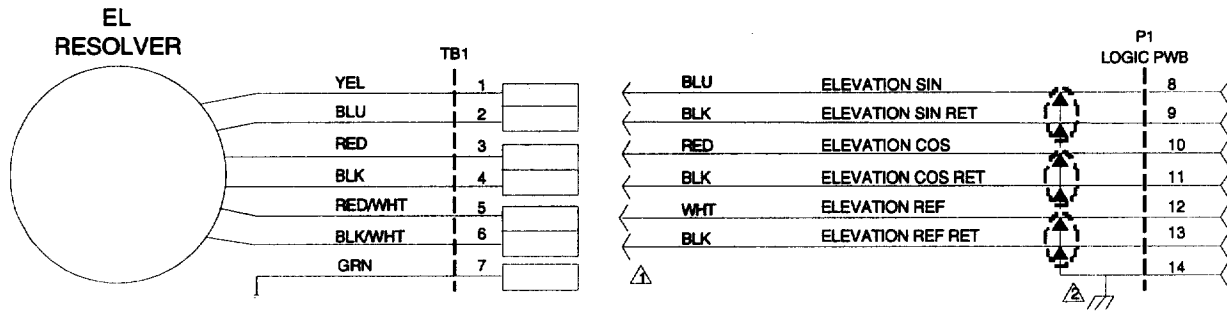
18. Remove three inches of shields and twist shields together with one end of a three inch green wire. Insulate exposed shields with large heatshrink tubing, and insulate twisted shields with small heatshrink tubing to prevent shorting.
19. Position cables as indicated in Figure 2-20.
20. Attach the other end of the three inch green wire to the nearest PWB mounting screw with a spade lug.

Elevation LSR Cable Installation

CAUTION

It is extremely important that the direction of motor rotation be verified as correct by observing physical motion of the antenna, NOT resolver position display. Since the controller is designed to allow backing out of a limit condition, backward motor operation will not be stopped by the limit switches. Also, if a backup power source is available, its phasing must be verified to be the same as the primary power source.

1. Acquire 6-pair cable assembly (items 5 in Figure 2-17).
2. Remove elevation LSR cover.
3. Remove three-inches of cable jacket and shielding. Cut the shields and drain wires off flush with the end of the cable jacket - they are not connected at the LSR end of the cable.
4. Ensure connector grommet is in place on cover.
5. Thread cable through the liquid tight connector until the cable jacket is extended 12-inches beyond inside of cover. Hand tighten connector.
6. Strip wires insulation to 3/8-inch long.
7. To connect elevation resolver, twist wires to ensure conductor contour and terminate on terminal block (TB1), matching color code, as indicated in Figure 2-23.



⚠ SHIELDS AND DRAIN WIRES ARE CUT OFF FLUSH AT LSR END OF CABLE-NOT CONNECTED TOGETHER. UNSHIELDED WIRES AT TB1 SHOULD BE KEPT AS SHORT AS POSSIBLE, APPROXIMATELY 2 TO 3 INCHES.

⚠ AT PWB END, REMOVE APPROXIMATELY 3 INCHES OF SHIELDS AND TWIST DRAIN WIRES TOGETHER WITH ONE END OF A 3 INCH GREEN WIRE. INSULATED EXPOSED SHIELDS WITH LARGE HEATSHRINK TUBING AND INSULATE TWISTED DRAIN WIRES WITH SMALL HEATSHRINK TUBING TO PREVENT SHORTING. ATTACH OTHER END OF 3 INCH GREEN WIRE TO NEAREST PWB MOUNTING SCREW WITH SPADE LUG.

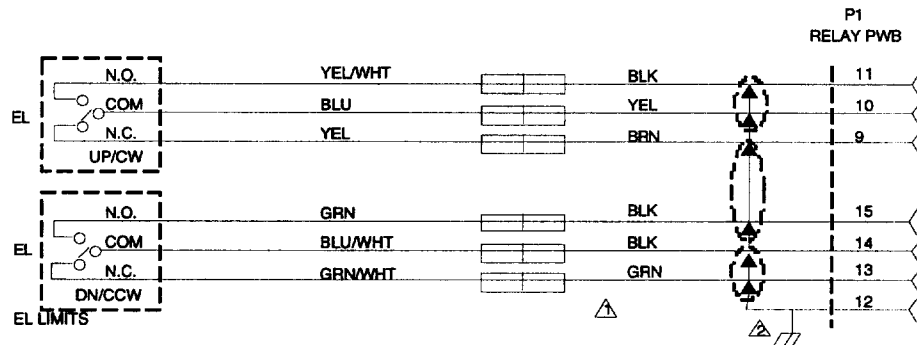
MAN 058-20A

Figure 2-23. Elevation Resolver Wiring, 456057

CAUTION

For each axis and direction, the limit switch wiring breaks the relay coil circuit. Shorting these terminals to ground via metal parts in the LSR, or via exposed shields, may cause unexpected axis motion which cannot be stopped by the limit switches. This motion may result in damage to the antenna or nearby structures. Extreme care must be taken to ensure that the limit switch connections and shields are properly insulated. If the butt splices are crimped incorrectly, the plastic sleeve may be cut through, exposing the metallic conductor. If this happens, the splices should be replaced. Also, the shields should be twisted, cut to a length of no more than 0.5 in (1.3 cm), and covered with tape or heat shrink tubing.

8. To connect limit switches, twist wires to ensure conductor contour and terminate to limit switch wires using butt splice (#179821) and matching color code as indicated in Figure 2-24.



⚠ SHIELDS AND DRAIN WIRES ARE CUT OFF FLUSH AT LSR END OF CABLE-NOT CONNECTED TOGETHER. UNSHIELDED WIRES AT TB1 SHOULD BE KEPT AS SHORT AS POSSIBLE, APPROXIMATELY 2 TO 3 INCHES.

⚠ AT PWB END, REMOVE APPROXIMATELY 3 INCHES OF SHIELDS AND TWIST DRAIN WIRES TOGETHER WITH ONE END OF A 3 INCH GREEN WIRE. INSULATE EXPOSED SHIELDS WITH LARGE HEATSHRINK TUBING AND INSULATE TWISTED DRAIN WIRES WITH SMALL HEATSHRINK TUBING TO PREVENT SHORTING. ATTACH OTHER END OF 3 INCH GREEN WIRE TO NEAREST PWB MOUNTING SCREW WITH SPADE LUG.

MAN 05B-21A

Figure 2-24. Elevation Limit Switch Wiring, 456057

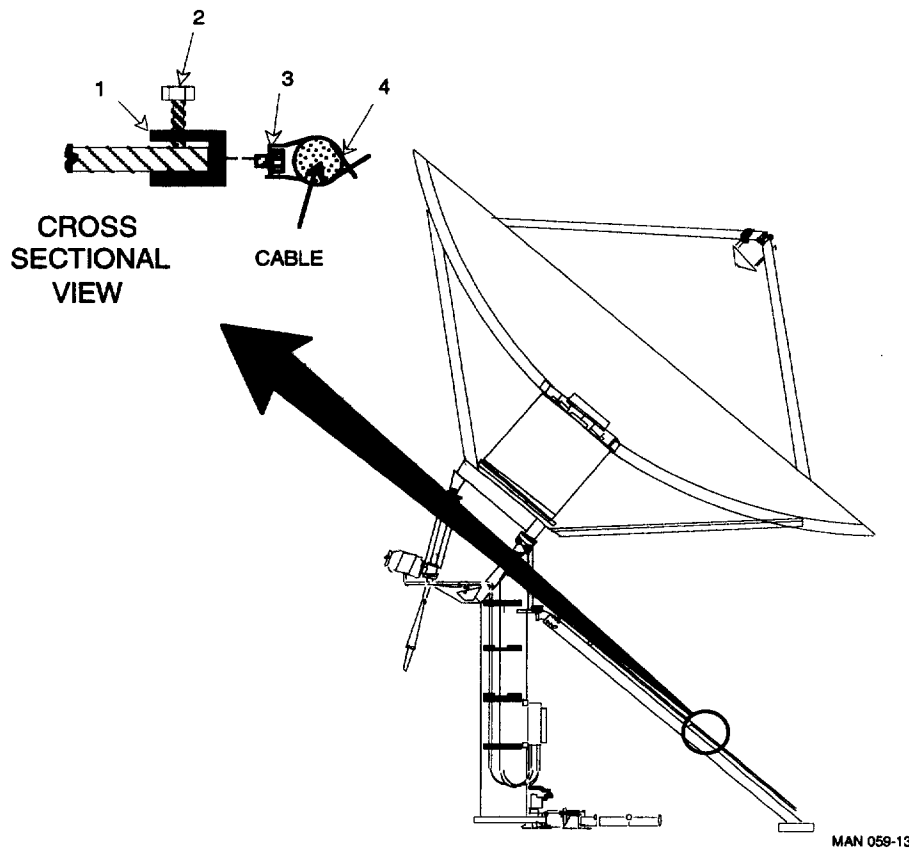
9. Remove one of the rubber plugs at lowest point from outside cover to promote condensation drainage.
10. Install cover on resolver. Cover will be removed later to calibrate the resolver.
11. Route cable down antenna leg and secure to azimuth motor cable using 8-inch cable ties.
12. Cut cable to proper length leaving enough wire length to route per Figure 2-20 and make connections inside controller.
13. Insert cable into bottom of antenna controller and secure as illustrated in Figure 2-11.
14. Strip 6-pair cable outer jacket and separate twisted wire pairs.
15. Route wire leads to correct connectors as illustrated in Figures 2-20.
16. Cut lengths of heat shrink tubing to cover wire pairs within 3 inches of connector plugs.
17. Connect wires in accordance with Figures 2-21 and 2-22 and Model 8861 Antenna Position Controller Technical Manual.

18. Remove three inches of shields and twist shields together with one end of a three inch green wire. Insulate exposed shields with large heatshrink tubing, and insulate twisted shields with small heatshrink tubing to prevent shorting.
19. Position cables as indicated in Figure 2-20.
20. Attach the other end of the three inch green wire to the nearest PWB mounting screw with a spade lug.

Control Cable Connections

To install the control cable between the antenna controller and indoor equipment, refer to Model 8861 Antenna Position Controller and the indoor equipment technical manuals for details on connecting the control cable. The technical drawings within these manuals will identify all of the internal connections. Secure the cable to the antenna in accordance with the following procedure.

1. Route cable up antenna leg.
2. Secure control cable to antenna leg using beam clamps and conduit cable clamp as illustrated in Figure 2-25.



- | | |
|----------------------|--|
| 1. BEAM CLAMP, 84738 | 3. 1/4 X 1/2-INCH PAN HEAD SCREW, 175796 |
| 2. BEAM CLAMP BOLT | 4. CABLE TIE, 282055 |

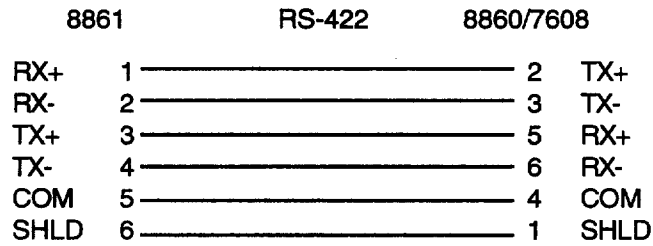
Figure 2-25. Securing Control Cable

3. Route control cable alongside feed cable and secure to feed cable using the 8-inch or 22-inch cable ties.
4. Cut wires to proper length leaving enough wire length to make connections inside controller.
5. Insert cables into bottom of antenna controller and secure as illustrated in Figure 2-11.
6. Connect wires in accordance with Figure 2-26 and Model 8861 Antenna Controller Technical Manual.

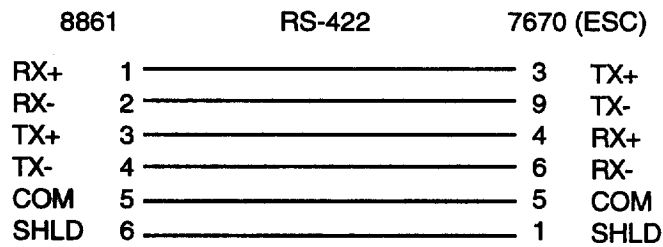
WARNING

Electrical shock from voltages used in this system can cause injury or death. Prior to making any electrical connections, ensure power is removed. Electrical connections should be made only by qualified personnel in accordance with local regulation.

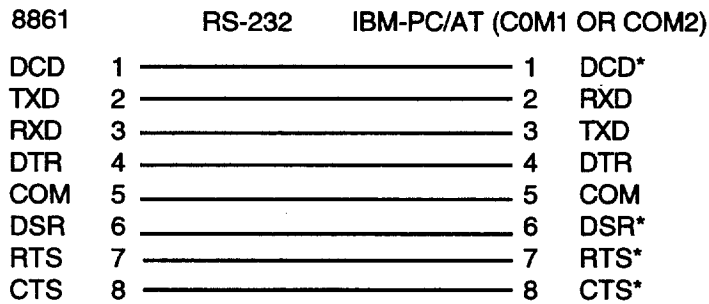
INSTALLATION PROCEDURES



MAN 057-23



MAN 057-24



* CONNECTION NOT REQUIRED

MAN 057-25

Figure 2-26. Remote Serial Cable Connections

Power Connections

For ac power versions of Model 8861, refer to Figure 2-27 for details on connecting power. For dc power versions of Model 8861, refer to Figure 2-28 and Model 8861 Antenna Position Controller Technical Manual for details on connecting power. The technical drawings within the antenna position controller manual will identify all of the internal power connections. Secure the cable using the 8-inch or 22-inch cable ties.

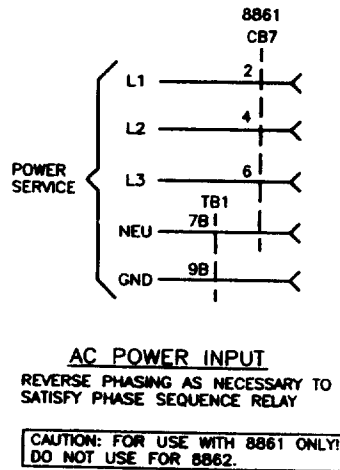


Figure 2-27. AC Power Connections, 483496

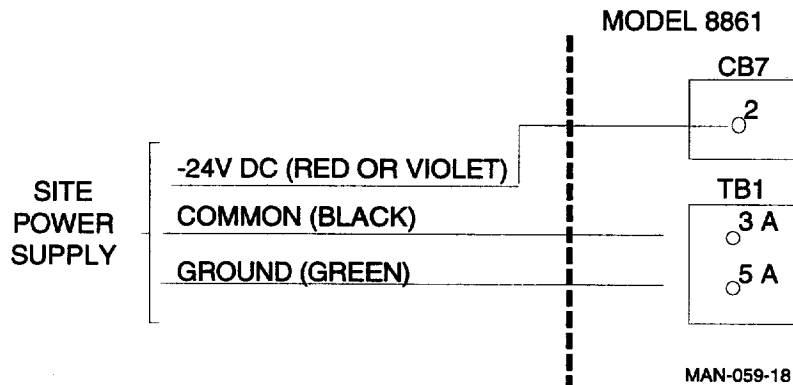


Figure 2-28. -24V DC Power Connections



SECTION 3 ALIGNMENTS AND ADJUSTMENTS

- 3-1 General**
- 3-1 Initial Power-up**
- 3-3 Thermal Overload Relay Adjustment and Test Procedure**
- 3-4 Limit Switch Test Procedure**
- 3-5 Axis Direction Check**
- 3-6 Elevation Limit Switch Adjustments**
- 3-8 Azimuth Limit Switch Adjustments**
- 3-10 Polarization Limit Switch Adjustments**



SECTION 3 ALIGNMENTS AND ADJUSTMENTS

GENERAL The procedures in this section are intended to verify that the 8861 controller, limit switches, motors, and overload relays are wired and adjusted correctly. While performing these procedures, certain fault conditions may occur which cannot be clearly indicated by the front panel LEDs. It is highly recommended that the installer connect the calibration computer at this time, so that the calibration program may be used for assistance during system startup. Refer to the Calibration Software Manual, 42S097 for additional information.

WARNING

Electrical shock from voltages used in this system can cause injury or death. Use extreme care when making any electrical connections while performing calibration procedures. Electrical connections should be made only by qualified personnel in accordance with local regulation.

CAUTION

Failure to perform the procedures in this section in the following order may result in damage to the 8861 or antenna actuators.

INITIAL POWER-UP Perform the following procedure the first time power is applied to the 8861.

1. With the main circuit breaker CB7 off, verify that the jumper plugs CP1-CP4 on the relay/power supply subassembly have been placed in the correct position:

115V ac for 208/230V (line-to-line) systems

220V ac for 380/415V (line-to-line) systems.

2. At the input terminals to CB7, verify that the voltage is correct from each phase to neutral. Also verify that voltage is correct from each phase to ground (earth). Correct the power service as required.

3. Set the main circuit breaker CB7 on. The 8861 should power-up and perform an LED test sequence. The LED labeled DS9, on the component side of the logic subassembly, should begin blinking, indicating that the microcontroller is operating.
4. Connect the computer to be used for calibration (laptop or S-A Earth Station Controller) to either the RS-232 port or the RS-422 port. If an 8860 is installed in the system, the computer may be connected to the 8860 and the 8860 placed in pass-through mode.
5. The calibration program may now be started. Refer to the Calibration Software Manual, 42S097 for detailed software installation and operating instructions. In particular, if a motorized feed is installed on the antenna, the feed type must be selected before the following tests are performed.

**THERMAL
OVERLOAD RELAY
ADJUSTMENT AND
TEST PROCEDURE**

Perform the following procedure to adjust and test the thermal overload relay. Adjust the current rating on each overload relay to match the full-load current on the respective motor name plate. If the motor is rated for more than one voltage, use the current rating corresponding most closely to the site supply voltage. Some 380V or 415V, 50 Hz antennas are actually supplied with 460V, 60 Hz motors. In these cases, 110% of the 460V rating is used. Some three-phase motors are 208V only and are supplied by a transformer mounted in the antenna hub. In these cases, use approximately 60% of the 208V current value. Some antenna configurations use single-phase feed motors which are protected by a non-adjustable circuit breaker.

1. Apply power to the 8861 and verify that none of the overload relays are indicating a fault condition on the front panel LEDs. If a fault is detected perform the following.
 - a. Reset the fault.
 - b. Check wiring to terminals 97 and 98 on the overload relay.
2. Push in RESET button and turn it to MAN position.
3. With power removed from the 8861, test each overload relay by pressing in the TEST button with a very small screwdriver or wire lead.
4. With power reapplied to the 8861, each axis should indicate overload faults after a maximum of one minute. If not, recheck the overload wiring.
5. With power removed from the 8861, push in the RESET button and turn it to the AUTO position.
6. If repeated overload tripping occurs, check to make sure that the actuator is properly lubricated, and that it is not binding. Under some conditions, such as high ambient temperatures, or repeated jogging of the axis, it may be necessary to increase the overload setting slightly; however, it should not exceed 115% of the full-load motor current.

**LIMIT SWITCH
TEST PROCEDURE**

Perform the following procedure to test the limit switch wiring. **The antenna motors should not be operated until this procedure has been performed for each axis.**

1. Apply power to the 8861 and wait for the power-on LED test to complete.
2. Connect the computer and start the calibration program.
3. Wait another 30 seconds. If no faults are indicated, proceed to step 4. If the FAULT LED and an axis up or down LED are blinking fast, this indicates that the respective up or down limit switch is wired incorrectly for that axis. If both the up and down LEDs are blinking fast, this may indicate that both limit switches are faulted, or that the thermal overload relay is tripped. The overload relays should have been checked in the previous section.
4. Correct the wiring as needed, and reset the fault by pressing all four axis switches down with the LOCAL/REMOTE switch in the REMOTE position. The fault may also be cleared from the calibration program.
5. Press and hold the azimuth up (increasing azimuth angle) limit switch for at least 30 seconds. While the switch is pressed, verify that the azimuth up LED blinks slowly, with no fault indication. If a fault is indicated, correct the wiring as needed, reset the fault, and repeat the test.
6. Repeat step 4 for the azimuth down (decreasing azimuth angle) limit switch.
7. Repeat steps 4 and 5 for the elevation limit switches and for each installed polarization axis. Note that the feed type must have been selected using the calibration program before this test will work correctly.

**AXIS DIRECTION
CHECK**

Perform the following procedure to verify that motor rotates in the correct direction.

1. Apply power to the 8861.
2. If the 8861 is equipped with V2.2 or later firmware, place the unit in maintenance mode by holding the two feed switches in the UP position for at least five seconds, with the LOCAL/REMOTE switch in the REMOTE position. While in this mode, if no fault conditions are active, the FAULT Indicator will flash briefly every 8-10 seconds. This mode will be cleared upon loss of power to the 8861. This mode may also be entered or exited from the calibration software.
3. Jog the azimuth axis in the up direction and observe physical motion of the mount. Note that the up direction corresponds to increasing compass angle, or clockwise rotation, viewed from above the mount. If the direction is incorrect, reverse the phasing by swapping the brown and orange wires leading to the motor. Repeat the test in the opposite direction.
4. Repeat step 3 for the elevation motor and for each installed polarization axis. Note that the feed type must have been selected using the calibration program before this test will work correctly. For the feeds, the up direction corresponds to clockwise rotation as viewed from the LNA side of the feed.
5. If a standby power source, such as a generator is used, repeat the above steps using it instead of primary power. If the motors rotate in the wrong direction, the standby source phasing must be changed so that it matches that of the primary source.

**ELEVATION LIMIT
SWITCH
ADJUSTMENTS**

Perform the following procedure to adjust the elevation limit switches.

CAUTION

The following procedure requires moving the antenna dish. Always check for tools or other obstructions before moving the antenna dish. A step ladder or truck parked in the wrong place can cause expensive damage to the dish and to the item.

1. Remove elevation LSR assembly cover.
2. Ensure LSR limit switch post and switch positions are set to the positions shown in Figure 3-1. If not, loosen flex coupling and adjust as necessary.
3. Ensure flex coupling has no distortion and flex coupling connecting LSR assembly to antenna drive is tight.
4. Apply power to Model 8861.
5. Place ELEVATION jog switch to the UP position and ensure motor drives antenna in the up direction.

CAUTION

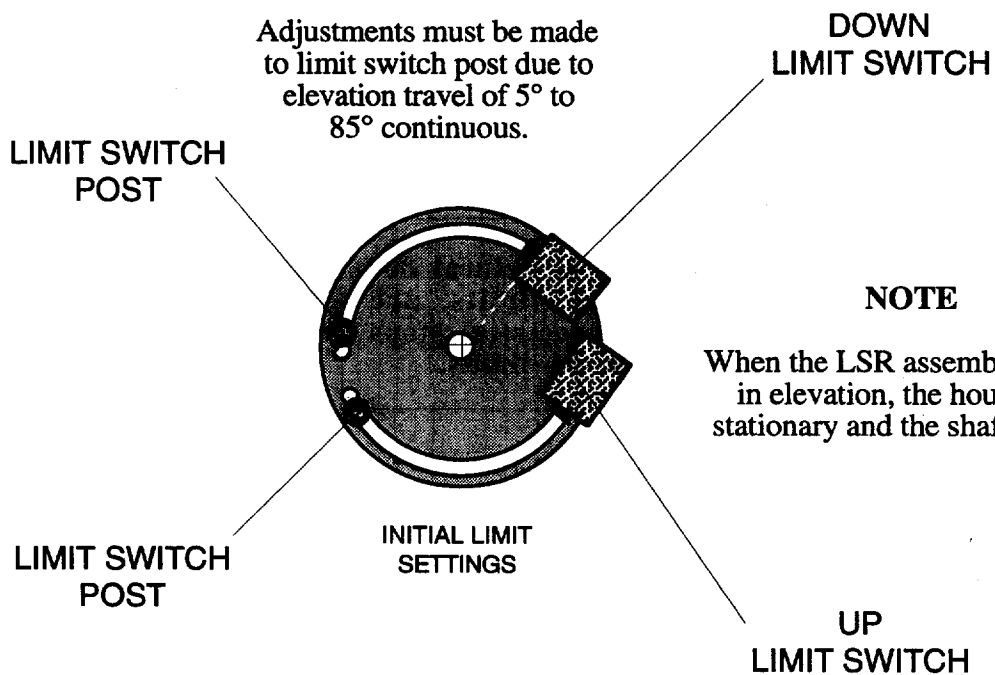
Antenna structural damage may occur if the electrical limits are not set properly. The pin-to-pin length refers to actuator travel from the fully retracted to the fully extended positions. Actual antenna travel may be less than this due to antenna structure limitations. Ensure electrical stops are set prior to any mechanical limits.

6. Drive the antenna elevation axis to the lowest desired angle (near zero degrees) but prior to the mechanical limit.
7. Set down limit switch post against the limit switch bracket so that limit switch engages (see Figure 3-1). It may be necessary to drive antenna down slightly to set arm then drive antenna back to ensure switch engages at desired angle.
8. Tighten down limit switch post.
9. Ensure up limit switch post is loose.

10. Drive antenna elevation axis to the 90° (vertical) position just prior to the mechanical limit. Do not go past the 90° elevation position (pin-to-pin length must stay greater than 17.0-inches).
11. Set up limit switch arm against the elevation pivot bracket so that limit switch engages at this point (see Figure 3-2). It may be necessary to drive antenna down slightly to set arm then drive antenna back to ensure switch engages at desired angle.
12. Tighten up limit switch post.
13. Install elevation LSR assembly cover.

NOTE

Adjustments must be made to limit switch post due to elevation travel of 5° to 85° continuous.



NOTE

When the LSR assembly is used in elevation, the housing is stationary and the shaft rotates.

MAN 057-17

Figure 3-1. Elevation Limit Switch Identification

**AZIMUTH LIMIT
SWITCH
ADJUSTMENTS**

Perform the following procedure to the azimuth limit switches.

1. Remove azimuth LSR assembly cover.
2. Ensure LSR limit switch post and switch positions are set to the positions shown in Figure 3-2. If not, loosen flex coupling and adjust as necessary.
3. Ensure flex coupling has no distortion and flex coupling connecting LSR assembly to antenna drive is tight.

NOTE

Azimuth travel is typically ± 55 degrees from nominal for 110° antenna and ± 90 degrees of travel for 180° antenna.

4. Place AZIMUTH jog switch to the UP position and ensure motor drives antenna in the increasing direction (antenna moving to right when viewed from behind antenna).

CAUTION

Antenna structural damage may occur if the electrical limits are not set properly. Ensure electrical stops are set prior to any mechanical limits.

5. Drive the antenna azimuth axis to the clockwise (CW) desired angle but prior to the mechanical limit.
6. Set CW limit switch post (see Figure 3-2) so that limit switch engages at this point. It may be necessary to drive antenna counterclockwise (CCW) direction slightly to set post then drive antenna back to ensure switch engages at desired angle.
7. Tighten down limit switch post.
8. Ensure up limit switch post is loose.
9. Drive the azimuth actuator toward the center of travel. The center of travel will occur when the four trunnion shafts are aligned vertically. Identify this zero reference.
10. Rotate the mount clockwise or counterclockwise to the desired azimuth angle. Do not rotate the mount in excess of 90 degrees from the zero reference. Use compass or similar measuring device to determine the azimuth angle.

11. Set the limit switch so that limit switch engages at this point. It may be necessary to drive antenna in the opposite direction slightly to set post then drive antenna back to ensure switch engages at desired angle.
12. Tighten down CCW limit switch post.
13. Install azimuth LSR assembly cover.

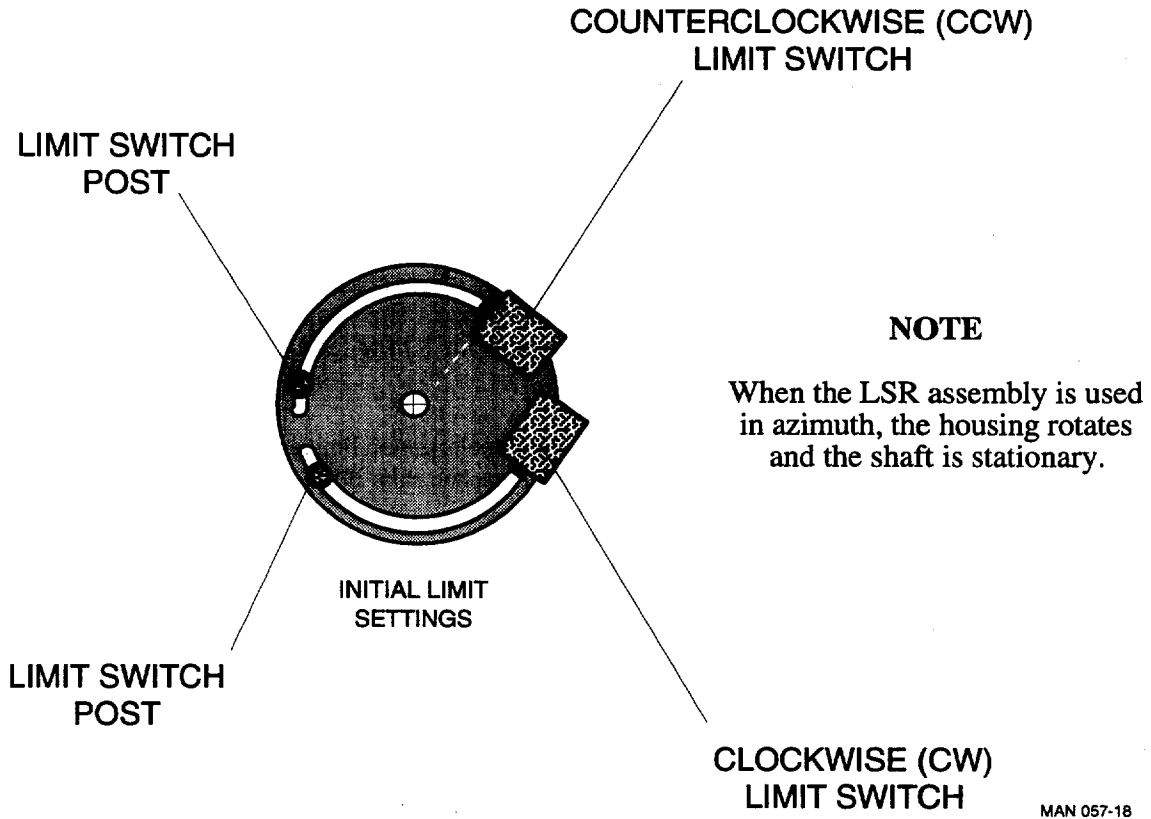


Figure 3-2. Azimuth Limit Switch Identification

**POLARIZATION
LIMIT SWITCH
ADJUSTMENTS**

Prior to performing the following procedure, connect a computer to antenna position controller, initialize calibration program and perform Select Feed Type calibration task using Section 2 and 3 of the calibration software manual #42S097. (This is required to initialize the antenna position controller to the proper feed configuration for the specific antenna before the feed motors can be driven.) Then, perform the following procedure to check motor drive direction and verify adjustment of the polarization limit switches.

1. Place FEED 1 jog switch to the UP position and ensure motor drives feed in the increasing direction (feed moving clockwise when viewed from LNA side of feed).

NOTE

If the feed motor drives in the wrong direction, reverse the positions of the orange and yellow wires on TB1 pin 9 and pin 10 for feed 1 (see Section 2 for wiring diagram).

2. Inside hub, verify polarization limit switches will make contact with the limit switch bracket, shim if necessary.

APPENDIX A

**ANTENNA ELECTRICAL INSTALLATION
CHECKLIST**



ANTENNA ELECTRICAL INSTALLATION CHECKLIST

INCOMING POWER TO MODEL 8862/8864 (variable speed systems only)

CHECK

Phase sequence correct for normal power source _____

Phase sequence correct for standby power source (If Applicable) _____

AZIMUTH AND ELEVATION MOTORS

CHECK CHECK

AZ EL

Connections tight and insulated _____

Motor frame grounded _____

Brake wiring (if applicable, Model 8862 only) _____

Brake operation (if applicable) _____

Motor physical rotation check - normal power _____

Motor physical rotation check - standby power (if applicable, Model 8861 only) _____

Actuator operates freely without binding _____

Brake heater wiring (if applicable) _____

Thermal overload adjusted to match nameplate _____

AZIMUTH AND ELEVATION LSR PACKAGES

CHECK CHECK

AZ EL

Limit switches tested for correct wiring and direction _____

Couplings tight, not binding _____

Limit switches adjusted for correct travel _____

LSR connections tight and insulated _____

Shields connected and insulated on enclosure end _____

AZIMUTH AND ELEVATION SECONDARY LIMITS (Model 8864 only)

CHECK CHECK

AZ EL

Connections tight and insulated _____

Secondary limits tested for correct wiring and direction _____

Secondary limits adjusted for correct travel _____

ANTENNA ELECTRICAL INSTALLATION CHECKLIST - continued

FEED 1 AND FEED 2 MOTORS (if applicable)

	<u>CHECK</u>	<u>CHECK</u>
	E1	E2
Chain tight, not binding	_____	_____
Motor connections tight and insulated	_____	_____
Motor frame grounded	_____	_____
Feed/motor physical rotation check	_____	_____
Thermal overload adjusted to match nameplate	_____	_____

FEED 1 AND FEED 2 POTENTIOMETER AND LIMIT SWITCHES

	<u>CHECK</u>	<u>CHECK</u>
	E1	E2
Connections tight and insulated	_____	_____
Limit switches tested for correct wiring and direction	_____	_____
Sprocket tight, pot travel correct	_____	_____
Shields connected and insulated on enclosure end	_____	_____

EMERGENCY STOP SWITCHES (if applicable)

	<u>CHECK</u>
Emergency stop switch connections tight and insulated	_____
Emergency stop switch operation	_____
Jog box connections tight and insulated	_____
Jog box operation - move all axes	_____
Jog box operation - emergency stop and fault reset	_____

RF INHIBIT SWITCHES (if applicable)

	<u>CHECK</u>
Elevation RF inhibit switch connections tight and insulated	_____
Elevation RF inhibit switch adjustment and operation	_____
Jog box RF inhibit switch connections tight and insulated	_____
Jog box RF inhibit switch operation	_____

ANTENNA ELECTRICAL INSTALLATION CHECKLIST - continued

CALIBRATION SOFTWARE (refer to manual #42S097)

	<u>CHECK</u>	<u>CHECK</u>
Connections of calibration computer to Model 8861/8862/8864, software startup, and entry of requested information		_____
Set alternate direction flags as required		_____
Adjust checkpoint parameters as required		_____
Azimuth and elevation static calibration (peak up and set look angle)		_____
Feed 1 static calibration (if applicable)		_____
Feed 2 static calibration (if applicable)		_____
Find limit positions	AZ_____	EL_____
	F1_____	F2_____
Dynamic calibration	AZ_____	EL_____
Save Model 8861/8862/8864 setup to disk file		_____
Peak up on desired satellites and mark for saving		_____
Save satellite file to disk		_____

MODEL 8860 INSTALLATION AND SETUP (refer to manuals #42S053 and #42S152)

	<u>CHECK</u>
Cable connected from Model 8860 to Model 8861/8862/8864 and communication established	_____
Cable connected to earth station controller and communication established (if applicable)	_____
Entry of time and site specific parameters	_____
Beacon receiver RF signal level checked	_____
Beacon receiver set up and checked for constant output	_____
Model 8860 beacon range set and level checked on Model 8860 display	_____
Positioning repeatability test	_____
Entry of sweep size and other tracking parameters	_____
Sample peaking cycle	_____
Selection of inclined satellite to be tracked one tracking started	_____
Initial 24 hour tracking period completed	_____

8861/62/64 FIRMWARE VERSION _____

8860 FIRMWARE VERSION _____

SITE COORDINATES Latitude _____ Longitude _____

INSTALLATION COMPLETED BY _____ **DATE** _____

