

SECTION 9B

POWER ANTENNA

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GENERAL DESCRIPTION

The "Slimline Mini-Mast" type antenna is similar in design to previous models both in physical appearance and internal construction except that the mast is 23mm dia. instead of 29mm dia.

As shown in Figure 9B-1, a plastic housing consisting of two halves is attached to the mast and tube assembly. The housing contains the permanent magnet motor parts, limit switch assembly, drive gear and drive cable storage spool. Sealer is used between the two housing halves to prevent water entry and they are held together with 5 snap-on clips and 4 eyelets.

The motor armature is protected by an automatic reset type circuit breaker which is located on the limit switch assembly.

OPERATION

Raising and Lowering Mast

As with past model designs, the mast sections are extended and retracted by a plastic drive cable attached to the top section of the mast. The other end of drive cable is attached directly to the drive gear by means of a metal hook (Figure 9B-2).

Automatic shut off, when the mast reaches the full up or down position, is accomplished by the thrust of the armature tripping a reaction switch assembly.

The reaction switch assembly (Figure 9-2) consists of two snap action type switches. One shuts off the motor when the antenna is full up -- the other when the antenna is down. Direction of armature thrust depends on armature rotation (CW of CCW).

To understand how armature thrust actuates the reaction switches, think of the armature worm as threads on a bolt. Next, think of the drive gear teeth as threads on a nut that is held in a fixed position (i.e., when the mast reaches the full up or down positions and the gear stops turning).

The continuing rotation of the armature when the gear stops turning causes the armature worm to act like a bolt being screwed in or out of a nut held in a fixed position. This causes the armature to move fore or aft depending on rotation.

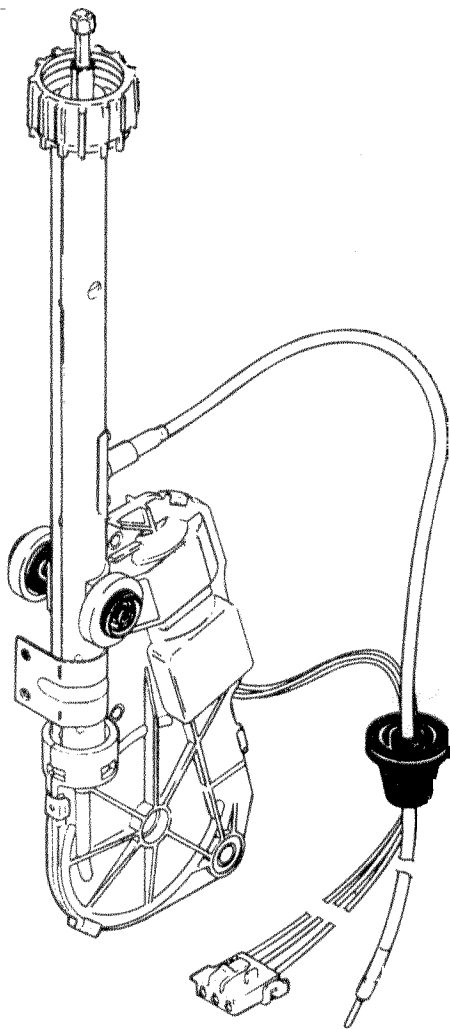


Figure 9B-1

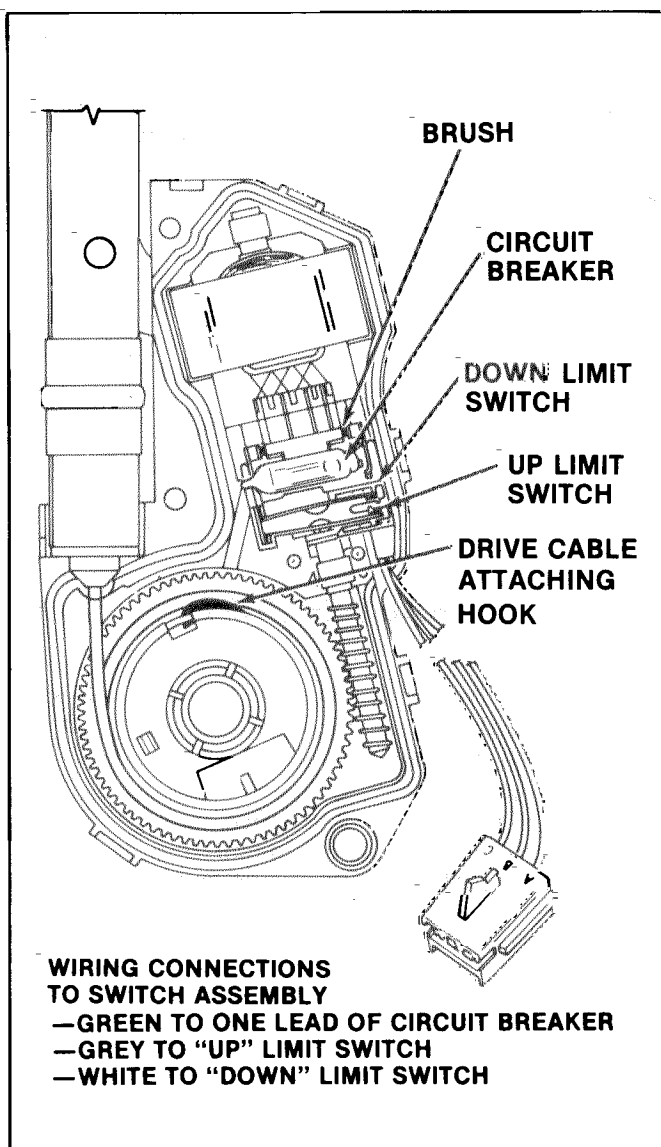


Figure 9B-2

The mechanism which permits the armature to thrust back and forth when the antenna mast reaches full extension or retraction is constructed as follows:

A spring loaded thrust mechanism consisting of two blocks and a load spring is assembled on the armature shaft. The mechanism is held in a fixed location on the shaft by two retainers (Figure 9B-3).

When the armature assembly is installed in the housing, the thrust mechanism fits into a cavity in the housing (Figure 9B-4). The spring load between the two thrust blocks prevents the armature from thrusting fore or aft until the drive gear stops turning.

As explained previously, when the mast reaches the full up or down position and the gear stops turning, the continuing rotation of the armature causes it to move fore or aft depending on rotation. As it moves fore or aft, it moves one of the thrust blocks toward the other compressing the load spring. After the thrust block has been moved a pre-determined distance, it triggers a limit switch to open the motor circuit. Refer to Figure 9B-2 to identify which thrust block and limit switch controls motor shut off when the mast reaches the up or down positions.

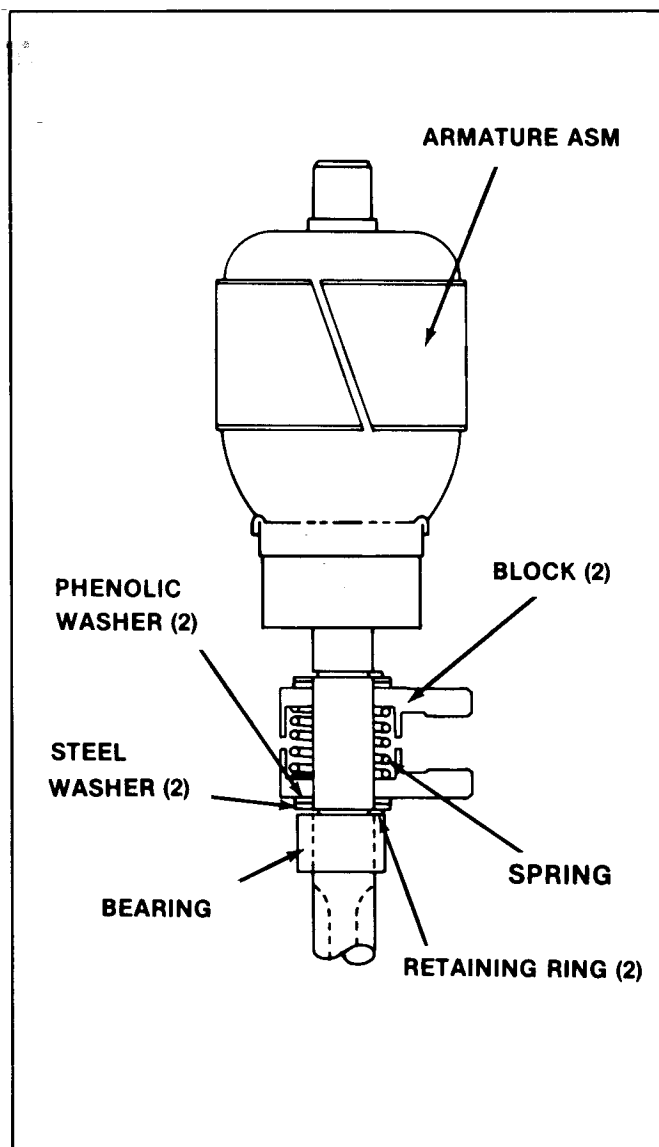


Figure 9B-3

All "Slimline" type of antennas are automatic type.

WIRING CIRCUITS

With the ignition switch "ON" and the radio turned "ON", the antenna motor automatically raises the mast to the full up position.

- AM-FM -- 31-1/4"

Turning the radio or ignition switch off automatically causes the antenna motor to lower the mast to full down position. Refer to Figures 9B-5 and 9B-6 for circuit diagrams.

UNIT REPAIR

NOTICE: All service procedures shown require opening the motor and gear housing.

HOUSING AND COVER DISASSEMBLY

1. Remove the four(4) eyelets (Figure 9B-7). Bolts and nuts are provided in the various service packages for reassembling the housing and cover.
2. Remove the five(5) retaining clips.

NOTICE
SWITCH ASSY REMOVED
TO SHOW THRUST BLOCK
CAVITY

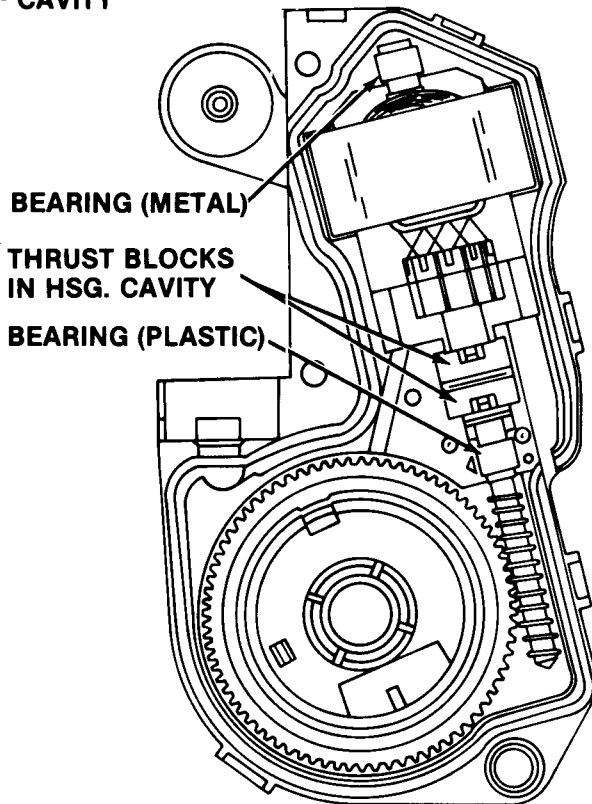


Figure 9B-4

3. Using a small screwdriver, carefully wedge the cover off the housing. Special slot locations have been molded in the housing behind the clips.
4. Clean off any excess and/or loose sealer from the cover and housing.

MAST AND TUBE ASSEMBLY

Removal

1. Follow Steps 1 thru 4 under housing disassembly.
2. Separate mast and tube assembly from gear housing and unwind cable from gear spool as required to gain access to attaching hook.
3. Unhook end of cable from gear (Figure 9B-8).

Installation

1. Extend replacement mast as required until approximately 10 inches (250mm) of cable is left exposed.
2. Hook end of cable in gear and route cable in spool as shown in Figure 9B-8.
3. Position the mast and tube assembly on the housing so that the rubber drain pipe fits into the housing hole and the mounting ears are located in the housing slots (Figure 9B-8).
4. Push excess drive cable into the tube assembly as required to maintain the cable in the gear spool.
5. Position cover on gear and motor housing and install the 2 nuts and bolts that attach the mast and tube assembly to housing. Next, install the other two bolts and nuts and the five retainer clips.

NOTICE: For isolation mount unit, re-install grommets in housing.

6. Check antenna operation. Refer to figure in Step 1 under Diagnosis procedure for "In-operative Antenna".
7. Apply sealer (GE-162 or equivalent) around the entire edge of the housing and cover; also the area where the tube fits into the plastic housing.

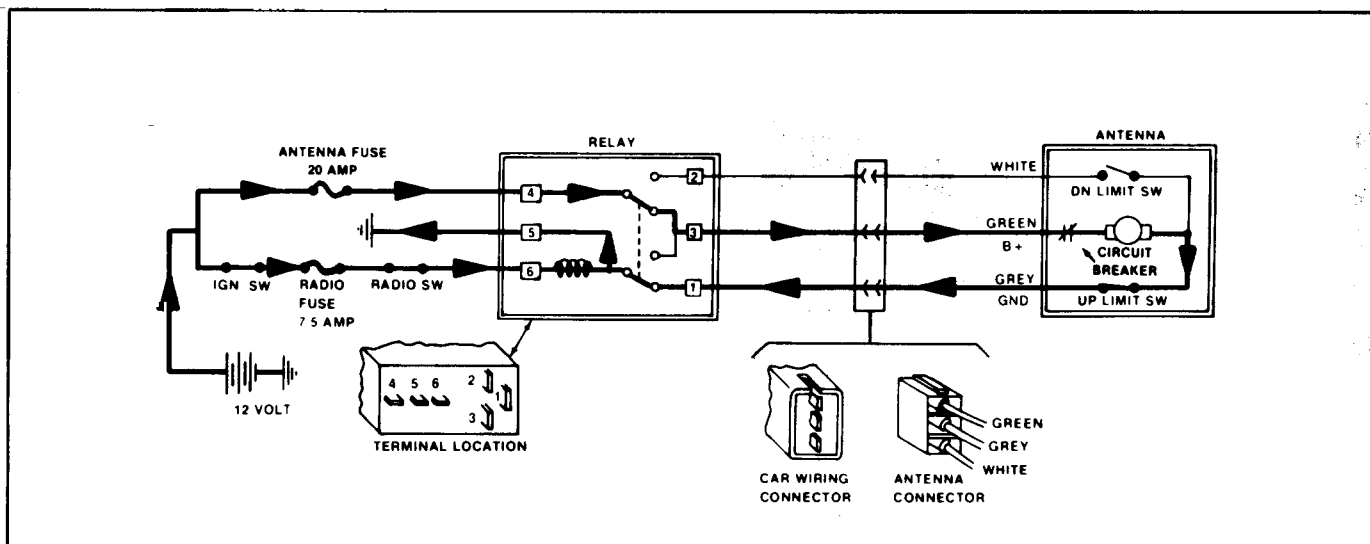


Figure 9B-5 Typical Wiring - Extend

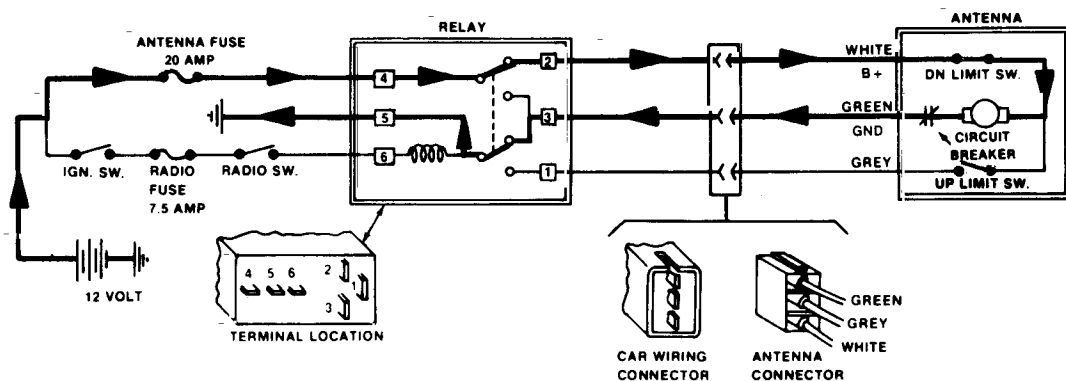


Figure 9B-6 Typical Wiring - Retract

LIMIT SWITCH ASSEMBLY

(Includes Motor Brushes, Circuit Breaker and Leads)

Removal and Installation

1. Follow Steps 1 thru 4 under "Housing and Cover Disassembly".
2. Remove excess sealer in area where leads extend out of housing and lift the switch assembly out of housing (Figure 9B-9).
3. Install replacement switch assembly in housing.
4. Follow Steps 3 thru 7 under "Installation of Mast and Tube Assembly". **NOTICE:** Extend mast as required so that plastic drive cable will not interfere with reassembly of cover on housing.
5. Reseal area where leads extend out of housing.

ARMATURE, FIELD ASSEMBLY

Removal and Installation

1. Follow Steps 1 thru 4 under "Housing and Cover Disassembly".
2. Remove limit switch assembly.
3. To remove armature and field together, pull out at the field end (Figure 9B-9).
4. Replace armature and/or field as required and reassembled in housing.
5. Reinstall switch assembly.
6. Follow Steps 3 thru 7 under "Installation of Mast and Tube Assembly".

GEAR ASSEMBLY

NOTICE: It is not necessary to remove switch assembly and armature or field assembly to remove gear.

Removal and Installation

1. Follow Steps 1 thru 4 under "Housing Disassembly".
2. Follow Steps 2 and 3 under "Mast and Tube" removal.
3. Slide gear off housing post. It may be necessary to grasp hub of gear with a pair of pliers (Figure 9B-9).
4. Install replacement gear and follow Steps 1 thru 7 under "Mast and Tube Installation".

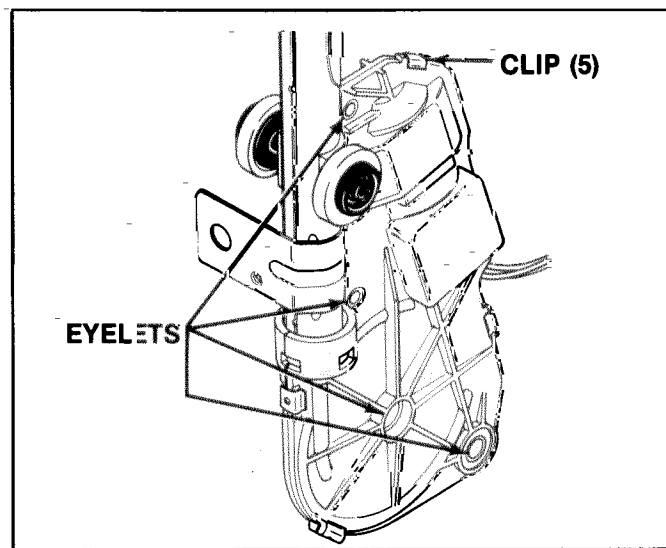


Figure 9B-7

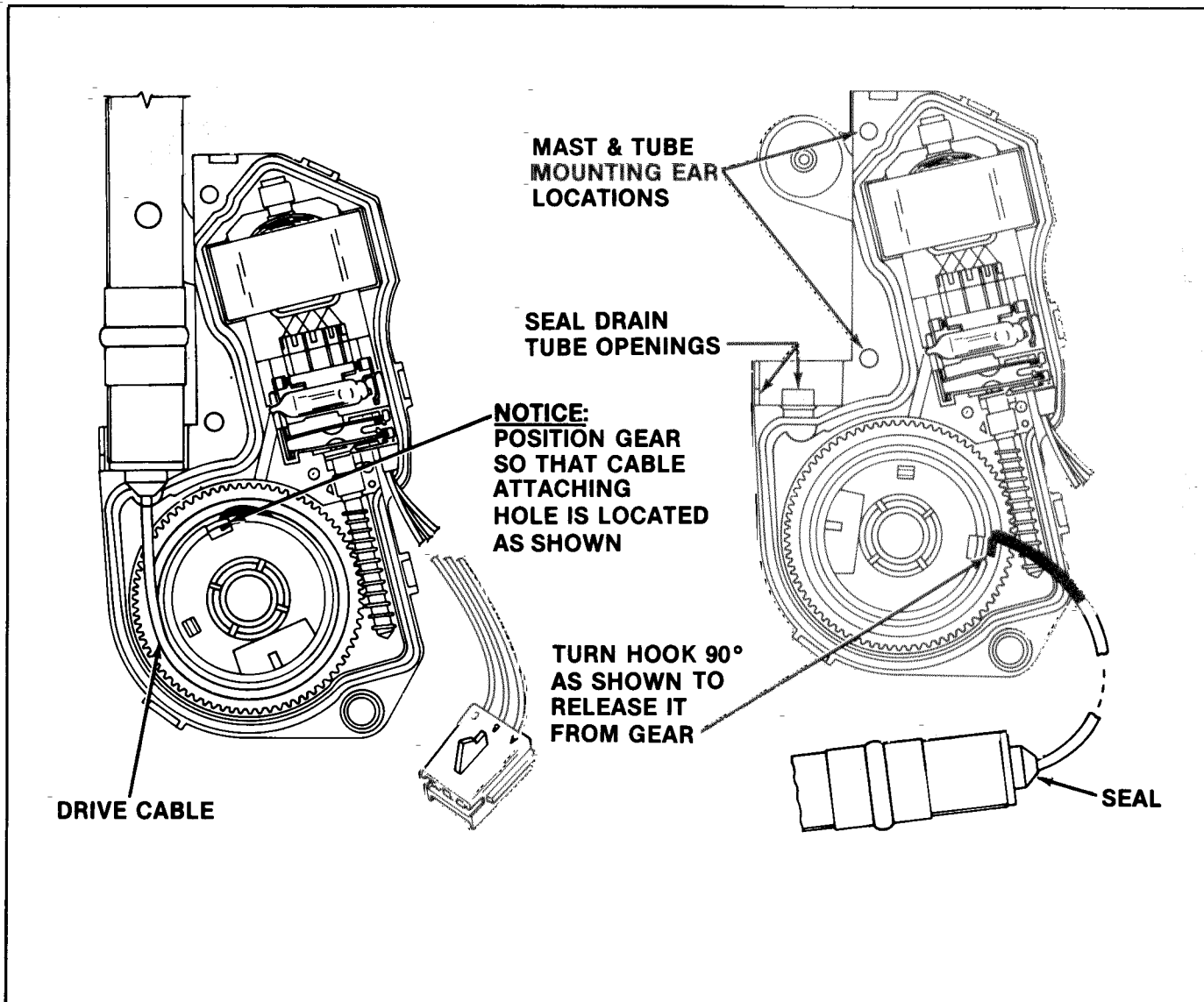
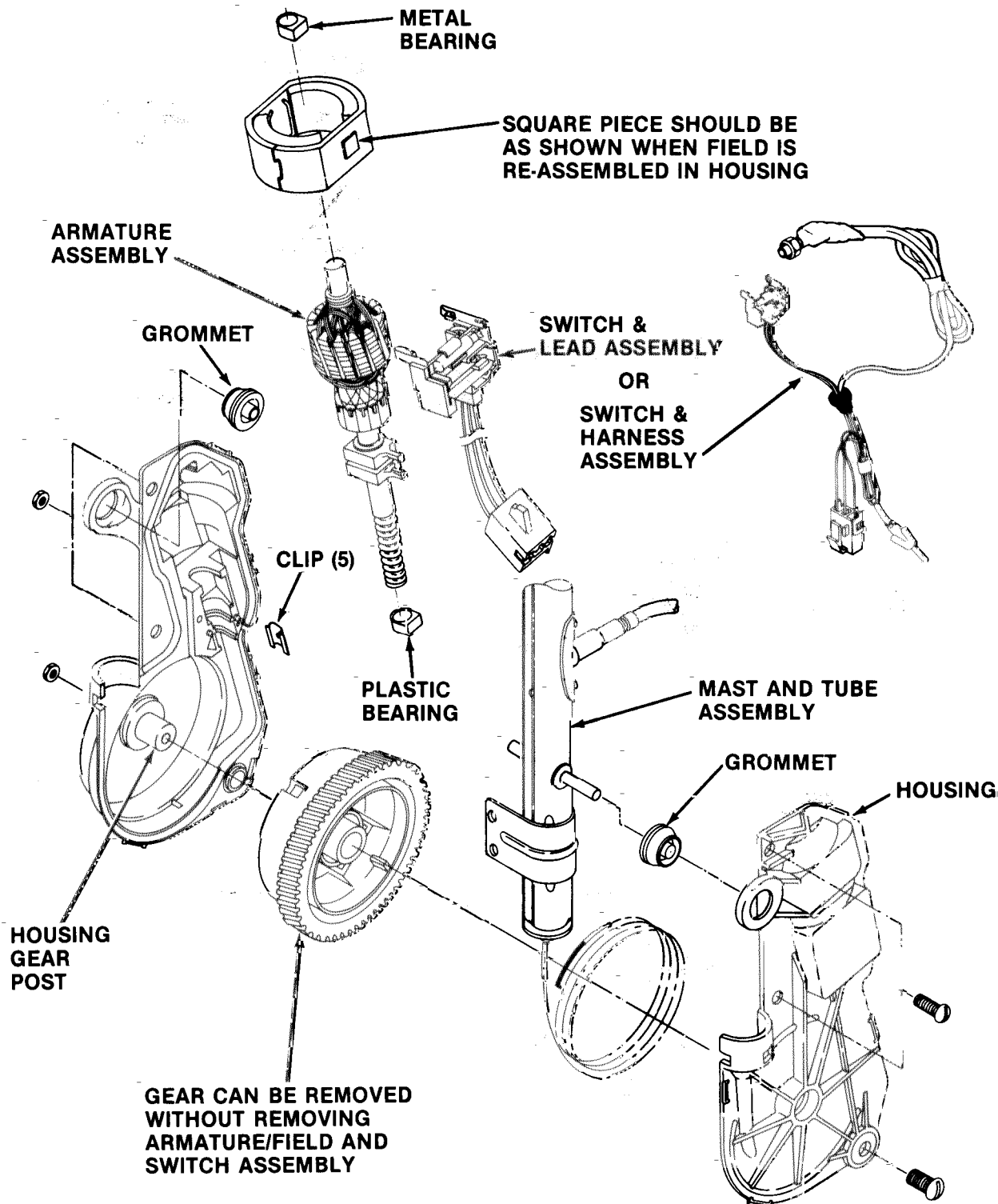


Figure 9B-8



**LUBRICATION: GREASE — PRESTIGE #22
 BY SUN OIL CO. OR EQUIVALENT**
 —GEAR TEETH
 —BOTTOM SURFACE OF GEAR
 —HOUSING GEAR POST

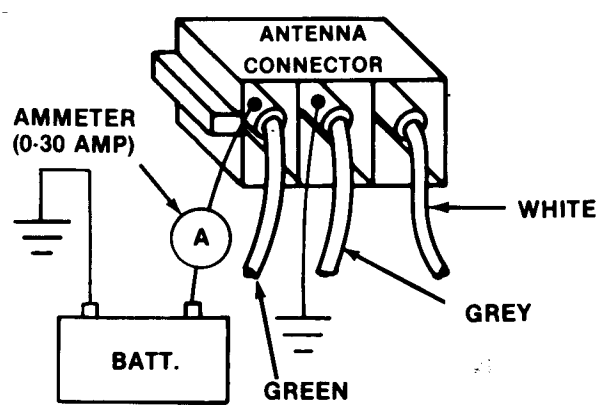
Figure 9B-9

DIAGNOSIS PROCEDURES

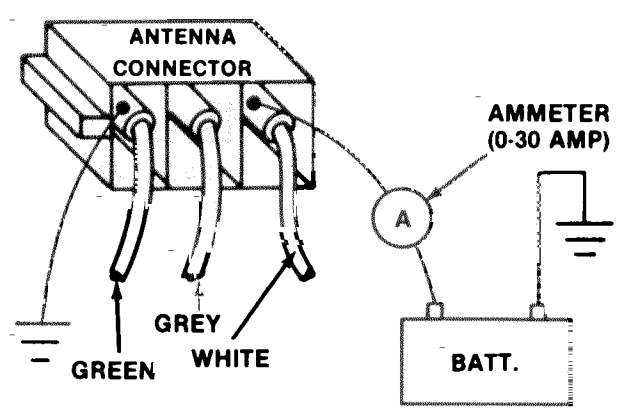
ANTENNA INOPERATIVE

STEP 1 Try operating antenna independently of car wiring as shown and observe current draw.

EXTEND-UP CYCLE



RETRACT-DOWN CYCLE



CURRENT DRAW SPEC. @ 12.0 VDC
AMPS

- (1) MAST EXTENDING OR RETRACTING 3.0
- (2) STALL CURRENT 10.5 (COLD) MAX.

ANTENNA INOP

ANTENNA RUNS BUT CURRENT DRAW EXCESSIVE

ANTENNA OK

Repair or replace antenna as req'd.

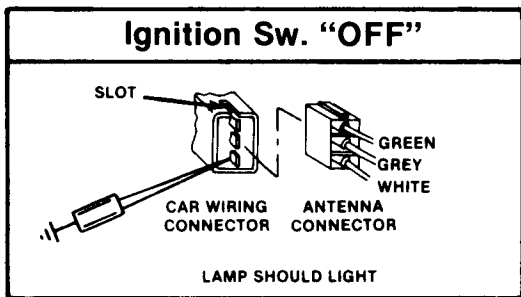
NOTICE: If current draw is excessive, be sure to check antenna fuse when repaired antenna is installed.

Go To STEP 2

ANTENNA INOPERATIVE (CONT.)

STEP 2

Disconnect car wiring from antenna and connect test light to car wiring connector as shown below:



OFF

ON

Check Antenna Fuse

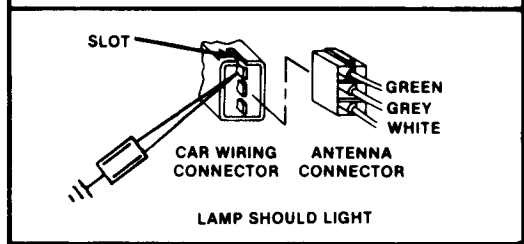
BLOWN

OK

Replace fuse and recheck system. If fuse blows again, problem is in wiring or relay.

Check relay per STEP 4 Tests "A" and "B"

Ign. Sw. "ON". Radio Sw. "ON"



ON

OFF

Check wiring connections at relay. If they appear OK problem is in relay.

Go To STEP 3

STEP 3

With ignition switch on, turn radio switch "off" and "on" and listen for relay "click" (wiring disconnected from antenna).

NO CLICK

CLICKS

Check Radio Fuse

Check relay per STEP 4 Test "D".

BLOWN

OK

Replace fuse and recheck system. If fuse blows again, check for shorted condition in wiring to relay terminal no. 6, relay or radio.

Check circuit to relay STEP 4, Test "C"

If circuit to relay checks OK, check ground circuit from no. 5 relay terminal. If ground circuit checks OK, relay is problem.

If relay check OK, look for an open condition in wire between relay and antenna.

**ANTENNA MOVES UP AND DOWN
BUT DOES NOT EXTEND TO FULL UP POSITION
AND/OR RETRACT TO FULL DOWN POSITION**

PROCEDURE	RESULT
<p>STEP 1</p> <p>Inspect antenna mast sections for a dirty or bent condition. Make necessary repairs and recheck antenna operation.</p> <p>NOTICE: If antenna mast is dirty, clean it first then wipe off mast with a cloth dampened with light oil. May require several operations of antenna before it comes clean.</p>	<p>ANTENNA OPERATES CORRECTLY AFTER REPAIRS End of test.</p> <p>PROBLEM NOT CORRECTED. <i>Go to STEP 2.</i></p>
<p>STEP 2</p> <p>Remove antenna assembly from vehicle and disassemble mast and support tube from motor drive unit. Manually extend and retract the mast sections and observe if sections move freely.</p>	<p>MAST SECTIONS EXTEND AND RETRACT EASILY. Check for correct wiring connections to gear box switch. Replace switch as req'd. See Figure 2.</p> <p>BINDING CONDITION IN MAST. Replace mast assembly.</p>

**ANTENNA MOTOR RUNS BUT
ANTENNA MAST DOESN'T MOVE**

OR

**ANTENNA MOTOR
WILL NOT SHUT OFF**

PROCEDURE	RESULTS
<p>STEP 1</p> <p>Manually try to move the top section of the mast up or down.</p>	<p>TOP SECTION MOVES UP AND DOWN. Replace mast and tube assy.</p> <p>TOP SECTION DOESN'T MOVE. Disassemble motor/gear box. Check mast assy for a jammed condition. If no jammed condition exists, repair motor/drive unit.</p>

**RADIO RECEPTION POOR OR NONE AT ALL
(ANTENNA EXTENDS AND RETRACTS OK)**

CHECK THE FOLLOWING:

- 1) RF cable connections at radio and antenna unit. (Note: Chevrolet has a 3rd connection.)
- 2) Antenna *mast* is not grounded. (Telescoping rod sections)
- 3) Check continuity between antenna R.F. pin and mast.
- 4) Antenna support tube is securely grounded.
- 5) Antenna mast for a dirty condition.

ON-CAR SERVICE

POWER ANTENNA

Remove and Install (Figs. 9B-10 and 9B-11)

1. Disconnect battery ground.
2. Open hatch and remove rear trim panel.
3. Disconnect power antenna lead to relay.
4. Remove left side trim.
5. Remove luggage shade (if equipped).
6. Remove carpet trim, left side, and pull back carpeting.
7. Remove left side trim panel.
8. Raise vehicle.
9. Remove inner fender screws and brace open to gain access.
10. Remove antenna ground strap.
11. Disconnect plastic nut at top of mast.
12. Remove antenna bracket nuts.
13. Remove power lead and antenna lead through body.
14. Remove antenna.
15. Transfer bracket and ground strap.
16. For installation reverse removal procedure.

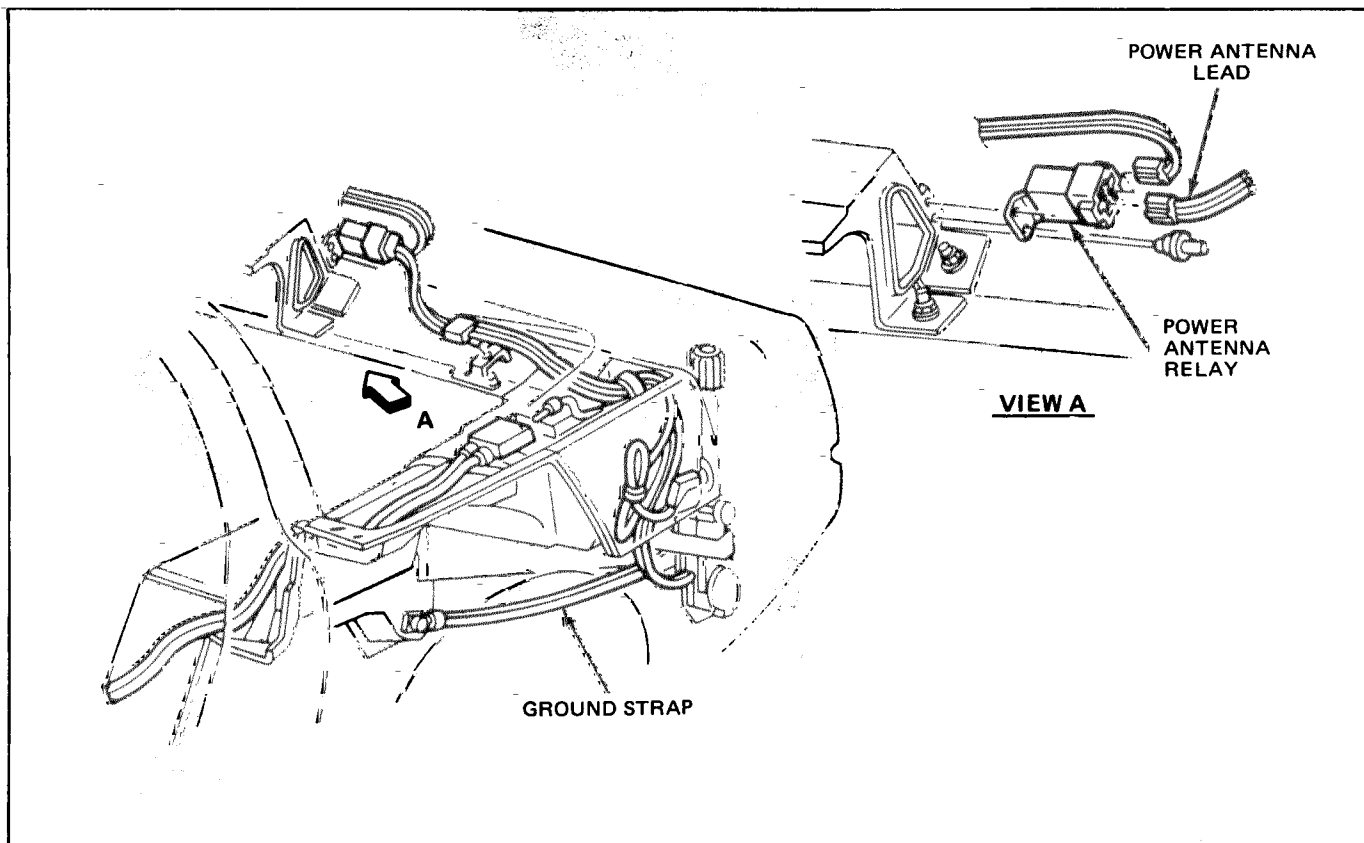


Figure 9B-10— Antenna Relay

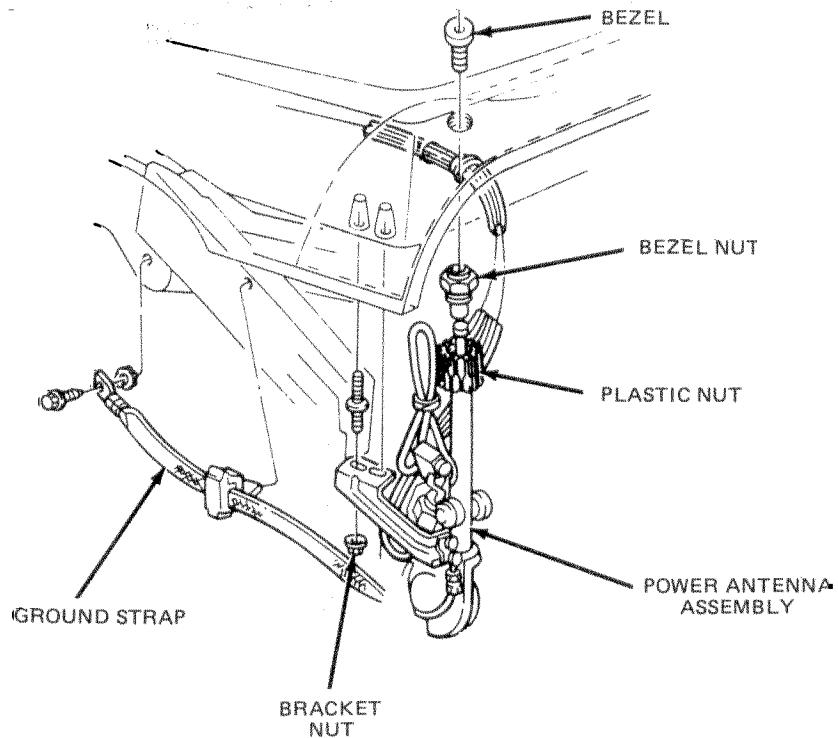


Figure 9B-11 – Power Antenna Installation