

GROUP 10

ELECTRICAL SYSTEMS

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10-1 BATTERY SPECIFICATIONS

Make	Delco
Model	1980568
Location Under Hood	L.F. Fender Skirt
Terminal Grounded	Negative
Voltage	12
Capacity—Wet (Amp. Hrs. @ 20 Hr. Rate)	70
Number of Cells & Plates/Cell.	6, 11
Specific Gravity, Full Charge @ 80° F.	1.260 to 1.280
Bench Charging Rate, Start	5 Amps.
Bench Charging Rate, Finish	2 Amps.
Separators	Porous Rubber
Case	Hard Rubber
Dimensions, Overall	10 1/4" x 6 13/16" x 9 11/16" High

10-2 GENERATING SYSTEM SPECIFICATIONS

a. Generator

Make and Type	Delco-Remy, Delcotron
Location, Side of Engine	Upper Right
Drive and Rotation (Viewing Drive End)	Fan Belt, Clockwise

	Standard	Air Condition
Number	1100708	1100709
Speed Ratio, Gen. to Engine	2.52 to 1	2.75 to 1
Field Current Draw (Amps.) @ 80 F. and 12 Volts	2.2 to 2.6	2.2 to 2.6
Bench Test at 14 Volts (Amps. Cold @ Gen. RPM)	42 @ 6500	55 @ 6500
Min. Current Output @ 500 Eng. RPM	10 Amps.	10 Amps.
Min. Current Output @ 1500 Eng. RPM	30 Amps.	40 Amps.
Belt Tension	80 Lbs.	110 Lbs.

10-3 CRANKING (STARTER) SYSTEM SPECIFICATIONS

a. Cranking Motor

Make	Delco-Remy
Number	1107313
Location, Side of Engine	Left
Type of Shift	Mechanical
Shift Actuation	Solenoid
Shift Operation	Ignition Switch
Type of Drive	Overrunning Clutch

10-2 ELECTRICAL SYSTEMS**a. Cranking Motor (Cont.)**

Rotation, Viewing Drive End	Clockwise
Gear Ratio, Motor to Engine	18.4 to 1
No. Teeth on Ring Gear and Drive Pinion	166, 9
Cranking Speed, Engine RPM (at Operating Temperature)	160 Approx.
No Load Test	
Amperes	80 to 120
Volts	10.6
RPM	3900 to 5400
Locked Armature Test	
Amperes	290 to 370
Volts	2.0
Brush Spring Tension - Ounces	35 min.
Armature End Play005" to .050"
Pinion Clearance in Cranking Position010" to .140"

b. Solenoid Switch

Make	Delco-Remy
Solenoid Switch Number	1114339
Current Draw of Solenoid Windings @ 80 F.	
Hold-in Winding, Amps. @ 10 Volts	14.5 - 16.5
Both Windings in Parallel, Amps. @ 10 Volts	41 - 47

10-4 IGNITION SYSTEM SPECIFICATIONS**a. Ignition Coil and Resistor**

Make	Delco-Remy
Coil Number (Less Bracket)	1115087
Current Draw, Amperes @ 12.6 Volts.	
Engine Stopped	3.8
Engine Idling	2.3
Coil Resistance (Ohms) @ 80 F.	
Primary	1.28 to 1.42
Secondary	7200 to 9500
Resistance Wire	Part of Wiring Harness
Resistance, Ohms @ 80 F.	1.80 ± .05

b. Spark Plugs

Make and Model (for Normal Operation)	AC 44S
Make and Model (for High Speed Operation)	AC 42 COM
Thread and Shell Hex. Sizes	14MM, 13/16"
Gap at Points035"
Tightening Torque (ft. lbs.)	30

c. Distributor

Make	Delco-Remy
Drive	From Camshaft
Rotation, Top View	Clockwise
Vacuum Control Number	1116210
Firing Order	1-2-7-8-4-5-6-3
Contact Point Opening016"
Contact Point Dwell Angle	30° ± 1
Dwell Variation	3° Max.
Breaker Arm Spring Tension, Ounces	19 to 23
Condenser Make and Capacity, Microfarads	Delco-Remy, .18 to .23
Distributor Number (less cap)	1111055

c. Distributor (Cont.)

Timing, Crankshaft Degrees before U.D.C. (with Vacuum Hose Disconnected and Engine Idling)	2 1/2°
Centrifugal Advance, Crankshaft Degrees and RPM	
Start Advance, @ RPM	600 to 800
Medium Advance, Degrees @ RPM	13° to 17° @ 1400
Maximum Advance, Degrees @ RPM	28° to 32° @ 3900
Vacuum Advance, Crankshaft Degrees and Inches of Vacuum	
Start Advance, @ In. of Vacuum	6 to 8
Maximum Advance, Degrees @ In. of Vacuum	14° to 18° @ 16

10-5 DESCRIPTION OF ELECTRICAL SYSTEM

All Skylark Gran Sport cars are equipped with a heavy duty battery. This battery looks somewhat like a regular Skylark battery; it has the same length and width dimensions, but is higher. The greater height of the plates increases the capacity of the heavy duty battery to 70 ampere hours. Because the starting motor is located on the left side of the engine, the battery is located on the left also. This makes specific battery and starter cables necessary. See Figure 10-1.

To accommodate the Gran Sport 400 engine, specific right and left engine compartment wiring harnesses are necessary; the left side harness includes leads for back-up lights and a tachometer. Specific engine to cowl ground straps are also required. See Figure 10-2.

Engine wiring for the Skylark Gran Sport 400 engine is the same as on the 401 engine. See Figure 10-3.

Instrument panel wiring harnesses in Skylark Gran Sport cars are specific where an automatic transmission is installed. This is due to the fact that all Gran Sport shift levers are in the floor. Since all automatic transmission cars are equipped with a long console, a console wiring harness must be

installed to supply lighting for the shift quadrant, circuits through the neutral safety and back-up light switch, and wiring to the tachometer (if so equipped). The automatic transmission instrument panel wiring harness has a connector where this console harness can be plugged in. See Figure 10-4. With a 3-speed or 4-speed manual transmission, a specific instrument panel wiring harness is required only if a short console and a tachometer is specified; this wiring harness provides a connector where the tachometer harness can be plugged in. See Figure 10-4.

A new longer speedometer cable is required for the 3-speed manual transmission because the cable connects into the right side of the transmission. See Figure 10-5 for installation instructions.

The Gran Sport 400 engine is equipped with the same large cranking motor as used on the 401 engine. Operation of the motor and solenoid switch, troubleshooting, inspecting, testing, and repair procedures are the same as for the smaller 300 engine cranking motor. However, specifications and appearance are different. See paragraph 10-3 for the specifications and Figure 10-6 for the appearance.

The cranking motor in the Gran Sport 400 engine has two parallel field coils connected to the insulated brushes, and two shunt

field coils connected to ground. The purpose of this design is to increase starting torque. Heavier field and armature windings help accomplish this. The additional shunt field is required to control free speed of the motor. See Figure 10-7.

The distributor in the Gran Sport 400 engine is the same as in the 401 engine. It is located at the rear of the engine and has a permanently lubricated cast iron housing. See Figure 10-8.

Since the spark advance curves are different than in a 300 engine, Figure 10-9 shows the 400 engine centrifugal advance and the combined centrifugal-vacuum advance for all engine RPMs. Notice that automatic transmission cars have vacuum advance at idle, while vacuum advance in manual transmission cars does not start until 600 to 700 engine RPMs. In order to get vacuum advance at idle, automatic transmission carburetors have a vacuum hole below the throttle valves so that the distributor is connected to intake manifold vacuum at all times. To get no vacuum advance at idle, manual transmission carburetors have a vacuum slot just above the throttle valve at idle position; this provides no vacuum at idle, but, as the throttle valve is opened slightly, its edge moves above the vacuum slot and exposes the slot to intake manifold vacuum.

Contact point dwell angle is adjusted to 30 degrees using a 1/8

10-4 ELECTRICAL SYSTEMS

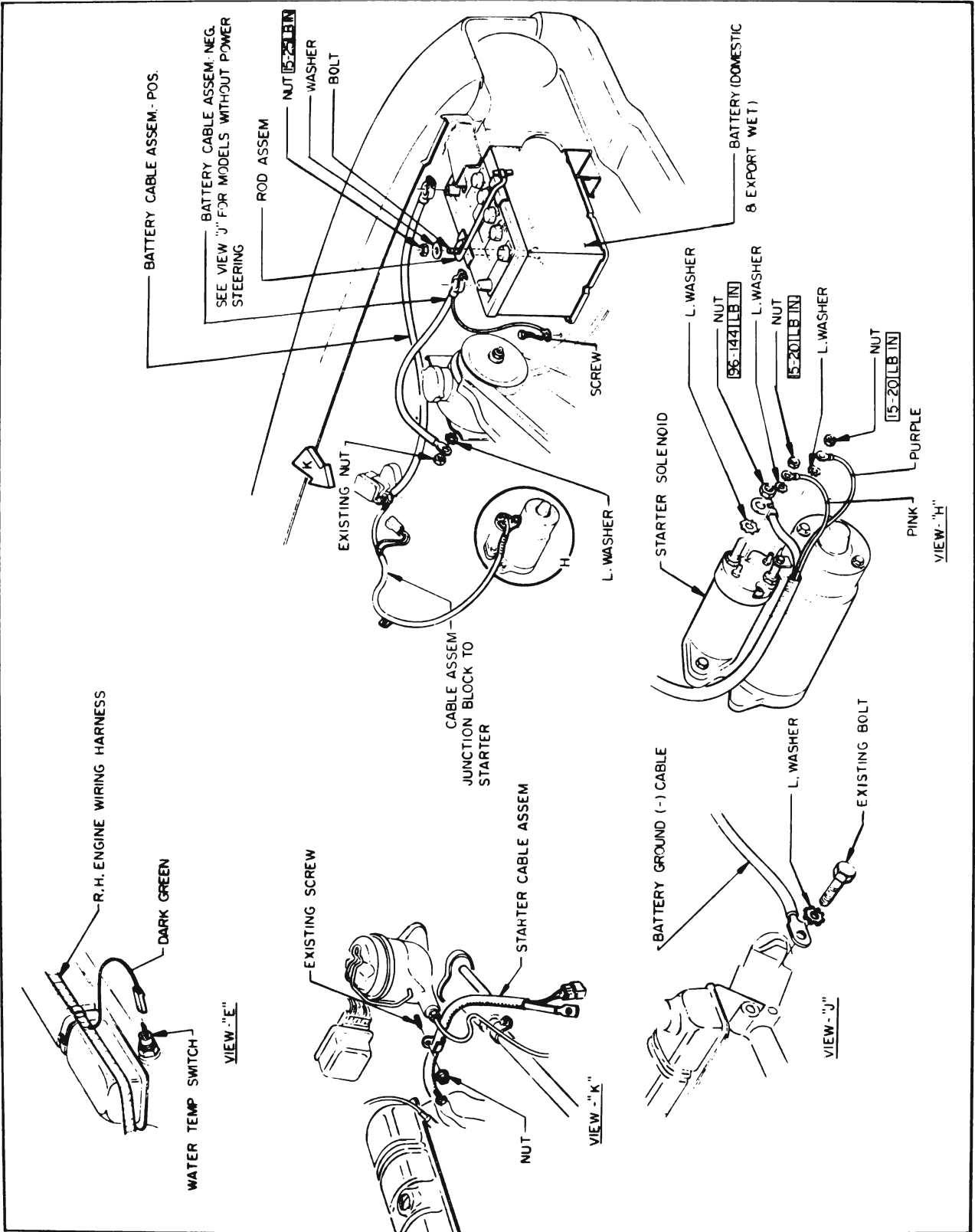


Figure 10-1—Gran Sport Battery and Starter Cables

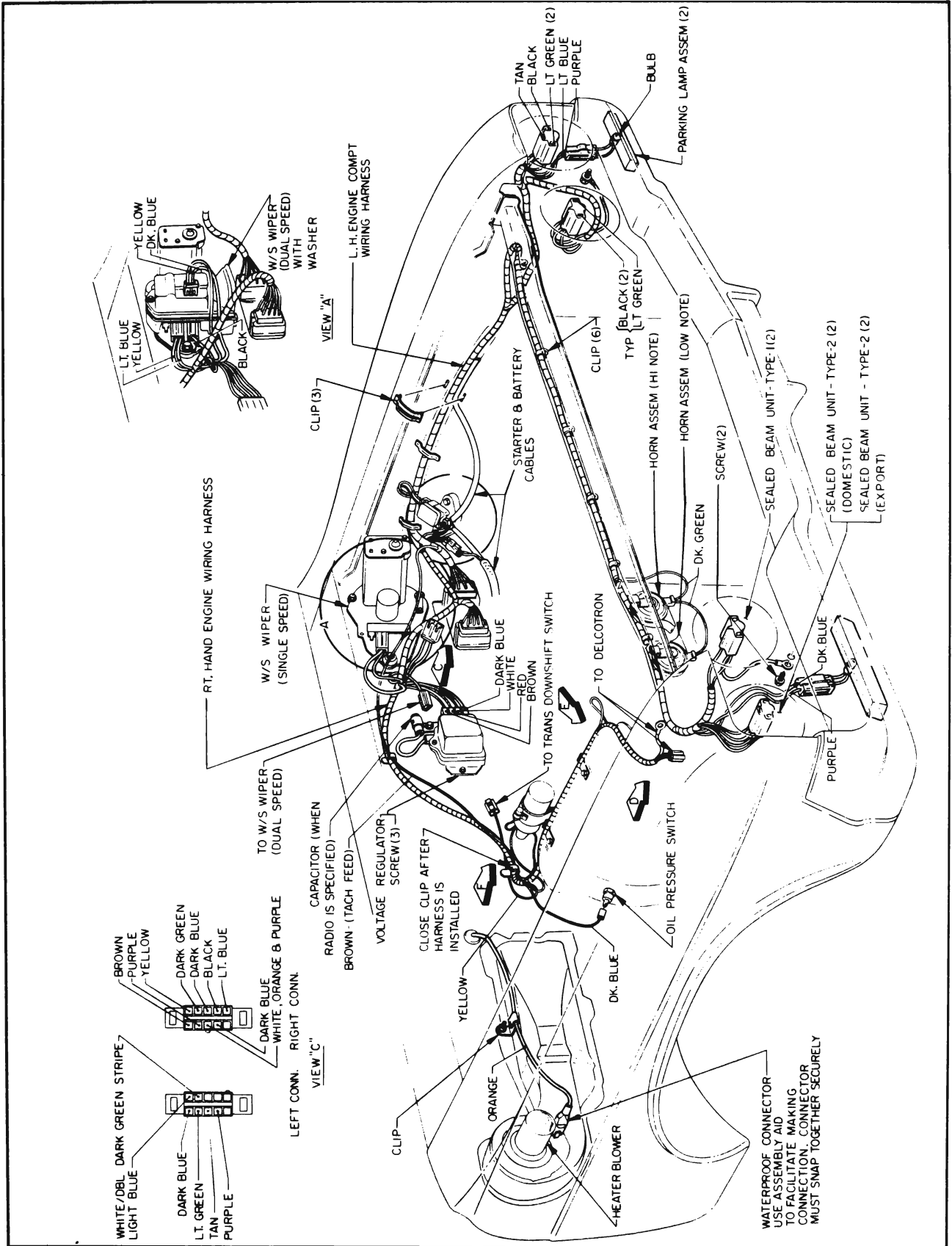


Figure 10-2—Gran Sport Engine Compartment Wiring Harnesses

10-6 ELECTRICAL SYSTEMS

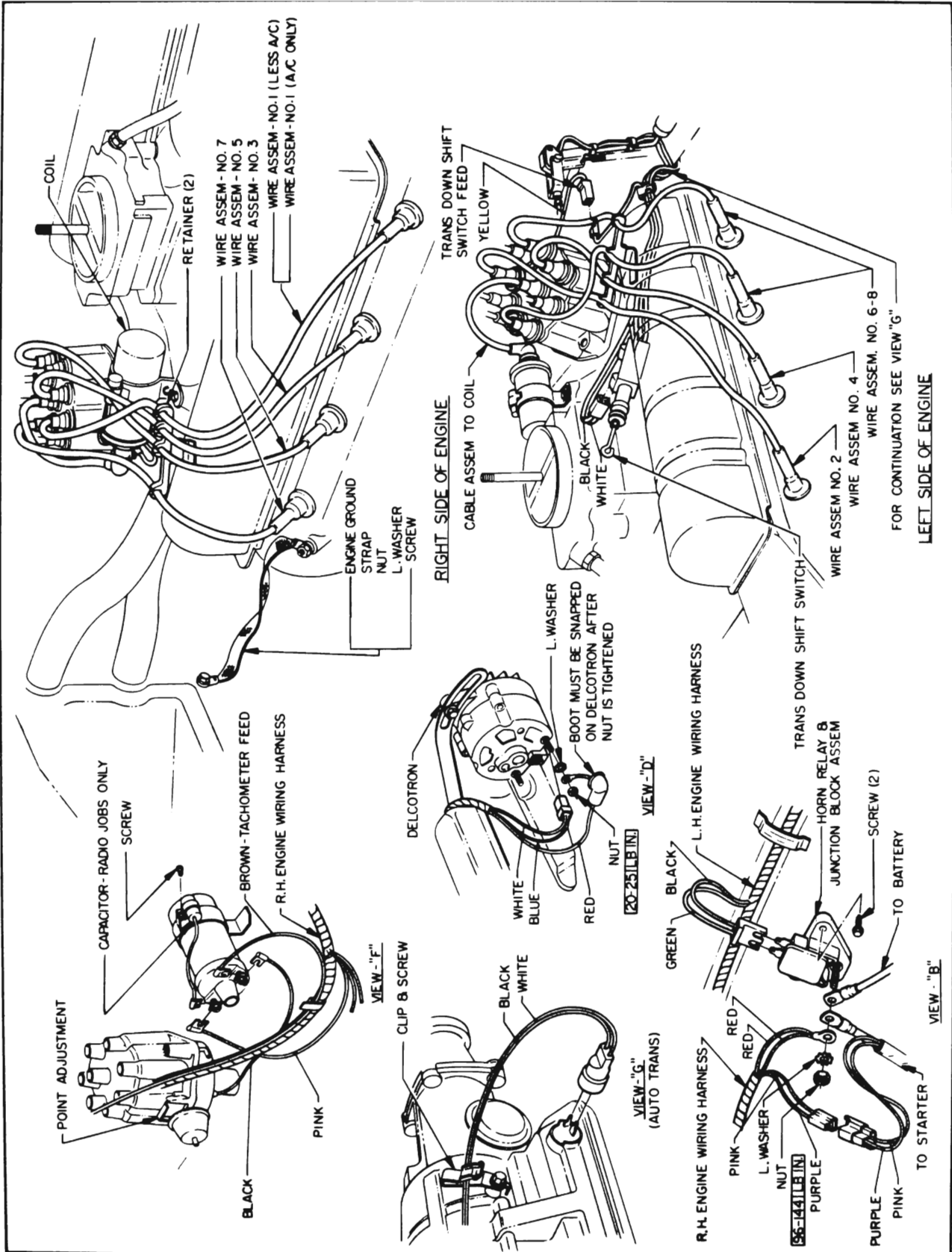


Figure 10-3—Gran Sport 400 Engine Wiring

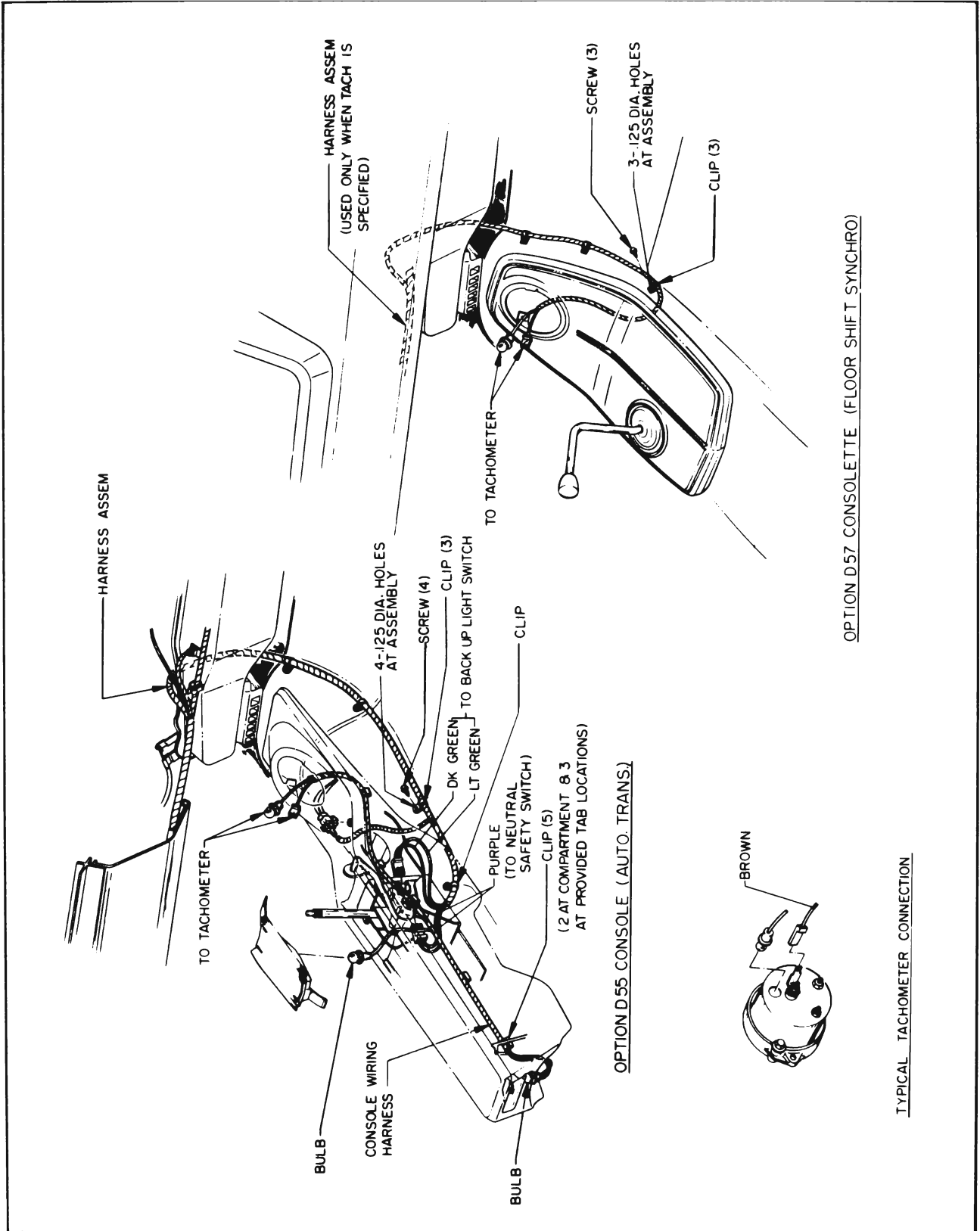


Figure 10-4—Gran Sport Console Wiring Harnesses

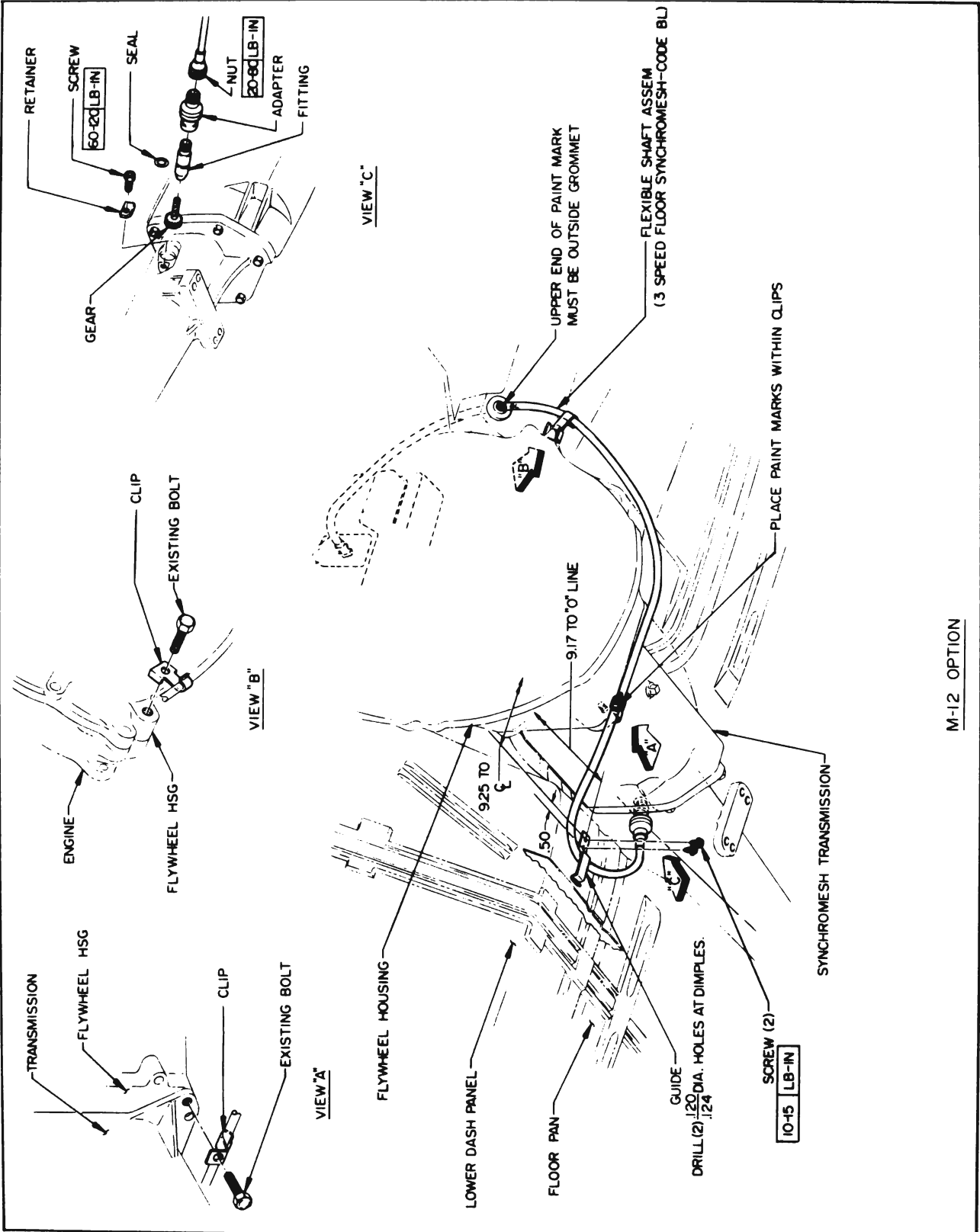


Figure 10-5—Gran Sport 3-Speed Manual Transmission Speedometer Cable Installation

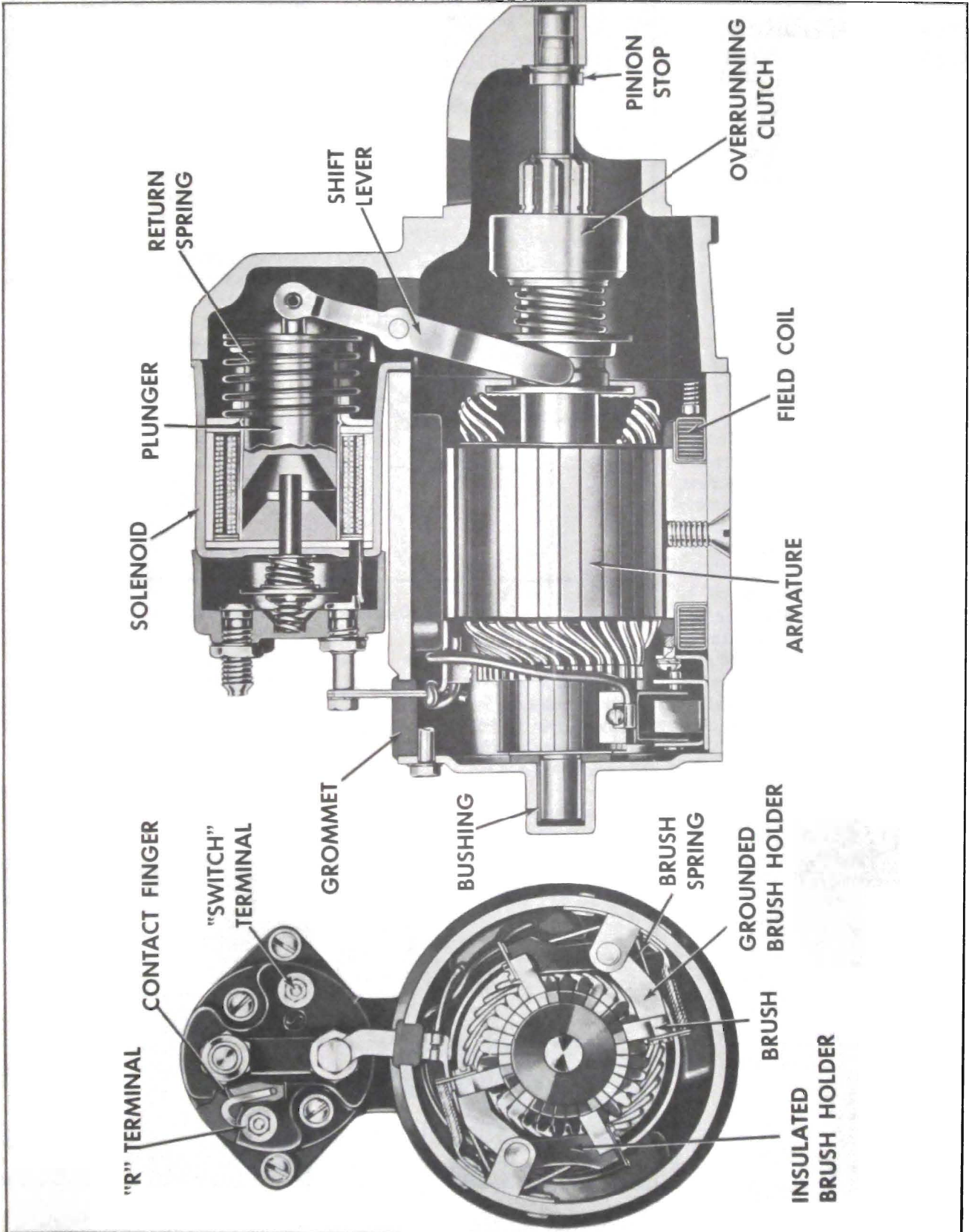


Figure 10-6—Cranking Motor

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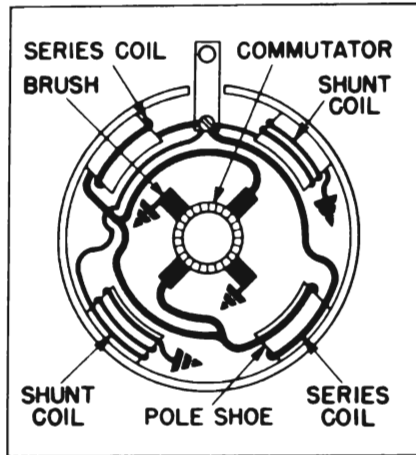


Figure 10-7—Cranking Motor Internal Circuits

inch Allen wrench. An extended type adjusting tool is convenient for reaching the adjusting screw, but is not required for safety reasons as it would be for a 225 or 300 engine. See Figure 10-10.

The Gran Sport 400 engine is timed at 2-1/2 degrees before upper dead center. The timing mark is located on the right side of the engine; this mark consists of a groove filled with yellow paint, which is in the outer edge of the harmonic balancer. The timing indicator, a part of the

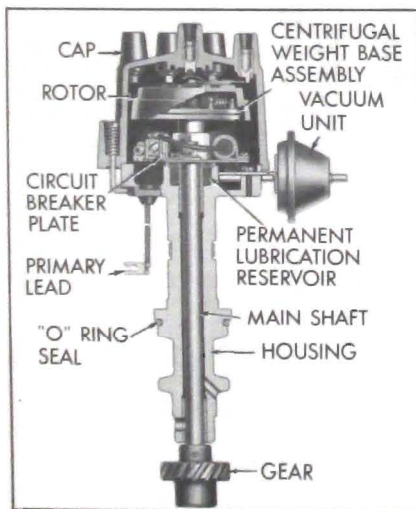


Figure 10-8—Distributor and Cap Assembly

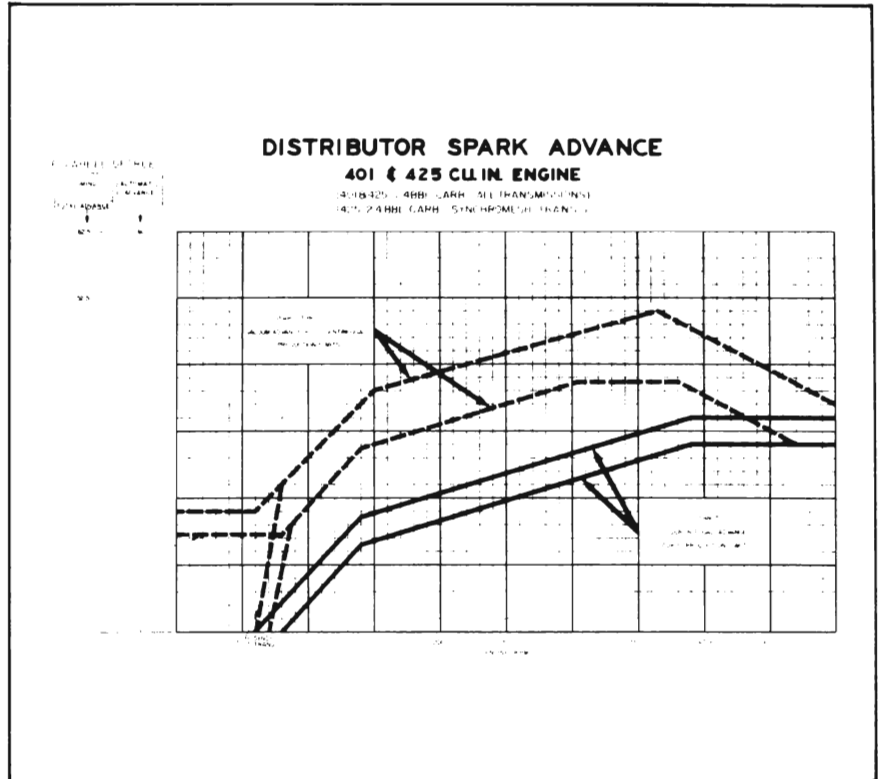


Figure 10-9—Distributor Spark Advance Chart

timing chain cover, has three ridges outlined with yellow paint. These ridges indicate U.D.C. (marked "0"), "5" degrees and "12" degrees before U.D.C. See Figure 10-11.

monic balancer is half-way between the "0" and the "5" degree marks on the timing indicator, with the engine idling and the vacuum hose disconnected.

Correct timing exists when the yellow timing mark on the har-

When installing a distributor in an engine which is completely out of

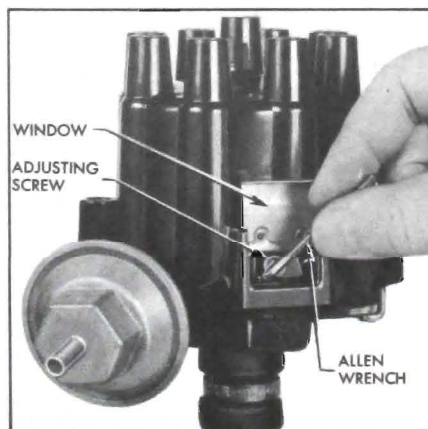


Figure 10-10—Adjusting Contact Point Dwell Angle

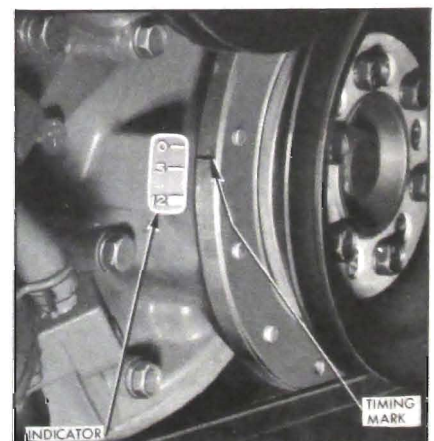


Figure 10-11—Ignition Timing Mark and Indicator

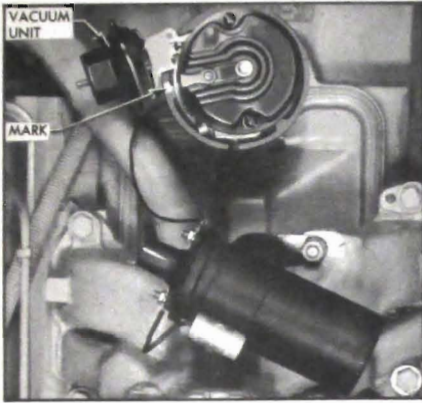


Figure 10-12—Installing Distributor
in Engine

time, rotate the crankshaft until No. 1 cylinder is in position to

fire. See Figure 10-11. As always in any Buick engine, No. 1 cylinder is in the bank projecting farthest forward -- the right bank in the 400 engine. A correctly installed distributor will now have the rotor and the vacuum control positioned approximately as shown in Figure 10-12.

When installing spark plug wires in a cap, install No. 1 wire in the first tower past the adjusting window in the direction of rotation (clockwise). This location for No. 1 wire is the same in all Buick distributors from 1957 on. Install the remaining wires in a clockwise direction according to the

firing order embossed on either rocker arm cover. See Figure 10-13.

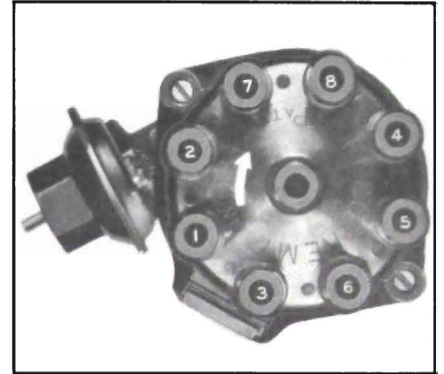


Figure 10-13—Installing Spark
Plug Wires in Cap