1973 AMC Technical Service Manual

SIX CYLINDER ENGINE

232-258 Cubic Inch Displacement

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1A

ENGINE ASSEMBLY

Description

The 232 and 258 CID six cylinder engines incorporate an overhead valve system in which the intake and exhaust rocker arms pivot on a bridged pivot assembly.

The cylinders are numbered from front to rear with a firing order of 1-5-3-6-2-4. The crankshaft rotates in a counterclockwise direction, viewed from the rear of the engine.

Seven two-piece main bearings are used to support the crankshaft and the camshaft is supported by four one-piece line bored bearings.

Identification

The Engine Code is located on a machined surface of the block between number two and three cylinders.

The letter contained in the code identifies the engine by cubic inch displacement, carburetor type and compression ratio (Fig. 1).

The letters used are coded as follows:

Code	CID	Carb.	Comp. Ratio
A	258	1V	8.0:1
E	232	1V	8.0:1

To identify engines built for sale in Georgia and Tennessee, an additional identification, by a non-repeating number, is located on the right side of the engine below the engine code.

Example: Kenosha built
*E-1197273*or
W-1197273
Brampton (Canada) built
C03164473

In the machining of cylinder blocks and crankshafts, it is sometimes necessary to machine the cylinder bores to .010" oversize, and the crankshaft main bearing journals or crank pins to .010" undersize.

These engines are marked with a single or two letter code (Fig. 2).

The code is located on a boss directly above the oil filter.

The letters used are coded as follows:

Single letter .. "B" .... Cylinder bore — .010" Oversize
Single letter .. "M" ..... Main bearings — .010" Undersize
Single letter .. "P" .. Connecting rod bearings — .010" Undersize
Double letters .. "PM" .... Main and connecting rod bearings — .010" Undersize
Single letter .. "C" ..... Camshaft block bores — .010" Oversize

Diagnosis Guide

Conditions and Probable Causes

Cannot Crank Engine

Electrical System
Trace circuits for faulty electrical units.

Coolant Leak into Cylinder
Remove spark plugs to check for coolant in cylinders. Crank with plugs removed. Cylinder heads must be removed to check gaskets, block, and head for a source of coolant leak. If permanent anti-freeze entered engine, complete disassembly

V-8 ENGINE

304-360-401 Cubic Inch Displacement

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ENGINE ASSEMBLY

Description

The 304, 360 and 401 CID engines incorporate an overhead valve system. The intake and exhaust rocker arms on the 304 CID engine pivot on a bridged pivot assembly. The rocker arms on the 360 and 401 CID engines pivot independently on studs mounted in the cylinder head.

Valve rotators are used on the exhaust valves of the 360 and 401 CID engines. The rotator is built into the valve spring retainer assembly.

The cylinders are numbered (front to rear) 1-3-5-7 on the left bank and (front to rear) 2-4-6-8 on the right bank. The cylinder firing order is 1-8-4-3-6-5-7-2. The crankshaft rotates in a counterclockwise direction, viewed from the rear of the engine.

Five two-piece main bearings are used to support the crankshaft and the camshaft is supported by five one-piece line bored bearings.

Identification

The Engine Code is located on a tag which is attached to the right bank cylinder head cover (Fig. 1).

The letter contained in the code identifies the engine by cubic inch displacement, carburetor type and compression ratio.

The letters are coded as follows:

Code	CID	Carb.	Comp. Ratio
H	304	2V	8.4:1
N	360	2V	8.5:1
P	360	4V	8.5:1
Z	401	4V	8.5:1

To further identify the engine by external inspection, the cubic inch displacement is cast into the cylinder block on both banks between the first and second core plug location.

To identify engines built for sale in Georgia and Tennessee, a non-repeating number is located on a machined pad on the left side of the block, adjacent to the front core plug.

Example: Kenosha built
E-1197273 or
W-1197273
Brampton (Canada) built
C03164473

In the machining of cylinder blocks and crankshafts, it is sometimes necessary to machine the cylinder bores to .010" oversize, and the crankshaft main bearing journals or connecting rod journals to .010" undersize. These engines have a code stamped adjacent to the Engine Code on the tag attached to the right bank cylinder head cover.

A single or two letter code is used. The letters are decoded as follows:

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DIAGNOSIS GUIDE

Conditions and Probable Cause:

High Temperature Indication

NOTE: High temperature indication, due to engine overheating, will result in continuous coolant loss. Unless coolant loss is encountered, it is advisable to check for inaccurate indication rather than assuming that the engine is running hot.

- Temperature gauge inaccurate.
- Fan belt slipping.
- Thermostat sticks, closed or opens only partially.
- Leaky cylinder head gasket.
- Radiator cap leaks.
- Water pump impeller broken or loose on shaft.
- Lower radiator hose collapsing.
- Clogged radiator passages.
- Insufficient cooling system capacity due to heavy deposit of rust or scale.
- Air pocket (trapped air) in system.
- Excessive engine friction.
- Brakes dragging.
- Radiator frontal area clogged or covered.
- Late ignition timing.
- Piece of flashing in coolant passage from casting operation. (May be visible with thermostat removed.)
- Extreme concentration of anti-freeze (over 70%)
- Cracked block
- Cracked head

Low Temperature Indication

- Temperature gauge inaccurate.
- Thermostat stuck open.

NOTE: Low temperature indication does not necessarily indicate the engine is running too cold. During cold weather operation, the engine temperature will be considerably lower than under warm weather operation, this is considered normal. Proper Weather Eye operation is determined mainly by air discharge temperature. Consult the Weather Eye Section of this manual for further information.

Boil-Over

Boil-over can be caused by most of the conditions listed under "High Temperature Indication." There are other reasons for boil-over, however, that can occur even in a good cooling system:

- Shutting down an engine immediately after high speed or severe service operation. The resultant loss of coolant, due to boil-over, will in itself cause a heating problem if repeated often enough.
- Use of water instead of anti-freeze mixture.
- Failure to bleed air out of heater.
- Overloading the engine — pulling a trailer or operating in too high a gear.
- Abnormal heat load (high ambient temperatures, air conditioner operation and engine idle set too low).
- Old anti-freeze — anti-freeze gradually loses some of its inhibitors through evaporation and chemical breakdown.
- Overfilling the system when cold.

WATER PUMP

The water pump is the centrifugal type and is serviced only as a complete assembly.

232-258 CID Engines

The pump assembly is mounted on the upper front of the cylinder block and discharges coolant directly into the cylinder block (Fig. 1). The coolant flows through the cylinder block and back through the cylinder head to the radiator inlet when the thermostat is open.

An internal coolant by-pass port in the water pump allows some coolant to circulate within the engine coolant passages when the thermostat is closed.

304-360-401 CID Engines

The impeller housing is cast integrally with the water distribution manifold and the engine front cover (Fig. 2).

The water pump discharges coolant into the distribution manifold where dual outlets supply a balanced flow of coolant into both cylinder banks. The coolant flows through the block and back through the cylinder heads to the intake manifold where it is directed through the by-pass to the suction side of the water pump or through the open thermostat to the top tank of the radiator (Fig. 3).

Water Pump Removal — Six Cylinder

The following procedure applies to all vehicles with or without power steering, air guard and air conditioning.

Drain cooling system at the radiator.

Remove radiator and heater hoses from pump.

Remove drive belts.

Remove alternator front bracket.

Lay alternator aside, do not disconnect wires.

Remove fan ring attaching bolts.

Remove fan and hub assembly.

Remove fan ring.

Remove the water pump and gasket.

Installation

Before installing a new pump, clean gasket sealing surfaces and remove deposits and other foreign material from impeller cavity. Install the water pump and a new gasket.

After the new pump has been installed, rotate the shaft by hand to be sure it turns freely.

Position the fan ring against the front of the engine.

Install the fan and hub assembly.

Install the fan ring to the radiator.

Install the drive belts and tighten to the specified tension, using Belt Tension Gauge J-7316-01 or J-23600.

CAUTION: Set air pump drive belt tension to a maximum of 50 lbs. when driven off of the power steering pump. Pry only against the cast iron portion of the pump.

Install hoses to water pump.

Fill radiator with coolant. Start engine, open heater control valve to re-

ELECTRICAL

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ELECTRICAL SYSTEM

A single wire, twelve (12) volt DC, negative ground system is used which utilizes the welded unit body to form a ground return circuit to the battery. The battery is grounded to the engine assembly. To assure a ground connection between the body and the engine, a ground cable is installed between the body and the right motor mount bracket (six cylinder and V-8).

First check for a poor or no ground condition, when checking for electrical malfunctions such as erratic temperature and fuel gauge readings, directional lights glowing when headlights are operated, windshield wiper motor attempting to operate when some other electrical component is operated.

BODY GROUND WIRES

01-40 Series

The ground wires for the front lights (headlights, park — directional and side markers) terminate through a single wire connection at the dash panel (engine side).

The ground wires for the instrument panel components — cigar lighter, glove box light, courtesy lights (when the door is closed); clock, dash panel lights and the instrument cluster are joined through a common soldered connection at the wire harness "J" splice and then terminate through a single wire connection at the dash panel (engine side).

The ground wire for the front lights and the ground wire for the instrument panel components are attached by a sheet metal screw at the dash panel (engine side) to complete the ground return circuit to the body.

The rear side marker lights on the 40 Series also require a ground wire which is located near the fuel tank filler housing.

Ground connections for the instrument panel components require checking at four locations:

01-40-70 Series — At the dash panel (engine side) where the ground wires are attached with a sheet metal screw.

01-40 Series — "J" splice connection (good solder connection for **each** ground wire). Trace the cigar lighter ground wire back into the main wire harness to find the exact location of the "J" splice.

All Series — Dash connector (continuity and proper location).

All Series — At the individual component.

10-80 Series

The front lights (headlights, park — directional and side marker) are grounded by two (left and right side) wires which are attached to the dash

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EMISSION CONTROL SYSTEMS

Emission Control Systems are required to meet existing Federal Standards for exhaust, crankcase and raw fuel vapor emissions.

The systems are designed to control the emission of hydrocarbons, carbon monoxide and oxides of nitrogen at the levels specified in the Federal Standards.

Emission control system usage varies in relation to engine, transmission and series application. "EMISSION CONTROL" chart (page 5) may be used to determine the correct system usage for any particular vehicle.

AIR GUARD SYSTEM

This system incorporates a belt driven air pump, by-pass (diverter) valve, air distribution manifold (two on V-8 engines), air injection tubes and connecting hoses (Figs. 1 and 2).

The system air pressure is regulated at approximately five PSI by a relief valve which is located in the air pump housing on V-8 engines or in the by-pass (diverter) valve on six cylinder engines.

Air is discharged from the air pump to the by-pass (diverter) valve where it is directed to the air distribution manifold(s) or dumped through a by-pass port depending on engine operating conditions. The air is routed through the air distribution manifold tubing to injection tubes and then introduced to the engine exhaust ports. As the air is discharged from the injection tubes, it mixes with the hot unburned gases entering the exhaust ports during the exhaust stroke. This results in further burning of the combustion mixture and reduces hydrocarbon and carbon monoxide emission to the atmosphere.

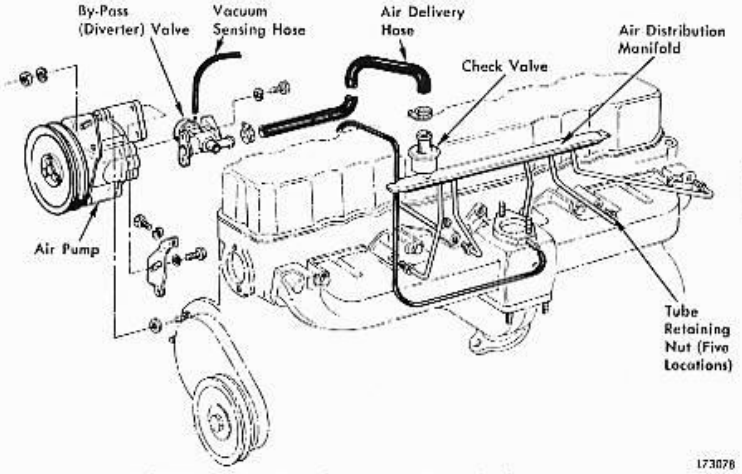

FIGURE 2 — Air Guard System — Six Cylinder Engine

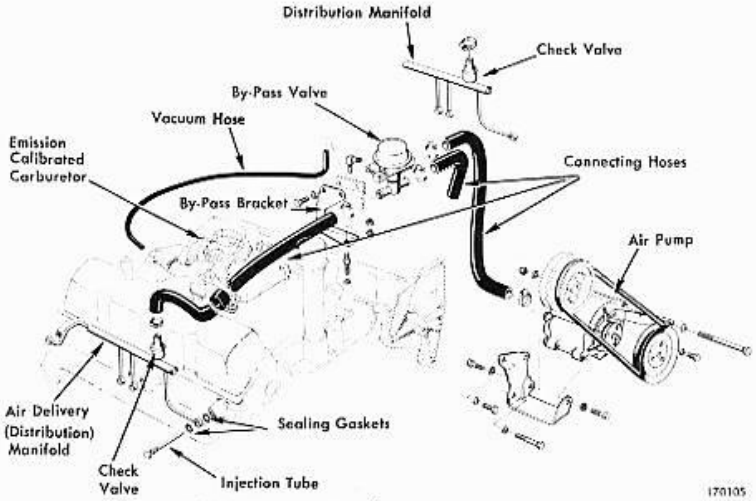

FIGURE 1 — Air Guard System — V-8 Engine

Air Pump — V-8 Engine

The major components of the air pump are enclosed in a die cast aluminum housing. A filter fan assembly, rotor shaft, drive hub, relief valve, and exhaust tube are visible on the pump exterior (Fig. 3).

The pump has been designed to be relatively service free. The only service items are: filter fan assembly, exhaust tube, and relief valve. It is not recommended that the rear housing cover be

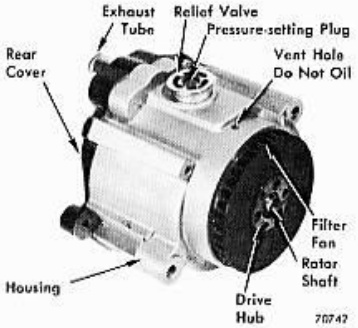

FIGURE 3 — Air Pump — V-8 Engine

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DIAGNOSIS

Condition and Probable Cause

Clutch Chatter

- Grease on the clutch driven plate facings
- Binding of the clutch linkage
- Loose or damaged clutch driven plate facings
- Loose engine mountings
- Incorrect adjustment of clutch pressure levers
- Misalignment of clutch housing
- Loose driven plate hub

Clutch Grabbing

- Oil or grease on clutch driven plate facing
- Broken pressure plate
- Clutch driven plate binding or transmission clutch shaft

Clutch Slipping

- Lack of lubrication in clutch linkage
- Broken clutch pressure springs
- Weak pressure springs
- Grease on the clutch driven plate facings

Incomplete Clutch Release

- Incorrect drive plate lever adjustment
- Loose or broken facings
- Bent or dished clutch driven plate due to overheating

CLUTCH PEDAL LINKAGE

The clutch pedal linkage consists of a suspended type pedal with an attaching link connected to the outer clutch release idler lever. The outer release idler lever is attached to a tube which pivots on the two ball studs. The outer ball pivot is secured to the strut rod to sill mounting bracket. The inner ball pivot is encased in a socket which is fastened to the engine block. The adjusting link is fastened to the inner idler release lever. The adjusting link connects the inner idler release lever to the clutch throw-out lever.

A pedal return spring is attached to the throw-out lever.

PEDAL FREE PLAY ADJUSTMENT

Pedal free play adjustment is obtained by varying the length of the link connecting the throw-out lever to the inner release idler lever assembly. Lengthening this link reduces pedal free play and shortening increases pedal free play.

The pedal free play should be 7/8" to 1 1/8", one and one eighth (1 1/8") desired to provide sufficient free movement of the clutch throw-out bearing when the clutch is engaged and the pedal is fully released.

LUBRICATION

The clutch release idler lever is provided with "Delrin" (nylon type) bearings prelubricated at time of assembly.

Lubricate at 24,000 mile intervals.

The clutch release idler lever must be disassembled in order to lubricate the ball studs. Use Lithium Base Chassis Lubricant to lubricate the ball studs and idler lever. After assembly recheck clutch pedal free play. Reset to specifications.

CLUTCH ASSEMBLY

Description

The clutch is a single plate, dry disc type. A steel cover assembly bolted to the flywheel contains the clutch driven plate, pressure plate, release levers and springs.

Three types of clutch covers are used: a 9¼" diameter, indirect spring pressure type; a 10" diameter, direct spring pressure type and an 11" diameter, semi-centrifugal type. The 9¼ diameter clutch is used with six cylinder engines except in fleet and export cars. The 10" diameter clutch is used with six cylinder engines in fleet and export cars and with 304 CID engines. The 11" diameter clutch is used with 360 and 401 CID engines.

The direct spring pressure type and semi-centrifugal type are similar because both apply direct spring pressure to the pressure plate to provide engagement; however, the semi-centrifugal cover utilizes six rollers that are forced outward by centrifugal action to apply extra force to the pressure plate and insure positive clutch action at high engine RPM (Fig. 1).

The indirect spring pressure type applies spring pressure to the release levers which pivot and apply pressure to the pressure plate (Fig. 2).

Although no adjustment for wear is provided in the clutch itself, release lever height should be checked and adjusted if needed whenever the clutch cover assembly is removed for replacement, overhaul or when the driven plate is replaced.

Removal

Remove transmission (Refer to "Transmission Removal").

Remove starter, throw-out bearing and sleeve assembly and clutch housing.

Align mark the clutch cover, pressure plate and flywheel to insure correct alignment during assembly.

CAUTION: When removing the clutch cover from the flywheel, loosen the attaching screws in rotation, one or two turns at a time, until spring tension on the cover is released. The clutch cover is a steel stamping which could be warped by improper removal procedure, resulting in clutch chatter when reused.

Inspect the crankshaft pilot bushing, flywheel, transmission clutch shaft, throw-out bearing and sleeve assembly, driven plate, clutch cover, and clutch housing alignment.

Installation

Inspect clutch release lever height.

Use Aligning Tool J-21617 on six cylinder and J-22056 on eight cylinder cars to align the driven plate during installation. A transmission clutch shaft may be used if the proper tool is not available.

Align the driven plate and loosely

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TORQUE-COMMAND TRANSMISSIONS

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IDENTIFICATION

Torque-Command transmissions are used in three basic models: 904, 998 and 727. Models 904 and 998 transmissions are similar in appearance and operation. The main differences are in the low and reverse band and valve body. Model 727 transmissions are similar to Models 904 and 998 in operation and general appearance. However, Model 727 transmissions are physically larger and stronger. The transmission model for each engine is as follows.

ENGINE	TRANSMISSION MODEL	
232	904 STD.	NA HD.
258	904 STD.	727 HD.
304	998 STD.	727 HD.
360	727 STD.	727 HD.
401	727 STD.	727 HD.

Transmission capacity requirements are different for each engine-transmission combination and some internal parts will be different to provide for this.

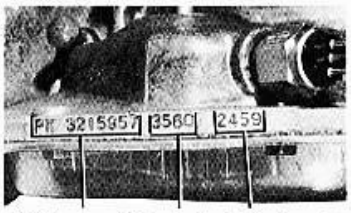
The seven digit part number is stamped into the case on the left side just above the oil pan mating surface.

Following the part number is a coded, four digit number which indicates the date of manufacture. Date code numbers above 3500 may be decoded by adding 1 for each calendar day after February 26, 1971 (e.g., 3501 = February 27, 1971, 3624 = June 30, 1971, 3809 = January 1, 1972).

The last group of numbers stamped on the left side of the case is the transmission serial number (Fig. 1).

Special Identification

Cars built for sale in Georgia and Tennessee have certain components identified by a non-repeating number. On automatic transmissions this number is stamped on the right side of the converter housing on a machined pad on the starter housing boss.



Part Number Calendar Serial Number 72132

FIGURE 1 — Identification Numbers

The number used on Kenosha built cars is the Final Line Building Sequence Number followed by "73" to identify the year.

The number used on Brampton built cars is the Body Sequence Number preceded by "C" and followed by "73".

These numbers on Kenosha and Brampton built cars, begin and end with an asterisk to prevent alteration by extension.

TOWING THE VEHICLE

The car may be towed safely in N (Neutral) with the rear wheels on the ground at speeds under 30 MPH except as follows.

CAUTION: Disconnect the propeller shaft or raise the rear wheels if any of the following conditions are present:

1. *Known or suspected transmission malfunction.*
2. *Car is to be towed over 50 miles.*
3. *Car is to be towed over 30 MPH.*
4. *Ignition key is not available.*

OPERATION

"P" — PARK

Park (P) position provides an internal transmission lock by mechanically locking the transmission output shaft. The car must be completely stopped before engaging park.

CAUTION: Internal damage to the transmission could result from moving the selector to (P) Park position while the car is moving or by pushing the car with another car while in (P) Park position.

"D" — FORWARD RANGE

The "D" position provides three automatically shifted forward speeds. 1-2, 2-3, 3-2, 3-1 and 2-1 shifts occur at various car speeds depending on throttle opening. Approximate shift speeds for the various modes of operation are shown in the "Automatic Shift Speed and Governor Pressure" chart.

To obtain extra acceleration when driving in third gear above approximately 30 MPH and below approximately 70 MPH, depress the accelerator completely. This forces a 3-2 down shift. The transmission will then remain in second gear until full throttle automatic upshift speed is attained or the accelerator pedal is released.

If the accelerator pedal is depressed completely while in third gear below approximately 30 MPH, the transmission will down shift to first gear. Upshifts to second and third gears would then occur at full throttle automatic upshift speeds or when the accelerator pedal is released.

"2" FORWARD RANGE

The "2" position provides automatic 1-2 and 2-1 shifts. Automatic shift speeds in "2" range are the same as in "D" range except that the transmission should not shift into third gear while in "2" range.

If the selector is moved from "D" range to "2" range while the car is in third gear, the transmission will down shift to second gear.

"1" FORWARD RANGE

The "1" position permits no automatic upshifts.

If "1" range is initially selected, the transmission will start and remain in

BRAKES AND WHEELS

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BRAKE TYPE AND SIZES

Model & Engine		Wheel Cylinder Bore Size		Brake Size		Braking Area Square Inches
		Front	Rear	Front	Rear	
01-70	6 Cyl.	1⅛"	⅞"	9"/2.50"	9"/2.0"	153"
40	6 Cyl.	1⅛"	13/16"	9"/2.50"	9"/2.0"	153"
01-40-70	V8	1 3/16"	⅞"	10"/2.50"	10"/1.75"	167"
10	All	1 3/32"	15/16"	10"/2.50" 10"/2.50"	10"/1.75" Sedan, Hardtops 10"/2.50 Station Wagons	167" 196"
	(With Front Disc)					
01-70	6 Cyl.	2¾"	⅞"	11" Disc	9"/2.0"	111"
01-40-70	V8	2¾"	⅞"	11" Disc	10"/1.75"	110"
40	6 Cyl.	2¾"	13/16"	11" Disc	9"/2.0"	111"
10-80	All	2¾"	15/16"	11" Disc 11" Disc	10"/1.75" Sedans, Hardtops 10"/2.50" Station Wagons	110" 139"

8

DIAGNOSIS GUIDE

Brake Diagnosis

In most instances, the customer will describe the difficulty as one or more of the conditions listed in the Brake Diagnosis Chart (Page 5). Road test the car with the customer to confirm the difficulty and obtain additional information which will be helpful.

The diagnosis guides are a sequential procedure to aid in determining the cause of a brake problem.

Guide "A" (Page 3) is to be used for all cars and Guide "B" (Page 4) is to be used for cars equipped with power brakes after completing the steps outlined in Guide "A."

Vibration Diagnosis

Vibrations can be divided into two major categories; mechanical and audible-type vibrations. Mechanical vibrations are those which are felt through seats, floor pan or steering wheel or may also be visible and sensed by fender, mirror or dash panel motion. Audible vibrations are heard above normal background noise and may or may not be accompanied by a mechanical vibration.

Mechanical and audible vibrations can usually be divided into three subgroups; torque sensitive, vehicle speed sensitive and engine speed sensitive:

Torque sensitivity means that the condition can be made better or worse when accelerating, decelerating, coasting or holding constant steady speed.

Vehicle speed sensitive vibrations occur at the same speed regardless of which transmission gear is selected or how much torque is applied.

Engine speed sensitive vibrations will occur at different car speeds when a different transmission gear is selected and can sometimes be isolated by increasing or decreasing engine speed with the transmission in neutral or stall testing with the transmission in gear.

Road Test

Road test vehicle with customer to determine exact nature of complaint and condition that causes complaint.

A. If particular road surfaces other than a smooth road are necessary to generate the complaint condition, the following procedures are not applicable.

B. If complaint condition is apparent on a smooth road, select the smoothest available road and proceed with the following identification tests:

1. Determine the speed ranges of the particular disturbance of concern.
2. At each existing speed range, determine the following:
   a. Is a **mechanical** vibration present?
   b. Is an **audible** vibration present, above normal background operational noise?
3. At each speed range, determine the following:
   a. Is the disturbance torque sensitive?
   b. Is the disturbance vehicle speed sensitive or engine speed sensitive?

Diagnosis

A. Consult diagnosis charts to determine the codes for possible causes of disturbance. **Consider** for correction **only those items coded** on the chart for the complaint condition(s) encountered.

B. Refer to the correction codes for

AXLE AND PROPELLER SHAFT

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IDENTIFICATION

Axle Ratio Identification

All 7$^{9}/_{16}$" axles will have the axle ratio stamped on the right axle tube housing boss adjacent to the dowel hole.

The axle ratio codes are decoded as follows:

E = 3.58:1 — 12/43
F = 3.08:1 — 13/40
G = 3.31:1 — 13/43
H = 2.73:1 — 15/41

All 8$^{7}/_{8}$" axles will have the **AXLE RATIO CODE** stamped on the differential housing cover flange.

The axle ratio codes are decoded as follows:

A = 3.54:1 — 11/39
B = 3.15:1 — 13/41
C = 2.87:1 — 15/43
D = 3.91:1 — 11/43

The following chart shows rear axle drive gear size and standard and optional rear axle ratios for each available series, engine and transmission combination.

AXLE TESTING AND DIAGNOSIS

The first important step in diagnosing a reported rear axle noise condition is to obtain a complete description of the noise and driving conditions when the noise occurs. Therefore, a preliminary road test, with the customer demonstrating the complaint condition, is recommended.

The action of transmitting engine torque through a 90° angle to drive the rear wheels will produce some noise in the rear axle. Slight axle noises confined to a short speed range or to a specific period are considered normal.

Noises produced by the engine, transmission, tires, wheel bearings, exhaust system, propeller shaft, or the action of wind on the body or grille may be incorrectly diagnosed as produced by the rear axle. Therefore, it is necessary to thoroughly test the car to isolate the trouble to a specific unit.

With the car stopped and the transmission in neutral, run the engine at various speeds. If the noise is heard during this test, the noise is confined to the engine, exhaust system, clutch, transmission or engine driven accessory equipment.

Prior to the diagnostic road test check the tire pressure and rear axle lubricant level.

Tire Noise Tests

Some types of tire tread wear or tread patterns may produce objectionable noises. Therefore, drive the car on various types of road surfaces and listen for a change in the noise. If the noise varies with the types of surfaces the tires may be the cause.

Wheel Bearing Tests

Worn, loose, or damaged wheel bearings may be confused with axle noise. Wheel bearing noise is usually more noticeable when coasting at lower car speeds. Gently applying the brakes will usually change wheel bearing noise. Another test is to turn the car alternately left and right which side loads the bearings causing the defective bearing to become noisy.

Axle Tests

Drive the car a sufficient distance to warm the axle to the required operating temperature. Tests should then be performed using different transmission gears.

Rear axle noise conditions are usually related to car speed rather than engine RPM or transmission gears.

Rear axle noises may be classified into two types: gear noise and bearing noise.

Gear noise is recognized as a whine or high pitched resonating sound more pronounced at certain speeds and usually within a narrow speed range under a drive (accelerating load), coast (decelerating load), or float (maintained speed) condition.

Axle bearing noise is usually constant and the pitch related to the car speed.

The drive pinion turns faster than the drive gear; therefore, the drive pinion bearings will be a higher pitch than the differential bearings. The drive pinion bearings are usually heard at low car speeds (20-30 MPH).

The differential bearings are lower in pitch because they are turning at the same speed as the wheels when the car is driven straight ahead. Differential bearing noise will not vary when the car is turned alternately left to right or when the brakes are gently applied.

Axle Backlash

Rear axle backlash must be isolated from worn universal joints, or a loose fit of universal joint on the transmission splines.

Rear axle backlash may be due to excessive clearance between the differential gear and differential pinion or a loose fitting differential pinion shaft in the case.

Excessive drive gear and drive pinion clearance will also cause excessive backlash. However, a gear noise will usually be present due to an improper drive gear and drive pinion adjustment.

Other Axle Conditions

A knocking or "clucking" noise heard at low speed when coasting may be caused by a loose fitting differential gear in the differential case bore. When this condition is encountered, lightly applying the brakes usually will reduce the sound.

Differential gear noise heard only under certain conditions such as, when spinning a rear wheel for on-the-car wheel balancing, or when a rear wheel is spinning due to icy conditions, is considered normal.

When a noise has been determined to be caused by the bearings, the gears do not require replacement unless an inspection reveals signs of obvious damage.

When the noise is determined to be

WEATHER EYE AND COMMAND AIR SYSTEM

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DIAGNOSIS GUIDE

Condition and Probable Cause

No Air Discharge from Heater Outlets with "DEF" Control off and "AIR" and BLOWER on.

Air damper adjustment incorrect.
Binding air damper.
Heater and defroster damper adjustment incorrect.
Damper housing obstructed.
Cowl air inlet obstructed.
Obstructed air passage through heater core.

No Air Discharge from Defroster Outlets with "AIR" Control on, "DEF" on and Blower on.

Defroster duct misaligned or disconnected.
Heater and defroster damper adjustment incorrect.
Heater and defroster damper housing obstructed.
Defroster duct obstructed.

Air Discharge from Heater or Defroster Outlets with "AIR" Control in off Position.

Air damper adjustment incorrect.
Air damper binding or movement restricted.
Improperly seating air damper.

Cold Air Discharge from Heater Outlets with "TEMP" Control Full on.

NOTE: 125° F. minimum at lower center outlet is normal.

01-40 and 70 Series

Inspect coolant level in the radiator upper tank.

Check heater core inlet and outlet hoses.

If the outlet hose is hot, but not quite as hot as the inlet hose, it is considered normal and satisfactory.

If the outlet hose is cold or noticeably cooler than the inlet hose, the heater core may be obstructed.

Inspect the bland air cable adjustment for proper damper door operation.

10 and 80 Series

Inspect coolant level in the radiator upper tank.

Inspect heater valve control cable adjustment.

Check the heater inlet and outlet hoses at the heater valve.

If the outlet hose is hot and approximately the same temperature as the inlet, the heater valve is open.

If the outlet hose is cold or noticeably cooler than the inlet, the heater valve is not opening, or is obstructed.

Check the heater core inlet and outlet hoses.

If the outlet hose is hot, but not quite as hot as the inlet hose, it is considered normal and satisfactory.

If the outlet hose is cold or noticeably cooler than the inlet hose, the heater core may be obstructed.

If the problem is insufficient heat, inspect the cooling system for proper operation.

Coolant leaking past or through the thermostat will result in cooler engine coolant.

Broken water pump impeller fins will reduce coolant circulation resulting in a warm operating engine, but insufficient coolant circulation through the heater system.

The Weather Eye system is designed to provide fresh air ventilation for summer driving and fresh heated air within the car for winter driving.

It is very important to understand how the Weather Eye functions and is operated to obtain the best possible results.

SYSTEM CONTROLS

The temperature, air, defroster and fan controls are illustrated in Figures 1, 2, 3 and 4.

Operation of the controls in all Series is similar. Moving the temperature control lever to the right opens the heater control. Extreme right is full heat position and extreme left is the heat "OFF" position.

The "AIR" lever controls the air and defroster operation by changing the positions of the defroster and heater dampers in their respective housings. Refer to Figures 6 through 11. At the extreme left "AIR OFF" position, air

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FIGURE 1 — Weather Eye Control Panel — 01-40 Series

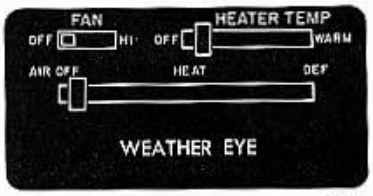

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FIGURE 2 — Weather Eye Control Panel — 70 Series

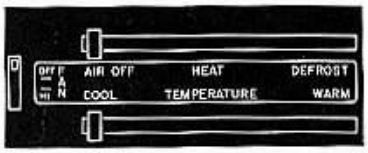

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FIGURE 3 — Weather Eye Control Panel — 10 Series

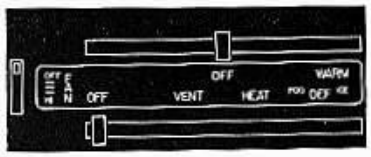

FIGURE 4 — Command Air System Control Panel — 80 Series

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DIAGNOSIS GUIDE

Condition and Probable Cause

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Heater and defroster damper adjustment incorrect.
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Cowl air inlet obstructed.
Obstructed air passage through heater core.

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Defroster duct misaligned or disconnected.
Heater and defroster damper adjustment incorrect.
Heater and defroster damper housing obstructed.
Defroster duct obstructed.

Air Discharge from Heater or Defroster Outlets with "AIR" Control in off Position.

Air damper adjustment incorrect.
Air damper binding or movement restricted.
Improperly seating air damper.

Cold Air Discharge from Heater Outlets with "TEMP" Control Full on.

NOTE: 125° F. minimum at lower center outlet is normal.

01-40 and 70 Series

Inspect coolant level in the radiator upper tank.

Check heater core inlet and outlet hoses.

If the outlet hose is hot, but not quite as hot as the inlet hose, it is considered normal and satisfactory.

If the outlet hose is cold or noticeably cooler than the inlet hose, the heater core may be obstructed.

Inspect the blend air cable adjustment for proper damper door operation.

10 and 80 Series

Inspect coolant level in the radiator upper tank.

Inspect heater valve control cable adjustment.

Check the heater inlet and outlet hoses at the heater valve.

If the outlet hose is hot and approximately the same temperature as the inlet, the heater valve is open.

If the outlet hose is cold or noticeably cooler than the inlet, the heater valve is not opening, or is obstructed. Check the heater core inlet and outlet hoses.

If the outlet hose is hot, but not quite as hot as the inlet hose, it is considered normal and satisfactory.

If the outlet hose is cold or noticeably cooler than the inlet hose, the heater core may be obstructed.

If the problem is insufficient heat, inspect the cooling system for proper operation.

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FIGURE 1 — Weather Eye Control Panel — 01-40 Series

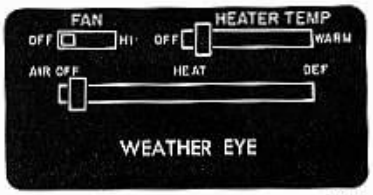

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FIGURE 2 — Weather Eye Control Panel — 70 Series

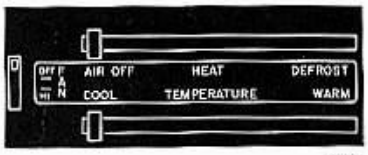

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FIGURE 3 — Weather Eye Control Panel — 10 Series

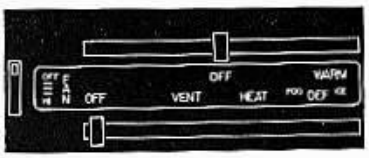

FIGURE 4 — Command Air System Control Panel — 80 Series

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GENERAL BODY CONSTRUCTION

All American Motors Series cars are of the advanced unit construction, which is a combination of body panels and sub-assemblies of boxed sections including the frame, all welded together into a single structural unit.

In the event of collision damage it is important that underbody alignment be checked and, if necessary, realigned to frame dimensions shown on the individual dimensions charts.

ENERGY ABSORBING BUMPER SYSTEMS

Energy absorbing FRONT bumpers are standard equipment on all 01-10-40-80 Series.

The Javelin Series retains the previous year standard bumper system.

Energy absorbing REAR bumpers are optional equipment on 01-40 Series.

When standard rear bumpers are installed, bumper vertical guards are mandatory on 01-40 Series.

The energy absorbing bumpers consist of the bumper impact bar (rail) and rubber guard (nerf) strip, the impact bar reinforcement, the mounting brackets and two energy absorbing steel cylinder assemblies.

Each cylinder assembly consists of two heavy gauge steel tubes, a piston tube and a cylinder tube.

The piston tube houses a floating piston backed by an inert gas under pressure. It telescopes into a cylinder tube filled with hydraulic fluid (Fig. 4).

On impact the hydraulic fluid is

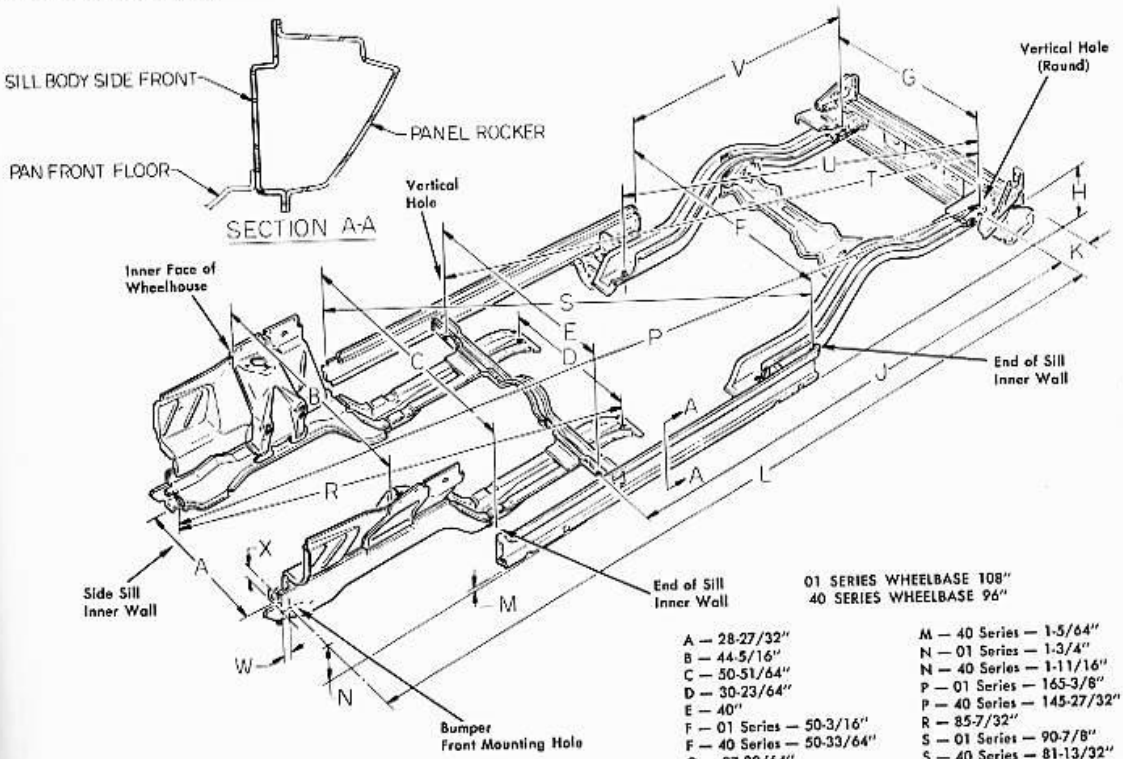

FIGURE 1 — 01 and 40 Series Frame Dimensions

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ARMREST

The armrest assembly is a vinyl covered moulded pad vulcanized to a plastic frame and is serviced as an assembly.

The armrest is attached to the door panel or rear quarter panel with screws concealed by an overlay strip or hole plugs.

WINDOW REGULATOR HANDLES

The window regulator handle is serrated to attain a positive fit of the handle to the serrated shaft of the window regulator.

The window regulator handle is fastened to the shaft with a hexagon socket machine screw. Use a $^5/_{32}$" Allen wrench to remove the screw. Pull the handle straight off the shaft.

Position the regulator handle on the shaft so that when the window is full up the knob is forward with the handle in a horizontal position.

REMOTE CONTROL HANDLE

01-40 Series

The handle is serviced only as an assembly. To remove the handle assembly, the door trim panel must be removed to facilitate disconnecting the remote rod from the handle.

Remove the door trim panel.

Disconnect the remote rod to handle plastic clip and remove the handle nuts.

10, 70 and 80 Series

The inside door latch remote control handle is attached to the square shank of the remote control lever with a Phillips head screw.

The door latch remote control handle is installed forward and horizontal to align with the cut out opening in the arm rest. The remote control assembly is adjustable up or down to obtain this desired alignment.

TRIM PANELS

The 01, 10, 40 and 80 Series trim panels are a hardboard composition covered with a vinyl material to match the interior of the car. The 70 Series trim panel consists of an upper and lower section of moulded plastic. Decorative mouldings that are utilized with the various models are attached to the trim panel.

The back of the hardboard trim panel has cutout slots, along the sides, to accommodate the trim panel to inner door panel attaching clips.

The lower edge of the door trim panel, is secured to the door inner panel with sheet metal screws.

The top of the trim panel, on 10, 70 and 80 Series, laps over the door inner panel top flange and is held in position on the door inner panel with a metal retainer plate attached to the top of the trim panel.

Various trim options include trim panel overlays and mouldings. The overlays are clinched to the door trim panel with metal tabs.

The trim panel mouldings are serviced individually.

Door Trim Panel Removal 01-40 Series

Remove the screw that holds the armrest overlay strip at the forward end and unhook the strip from the armrest.

Remove the armrest screws.

Remove the medallion and bezel assembly.

Loosen the two nuts holding the remote handle.

Slide the plastic housing toward the latch side of the door to disengage it

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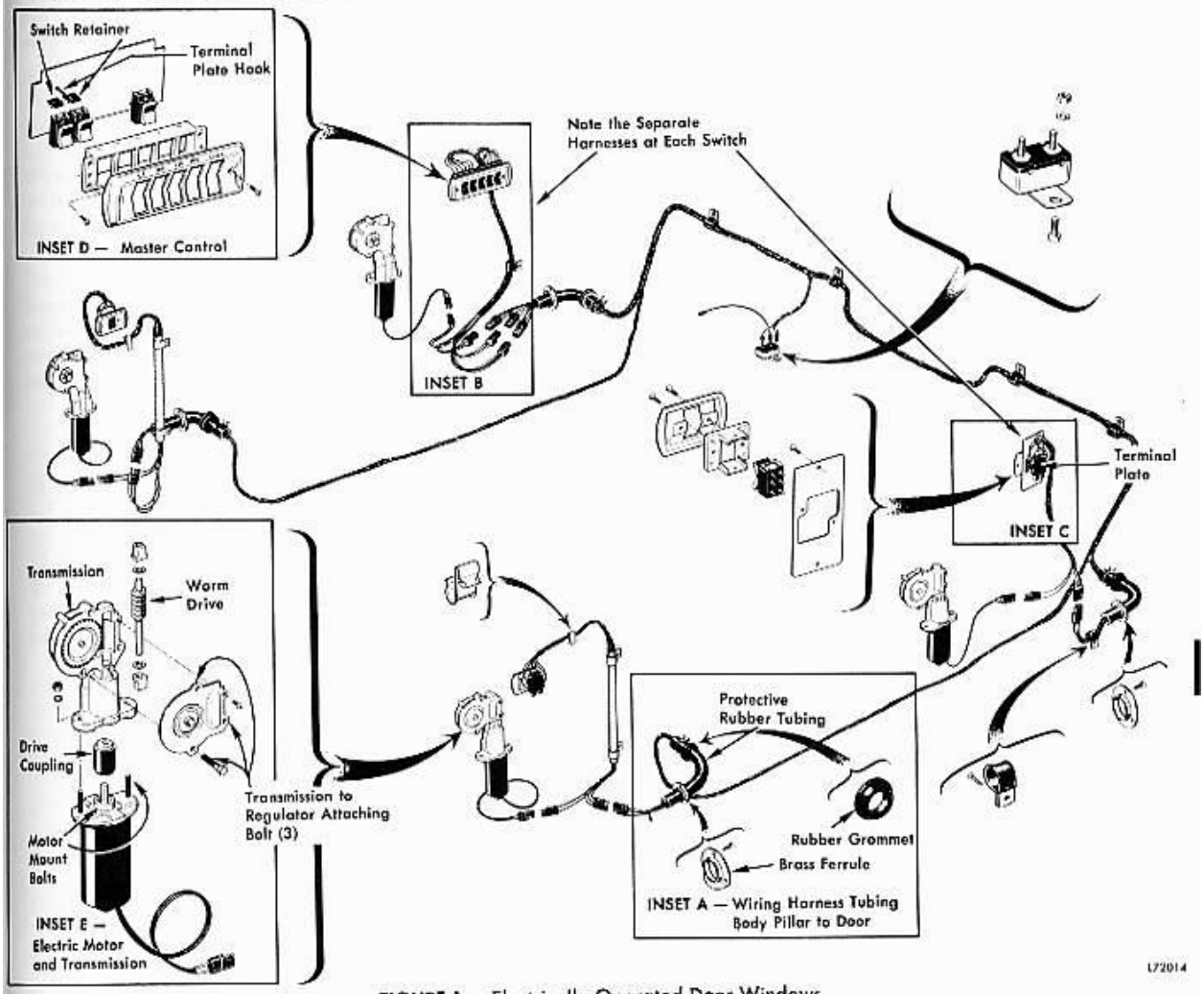

FIGURE 1 — Electrically Operated Door Windows

ELECTRIC WINDOW

The window regulator motors are of a two wire design, using polarity of the circuit to change motor rotation. To raise or lower a window using the master switch or individual window switches, the ignition switch must be in the "ON" position. A lockout switch located on the master control switch

DECK COVER—LIFTGATE—TAILGATE—TRAVEL RACK

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REAR COMPARTMENT LOCKS

LIFT DOOR LIFTGATE

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TRAVEL RACK 16

DECK COVER

Rear Deck Drain Trough

The rear deck drain trough inner wall is formed by the flange stamped in the upper and lower deck center panels and the rear quarter panel flanges. These panels are welded at the four corners to form a water tight drain.

Sealer Rubbers

The 01 Series deck sealer rubber is extruded with a hollow center.

The 10-70 and 80 Series sealer rubber consists of a sponge rubber core with a dense smooth rubber skin.

The one piece moulded sealers fit in the drain trough and are joined together in the drain trough of the lower deck center panel (Fig. 1).

They are cemented into the drain trough.

The sealer rubber must contact the deck cover inner panel around the entire opening to afford a positive seal when the deck cover is in the closed position. Any irregularities in either the sealer rubber contact area of the deck lid inner panel or the drain trough can cause a water or dust leak into the trunk compartment. The sealer rubber contact may be checked by marking the deck lid inner panel with white chalk marks spaced about one inch apart. When the deck cover is closed these chalk marks will transfer onto the sealer rubber and show the point of contact and also indicate where adjustment is necessary.

Block the drain trough up or down as required to provide a positive deck cover to sealer rubber contact, around the complete opening.

Replacement sealer rubbers are coated with graphite or powder to prevent sticking while in stock.

Removal

Apply a small amount of rubber cement solvent a distance of 10 to 12 inches at a time between the rubber and the drain trough flange to soften the cement. Carefully lift the rubber from the drain trough before the solvent evaporates and the cement resets. If the rubber is torn, be sure to remove all old rubber from the drain trough.

Installation

If a new rubber is to be installed, remove all protective powders (use a cloth dampened with a suitable fast drying solvent). Apply a ⅛ inch ribbon of cement in the drain trough at the bottom outer angle, the full length of the drain trough.

Position one end of the sealer rubber in the drain trough to the left or right of the lock striker and install the rubber into the full length of the trough with a fiber stick or similar tool (Fig. 2). Do not stretch the rubber.

Cut the excess length and cement the ends to provide a neat butt joint.

Maintenance of Sealer Rubbers

Cold weather has a tendency to cause the sealer rubbers to harden. Warm weather sets up a dryness in the lips of the sponge rubber causing them to crack if they are not properly maintained.

These parts are constantly exposed to dust particles that may contain salts, coal, ash or other impurities which, combined with moisture and atmospheric changes, set up a chemical reaction into those dust particles that attack the sponge rubber. In some cases the rubber expels a white chalky substance.

These combined conditions attack the paint on the body as well as the deck cover inner panel.

To prevent unnecessary deterioration of paint and rubbers, brush all foreign materials from the sealer rubbers. Then use a cloth dampened in a suitable solvent to clean all corrosion from the rubbers and the areas which they contact. The rubbers should be treated with a good rubber softener solution. In some cases when the rubber is dry, a second application of rubber softener may be necessary to obtain the desired results.

CAUTION: Do not use graphite, brake fluid, or any wax on sealer rubbers.

WINDSHIELD
REAR WINDOW
WINDSHIELD WIPER

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WINDSHIELD — REAR WINDOW

A one piece curved windshield which consists of two sheets of plate glass laminated together is used on the 01-10-40 and 80 Series.

The 70 Series uses a windshield consisting of an outer layer of plate glass laminated to an inner layer of chemically treated tempered glass. The inner layer will flex and absorb minor impact and, under extreme impact will granulate into fine particles.

The curved rear window is made of one layer of tempered glass which will withstand considerable impact but shatter into small pieces if fractured.

The electrically heated rear window is also one layer tempered glass with two vertical buss bars and horizontal rows of heating elements of a silver bearing ceramic enamel compound baked to the inside surface of the glass.

All Series and models utilize the butyl tape method for installing the windshield, stationary rear window and also the lift gate glass of the 01 hatchback and station wagon. The same procedure for removal, installation and/or sealing is applicable to all.

Windshield Reveal Mouldings

The reveal mouldings consist of a lower right and left, side mouldings right and left and the upper mouldings right and left.

The upper and side mouldings on all series and also the lower moulding of the 01-40 and 70 Series are "L" shaped with a lip edge which engages a barb on the retaining clips (Fig. 1).

The clips are set onto studs which are welded around the windshield opening.

The lower reveal moulding on the 10 and 80 Series is anchored by spring tension wire clips inserted into holes in the cowl top (Fig. 2).

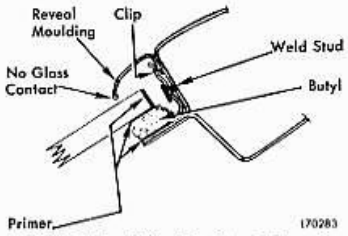

FIGURE 1 — Windshield and Reveal Moulding to Body Upper Assembly

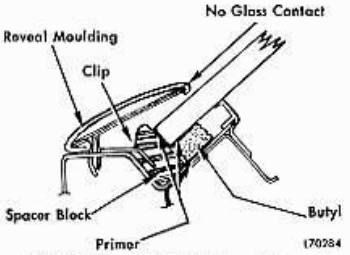

FIGURE 2 — Windshield and Reveal Moulding to Body Lower Assembly

NOTE: Plastic spacers inserted in the mouldings prevents mouldings to glass contact.

Rear Window Reveal Mouldings

The reveal mouldings are "L" shaped with a lip edge which engages a barb on the retaining clips (Fig. 1).

The clips are set onto studs which are welded around the windshield and rear window openings at intervals of 5 to 6 inches starting at the first clip which is 2 inches from each corner.

Removal

Remove the reveal mouldings using Trim Pad Depressor Tool J-2631-01.

Insert the tool between the glass and the moulding parallel with the glass.

Exercise care to prevent denting the moulding.

With a pumping action pry the moulding until the moulding is released from the clips.

Windshield and Rear Window Removal

Cover adjacent areas, interior and exterior, with a protective covering to avoid paint damage and additional clean-up.

As required, remove windshield wiper arms, exterior reveal mouldings, interior finish mouldings and rear view mirror support bracket.

On vehicles equipped with electrically heated rear windows, disconnect the feed wire connection located in the trunk compartment below the rear shelf panel and remove the ground screw located on the right side, under the finish moulding between the window and the rear shelf panel. Tape the wire leads to the inside surface of the glass.

During removal and installation of a glass equipped with defogger grids, protect or use extreme care to prevent damage to any of the grids or buss lines. A scratch through a grid will be an open circuit making the grid inoperative.

Slowly push the glass outward along the top, applying foot pressure until the seal stretches one to two inches.

Have an assistant cut the stretched sheet of rubber seal with a scissors.

Apply pressure and cut the seal around the complete glass.

Use wood spacer blocks to keep the glass separated from the opening as the sealer on the glass will again ad-

INSTRUMENT PANEL AND MOUNTED ASSEMBLIES

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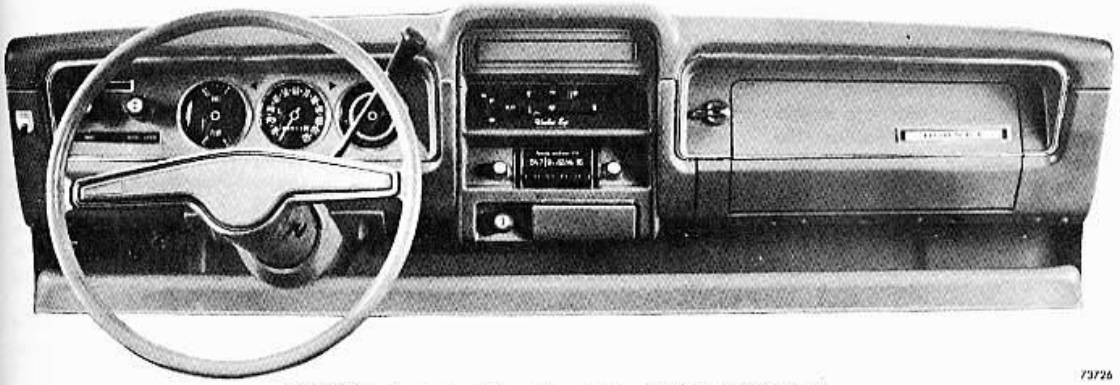

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FIGURE 1 — Instrument Panel Assembly — 01 Series (40 Similar)

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FIGURE 2 — Instrument Panel Assembly — 70 Series

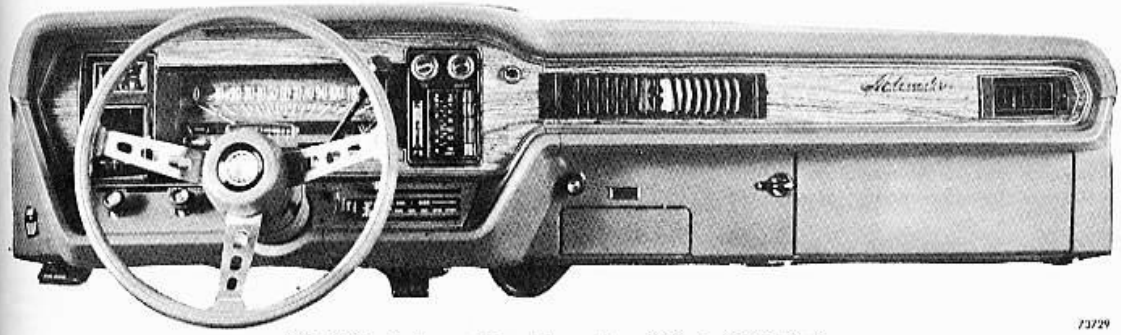

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FIGURE 3 — Instrument Panel Assembly — 80 Series (10 Similar)

SEAT ASSEMBLIES AND ADJUSTERS

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FRONT SEAT ASSEMBLIES

The following types of front seat assemblies are available:

Bench seats with full cushion, non-reclining full back and adjustable headrests.

Bench seats with full cushion, non-reclining split back and adjustable or integral headrests.

NOTE: Four door models utilize a bench seat with a full back and two door models a bench seat with a split back.

Individual reclining seats with adjustable headrests.

Bucket seats with integral headrests. All bucket seats are non-reclining.

All front seat backs used on two door models are equipped with a manually released positive lock to prevent forward tilt.

Seat Back and Bottom Frame

The full seat back is attached, at each side, to the seat bottom frame assembly with a shoulder bolt and pin.

The non-reclining split seat back on Two Door Models is attached with shoulder bolts at the outer pivot, and pivots on a pin in a tubular center or inner post.

The split seat back with solid seat cushion pivots in the center on a pin in the seat back which rides in a bushing of a tubular post welded to the seat bottom frame. The outer arm of the seat back pivots on a stud welded to the lower seat frame.

The individual and bucket seats consist of a right and left seat back frame and spring assembly and a right and left seat bottom frame and spring assembly.

All seat cushion spring assemblies and all seat back springs **except** 10 and 80 Series with individual reclining seats are welded to the seat bottom frame and are not removable. Seat back springs on 10 and 80 Series with reclining seats are not welded to the seat back frame. The seat back spring and pad are one unit held in place to the seat back frame by the seat back upholstery.

Except for bucket seats, all 10 and 80 reclining or non-reclining seat back and bottom frame assemblies contain coil springs.

Except for bucket seats the 01, 40 and 70 seat back and bottom frame assemblies incorporate a formed wire construction.

Front Seat Assembly Removal 01, 40 and 70 Series

Bolts swedged to the front and rear of each seat adjuster extend down through the floor and are anchored with spin lock nuts.

Move the seat assembly to the front.

Remove the nuts with a ½" deep well socket and ratchet from the underside of the car.

On installation, torque the spin lock nuts to 10 Foot Pounds.

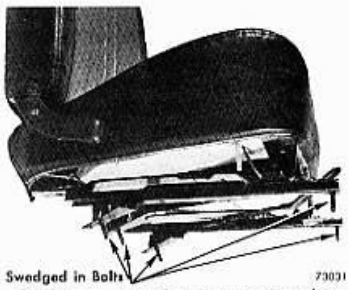

FIGURE 1 — Front Seat Assembly Floor Mounting — 01-40-70 Series

10 and 80 Series

Move the seat assembly to the full forward position on the seat slides to gain access to the seat adjuster rear mounting cap screws inside the car. Move the seat assembly to the rear and remove the front cap screws.

Forward Tilt Seat Back and Positive Lock Reclining Seat Backs

The operating handle of the reclining mechanism also serves as the forward tilt lock release handle. A stop pin on the spring loaded locking release lever engages the stop on the reclining drum. When the operating handle is moved rearward and the seat back pulled forward simultaneously the stop pin bypasses the stop allowing the seat back to tilt forward (Fig. 2). For servicing the tilt lock, follow the procedures outlined for reclining mechanism removal and installation.

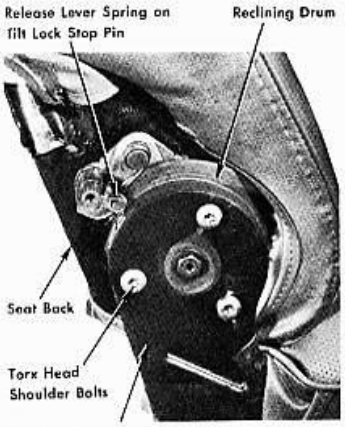

FIGURE 2 — Tilt Lock Mechanism with Reclining Seats

Two Door Non-Reclining Seat 01-40 Series (Except Bucket Seats)

On two door models a spring

DOME LIGHT—HEADLINING VINYL COVERED ROOF— EXTERIOR DECALS

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DOME LIGHT

The Sedan dome light and Station Wagon cargo lights are similar, consisting of the base reflector, bulb, socket with two wires, and the lens.

The dome light is fastened to the roof support, above the front seat back, with two sheet metal screws, while the cargo light is fastened above the tail gate to a support bracket. The light base is attached with sheet metal screws which are visible after the lens is removed.

A double contact single filament bulb is utilized in both lamps.

Lens Removal

The lens is molded nylon with a metallized surface band to simulate the appearance of a chrome bezel.

Three irregular spaced barbed tabs on the lens are inserted into slots in the dome light base to retain it. The lens is removed by pulling it downward or by prying it down with a small screw driver.

To install, align the lens tabs with the proper slots and snap it into place.

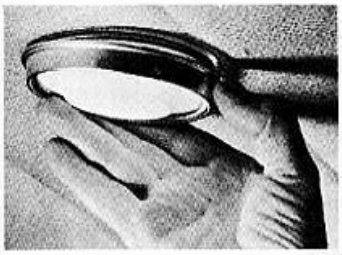

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FIGURE 1 — Removing Dome Light Lens

HEADLINING

The 01 (except 03 and 08) and 40 Series headliner is made of laminated polystyrene backing board with a grained plastic finish coating. This plastic-coated headliner is very rigid, but not contour molded. A series of lines scored into the surface allow it to be shaped to fit the roof panel and provide added strength for self-support.

Insulation pads cemented to the headliner provide sound deadening. These pads are not cemented to the roof panel.

The headlining used in the 03, 08, 10, 70 and 80 Series is a molded fiber glass with excellent sound deadening qualities. The finished surface used on Two Door Sedan, Four Door Sedan and Station Wagon models is a fiber glass cloth, and that used on the Hardtop models is vinyl. The surfaces are colored coordinated to harmonize with various trim combinations.

The headlinings of all models except the 70 Series are retained on the sides by one piece "J" shaped mouldings which extend the entire length of the headlining (Fig. 2). Adhesive is used on all Hardtop models to bond the headlining to the roof between the roof supports.

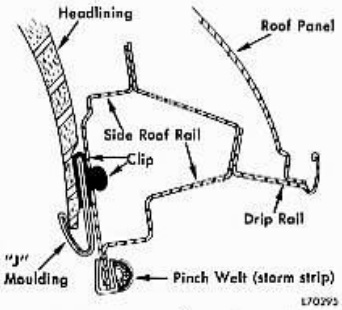

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FIGURE 2 — Headlining Fastening at Side Roof Rails — 01, 10, 40 and 80 Series

The side edges of the 70 Series headlining are retained with a one piece molded headlining retainer crash pad. This serves as a safety pad in addition to retention for the headlining.

Sedan, Hardtop, "Hatchback" and "Sportabout" Models

Sedan, Hardtop, "Hatchback" and "Sportabout" model headlinings are formed into a single panel which extends from the windshield to the rear window and is retained at either end by the upper finish mouldings.

The headlining is retained along the sides by "J" shaped mouldings which in turn are fastened to the side rails with snap-in clips. One-piece mouldings extending the full length of the headlining are used on all Sedan and Hardtop models except the 70 Series which uses a pinchweld flange crash pad for headlining retention (Fig. 3).

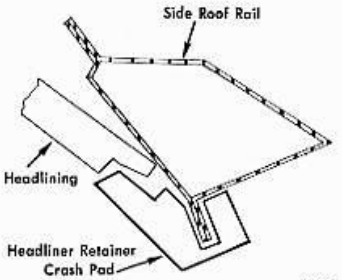

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FIGURE 3 — Headlining Fastening at Side Roof Rails — 70 Series

Station Wagon Models 10-80 Series

The headlining consists of a front and rear section.

The front section extends from the top of the windshield to above the rear seat back. It is retained along the side roof rails, above the doors, with "J" shaped mouldings.

The rear section extends from the joint above the rear seat back to the tail gate opening where it is retained along the rear by the finish moulding. It is retained along the sides, above the rear quarter windows, with "J" mouldings.

A cover moulding, painted to match the headlining, is used at the joint formed by the front and rear headlinings and is retained by four (4) spring steel clips which are fastened to the roof support by spring tension. The ends are inserted into the "J" mouldings or headlining retainers.

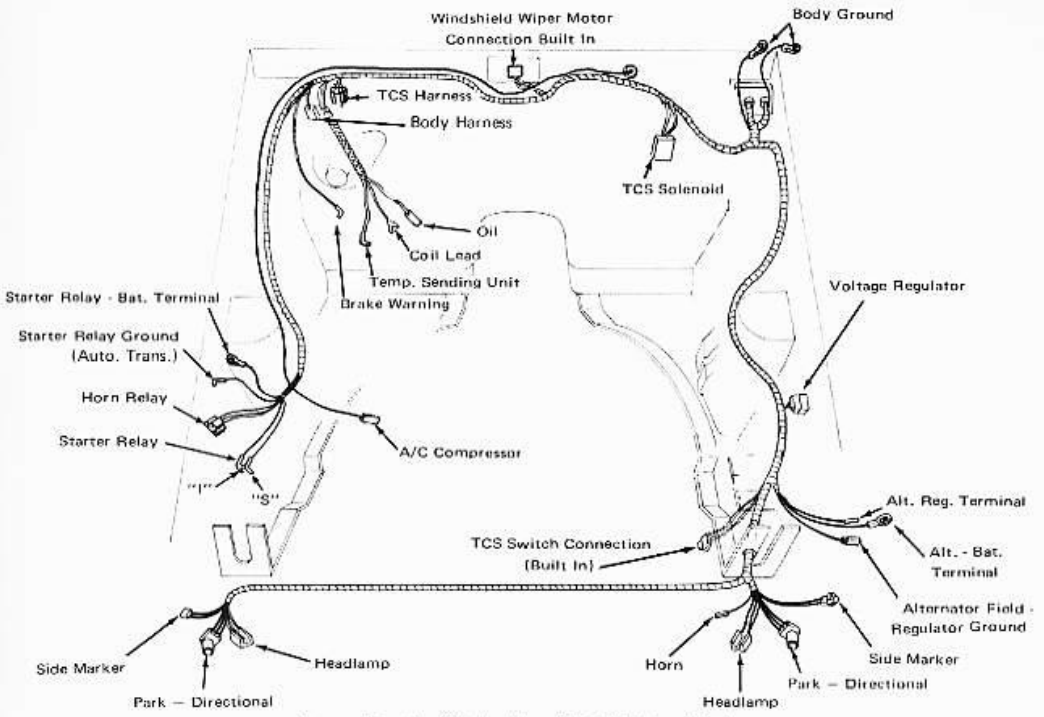
Removal

01 and 40 Series Sedans

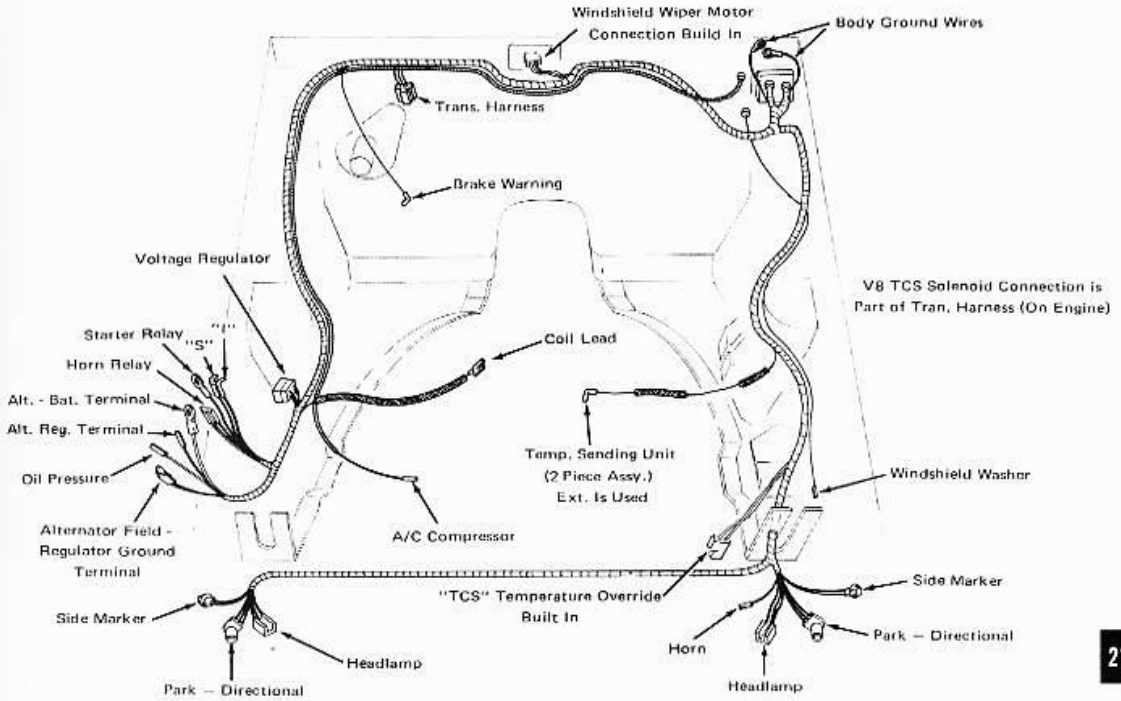
Remove sun visors and top and corner windshield finish mouldings.

Remove shoulder harnesses and

HARNESS ROUTING
01-40 Series



Harness Routing (Under Hood) 01-40 Series 6 Cyl.



Harness Routing (Under Hood) 01 Series V-8